cPCI-7252
PCI-7250/7251
Relay Actuator &
Isolated D/I Cards

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CONTENTS

How to Use This Guide

In the following contents, we use PCI-725X as a convenient for PCI-7250, PCI-7251 and cPCI-7252 if no specifed.   The manual describes how to modify various settings on the PCI-725X cards to meet your requirements. It is divided into five chapters:

- **Chapter 1**, "Introduction", gives an overview of the product features, applications, and specifications.

- **Chapter 2**, "Installation", describes how to install the PCI-725X. The layout is shown, the jumpers setting for input configuration are specified.

- **Chapter 3**, "Programming", describes how to program the digital input and output channels on the PCI-725X.

- **Chapter 4**, "Relay Outputs & Isolation Inputs", gives an overview of PCI-725X's relay outputs and isolation inputs.

- **Chapter 5**, "C/C++ Libraries", describes the DOS and Windows 95 C/C++ Library for operating the PCI-725X.

- **Chapter 6**, "Troubleshooting", describes how to use DOS DEBUG utility to vertify the functionality of PCI-725X.

1

Introduction

The PCI-7250/7251 and cPCI-7252 Relay Actuator and Isolated D/I card is a basic Digital I/O card for PCI bus computer in industrial applications.

This PCI-7250 and PCI-7251 provide 8 relay actuators and 8 opto-isolated digital inputs. From the eight relays, four relays are Form C (R0~R3) and four relays are Form A (R4~R7). The cPCI-7252 provides 8 relay actuators and 16 opto-isolated digital inputs, all relays are Form C type. They are very suitable for ON/OFF control devices.

For the identical non-polarity opto-isolated digital input channels, each of them can be switchable by using RC filter or non-RC filter. All channels are isolated and suitable for collecting digital inputs in noisy environments.

The status of each relay output is reflected by a LED. When the relay is energized, its corresponding LED will turn ON, otherwise it is OFF.

The relay outputs and digital inputs are controlled by two bytes of I/O address. When the corresponding bit is read or written, its output status will be controlled, or its input status be monitored. The I/O signals are via a 37 pin D-type connector that projects through the computer case at the rear of the board.

1.1 Features

The PCI-7250 Relay Actuator and D/I Card provides the following
advanced features:

- 32-bit PCI-Bus, Plug and Play for PCI-7250
- 32-bit ComapctPCI® Bus, Plug and Play for cPCI-7252
- 8 relay actuator outputs
- 8 opto-isolated digital inputs for PCI-7250
- 16 opto-isolated digital inputs for cPCI-7252
- LED indicators to show activated relays
- Jumper selectable AC-filter/non-AC-filter input signals
- On-board relay driving circuits
- On-board digital input signal conditioning circuits

Note: The PCI-7251 can attach to the PCI-7250 card. Each PCI-7251 card provides
another 8 relay output and 8 photo isolated input signals. There are at most
three PCI-7251 cards can be attached on one PCI-7250 card so that the
system can provide 32 relay output signals and 32 photo isolated inputs
signals.

1.2 Applications

- Industrial ON/OFF control
- External high power relay driving, Signal switching
- Laboratory automation
- Industrial automation
- Switch contact status sensing, limit switch monitoring,
- Useful with A/D and D/A cards to implement a data acquisition & control system

1.3 Specifications

♦ Digital input

Input channels	8 for PCI-7250 and PCI-7251 16 for cPCI-7252
Photo-coupler	PC-814
Input current	60 mA max. for isolated input
Input Voltage	3 - 24 VDC (AC 50-1,000Hz)
Input impedance	1.2 KΩ
Threshold Voltage	2.4 VDC
Input mode	Isolation AC-filter/ Non-AC-filter

Withstanding voltage	1,000 VDC

♦ Relay Output

Output Channels	8
Relay Type	8 SPST (Form C)
Contact rating	120V AC/DC , 0.5 A 24V Vdc, 1A
Breakdown Voltage	1000 V AC/DC min..
Release time	8 msec max.
Operate time	8 msec max..
Insulation Resistance	100M Ω min.
Life Expectancy	> 10 million operations at full load
Power Consumption	+12V , 33 mA for each relay , total 0.264 A
Power supply of Relay	+ 5V from the PCI-Bus

♦ General Specifications

Dimensions	147 mm x 95 mm for PCI-7250 141 mm x 106 mm for PCI-7251 160 mm x 100 mm for cPCI-7252
Bus	32-bit PCI bus
I/O port address	Assigned By System BIOS
Temperature	0 ~ 50° C (Operating);
Humidity	0 to 90% non-condensing

♦ Power Consumption

Power Consumption	Note: No relay is energized
PCI-7250	+5V @ 140 mA
PCI-7251	+5V @ 125 mA
cPCI-7252	+5V @ 120 mA

2

Installation

This chapter describes how to install the 725X series products. At first, the contains in the package and unpacking information that you should be careful are described. The jumpers setting for digital input channel configuration (AC-filter or Non-AC-filter) and the signals definitions of the 37-pins connectors are also specified in this chapter.

2.1   What You Have

In addition to this *User's Manual* , the package includes the following items:

- PCI-7250 (or PCI-7251, cPCI-7252) Relay Actuator & Isolated D/I Card
- Manual & Software Utility CD-ROM Disk (for PCI-7250 and cPCI-7252 only)

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 want to ship or store the product in the future.

2.2   Unpacking

Your PCI-7250 card contains sensitive electronic components that can be easily damaged by static electricity.

