



PCI-2602U

Universal PCI, 1 MS/s, 16-ch, 16-bit AI Multifunction Board (8 K WORD FIFO)

Introduction

The PCI-2602U is a high-performance multifunction card that provides Analog and Digital I/O functions for high-speed data transfer, analog signal measurement, I/O control and pattern generation applications, etc. The card features a continuous, 1 MS/ s 16-bit resolution AD converter, an 8 K-sample hardware FIFO, a 2-channel 16-bit DA converter, and 32-channel programmable Digital I/O with Digital Output readback. The PCI-2602U provides either 16-channel single-ended or 8-channel differential Analog Input, which is selectable via software, and is equipped with a high speed PGA featuring programmable gain.

In addition, the PCI-2602U card also provides the following advantages:

Card ID

The PCI-2602U also includes an onboard Card ID that enables the board to be recognized via software if two or more PCI-2602U cards are installed in the same computer.

Programmable Digital Input Filters (DI)

Programmable Digital Input filters can be employed to remove noise, glitches, and spikes on Digital Input ports, as well as to denounce the signal from the switch and relays in noisy industrial environments to prevent false readings caused by noise. The filter for the Digital Input channel can be configured by setting the filter time in seconds, preventing invalid readings and false triggers related to status change detection events.

Analog Pattern Generator (DA)

The PCI-2602 can be used to generate arbitrary wave shapes on a single Analog Output port based on user-defined waveform patterns. The Analog Pattern Generator operates at a full 20 MHz rate and is suitable for control systems or radar simulation, etc. The user-defined waveform pattern is stored in the onboard memory with a length of 512 samples of 16-bit data for simple- or complexpattern applications.

O Digital Pattern Generator (DO)

The PCI-2602U can be used to continuously output a digital pattern on the Digital Output port by utilizing a user-defined data pattern and rate that is based on 100 ns high-resolution timing (10 MHz).

Software

Drivers

√ | 32/64-bit Windows 10/11

Sample Programs

✓ VB/VC/Delphi/VB.NET/C#.NET/VC.NET/LabVIEW/Python/MATLAB

■ Features

- Universal PCI (3.3 V/5 V) Interface
- Supports Card ID (SMD Switch)
- 2-channel 16-bit Voltage Output
 - 512-sample Hardware FIFO for Analog Pattern Generator
- 32-channel Programmable DI/O
 - Supports DO Status Readback (Register Level)
 - □ 512-sample Hardware FIFO for Digital Pattern Generator
 - Digital Input Filter Function
- 16 Single-ended/8 Differential Analog Input Channels
 - ☐ 16-bit ADC with Max. 1 MS/s Sampling Rate
 - □ 8192-sample Hardware FIFO for Analog Input
 - Supports Variety of Programmable AD Trigger Mode
 - ☐ AD Data Transfer: Polling, Interrupt, DMA
 - ☐ AD R/L Filter Function
 - ☐ AD Continuous Capture
 - AD Auto-calibration Function

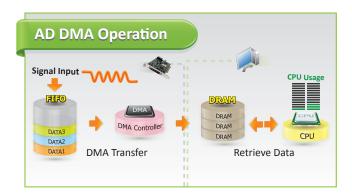




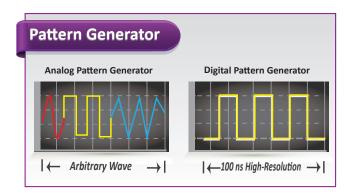




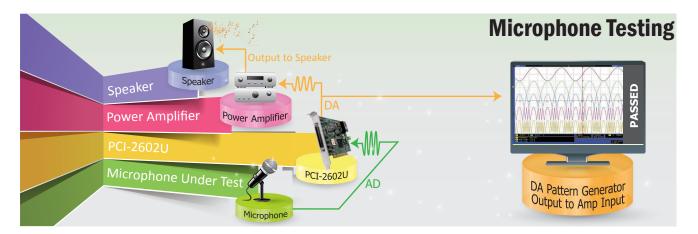








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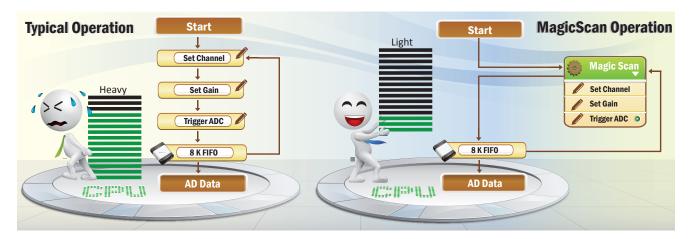


9 AD Continuous Capture

PCI-2602U provides the AD continuous capture function. The continuous capture refers to the acquisition of an unspecified number of samples. Instead of acquiring a set number of data samples and stopping, a continuous acquisition continues until you stop the operation.

