

PCI8250

User's Manual

 **Beijing ART Technology Development Co., Ltd.**

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Chapter 1 Overview

In the fields of Real-time Signal Processing, Digital Image Processing and others, high-speed and high-precision data acquisition modules are demanded. ART PCI8250 data acquisition module, which brings in advantages of similar products that produced in china and other countries, is convenient for use, high cost and stable performance.

ART PCI8250 is an analog output module based on PCI bus. It can be directly inserted into IBM-PC/AT or a computer which is compatible with PCI8250 to constitute the laboratory, product quality testing center and systems for different areas of data acquisition, waveform analysis and processing. It may also constitute the monitoring system for industrial production process.

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.

- PCI8250 Data Acquisition Board
- ART Disk
 - a) user's manual (pdf)
 - b) drive
 - c) catalog
- Warranty Card

FEATURES

Analog Output

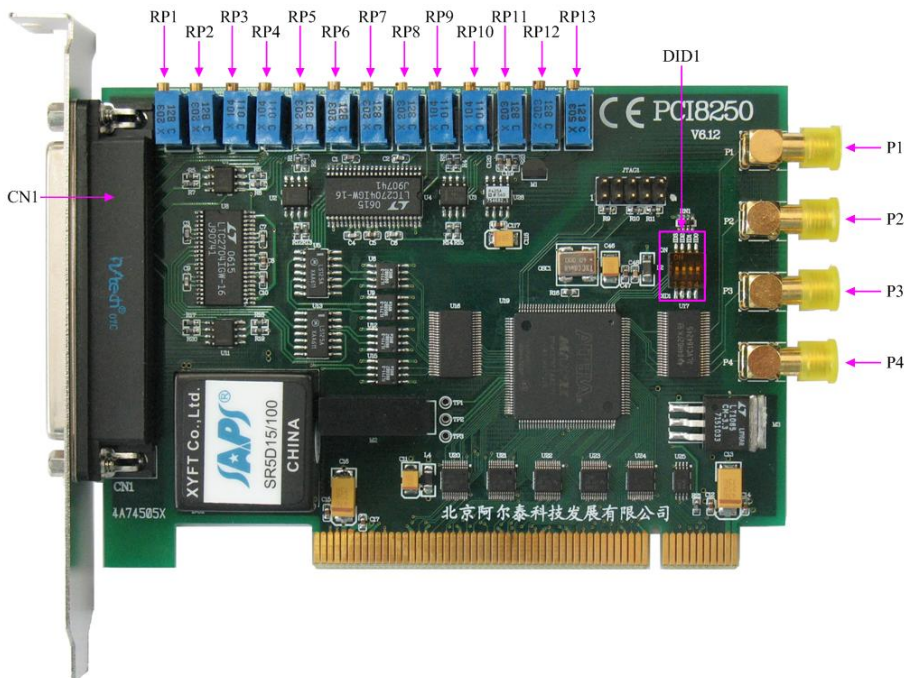
- Output Range: 0~5V(default), 0~10V, ±2.5V, ±5V, ±10V
- 16-bit resolution
- Update Rate: 100 KHz (single channel)
- Set-up Time: 600nS (0.01%)
- Channel No.: 8-channel isolated sync output
- Isolated voltage: 2500Vrms(1 min)
- Input impedance: 50Ω
- Sync Source: software, hardware
- Trigger Dir: rising edge trigger, falling edge trigger
- Data transmission mode: program mode
- Support multi-card synchronization, at most 4 cards

