PCI2362

User's Manual

Beijing ART Technology Development Co., Ltd.

Contents

Chapter 1 Overview

Unpacking Checklist

Check the shipping carton for any damage. If the shipping carton and contents are damaged, notify the local dealer or sales for a replacement. Retain the shipping carton and packing material for inspection by the dealer.
Check for the following items in the package. If there are any missing items, contact your local dealer or sales.

- PCI2362 Data Acquisition Board
- ART Disk
  a) user's manual (pdf)
  b) drive
  c) catalog
- Warranty Card

FEATURES

Digital Input/Output

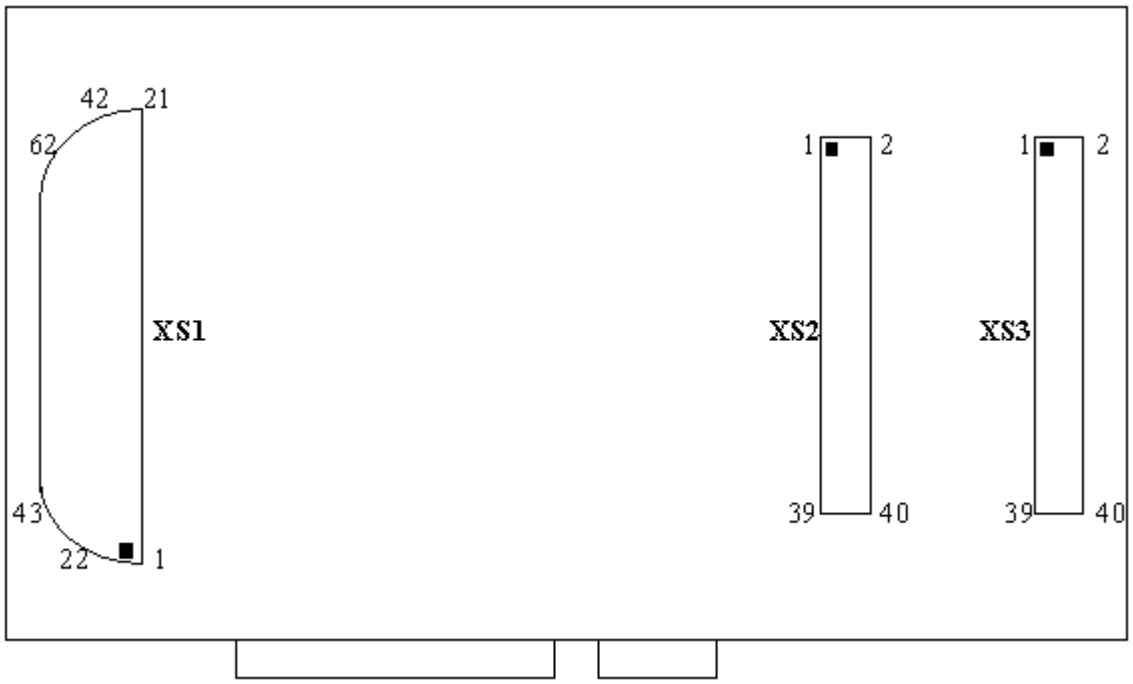
- 48-ch multiplex DI/DO, 24-ch digital input, 24-ch digital output
- Software Control: can be configured the 72-ch(max) digital input, 72-ch (max) digital output
- Electric Standard: TTL, DTL compatible
- The maximum switching frequency of input and output signals is 10M (square wave)

Counter/Timer

- 3-ch counter/timer
- Software to set each channel's CLK clock source: internal 10M, external input or to cascade use
- Software to set each channel's GATE signal: low level, high level, external in-phase input or external inverse-phase input
- The OUT of 8253 can be used as trigger interrupt
- TTL, DTL compatible

