PCI-1742U

16-bit, 1MS/s High-Resolution Multifunction Card

Packing List

Before installation, please make sure that you have received the following:

- PCI-1742U DA&C card
- Driver CD
- Quick Start User Manual

If anything is missing or damaged, contact your distributor or sales representative immediately.

User Manual

For more detailed information on this product, please refer to the PCI-1742U User Manual on the CD-ROM (PDF format).

CD:\Documents\Hardware Manuals\PCI\PCI-1742U

Declaration of Conformity

FCC Class A

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause interference in which case the user is required to correct interference at his own expense.

CE

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This kind of cable is available from Advantech. Please contact your local supplier for ordering information.

Overview

The PCI-1742U is a powerful high-resolution multifunction DAS card with 1MS/s sampling rate and 16-bit resolution, fulfills the needs of most data acquisition applications. PCI-1742U provides 16 single-ended or 8 differential analog input channels, two 16-bit D/A output channels, 16 digital input/output channels, and one 10 MHz 16-bit counter channel.

Notes

For more information on this and other Advantech products, please visit our websites at:

http://www.advantech.com/eAutomation

For technical support and service:

http://www.advantech.com/support/

This startup manual is for PCI-1742U.

Part No. 2003174210   1st Edition

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Specifications

Analog Input

Channels	16 single-ended or 8 differential or combination				
Resolution	16-bit				
FIFO Size	1K samples				
Max. Sampling Rate	1 MS/s single-channel 800kS/s multi-channel 250kS/s unipolar bipolar mixed				
A/D converter mode	Normal mode: maximum 800kS/s minimum: no Warp mode: maximum 1MS/s minimum: 1kS/s				
Input range and PGA Gain List	PGA Gain	0.5	1	2	4	8
	Unipolar	N/A	0~10	0~5	0~2.5	0~1.25
	Bipolar	±10	±5	±2.5	±1.25	±0.625
Bandwidth of PGA	PGA Gain	0.5	1	2	4	8
	Band-width	2MHz	2MHz	1MHz	1MHz	800kHz
Common Mode Voltage	±7 V max. (operational)				
Protection	±20 V				
Input Impedance	100 M/10pF(Off); 100 M/100pF(On)				
Accuracy	DC	DNLE: ±1LSB				
		INLE: ±3LSB				
		Offset error: Adjustable to ±2 LSB				
		Gain	0.5	1	2	4	8
		Gain error (% FSR)	0.02	0.02	0.02	0.03	0.04
	AC	THD: -90 dB				
		ENOB: 13.5 bits @ 1MS/s 14.5 bits @ < 250KS/s				

Analog Output

Channels	2	
Resolution	16-bit	
Throughput	2MS/s max. per channel (FSR)	
Output Range (Internal & External Reference)	Using Internal Reference	0~+5V, 0~+10 V, -5~+5V,-10~+10V
	Using External Reference	0~+x V@ +x V (-10 x 10) -x~+x V@ +x V (-10 x 10)
Accuracy	DC	DNLE: ±1LSB (monotonic)
		INLE: ±2LSB
		Offset error: Adjustable to ±2 LSB
		Gain error: Adjustable to ±2 LSB
Dynamic Performance	Settling Time	0.5µs (to 4 LSB of FSR)
	Slew Rate	40 V/µs
Driving Capability	±2mA	
Output Impedance	2.5 ohm	
Tempco	Gain: 30 ppm/°C Offset: 15µV/°C	

Specifications

Digital Input /Output

Input channels	16	
Output channels	16	
Number of ports	2	
Input Voltage	Low	0.8 V max.
	High	2.0 V min.
Output Voltage	Low	0.5 V max.@+24 mA (sink)
	High	2.4 V min.@-15 mA (source)
Pull up resistor	10k	

Counter/Timer

Channels	1 (82C54)
Resolution	16-bit
Clock source	10MHz max.
Clock Tempco	50 ppm/°C

General

I/O Connector Type	68-pin SCSI-II female	
Dimensions	175 × 100 mm (6.9" × 3.9")	
Power Consumption	Typical	+5 V @ 850 mA +12 V @ 600 mA
	Max.	+5 V @ 1 A +12 V @ 700m A
Temperature	Operation	0~+60°C (32~158°F) (refer to *IEC 68-2-1,2)*
	Storage	-20~+85°C (-4~185°F)
Relative Humidity	5 ~ 95% RH non-condensing (refer to *IEC 68-2-3)*	
Certification	CE certified	

Installation

Software Installation

Hardware Installation

1. Turn off your computer and unplug the power cord and cables.Turn off your computer before installing or removing any components.
2. Remove the cover of your computer.
3. Remove the slot cover on the back panel of your computer.
4. Touch the metal part on the surface of your computer to neutralize any static electricity that might be in your body.
5. Insert the PCI-1742U card into a PCI slot. Hold the card only by its edges and carefully align it with the slot. Insert the card firmly into place. Use of excessive force must be avoided; or the card might be damaged.
6. Fasten the bracket of the PCI card on the back panel rail of the computer with screws.
7. Connect appropriate accessories (68-pin cable, wiring terminals, etc. if necessary) to the PCI card.
8. Replace the cover of your computer chassis. Re-connect the cables you removed in step 2.
9. Plug in the power cord and turn on the computer.