The card should be done on a grounded anti-static mat. The operator should be wearing an anti-static wristband, grounded at the same point as the anti-static mat.

Inspect the card module carton for obvious damage. Shipping and
handling may cause damage to your module. Be sure there are no
shipping and handing damages on the module before processing.

After opening the card module carton, extract the system module and
place it only on a grounded anti-static surface component side up.

Again inspect the module for damage. Press down on all the socketed
IC's to make sure that they are properly seated. Do this only with the
module place on a firm flat surface.

**Note : DO NOT APPLY POWER TO THE CARD IF IT HAS BEEN
        DAMAGED.**

You are now ready to install your 7250 series products.

2.3   Device Installation for Windows 95

While you first plug PCI-7250 or cPCI-7252 card and enter Windows 95,
the system will detect this device automatically and show the following
dialog box that prompts you to select the device information source.

Choose the default option "*Driver from disk provided by hardware manufacturer*" and then a dialog box is shown to prompt you give the path of installation disk.
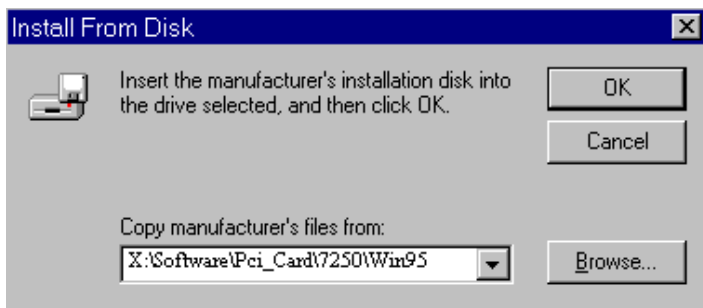
Place ADLink's "Manual & Software Utility" CD into the appropriate CD drive. Type "X:\Win95Inf\7250" (this directory includes PCI-7250 device information file "Pci7250.inf") in the input field (**X indicates the CD ROM drive**) and then click OK. The system will start the installation of PCI-7250.

For cPCI-7252, please get the software driver from "X:\Win95Inf\7252" subdirectory.

2.4   PCB Layout

2.4.1. PCI-7250' PCB Layout
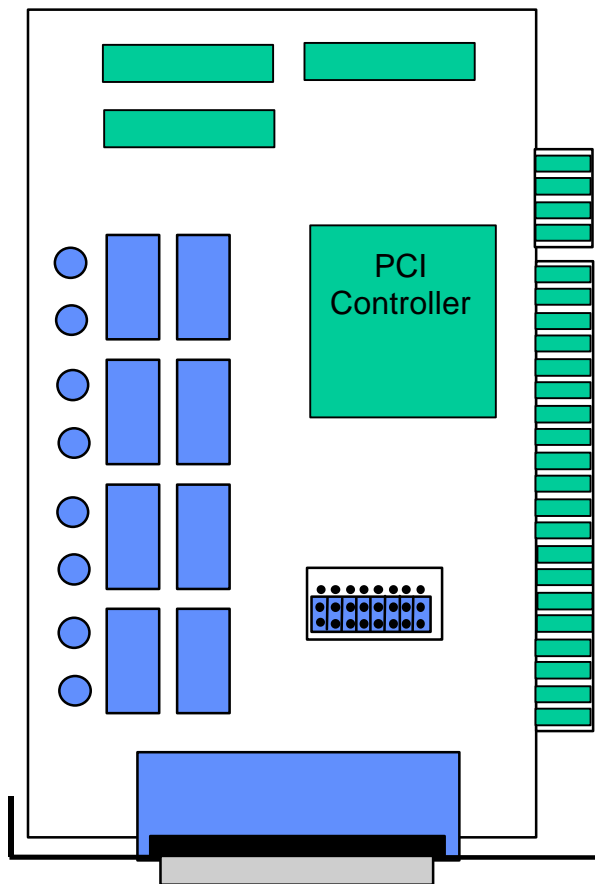
Figure 2.1 PCI-7250 Layout

2.4.2. cPCI-7252' PCB Layout
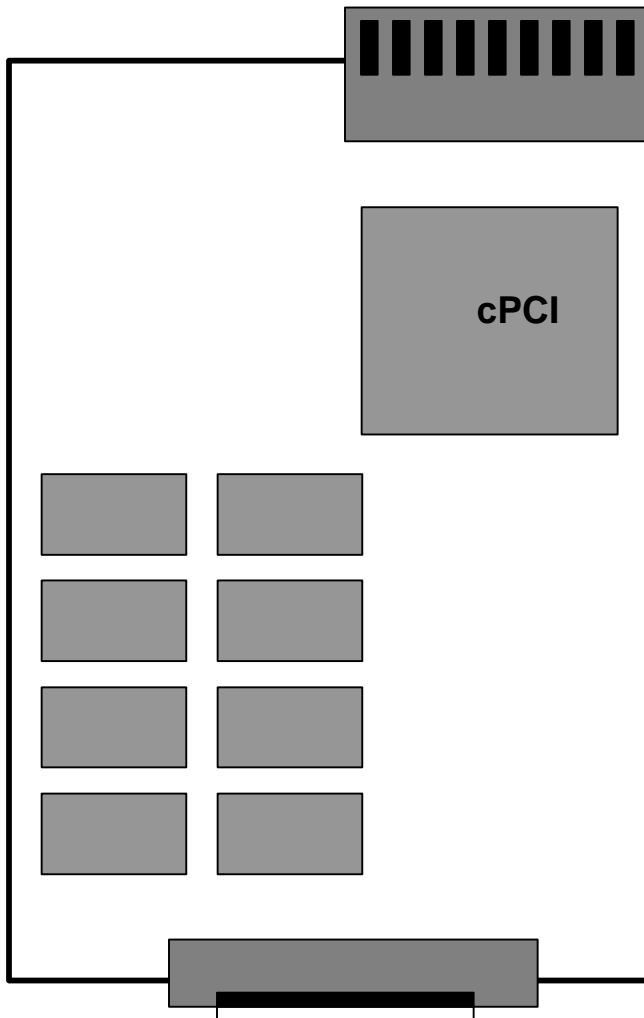
2.5 Input Signal Setting