Chapter 2 Components Layout Diagram and a Brief Description

2.1 The Main Component Layout Diagram



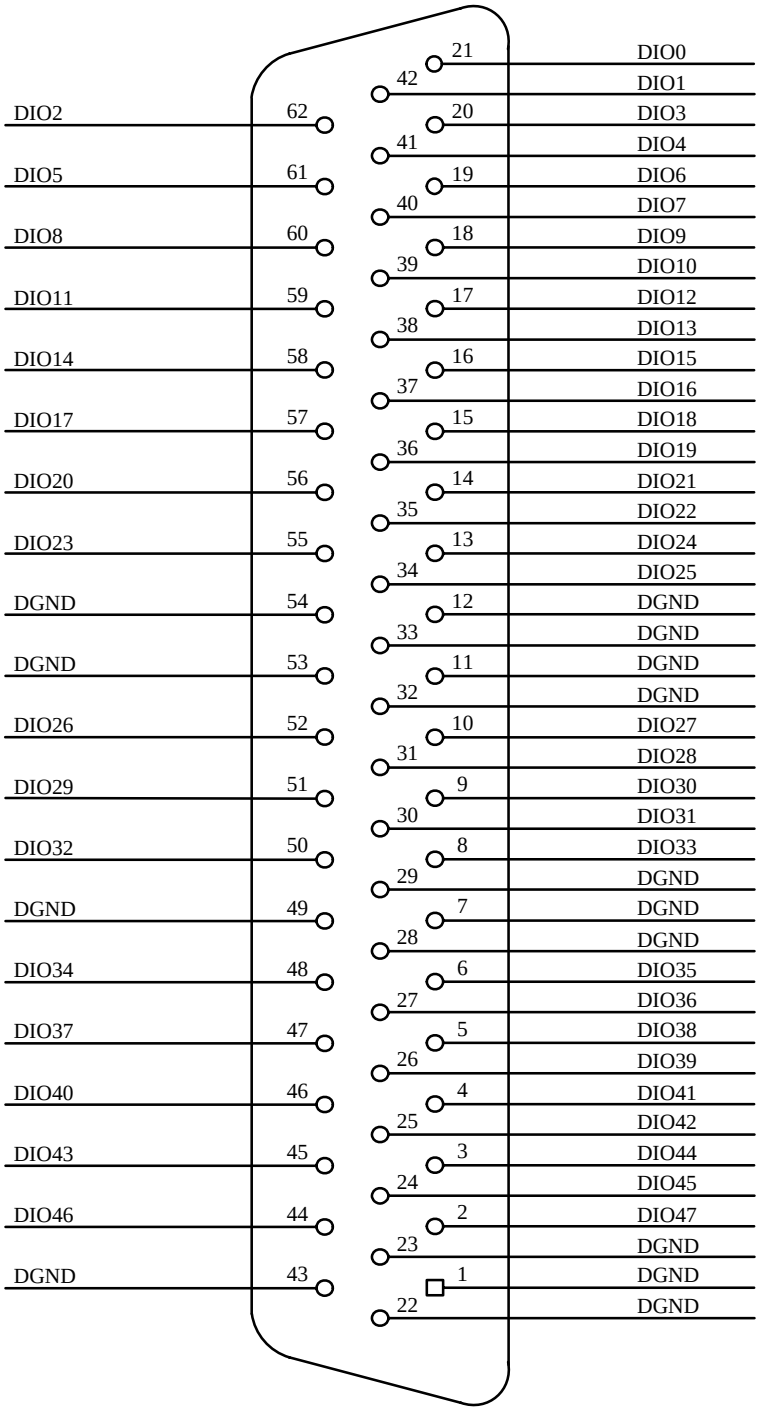
XS1: 48-ch multiplex DI/DO socket

XS2: 24-ch digital output (DO48~DO71) and 8-ch digital input (DI72~DI79)