Other features

Board Clock Oscillation: 40MHz

Chapter 2 Components Layout Diagram and a Brief Description

2.1 The Main Component Layout Diagram



2.2 The Function Description for the Main Component

2.2.1 Signal Input and Output Connectors

CN1: Analog signal output connector

P1: Sync pulse signal input, external trigger

P2~P4: Sync pulse signal output

2.2.2 Potentiometer

RP11: AO0 analog output full-scale adjustment potentiometer

RP12: AO1 analog output full-scale adjustment potentiometer

RP7: AO2 analog output full-scale adjustment potentiometer

RP8: AO3 analog output full-scale adjustment potentiometer

RP5: AO4 analog output full-scale adjustment potentiometer

RP6: AO5 analog output full-scale adjustment potentiometer

RP2: AO6 analog output full-scale adjustment potentiometer

RP1: AO7 analog output full-scale adjustment potentiometer

RP10: AO0, AO1 analog output zero-point adjustment potentiometer

RP9: AO2, AO3 analog output zero-point adjustment potentiometer

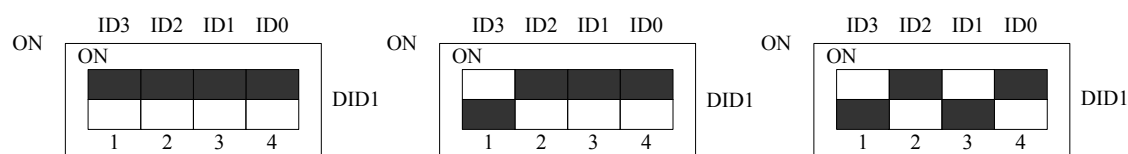
RP4: AO4, AO5 analog output zero-point adjustment potentiometer

PR3: AO6, AO7 analog output zero-point adjustment potentiometer

RP13: analog output signal +5V reference voltage adjustment

2.2.3 Physical ID of DIP Switch

DID1: Set physical ID number. When the PC is installed more than one PCI8250 , you can use the DIP switch to set a physical ID number for each board, which makes it very convenient for users to distinguish and visit each board in the progress of the hardware configuration and software programming. The following four bits numbers are expressed by the binary system: When DIP switch points to "ON", that means "1", and when it points to the other side, that means "0." As they are shown in the following diagrams:"ID3" is the high bit."ID0" is the low bit, and the black part in the diagram represents the location of the switch. (Test softwares of the company often use the logic ID management equipments and at this moment the physical ID DIP switch is invalid. If you want to use more than one kind of the equipments in one and the same system at the same time, please use the physical ID as much as possible.).



The above chart shows "1111", so it means that the physical ID is 15.

The above chart shows "0111", so it means that the physical ID is 7.

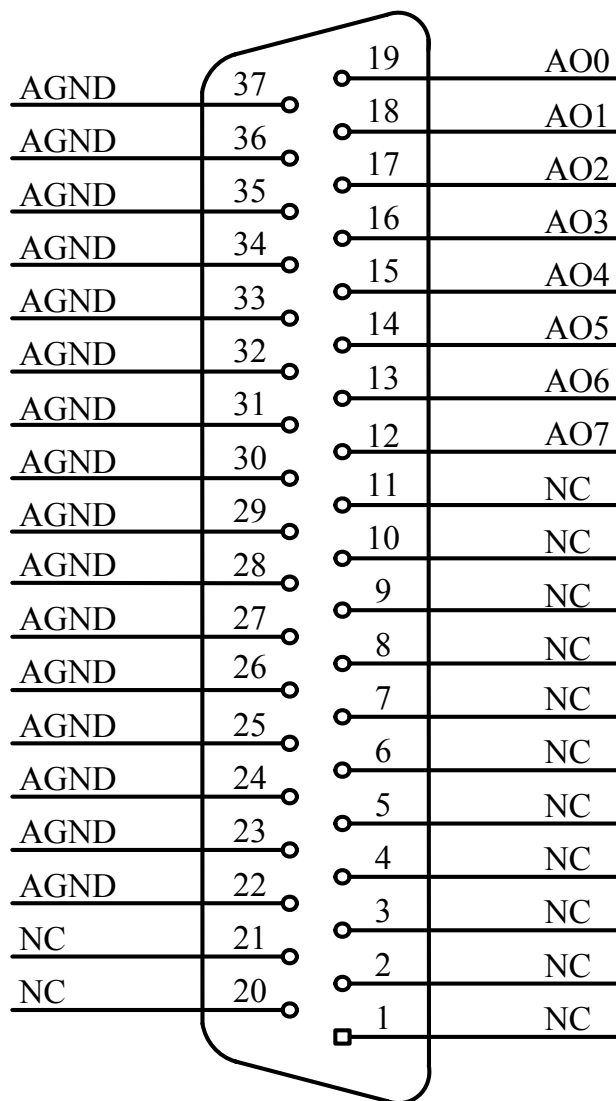
The above chart shows "1011", so it means that the physical ID is 5.