MagicScan (AD)

The AD channel scan function, called MagicScan, eliminates the majority of the effort required to acquire the AD value, such as selecting the channel, setting the gain values and the settling time, triggering the ADC, and acquiring the data. Using the built-in MagicScan and the interrupt features, these complex tasks are effectively offloaded from the CPU. Even in channel scan mode, a different gain code can be used for each channel, and the sampling rate can still achieve a total of 1 MS/s.



Pulse Width Modulation (PWM, DO)

PCI-2602U is capable of producing PWM signals. PWM signals can be generated as a digital signal, using digital output line(s) from PA. PWM signals are most commonly used to control from controlling valves or pumps to adjusting the brightness of an LED.

SCSI II Connector

PCI-2602U provides a single SCSI II 68-pin high-density connector that reduces the required installation space and slot of the card in the computer and incorporates 32 programmable Digital I/O channels, 16 analog input channels and 2 analog output channels.



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■ Pin Assignments

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Pin Assignment	Terminal		No.	Pin Assignment
+5 V (Output)	1		35	+12 V (Output)
Ext_TRG	2		36	Cnt0_GATE
Trg_GATE	3	ш	37	Cnt0_OUT
Pacer_OUT	4	ш	38	Cnt0_CLK
D_GND	5	ш	39	D_GND
PD7	6		40	PD6
PD5	7		41	PD4
PD3	8		42	PD2
PD1	9	ш	43	PD0
PC7	10		44	PC6
PC5	11		45	PC4
PC3	12		46	PC2
PC1	13		47	PC0
D_GND	14		48	D_GND
PB7	15		49	PB6
PB5	16		50	PB4
PB3	17		51	PB2
PB1	18		52	PB0
PA7	19	ш	53	PA6
PA5	20	ш	54	PA4
PA3	21	ш	55	PA2
PA1	22	ш	56	PA0
AO_GND	23		57	AO_GND
AO1_OUT	24	ш	58	AO0_OUT
AO1_REF	25		59	AO0_REF
AI_GND	26		60	AI_GND
AI15	27		61	AI14
AI13	28	ш	62	AI12
AI11	29	ш	63	AI10
AI9	30		64	AI8
AI7	31		65	AI6
AI5	32	ш	66	AI4
AI3	33		67	AI2
AI1	34		68	AI0
			Female SCSI 68-pin (CON1)	

Accessories

DN-68A CR	DIN-Rail Mountable I/O Connector Block with 68-pin Female SCSI II Connector (RoHS)
CA-SCSI15-H CR	68-pin SCSI-II Connector Cable, 1.5 m (RoHS)
2AB125R CR	Resistor DIP 125R 0.1% 1/4W MF 50PPM (1PCS) (RoHS)







Ordering Information

PCI-2602U CR Universal PCI, 1 MS/s, 16-ch, 16-bit AI Multifunction Board (8 K WORD FIFO) (RoHS)