(This section is for PCI-7250 and PCI-7251 only.)
For PCI7250 and PCI-7251, there are 8 jumpers (JP1 to JP8) associated with each digital input channel for configuring the channel as *AC-Filter* or *Non-AC-Filter* input. Each digital input channel and their corresponding jumper are shown in the following Table 2.1. Note

JUMPER	INPUT SIGNAL
JP1	DI0
JP2	DI1
JP3	DI2
JP4	DI3
JP5	DI4
JP6	DI5
JP7	DI6
JP8	DI7

Table 2.1 The jumper and DI channels

The default setting of the input signal selection is **Non-AC-Filter** (DC signal input), which is shown as below :

JP1

DC   AC
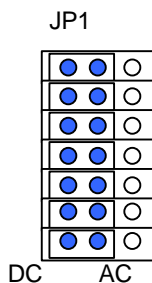
Input Signal Selection	Non-AC-Filter (DC Signal)	AC-Filter (AC Signal)
Jumper JP1 ~ JP8	2-3	1-2

Table 2.2 Input Signal Selection Jumper Setting

2.6 Connector Pin Assignments

2.6.1 PCI-7250/51 Pin assignments

The PCI-7250 card comes equipped with a 37-pin D type connector
(CN1) accessible from the rear of the card (Ref. Fig 2.1). The pin
assignment of the D type connector is described by Figure 2.2.

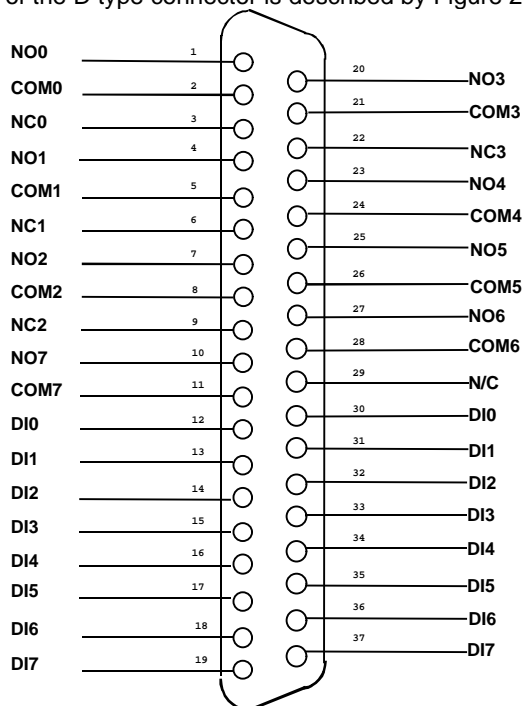|				
NO0	1		20	NO3
COM0	2		21	COM3
NC0	3		22	NC3
NO1	4		23	NO4
COM1	5		24	COM4
NC1	6		25	NO5
NO2	7		26	COM5
COM2	8		27	NO6
NC2	9		28	COM6
NO7	10		29	N/C
COM7	11		30	DI0
DI0	12		31	DI1
DI1	13		32	DI2
DI2	14		33	DI3
DI3	15		34	DI4
DI4	16		35	DI5
DI5	17		36	DI6
DI6	18		37	DI7
DI7	19			

Figure 2.2 Pin Assignment of PCI-7250 and PCI-7251 CN1

Legend :
1. **DIn** - **digital input low, channel n (input signal Is not polarity sensitive)**
2. **NC n** - **normal close pin of relay n**
3. **NO n** - **normal open pin of relay n**
4. **COM n** - **common pin of relay n**
5. **N/C** - **No Connection**

2.6.2 cPCI-7252 Pin assignments

IGND	1	26	IGND
DI8	2	27	DI12
DI9	3	28	DI13
DI10	4	29	DI14
DI11	5	30	DI15
DI0L	6	31	DI4H
DI0H	7	32	DI4L
DI1L	8	33	DI5H
DI1H	9	34	DI5L
DI2L	10	35	DI6H
DI2H	11	36	DI6L
DI3L	12	37	DI7H
DI3H	13	38	DI7L
NO0	14	39	NO4
NO1	15	40	NO5
NC0	16	41	NC4
NC1	17	42	NC5
COM0	18	43	COM4
COM1	19	44	COM5
NO2	20	45	NO6
NO3	21	46	NO7
NC2	22	47	NC6
NC3	23	48	NC7
COM2	24	49	COM6
COM3	25	50	COM7

**Figure 2.3 Pin Assignment of cPCI-7252 CN1**

Legend :
1. DIn   -digital input channel n
2. IGND   - ground of DIn signals
2. DInH   -digital input channel n with positive polarity
3. DInL   -digital input channel n with negative polarity
5. NC n   -normal close pin of relay n
6. NO n   -normal open pin of relay n
7. COM n -common pin of relay n

2.7   PCI-7250 and PCI-7251 Connection

There are 8 relay output and 8 isolation input on both PCI-7250 and PCI-7251. The PCI-7251 is used as expansion of the PCI-7250. The operations of PCI-7251 are the same as which in PCI-7250. There are at most 3 PCI-7251 expansion boards to attach on the PCI-7250. Therefore, the PCI-7250 can control up to 32 relays and sense 32 isolation signals. Figure 2.3 shows the block diagram of connecting PCI-7250 and PCI-7251.