ID3	ID2	ID1	ID0	Physical ID (Hex)	Physical ID (Dec)
OFF (0)	OFF (0)	OFF (0)	OFF (0)	0	0
OFF (0)	OFF (0)	OFF (0)	ON (1)	1	1
OFF (0)	OFF (0)	ON (1)	OFF (0)	2	2
OFF (0)	OFF (0)	ON (1)	ON (1)	3	3
OFF (0)	ON (1)	OFF (0)	OFF (0)	4	4
OFF (0)	ON (1)	OFF (0)	ON (1)	5	5
OFF (0)	ON (1)	ON (1)	OFF (0)	6	6
OFF (0)	ON (1)	ON (1)	ON (1)	7	7
ON (1)	OFF (0)	OFF (0)	OFF (0)	8	8
ON (1)	OFF (0)	OFF (0)	ON (1)	9	9
ON (1)	OFF (0)	ON (1)	OFF (0)	A	10
ON (1)	OFF (0)	ON (1)	ON (1)	B	11
ON (1)	ON (1)	OFF (0)	OFF (0)	C	12
ON (1)	ON (1)	OFF (0)	ON (1)	D	13
ON (1)	ON (1)	ON (1)	OFF (0)	E	14
ON (1)	ON (1)	ON (1)	ON (1)	F	15

Chapter 3 Signal Connectors

3.1 The Definition of Signal Input and Output Connectors

62 core plug on the CN1 pin definition



Pin definition

Signal Name	Type	Definition
AO0~AO7	Output	Analog signal output pins, the reference ground is AGND.
AGND	GND	Analog signal ground.
NC	--	Not connected.

Chapter 4 Connection Ways for Each Signal

4.1 Analog Output

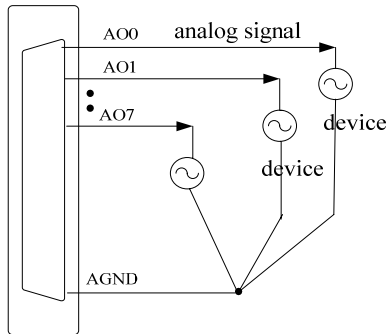
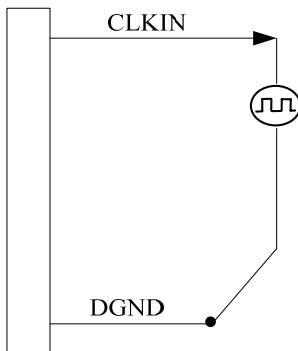
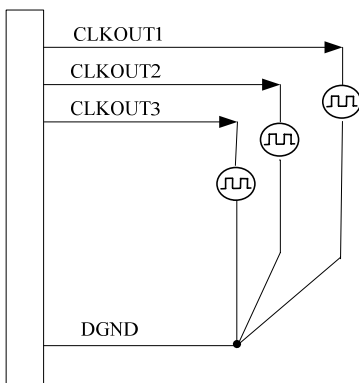


Figure 4.3 analog signal output connection

4.2 Sync pulse/Trigger Signal Input



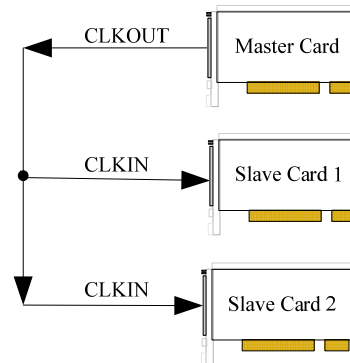
4.3 Sync pulse signal output



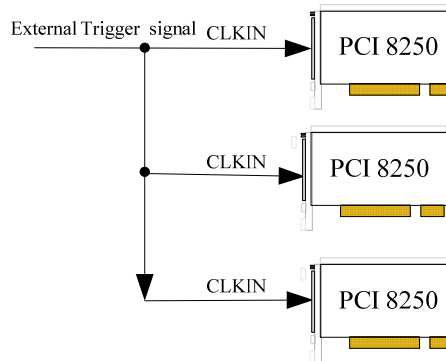
4.4 Methods of Realizing the Multi-card Synchronization

Three methods can realize the synchronization for the PCI8250, the first method is using the cascade master-slave card, the second one is using the common external trigger.