■ Hardware Specifications

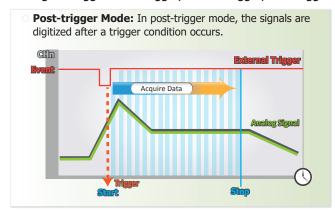
Card ID Yes (4-bit) Connector SCSI II 68-pin x 1 Analog Input Channels 16 Single-ended/8 Differential Range Bipolar Range: ±10.24 V, ±5.12 V, ±2.56 V Resolution 16-bit Accuracy 0.05 % of FSR ±1 LSB @ 25 °C, ±10.24 V Sampling Rate 0 Vervoltage Protection Continuous ±35 Vp-p FIFO Size 8192 samples Trigger Mode Software, Pacer, External(Analog/Digital) Data Transfer Polling, Interrupt, DMA Analog Output Channels 2 Range ±10 V, ±5 V, ±EXT_REF, 0 ~ +10 V, 0 ~ +5 V, 0 ~ EXT_REF Resolution 16-bit Accuracy ±6 LSB Response Time 20 MS/s (Max.) Voltage Output ±5 mA Slew Rate 8.33 V/µs FIFO Size 512 Samples FIFO Size 512 Samples Operation Mode Channels 32 (4-port Programmable) (Bi-Direction) Type 5 V/TTL ON Voltage Level 0.8 V Max. Response Speed 1.0 MHz (Typical) Trigger Mode Static Update Data Transfer Polling Digital Output Channels 32 (4-port Programmable) (Bi-Direction) Type 5 V/CMOS Operation Mode Static Update Data Transfer Polling Digital Output Channels 32 (4-port Programmable) (Bi-Direction) Type 5 V/CMOS Operation Mode Static Update Data Transfer Polling Digital Output Channels 32 (4-port Programmable) (Bi-Direction) Type 5 V/CMOS Operation Mode Static Update, Waveform generation Load Voltage Logic 0: 0.4 V Max. , Logic 1: 2.4 V Min. Channels 32 (4-port Programmable) (Bi-Direction) Type 5 V/CMOS Operation Mode Static Update, Waveform generation Load Voltage Logic 0: 0.4 V Max. , Logic 1: 2.4 V Min. Sink: 6 mA @ 0.33 V , Source: 6 mA @ 4.77 V Response Speed 4.0 MHz (Typical) Type 3.3 V/5 V Universal PCI, 32-bit, 33 MHz Data Bus 16-bit Power Consumption 1 A @ +5 V (Max.) Mechanical Dimensions (mm) 102 X 149 X 22 (W x L x D) Environment Operating Temperature 70 ~ +70°C Humidity 5 ~ 85% RH, Non-condensing	Hardware				
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Data Transfer Polling, Interrupt, DMA Analog Output Channels 2 Range \$\frac{\text{\$\text{to V}, \$\text{\$\	FIFO Size	8192 samples			
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FIFO Size Operation Mode Static update, Waveform generation (only for Channel 0) Digital Input Channels 32 (4-port Programmable) (Bi-Direction) Type 5 V/TTL ON Voltage Level 0.8 V Max. Response Speed 1.0 MHz (Typical) Trigger Mode Static Update Data Transfer Polling Digital Output Channels 32 (4-port Programmable) (Bi-Direction) Type 5 V/CMOS Operation Mode Static Update, Waveform generation Load Voltage Logic 0: 0.4 V Max. , Logic 1: 2.4 V Min. Load Current Sink: 6 mA @ 0.33 V ,Source: 6 mA @ 4.77 V Response Speed 4.0 MHz (Typical) DO Readback Yes PC Bus Type 3.3 V/5 V Universal PCI, 32-bit, 33 MHz Data Bus 16-bit Power Consumption 1 A @ +5 V (Max.) Mechanical Dimensions (mm) 102 X 149 X 22 (W x L x D) Environment Operating Temperature 5torage Temperature -20 ~ +70°C		8.33 V/us			
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Channels 32 (4-port Programmable) (Bi-Direction) Type 5 V/TTL ON Voltage Level 2.0 V Min. OFF Voltage Level 0.8 V Max. Response Speed 1.0 MHz (Typical) Trigger Mode Static Update Data Transfer Polling Digital Output Channels 32 (4-port Programmable) (Bi-Direction) Type 5 V/CMOS Operation Mode Static Update, Waveform generation Load Voltage Logic 0: 0.4 V Max. , Logic 1: 2.4 V Min. Load Current Sink: 6 mA @ 0.33 V ,Source: 6 mA @ 4.77 V Response Speed 4.0 MHz (Typical) DO Readback Yes PC Bus Type 3.3 V/5 V Universal PCI, 32-bit, 33 MHz Data Bus 16-bit Power Consumption 1 A @ +5 V (Max.) Mechanical Dimensions (mm) 102 X 149 X 22 (W x L x D) Environment Operating Temperature 0 ~ +60°C Storage Temperature -20 ~ +70°C	Operation Mode	Static update, Waveform generation (only for			
Channels 32 (4-port Programmable) (Bi-Direction) Type 5 V/TTL ON Voltage Level 2.0 V Min. OFF Voltage Level 0.8 V Max. Response Speed 1.0 MHz (Typical) Trigger Mode Static Update Data Transfer Polling Digital Output Channels 32 (4-port Programmable) (Bi-Direction) Type 5 V/CMOS Operation Mode Static Update, Waveform generation Load Voltage Logic 0: 0.4 V Max. , Logic 1: 2.4 V Min. Load Current Sink: 6 mA @ 0.33 V ,Source: 6 mA @ 4.77 V Response Speed 4.0 MHz (Typical) DO Readback Yes PC Bus Type 3.3 V/5 V Universal PCI, 32-bit, 33 MHz Data Bus 16-bit Power Consumption 1 A @ +5 V (Max.) Mechanical Dimensions (mm) 102 X 149 X 22 (W x L x D) Environment Operating Temperature 0 ~ +60°C Storage Temperature -20 ~ +70°C	Digital Input	Channel 0)			
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Data Bus 16-bit Power Consumption 1 A @ +5 V (Max.) Mechanical Dimensions (mm) 102 X 149 X 22 (W x L x D) Environment Operating Temperature 0 ~ +60°C Storage Temperature -20 ~ +70°C		3.3 V/5 V Universal PCI, 32-bit, 33 MHz			
Power Consumption 1 A @ +5 V (Max.) Mechanical Dimensions (mm) 102 X 149 X 22 (W x L x D) Environment Operating Temperature 0 ~ +60°C Storage Temperature -20 ~ +70°C					
MechanicalDimensions (mm)102 X 149 X 22 (W x L x D)EnvironmentOperating Temperature0 ~ +60°CStorage Temperature-20 ~ +70°C					
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Environment Operating Temperature O ~ +60°C Storage Temperature -20 ~ +70°C					
Environment Operating Temperature O ~ +60°C Storage Temperature -20 ~ +70°C	Dimensions (mm)	102 X 149 X 22 (W x L x D)			
Temperature 0 ~ +60°C Storage Temperature -20 ~ +70°C	` '				
Storage Temperature -20 ~ +70°C		0 ~ +60°C			
		-20 ~ +70°C			
		5 ~ 85% RH, Non-condensing			