XS3: 16-ch digital output (DI80~DI95) and 3-ch counter

2.2 Signal Input and Output Connectors

2.2.1 XS1 Connector



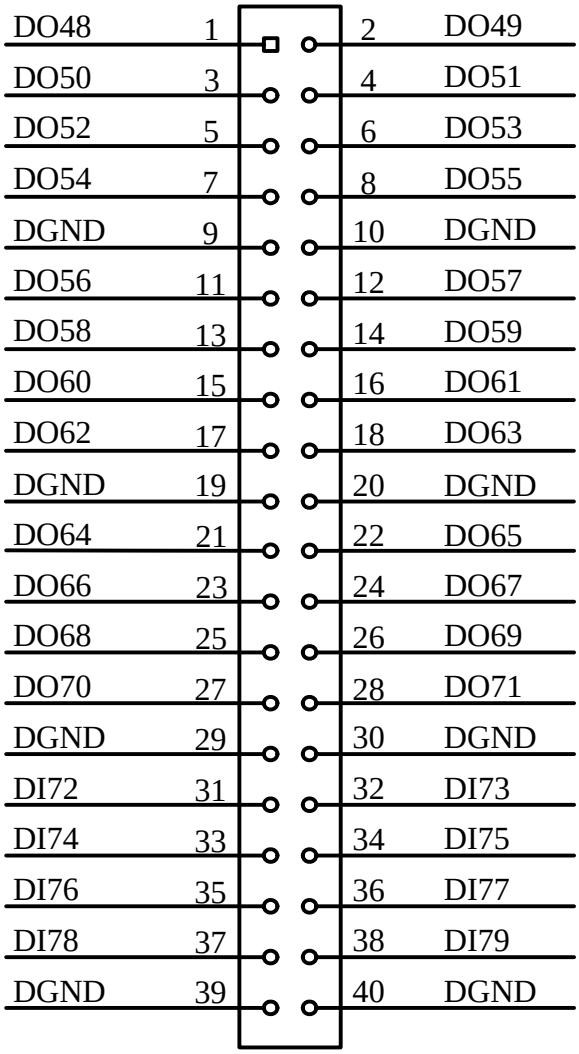
Pin definition

Pin No.	Name	Feature	Pin No.	Name	Feature	Pin No.	Name	Feature
			42	DIO1	IN/OUT	21	DIO0	IN/OUT
62	DIO2	IN/OUT	41	DIO4	IN/OUT	20	DIO3	IN/OUT
61	DIO5	IN/OUT	40	DIO7	IN/OUT	19	DIO6	IN/OUT
60	DIO8	IN/OUT	39	DIO10	IN/OUT	18	DIO9	IN/OUT
59	DIO11	IN/OUT	38	DIO13	IN/OUT	17	DIO12	IN/OUT
58	DIO14	IN/OUT	37	DIO16	IN/OUT	16	DIO15	IN/OUT
57	DIO17	IN/OUT	36	DIO19	IN/OUT	15	DIO18	IN/OUT
56	DIO20	IN/OUT	35	DIO22	IN/OUT	14	DIO21	IN/OUT
55	DIO23	IN/OUT	34	DIO25	IN/OUT	13	DIO24	IN/OUT
54	DGND	GND	33	DGND	GND	12	DGND	GND
53	DGND	GND	32	DGND	GND	11	DGND	GND
52	DIO26	IN/OUT	31	DIO28	IN/OUT	10	DIO27	IN/OUT
51	DIO29	IN/OUT	30	DIO31	IN/OUT	9	DIO30	IN/OUT
50	DIO32	IN/OUT	29	DGND	GND	8	DIO33	IN/OUT
49	DGND	GND	28	DGND	GND	7	DGND	GND
48	DIO34	IN/OUT	27	DIO36	IN/OUT	6	DIO35	IN/OUT
47	DIO37	IN/OUT	26	DIO39	IN/OUT	5	DIO38	IN/OUT
46	DIO40	IN/OUT	25	DIO42	IN/OUT	4	DIO41	IN/OUT
45	DIO43	IN/OUT	24	DIO45	IN/OUT	3	DIO44	IN/OUT
44	DIO46	IN/OUT	23	DGND	GND	2	DIO47	IN/OUT
43	DGND	GND	22	DGND	GND	1	DGND	GND

Pin definition

Signal Name	Definition	Definition
DIO0~DIO47	Input/Output	Digital input/output
DGND	GND	Digital ground