In addition, the existance of the PCI-7251 expansion boards can be detected. Refer to the section 4.x. for using the function library.
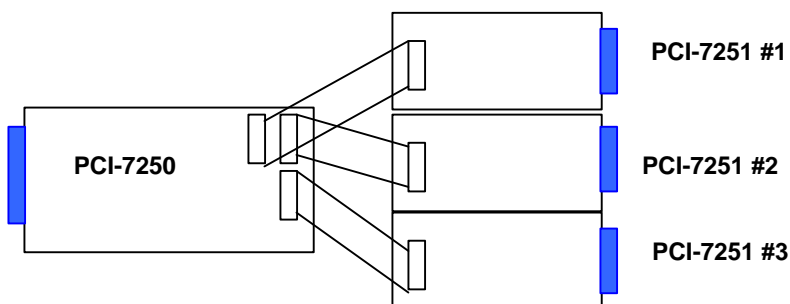
3

Register Format

In this chapter, a primitive digital I/O operations of 725x prodcuts will be specified. The I/O operations are also included.

3.1 I/O Port Base Address

The PCI-7250 or cPCI-7252 functions as a 32-bit PCI target device to any master on the PCI bus. There are three types of registers on the PCI-725X: PCI Configuration Registers (PCR), Local Configuration Registers (LCR) and PCI-725X registers.

The PCR which conforms the PCI-bus specifications is initialized and controlled by the system plug & play PCI BIOS. Please refer to the PCI BIOS specification to understand how to get information from the PCRs.

The LCR is specified by the PCI bus controller PLX-9050. It is not necessary for users to understand the details of the LCR if you use the software library. The base address of the LCR is assigned by the PCI p&p BIOS. The assigned address is located at offset 14h of PCR. Please refer to the PCI-9050's data sheet for the detail operation of the LCR and also the register format of the PCR.

The PCI-725X registers are shown in the Table 3.1. The base address of the PCI-725X registers is also assigned by the PCI p&p BIOS. The assigned base address is located at offset 18h of PCR. Therefore, users can read the PCR to know the base address by using the BIOS function call. Note that the PCI-725X registers are all 16 bits. The users can access these registers by 16 bits I/O instructions.

3.2   Control and Status Registers Map

The control of the relays and status of the isolation input is by means
of registers. The PCI-7250 and three PCI-7251 expansion boards
occupy 8 I/O address. Table 3.1 shows the registers' description and
offset address relative to the base address. If the expansion PCI-7251
boards is not installed, the corresponding registers are not used and
meanningless.

Offset	Write	Read	Board
0	Relay Output	Isolation Input	PCI-7250
1	not used	Output readback	
2	Relay Output	Isolation Input	PCI-7251 #1
3	not used	Output readback	
4	Relay Output	Isolation Input	PCI-7251 #2
5	not used	Output readback	
6	Relay Output	Isolation Input	PCI-7251 #3
7	not used	Output readback	

	Write	Read	Board
0	Relay Output	Isolation Input	
1	not used	not used	cPCI-7252
2	not used	Output readback	

Table 3.1 The register offset and the functions

3.3   Relay Output and Readback Registers

There are 8 relays on each PCI-7250 / 7251 and cPCI-7252 board.
Each relay are controlled by one bits of the control register.   The bit
value '0' means the relay is not excited. The normal open signal line is
'open' with the common line and the normal closed signal line is
connected with the common line. The bit value '1' means the relay is
excited and the normal open signal line is now closed, and vise versa.

The initial bits values of the control register are all '0'. And the status
of the relay can be readback from the readback register.   If the relay is
open, the corresponding bit value is '0'. If the relay is closed, the bit
value is '1'.

Refer to section 4.x and 4.x for the relative function library.

Data Format of Relay Output and Readback Status Registers:

Bit	7	6	5	4	3	2	1	0
Relay Output	DO7	DO6	DO5	DO4	DO3	DO2	DO1	DO0
Output Readback	RB7	RB6	RB5	RB4	RB3	RB2	RB1	RB0

3.4   Isolation Input Registers

There are 8 isolation input channels on each PCI-7250 / 7251 board. The status of the 8 channels can be read from the isolation input register. Each bit is corresponding to each channel.   As the DI status are controlled by one bits of the control register.   The bit value "1" means input voltage is high and "0" menas input voltage is low.

Data Format :
Relay Output :

Bit	7	6	5	4	3	2	1	0
Iso. Input	DI7	DI6	DI5	DI4	DI3	DI2	DI1	DI0
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**
Iso. Input	DI15	DI14	DI13	DI12	DI11	DI10	DI9	DI8

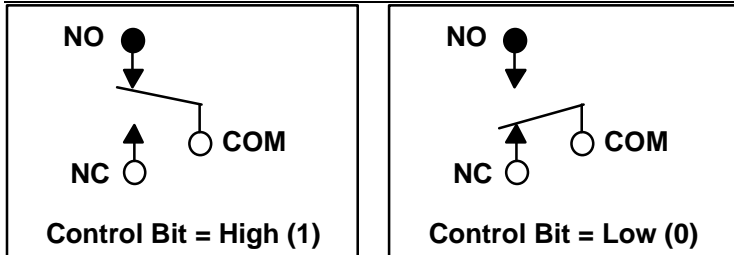(Note: bit#8~15 is for cPCI-7252 only)

4

Operation Theorem

4.1 Using Relay Output

The PCI-7250 contains two types of relay : Form C and Form A. The relay R0 ~ R3 are form C relays, and R4 ~ R7 are plain form A type. Note that the cPCI-7252 contains Form C relay only. The difference between these two types of relay are :

1. Form C Relay : (R0 ~ R3)

Form C relay has three contacts : NC (Normal Close), NO (Normal Open), and COM (Common). The CM post, located at the middle, can make contact either NO post or NC post. When the control bit is high (1), the COM post and NO post are contacted. If the control bit is low (0), the COM post and NC post make contact.