When using master-slave cascade card programs, the master card generally uses the internal clock source model, while the slave card uses the external clock source mode. After the master card and the slave card are initialized according to the corresponding clock source mode. At first, start all the slave cards, as the main card has not been activated and there is no output clock signal, so the slave card enters the wait state until the main card was activated. At this moment, the multi-card synchronization has been realized. When you need to sample more than channels of a card, you could consider using the multi-card cascaded model to expand the number of channels.



When using the common external trigger, please make sure all parameters of different PCI8250 are the same, input triggering signal from CLKIN pin, then click “Start” button, at this time, PCI8250 does not output any signal but waits for external trigger signal. When all modules are waiting for external trigger signal, use the common external trigger signal to startup modules. See the following figure:



Chapter 5 The Instruction of Trigger Function

When `ADPara.TriggerDir = PCI8250_TRIGDIR_NEGATIVE`, we can achieve falling edge trigger. Whenever a falling edge occurs on CLKIN, the D/A begins to work. The following CLKIN has no effect on analog output.

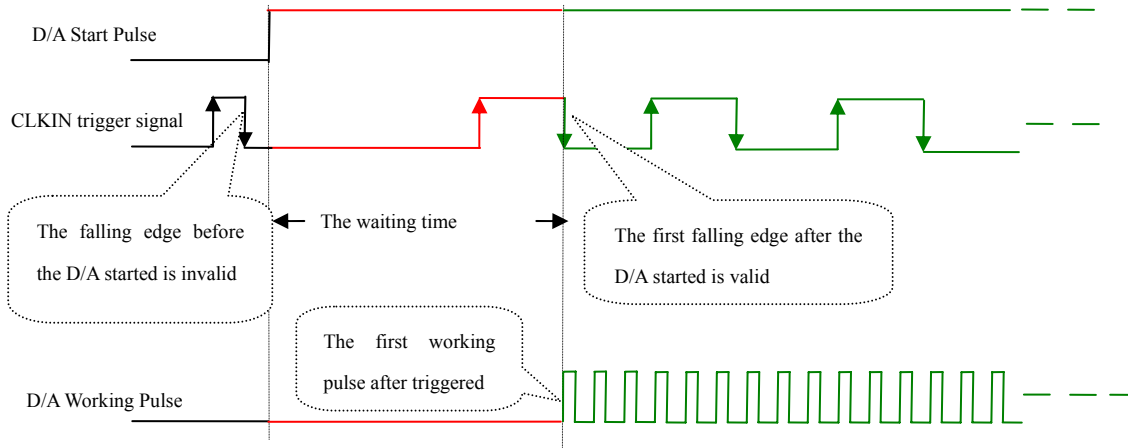


Figure5.1 Falling edge trigger

When `ADPara.TriggerDir = PCI8250_TRIGDIR_POSITIVE`, we can achieve rising edge trigger. Whenever a rising edge occurs on CLKIN, the D/A begins to work. The following CLKIN has no effect on analog output.

Chapter 6 Notes, Calibration and Warranty Policy

6.1 Notes

In our products' packing, user can find a user manual, a PCI8250 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 PCI8250, in order to prevent the IC (chip) from electrostatic harm, please do not touch IC (chip) in the front panel of PCI8250 module.

6.2 Analog Signal Output Calibration

In the manual, we introduce how to calibrate PCI8250 in $\pm 10V$; calibrations of other output ranges are similar.

- 1) Zero adjustment: Select AO0; connect a DC voltage source with value equal to 0V to AO0. Adjust RP10 until the actual output value 0.000V.
- 2) Full-scale adjustment: Select AO0; connect a DC voltage source with value equal to 10000mV to AI0. Adjust RP5 until the input value 9999.69mV.
- 3) Repeat steps above until meet the requirement.

6.3 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 sending 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 sending 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 humidity, 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 disc, 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 directly 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 directory, 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 -> Corresponding 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 corresponding 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.