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O AD External Trigger

Synchronization of the data acquisition process relative to an external event is an important criterion in many applications. For example, user may want to collect data after receiving a pulse signal from an encoder or when the temperature of a chamber exceeds a critical value. In such instances, the PCI-2602U must be set up to start the ADC as soon as the external event, or trigger, occurs. PCI-2602U supports both analog and digital triggers.

■ Digital Trigger: Post-trigger, Middle-trigger, Pre-trigger and Delay-trigger



Pre-trigger Mode: In pre-trigger mode, the signals are digitized before a trigger condition occurs.

Crin
External Trigger

Acquire Data

Analog Signal

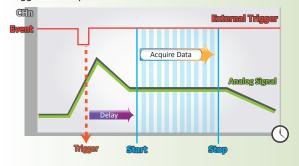
Middle-trigger Mode: In middle-trigger mode, the signals are digitized both before and after a trigger condition occurs.

Cilia Batarnal Trigger

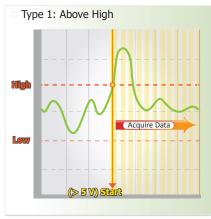
Acquire Data = D1+D2

Analog Signal

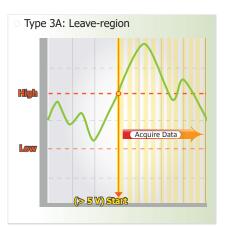
Delay-trigger Mode: In delay-trigger mode, signal capture begins once the programmed delay period from the trigger has elapsed.

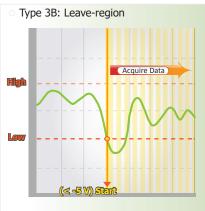


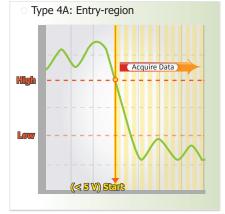
■ **Analog Trigger:** There are six different types of analog trigger, as illustrated below:

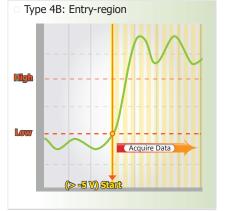












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