Pin Assignment

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AI0  |68|34| AI1
AI2  |67|33| AI3
AI4  |66|32| AI5
AI6  |65|31| AI7
AI8  |64|30| AI9
AI10 |63|29| AI11
AI12 |62|28| AI13
AI14 |61|27| AI15
AGND |60|26| AGND
AI16 |59|25| AI17
AI18 |58|24| AI19
AI20 |57|23| AI21
AI22 |56|22| AI23
AI24 |55|21| AI25
AI26 |54|20| AI27
AI28 |53|19| AI29
AI30 |52|18| AI31
AI32 |51|17| AI33
AI34 |50|16| AI35
AI36 |49|15| AI37
AI38 |48|14| AI39
AI40 |47|13| AI41
AI42 |46|12| AI43
AI44 |45|11| AI45
AI46 |44|10| AI47
AGND |43| 9| AGND
AI48 |42| 8| AI49
AI50 |41| 7| AI51
AI52 |40| 6| AI53
AI54 |39| 5| AI55
AI56 |38| 4| AI57
AI58 |37| 3| AI59
AI60 |36| 2| AI61
AI62 |35| 1| AI63
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Signal Name	Reference	Direction	Description
AI<0...15>	AIGND	Input	Analog Input Channels 0 through 15. Each channel pair, AI<i, i+1> (i = 0, 2, 4...14), can be configured as either two single-ended inputs or one differential input.
AIGND	-	-	Analog Input Ground. The three ground references (AIGND, AOGND, and DGND) are connected together.
AO0_REF AO1_REF	AOGND	Input	Analog Output Channel 0/1 External Reference.
AO0_OUT AO1_OUT	AOGND	Output	Analog Output Channels 0/1
AOGND	-	-	Analog Output Ground. The analog output voltages are referenced to these nodes. The three ground references (AIGND, AOGND, and DGND) are connected together.
DI<0..15>	DGND	Input	Digital Input channels.
DO<0..15>	DGND	Output	Digital Output channels.
DGND	-	-	Digital Ground. This pin supplies the reference for the digital channels at the I/O connector as well as the +5VDC supply. The three ground references (AIGND, AOGND, and DGND) are connected together.
CNT0_CLK	DGND	Input	Counter 0 Clock Input. The clock input of counter 0 can be either external or internal , as set by software.
CNT0_OUT	DGND	Output	Counter 0 Output.
CNT0_GATE	DGND	Input	Counter 0 Gate Control.
PACER_OUT	DGND	Output	Pacer Clock Output. This pin pulses once for each pacer clock when turned on. If A/D conversion is in the pacer trigger mode, users can use this signal as a synchronous signal for other applications.
TRG_GATE	DGND	Input	A/D External Trigger Gate. When TRG _GATE is connected to DGND, it will disable the external trigger signal to input.
EXT_TRG	DGND	Input	A/D External Trigger. This pin is external trigger signal input for the A/D conversion. A low-to-high edge triggers A/D conversion to start.
+12V	DGND	Output	+12 VDC Source.
+5V	DGND	Output	+5 VDC Source.

Analog Input Connections

Single-ended Channel Connections

The single-ended input configuration has only one signal wire for each channel, and the measured voltage (Vm) is the voltage of the wire as referenced against the common ground.
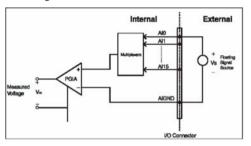

Figure 1: Single-ended Channel Connections

Differential Channel Connections

The differential input channels operate with two signal wires for each channel, and the voltage difference between both signal wires is measured. On PCI-1742U, when all channels are configured to differential input, up to 8 analog channels are available.
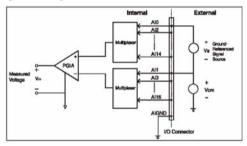

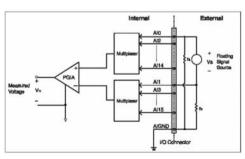*Figure 2: Differential Connection - Ground Signalt*

Figure 3: Differential Connection - Floating Signal

Analog Output Connections

The PCI-1742U provides two D/A output channels, **AO0** and **AO1**. You may use the PCI-1742U internally-provided precision -5V (-10V) reference to generate 0 to +5 V (+10 V) D/A output range. You may also create a D/A output range through the external reference, **AO0_REF**. The external reference input range is +/-10 V. For example, connecting with an external reference of -7 V will generate 0 ~ +7 V D/A output.
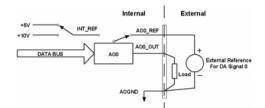

Figure 4: Analog Output Connections

Trigger Source Connections

Internal Pacer Trigger Connection

PCI-1742U includes one 82C54 compatible programmable Timer/Counter chip which provides three 16-bit counters connected to a 10 MHz clock, each designated specifically as Counter 0, Counter 1 and Counter 2. Counter 0 is a counter which counts events from an input channel or outputting pulse. Counter 1 and Counter 2 are cascaded to create a 32-bit timer for pacer triggering. A low-to-high edge from the Counter 2 output (**PACER_OUT**) will trigger an A/D conversion on the PCI-1742U. At the same time, you can also use this signal as a synchronous signal for other applications.

External Trigger Source Connection

In addition to pacer triggering, the PCI-1742U also allows external triggering for A/D conversions. A low-to-high edge coming from **EXT_TRG** will trigger an A/D conversion on the PCI-1742U. When **DGND** is connected to **TRG_GATE**, the external trigger function is thereby disabled.