In normal power-up and reset, the relay is in *low* status.

2. Form A Relay : (R4 ~ R7)

| NO ● | NO ● |
| COM | COM |
| Control Bit = High (1) | Control Bit = Low (0) |

Form A relay only has two contacts : NC (Normal Close) and COM (Common). The COM post can make contact either NO post or not contact NO post. When the control bit is high (1), the COM post and NO post are contacted. If the control bit is low (0), the COM post and NO post does not make contact.
In normal power-up and reset, the relay is in *low* status.

The relay output contacts are rated for a maximum of 0.5A at 120VAC (resistive), 1A 24VDC, or 0.3A 60VDC. You should reduce these ratings for inductive loads. For more detailed information of relay contact, please refer Appendix B.

4.2 Using Isolated Input

The PCI-7250 (or PCI-7251) contains 8 identical opto-isolated control input channels. The circuit diagram of the isolated input channel is shown.
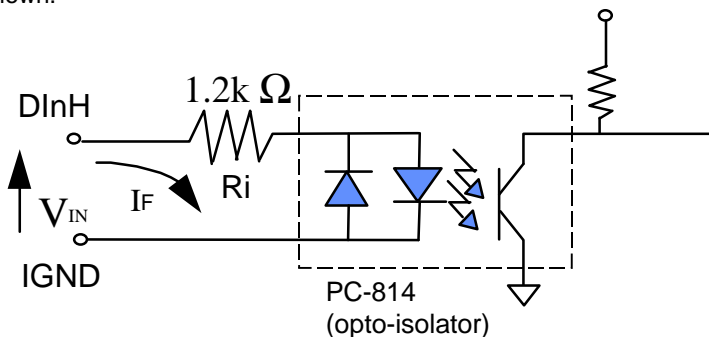
The digital input is first routed through a photo-coupler (PC-814), so that the connection are not polarity sensitive whether used on AC or

DC voltage.

The cPCI-7252 contains 16 identical opto-isolated control input channels. The circuit diagram of the isolated input signales of channel number 8~15 are the same as which in PCI-7250. However, the input signals for channel number 0~7 is differential input which is shown in the following diagram.

PC-814
(opto-isolator)
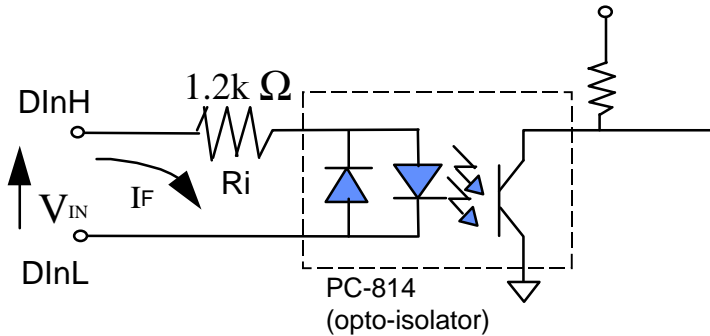
In addition, a single-pole filter with a time constant about 5ms is used to filter when the AC inputs passed through.

The normal input voltage range for high state is 3 to 24VAC or DC. The normal input range can be extended by changing the resister (Ri) to limit the current (I_F) through the PC-814 (opto-isolator to about 10mA . The exact resister value to replace the original resister Ri (1.2K Ω) can be calculated by the following formula.

$$Vin = I_F \times Ri$$

$$Pw = Vin \times I_F$$

For example, if the input voltage is 110V, then the Ri should be replace by

Ri = 110 (V) / 0.01 (A) = 11 KΩ
Pw = 110 (V) X 0.01 (A) = 1.1 W

5

C/C++ Libraries

In this chapter, the PCI-7250's software drivers : C/C++ language libraries for DOS and Windows 95 are described.

5.1 Installation

5.1.1   Installation

The PCI-7250's Software Library supplied with PCI-7250 includes a utility software, C-language library, DLL libraries and some demonstration programs which can help you reduce programming work.

♦   **MS-DOS Software Installation**

The procedures should be followed as :

1. Turn your PC's power switch on

2. Put the ADLink's "Manual & Software Utility" CD into the appropriate CD driver.

3. Type the commands(X indicates the CD ROM drive):

> X:\> **CD NuDAQPCI\7250\DOS**
>
> X:\ NuDAQPCI\7250\DOS> **SETUP**

**4.** An installation completed message will be shown on the screen

After installation, all the files *of PCI-7250 Library & Utility for DOS* are stored in C:\ADLink\7250\DOS directory.

♦ **Windows 95 Software Installation**

1. Turn your PC's power switch on and enter Windows 95

2. Put the ADLink's "Manual & Software Utility" CD into the appropriate CD driver.

3. If Windows 95 is loaded, choose Run from the Start menu.

4. For PCI-7250/7251, please type **X:\NuDAQPCI\7250\Win95\Setup.exe** in the Run dialog box. (X indicates the CD ROM driver).