2.2.2 XS2 Connector



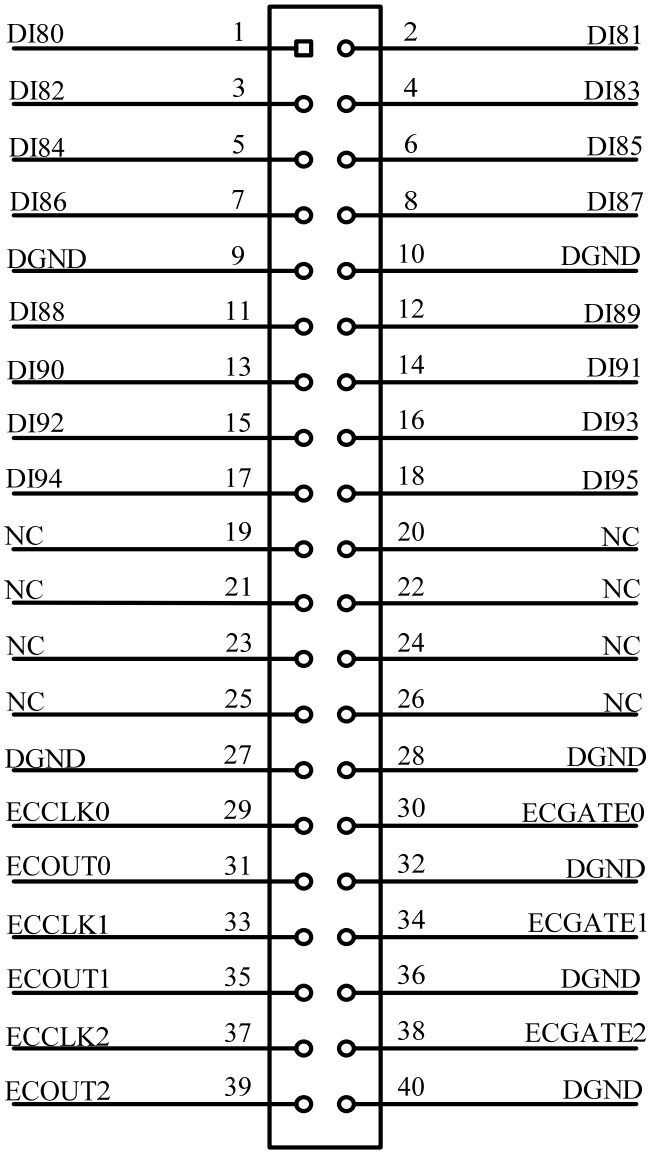
Pin definition of XS2

Pin No.	Name	Feature	Pin No.	Name	Feature
1	DO48	OUT	2	DO49	OUT
3	DO50	OUT	4	DO51	OUT
5	DO52	OUT	6	DO53	OUT
7	DO54	OUT	8	DO55	OUT
9	DGND	GND	10	DGND	GND
11	DO56	OUT	12	DO57	OUT
13	DO58	OUT	14	DO59	OUT
15	DO60	OUT	16	DO61	OUT
17	DO62	OUT	18	DO63	OUT
19	DGND	GND	20	DGND	GND
21	DO64	OUT	22	DO65	OUT
23	DO66	OUT	24	DO67	OUT
25	DO68	OUT	26	DO69	OUT

27	DO70	OUT	28	DO71	OUT
29	DGND	GND	30	DGND	GND
31	DI72	IN	32	DI73	IN
33	D74	IN	34	DI75	IN
35	DI76	IN	36	DI77	IN
37	DI78	IN	38	DI79	IN
39	DGND	GND	40	DGND	GND

Signal Name	Definition	Definition
DO48~DO71	Output	Digital output
DI72-DI79	Input	Digital input
DGND	GND	Digital ground