5. For cPCI-7252, please type **X:\NuIPC\7252\Win95\Setup.exe** in the Run dialog box. (X indicates the CD ROM driver).

Setup first displays a Welcome dialog box. Please click Next button to go on installation.

After a welcome dialog box, Setup prompts the following dialog box for you to specify the destination directory. The default path is C:\ADLink\7250\W95. If you want to install *PCI-7250/51 DLL for Windows 95* in another directory, please click Browse button to change the destination directory.
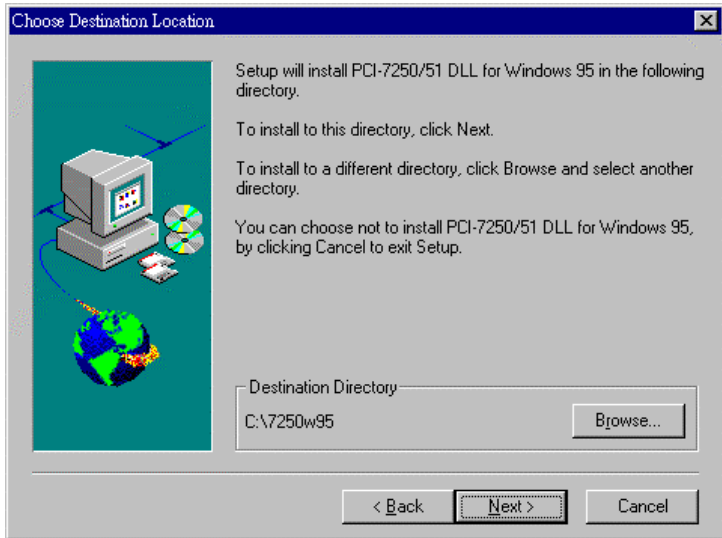
Then you can click Next to begin installing *PCI-7250/51 DLL for Windows 95*.

After you complete the installation of PCI-7250/51 Software, PCI-7250's DLL (7250.DLL) is copied to Windows System directory (default is C:\WINDOWS\SYSTEM for Win-95) and the driver file PCIW95.VXD is also copied to the appropriate directory.

5.2 Running Testing Utility (7250UTIL.EXE)

After finishing the DOS installation, you can execute the utility by typing as follows :

C> cd \ADLink\7250\DOS\UTIL

(or "cd \ADLink \7252\DOS\util" for cPCI-7252.)

C> 7250UTIL

the following diagram will be displayed on you screen. You can test the functionality of digital input and output.

5.3 Software Driver Naming Convention

The functions of PCI-725X software drivers are using full-names to represent the functions' real meaning. The naming convention rules are :

In DOS Environment :
_{hardware_model}_{action_name}. e.g. **_725X_Initial** ().
 (where "725X" is "7250" for PCI-7250 and "7252" for cPCI-7252.)

In order to recognize the difference between DOS library and Windows 95 library, A capital "**W**" is put on the head of each function name of the Windows 95 DLL driver. e.g. **W_7250_Initial** ()

The detailed description of each function are specified in the following sections.

5.4 _7250_Initial/_7252_Initial

@ Description

The PCI-7250 and cPCI-7252 cards are initialized according to the card number.   Because the PCI-7250 is PCI bus architecture and meets the plug and play design, the *IRQ* and *base_address* (pass-through address) are assigned by system BIOS directly.   Every PCI-7250 card has to be initialized by this function before calling other functions.

> **Note :** Because configuration of PCI cards are handled by the system, there is no jumpers or IRQ selection on the PCI boards that need to be set up by the users.

@ Syntax

C/C++ (DOS, Windows 95)

U16 W_7250_Initial (U16 *existCards, PCI_INFO *pciInfo)
U16 W_7252_Initial (U16 *existCards, PCI_INFO *pciInfo)

Visual Basic (Windows 95)

W_7250_Initial (existCards As Integer, pciInfo As PCI_INFO) As Integer
W_7252_Initial (existCards As Integer, pciInfo As PCI_INFO) As Integer

@ Argument

existCards : The number of installed PCI-7250 cards. The returned value shows how many PCI-7248 cards are installed in your system.

pciinfo: It is a structure to memorize the PCI bus plug and play initiallization information which is decided by p&p BIOS.   The PCI_INFO structure is defined in ACL_PCI.H.   The base I/O address and the interrupt channel number is stored in pciinfo which is for reference.

@ Return Code

ERR_NoError, ERR_PCIBiosNotExist

5.5 _7250_DI, _7252_DI

@ Description

This function is used to read data from digital input port. There are 8-bit digital inputs on the PCI-7250 or PCI-7251 extended board. You can get all 32 input data from _7250_DI by using this function.

@ Syntax

C/C++ (DOS)

U16 _7250_DI (U16 cardNo, U16 diPortNo, U16 *diData)
U16 _7252_DI (U16 cardNo, U16 *diData)

C/C++ (Windows 95)

U16 W_7250_DI (U16 cardNo, U16 diPortNo, U16 *diData)
U16 W_7252_DI (U16 cardNo, U16 *diData)

Visual Basic (Windows 95)

W_7250_DI (ByVal cardNo As Integer, ByVal diPortNo As
    Integer, diData As Integer) As Integer
W_7252_DI (ByVal cardNo As Integer, diData As Integer) As
    Integer

@ Argument

cardNo :   card number to select borad
diPortNo :   Digital Input Channel No, the constant is
                (Note: This argument is not necessary for cPCI-7252)
                DI_PORT0   0x00   Access the 8 Digital Input of PCI-7250
                DI_PORT1   0x01   Access the 8 Digital Input of
                                     Expansion Board PCI-7251#1
                DI_PORT2   0x02   Access the 8 Digital Input of
                                     Expansion Board PCI-7251#2
                DI_PORT3   0x03   Access the 8 Digital Input of
                                     Expansion Board PCI-7251#3
diData :   return 8-bit value from digital port.