2.2.3 XS3 Connector

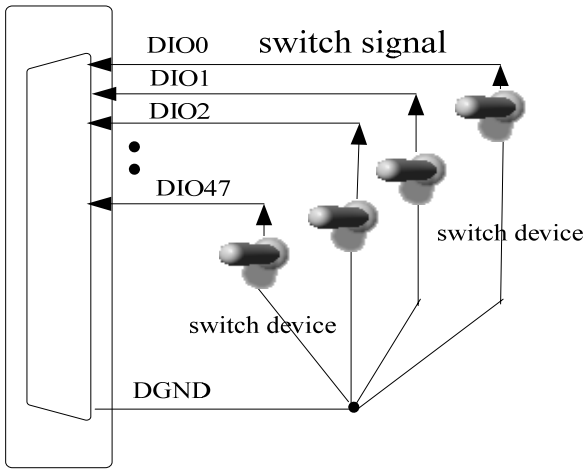


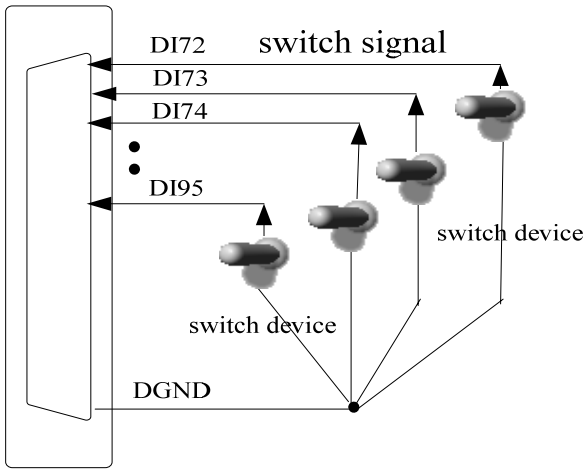
Pin No.	Name	Feature	Pin No.	Name	Feature
1	DI80	IN	2	DI81	IN
3	DI82	IN	4	DI83	IN
5	DI84	IN	6	DI85	IN
7	DI86	IN	8	DI87	IN
9	DGND	GND	10	DGND	GND
11	DI88	IN	12	D89	IN
13	DI90	IN	14	DI91	IN
15	DI92	IN	16	DI93	IN
17	DI94	IN	18	DI95	IN
19	NC	NC	20	NC	NC
21	NC	NC	22	NC	NC
23	NC	NC	24	NC	NC
25	NC	NC	26	NC	NC
27	DGND	GND	28	DGND	GND
29	ECCLK0	IN	30	ECGATE0	IN
31	ECOUT0	IN	32	DGND	GND
33	ECCLK1	OUT	34	ECGATE1	IN
35	ECOUT1	OUT	36	DGND	GND
37	ECCLK2	IN	38	ECGATE2	IN
39	ECOUT2	OUT	40	DGND	GND

Name	Definition	Definition
ECLK0~ECLK2	Input	Timer/counter clock source input, on-board there is 10M CLK. 8253 timer/counter clock source can be selected by software.
EGATE0~EGATE2	Input	Timer/counter gate input
EOUT0~EOUT2	Output	Timer/counter output
DI80-DI95	Input	Digital inputs
DGND	GND	Digital ground
NC		NC

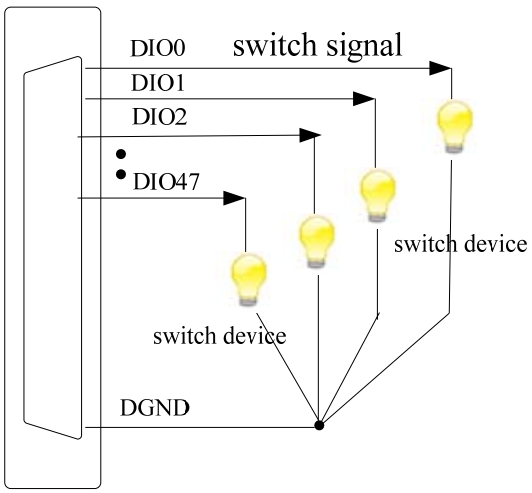
Chapter 3 Connection Ways for Each Signal

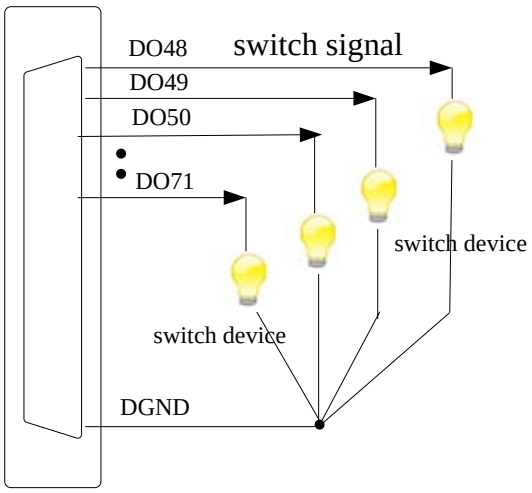
3.1 Digital Input Connection



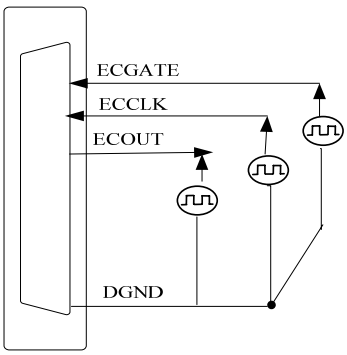


3.2 Digital Output Connection





3.2 Timer/Counter Connection



Chapter 4 Address Assignment

There are two groups of continuous space of PCI2362 I/O address.
The first group is 128 bytes continuous space, the second group is 64 bytes continuous space.

I/O ports Offset Address	Read	Write
0000H	DIO0~DIO31	DIO0~DIO31
0004H	DIO32~DIO47	DIO32~DIO47
0008H	DI72~DI95	DO48~DO71
000CH	Digital output enable register	Digital output enable register
0010H	Digital Input comparison register	Digital Input comparison register
0014H	Digital input trigger register	Digital input trigger register
0018H	Status Register	Clear status flags
001CH	Interrupt mask register	Interrupt mask register
0020H	8253 Timer/Counter	8253 Timer/Counter
0024H	8253 Timer/Counter	8253 Timer/Counter
0028H	8253 Timer/Counter	8253 Timer/Counter
002CH	Control word	Control word
0030H	Timer/counter user mode register	Timer/counter user mode register

(1) 0000H port

0000H corresponding to 32-ch bi-directional digital input/output DIO0 ~ DIO31, data format is as follows:

Data Bit	DB31~DB0
Function	DIO31~DIO0

When use the digital output function, need enable digital output, the specific reference to 000CH (digital outputs enable register) port.
When use the digital output function, read 0000H port, can read-back DIO0 ~ DIO31 output status.

(2) 0004H port

0004H corresponding to 16-ch bi-directional digital input/output DIO32 ~ DIO47, data format is as follows:

Data Bit	DB15~DB0
Function	DIO47~DIO32

When use the digital output function, need enable digital output, the specific reference to 000CH (digital outputs enable register) port.

When use the digital output function, read 0004H port, can read-back DIO32 ~ DIO47 output status.

(3) 0008H port

0008H corresponding to 24-ch digital input (DI72~DI95) and the digital output (DO48~DO71), data format is as follows:

Read:

Data Bit	DB32~DB0
Function	DI95~DI72

Write:

Data Bit	DB32~DB0
Function	DO71~DO48

When use the digital output function, need enable digital output, reference to 000CH (digital outputs enable register) port.