@ Return Code

ERR_NoError
ERR_BoardNoInit

5.6 _7250_DO, _7252_DO

@ Description

This function is used to write data to digital output port which can energized RELAY ON/OFF. There are 8 digital outputs on the PCI-7250 or PCI-7251 extended board. You can control all 32 RELAYs through _7250_DO by using this function.

@ Syntax

C/C++ (DOS)

U16 _7250_DO (U16 cardNo, U16 doPortNo, U16 doData)
U16 _7252_DO (U16 cardNo, U16 doData)

C/C++ (Windows 95)

U16 W_7250_DO (U16 cardNo, U16 doPortNo, U16 doData)
U16 W_7252_DO (U16 cardNo, U16 doData)

Visual Basic (Windows 95)

W_7250_DO (ByVal cardNo As Integer, ByVal doPortNo As
　　　Integer, ByVal doData As Integer) As Integer
W_7252_DO (ByVal cardNo As Integer, ByVal doData As
　　　Integer) As Integer

@ Argument

cardNo : card number to select borad

doChannelNo : Digital Output Channel No, the constant is

(Note: This argument is not necessary for cPCI-7252)

DI_PORT0	0x00	Access the 8 Digital Input of PCI-7250
DI_PORT1	0x01	Access the 8 Digital Input of Expansion Board PCI-7251#1
DI_PORT2	0x02	Access the 8 Digital Input of Expansion Board PCI-7251#2
DI_PORT3	0x03	Access the 8 Digital Input of Expansion Board PCI-7251#3

doData : value will be written to digital output port

@ Return Code

ERR_NoError, ERR_BoardNoInit

5.7 _7250_DO_Read_Back, _7252_DO_ReadRelay

@ Description

This function is used to read-back data from digital output port which is control by 725X_DO function. There are 8-bit digital outputs on the PCI-7250, cPCI-7252, or PCI-7251 extended board. You can get back all RELAYs status (ON or OFF) by using this function.

@ Syntax

C/C++ (DOS)

U16 _7250_DO_Read_Back (U16 cardNo, U16 doChannelNo, U8 *doReadBackData)

U16 _7252_DO_ReadRelay (U16 cardNo, U16 doReadBackData)

C/C++ (Windows 95)

U16 W_7250_DO_Read_Back (U16 cardNo, U16 doChannelNo, U16 *doReadBackData)

U16 W_7252_DO_ReadRelay (U16 cardNo, U16 *doReadBackData)

Visual Basic (Windows 95)

W_7250_DO_Read_Back (ByVal cardNo As Integer, ByVal doChannelNo As Integer, doReadBackData As Integer) As Integer

W_7252_DO_ReadRelay (ByVal cardNo As Integer, doReadBackData As Integer) As Integer

@ Argument

cardNo :   card number to select borad

doChannelNo : Digital Output Channel No, the constant is
            (Note: This argument is not necessary for cPCI-7252)
            DI_PORT0   0x00   Access the 8 Digital Input of PCI-7250
            DI_PORT1   0x01   Access the 8 Digital Input of Expansion Board PCI-7251#1
            DI_PORT2   0x02   Access the 8 Digital Input of Expansion Board PCI-7251#2
            DI_PORT3   0x03   Access the 8 Digital Input of Expansion Board PCI-7251#3

diReadBackData : value read back from digital output port

@ Return Code

ERR_NoError, ERR_BoardNoInit

5.8 _7251_Check_Exist

@ Description
This function is used to check the exist of PCI-7251 expanded board.
For normal configuration, each PCI-7250 can be connected with three
expanded PCI-7251 boards. This function can be used to check if each
of the PCI-7251 is existed or not.

@ Syntax

C/C++ (DOS, Windows 95)
U16 _7251_Check_Exist (U16 cardNo, U16
        extnesionBoardNo)

Visual Basic (Windows 95)
 W_7251_Check_Exist (ByVal cardNo As Integer, ByVal
        extensionBoardNo As Integer) As Integer

@ Argument
cardNo :   card number to select borad
existBoardNo : Extension PCI-7251 No.
          PCI_7251_EX1 0x01 PCI-7251 Board #1
          PCI_7251_EX2 0x02 PCI-7251 Board #2
          PCI_7251_EX3 0x03 PCI-7251 Board #3

@ Return Code
  PCI_7251_EXIST   1
  PCI_7251_NOT_EXIST   0

6

Troubleshooting

If your PCI-7250 can not work properly, use the information in this chapter to isolated the problem. You can use the DOS debug program to verify the functionality of your PCI-7250 card. The verification procedures are as follows.

Note : Before doing the following procedures, please inspect your PCI-7250 is not damaged and your computer system is proper operation.

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1. Plug your PCI-7250 into your PCI slot, and turn the power on.
2. Make sure the base address, which is assigned by system BIOS, is shown when the system is booted up, such as base address is Hex 6000
3. In DOS environment, execute DOS DEBUG utility
    C> DEBUG <cr>

4. Using the following instructions to evaluate PCI-7250's I/O functions.
    - O 6000 FF   ' All relay are energized and all LEDs will be 'turn on
    - O 6000 00   ' All relay are OFF and all LEDs will be turn off

Prepare some input signals and connection with your PCI-7250 card, and check its input status.

    - I 6000   ' the input status will be read

If you get any incorrect results, such as the LEDs does not turn on or off, or the input status does not match with your input signals. Please contact your agent for service.


Appendix A. Relay Contact Protection Circuits

The contacts are the most important elements of relay constructions, Contact performance conspicuously influenced by contact material, and voltage and current values applied to the contacts.

Another important issue is contact protection, a right contact protection circuit can suppress the counter emf to a low level. However, note that incorrect use will result in an adverse effect. Typical contact protection circuits are given below :

1. RC Circuit
   This circuit is suitable for DC application. If the load is a timer, leakage current flows through the RC circuit causing faulting operation.
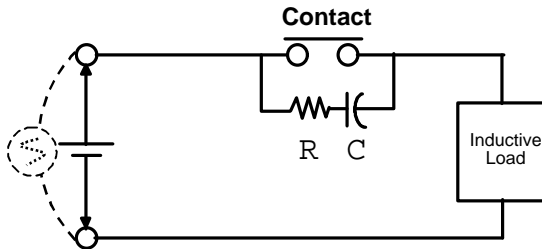
The below circuit is suitable for both AC and DC applications. If the load is a relay or solenoid, the release time lengthens. Effective when connected to both contacts if the power supply voltage is 24V or 48V and the voltage cross the load is 100 to 200V.
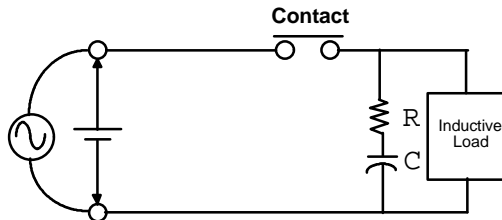
Device Selection :
As a guide in selecting R and C,
R : 0.5 to 1 Ω per 1V contact voltage
C : 0.5 to 1 μF per 1A contact current
Value vary depending on the properties of the capacity C acts to suppress the discharge the moment the contacts open. Resistor R acts to limit the current when the power is turned on the next time. Test to confirm. Use a capacitor with a breakdown voltage of 200 to 300V. Use AC type capacitors (non-polarized) for AC circuits.

2. Diode Circuit

This circuit is suitable for DC application. The diode connected in parallel causes the energy stored in the coil to flow to the coil in the form of current and dissipates it as joule heat at the resistance component of the inductive load. This circuit further delays the release time compared to the RC circuit.
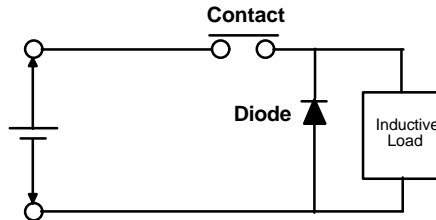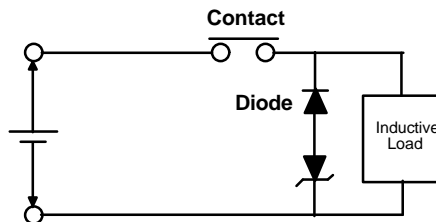

Device Selection :
Use a diode with a reverse breakdown voltage at least 10 times the circuit voltage and a forward current at least as large as the load current. In electronic circuits where the circuit voltages reverse breakdown voltage of above 2 to 3 times the power supply voltage.

3. Diode & Zener diode Circuit

This circuit is also suitable for DC application. Effective when the release time i the diode circuit is too long.

Device Selection :
Use a zener diode with a zener voltage about the same as the power supply voltage.

4. Varistor Circuit
This circuit is also suitable for both AC & DC applications. Using the stable voltage characteristics of the varistor, this circuit prevents excessively high voltages from being applied across the contacts. This circuit also slightly delays the release time. Effective when connected to both contacts of the power supply voltage is 24 or 48V and the voltage across the load is 100 to 200 V.
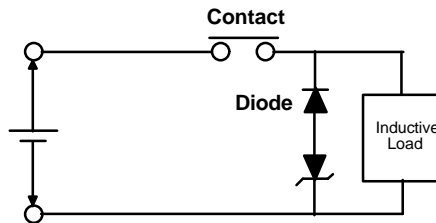
Product Warranty/Service

Seller warrants that equipment furnished will be free form defects in material and workmanship for a period of one year from the confirmed date of purchase of the original buyer and that upon written notice of any such defect, Seller will, at its option, repair or replace the defective item under the terms of this warranty, subject to the provisions and specific exclusions listed herein.

This warranty shall not apply to equipment that has been previously repaired or altered outside our plant in any way as to, in the judgment of the manufacturer, affect its reliability. Nor will it apply if the equipment has been used in a manner exceeding its specifications or if the serial number has been removed.

Seller does not assume any liability for consequential damages as a result from our products uses, and in any event our liability shall not exceed the original selling price of the equipment.

The equipment warranty shall constitute the sole and exclusive remedy of any Buyer of Seller equipment and the sole and exclusive liability of the Seller, its successors or assigns, in connection with equipment purchased and in lieu of all other warranties expressed implied or statutory, including, but not limited to, any implied warranty of merchant ability or fitness and all other obligations or liabilities of seller, its successors or assigns.

The equipment must be returned postage-prepaid. Package it securely and insure it. You will be charged for parts and labor if you lack proof of date of purchase, or if the warranty period is expired.