(4) 000CH port

000CH port corresponds to "digital outputs enable register" data format is as follows:

Data Bit	DB8~DB0
Function	OUTEN8~OUTEN0

OUTENn (n is the label) is:

1: Corresponding to digital output enable (the output function of DO)

0: Prohibition output (the input functions of D)

Bit	OUTEN8	OUTEN7	OUTEN6	OUTEN5	OUTEN4
Function	DO71~DO64	DO63~DO56	DO55~DO48	IO47~IO40	IO39~IO32

Bit	OUTEN3	OUTEN2	OUTEN1	OUTEN0
Function	IO31~IO24	IO23~IO16	IO15~IO8	IO7~IO0

(5) 0010H port

0010H port corresponds to the digital input comparison register", is used for the comparison with the digital input DIO7 ~ DIO0, the data format is as follows:

Data Bit	DB7~DB0
Function	CMP7~CMP0

When CMP7 ~ CMP0 correspond to the digital input DIO7 ~ DIO0, the corresponding status flag will be set to "1" (reference to 0018H "status register"), if enabled interrupt (reference to 001CH "interrupt mask register"), the interrupt will happen

(6) 0014H port

0014H port corresponds to the "digital input trigger register", used to control the digital input DIO15 ~ DIO8 the trigger mode, the corresponding data format is as follows:

Data Bit	DB15:14	DB13:12	DB11:10	DB9:8	DB7:6	DB5:4	DB3:2	DB1:0
Function	MSEL7	MSEL6	MSEL5	MSEL4	MSEL3	MSEL2	MSEL1	MSEL0
Relationship	DIO15	DIO14	DIO13	DIO12	DIO11	DIO10	DIO9	DIO8

MSELn (n is the label) is defined as follows:

MSELn	Trigger Mode
00	Not trigger
01	Falling edge trigger
10	Rising edge trigger
11	Either falling or rising edge trigger

When MSELn specified state occurs, the corresponding flag will be set to "1" (reference to port 0018H "status register"), if enabled interrupt (references to port 001CH “interrupt mask register"), the interrupt will happen.

(7) 0018H port

Read 0018H port, will read out the "status register", the corresponding data format is as follows:

Data Bit	DB11	DB10	DB9	DB8
Function	Timer /Counter 2, the status of the end of counting	Timer /Counter 1, the status of the end of counting	Timer /Counter 0, the status of the end of counting	DIO7~DIO0 comparison status

Data Bit	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
Function	DIO15 Trigger status	DIO14 Trigger status	DIO13 Trigger status	DIO12 Trigger status	DIO11 Trigger status	DIO10 Trigger status	DIO9 Trigger status	DIO8 Trigger status

In the status register:

1: with occurrence of the specified state

0: without occurrence of the specified state

Write 0018 port, can clear "status flag", if the corresponding bit was "0", it will clear the flag (flag clear "0"); write "1", it will not change the corresponding bit. Corresponding data format as above.

(8) 001CH port

001CH port corresponds to "interrupt mask register", the corresponding data format is as follows:

Data Bit	DB11	DB10	DB9	DB8
Function	Timer /Counter 2, the status of the end of counting	Timer /Counter 1, the status of the end of counting	Timer /Counter 0, the status of the end of counting	DIO7~DIO0 comparison status

Data Bit	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
Function	DIO15 Trigger status	DIO14 Trigger status	DIO13 Trigger status	DIO12 Trigger status	DIO11 Trigger status	DIO10 Trigger status	DIO9 Trigger status	DIO8 Trigger status

In the interrupt mask register:

1: enable the interrupt signal

0: maskable interrupt

(9) 0020H~002CH port

0020H ~ 002CH port 4 (× 8) addresses corresponding to the 4 addresses of "8253 timer/counter", the corresponding data bits are DB7 ~ DB0 effective.

(10) 0030H port

0030H port corresponds to "Timer/Counter user mode register." It is used to control the CLK, GATE and sources of the 8253 timer/counter. The data format is as follows:

Data Bit	DB11~DB10	DB9~DB8
Function	The CLK of the channel 2	The CLK of the channel 1

Data Bit	DB7~DB6	DB5~DB4	DB3~DB2	DB1~DB0
Function	The CLK of the channel 0	The GATE of the channel 2	The GATE of the channel 1	The GATE of the channel 0

DB1 ~ DB0 corresponds to channel 0 GATE:

	Function
00	Low level
01	High level
10	External EGATE0 In-phase input
11	External EGATE0 opposite phase input

DB3 ~ DB2 corresponds to channel 1 GATE:

	Function
00	Low level
01	High level
10	External EGATE1 In-phase input
11	External EGATE1 opposite phase input

DB5 ~ DB4 corresponds to channel 2 GATE:

	Function
00	Low level
01	High level
10	External EGATE2 In-phase input
11	External EGATE2opposite phase input

DB7 ~ DB6 corresponds to channel 0 CLK:

	Function
00	Internal 10MHz
01	External ECLK0
10	The OUT of channel 1
11	The OUT of channel 2

DB9 ~ DB8 corresponds to channel 1 CLK:

	Function
00	Internal 10MHz
01	External ECLK1
10	The OUT of channel 0
11	The OUT of channel 2

DB11 ~ DB10 corresponds to channel 2 CLK:

	Function
00	Internal 10MHz
01	External ECLK2
10	The OUT of channel 0
11	The OUT of channel 1

Chapter 5 Notes and Warranty Policy

5.1 Notes

In our products' packing, user can find a user manual, a PCI2362 module and a quality guarantee card. Users must keep quality guarantee card carefully, if the products have some problems and need repairing, please send products together with quality guarantee card to ART, we will provide good after-sale service and solve the problem as quickly as we can.

When using PCI2362, in order to prevent the IC (chip) from electrostatic harm, please do not touch IC (chip) in the front panel of PCI2362 module.

5.2 Warranty Policy

Thank you for choosing ART. To understand your rights and enjoy all the after-sales services we offer, please read the following carefully.

1. Before using ART's products please read the user manual and follow the instructions exactly. When senDOng in damaged products for repair, please attach an RMA application form which can be downloaded from: www.art-control.com.

2. All ART products come with a limited two-year warranty:

- The warranty period starts on the day the product is shipped from ART's factory
- For products containing storage devices (hard drives, flash cards, etc.), please back up your data before senDOng them for repair. ART is not responsible for any loss of data.
- Please ensure the use of properly licensed software with our systems. ART does not condone the use of pirated software and will not service systems using such software. ART will not be held legally responsible for products shipped with unlicensed software installed by the user.

3. Our repair service is not covered by ART's guarantee in the following situations:

- Damage caused by not following instructions in the User's Manual.
- Damage caused by carelessness on the user's part during product transportation.
- Damage caused by unsuitable storage environments (i.e. high temperatures, high humiDOty, or volatile chemicals).
- Damage from improper repair by unauthorized ART technicians.
- Products with altered and/or damaged serial numbers are not entitled to our service.

4. Customers are responsible for shipping costs to transport damaged products to our company or sales office.

5. To ensure the speed and quality of product repair, please download an RMA application form from our company website.

Products Rapid Installation and Self-check

Rapid Installation

Product-driven procedure is the operating system adaptive installation mode. After inserting the DOsc, you can select the appropriate board type on the pop-up interface, click the button【driver installation】; or select CD-ROM drive in Resource Explorer, locate the product catalog and enter into the APP folder, and implement Setup.exe file. After the installation, pop-up CD-ROM, shut off your computer, insert the PCI card. If it is a USB product, it can be DOrectly inserted into the device. When the system prompts that it finds a new hardware, you do not specify a drive path, the operating system can automatically look up it from the system DOrectory, and then you can complete the installation.

Self-check

At this moment, there should be installation information of the installed device in the Device Manager (when the device does not work, you can check this item.). Open "Start -> Programs -> ART Demonstration Monitoring and Control System -> CorresponDOng Board -> Advanced Testing Presentation System", the program is a standard testing procedure. Based on the specification of Pin definition, connect the signal acquisition data and test whether AD is normal or not. Connect the input pins to the corresponDOng output pins and use the testing procedure to test whether the switch is normal or not.

Delete Wrong Installation

When you select the wrong drive, or viruses lead to driver error, you can carry out the following operations: In Resource Explorer, open CD-ROM drive, run Others-> SUPPORT-> PCI.bat procedures, and delete the hardware information that relevant to our boards, and then carry out the process of section I all over again, we can complete the new installation.