

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:

❶ 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.

❷ 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.

❸ 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 complex-pattern applications.

❹ 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

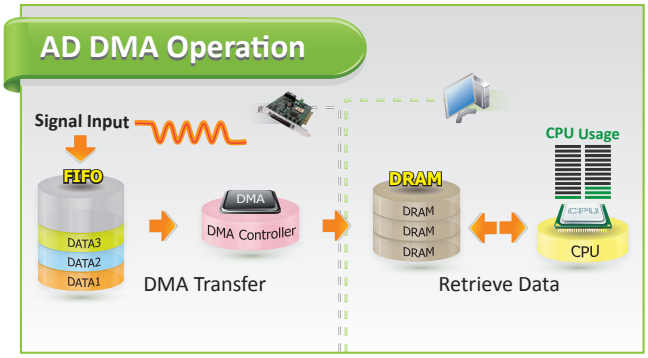
- ☑ 32/64-bit Windows 10/11

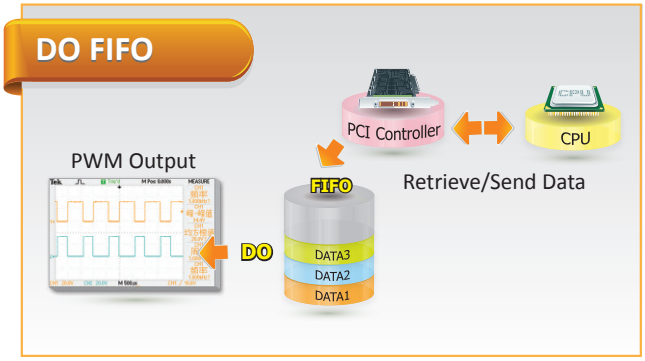
Sample Programs

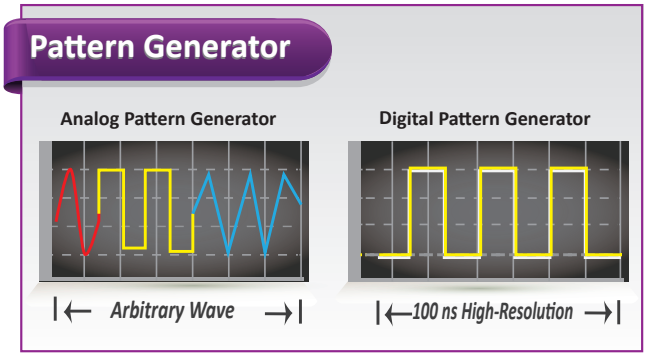
- ☑ VB/VC/Delphi/VB.NET/C#.NET/VC.NET/LabVIEW/Python/MATLAB

Features

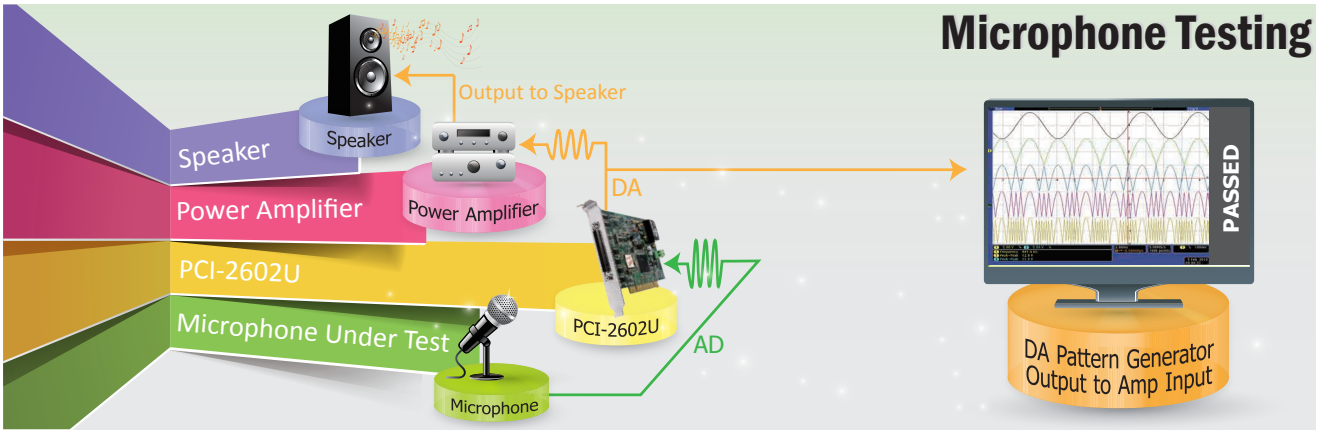
- ■ Universal PCI (3.3 V/5 V) Interface
- ■ Supports Card ID (SMD Switch)
- ■ 2-channel 16-bit Voltage Output
  - □ 512-sample Hardware FIFO for Analog Pattern Generator
- ■ 32-channel Programmable DI/O
  - □ Supports DO Status Readback (Register Level)
  - □ 512-sample Hardware FIFO for Digital Pattern 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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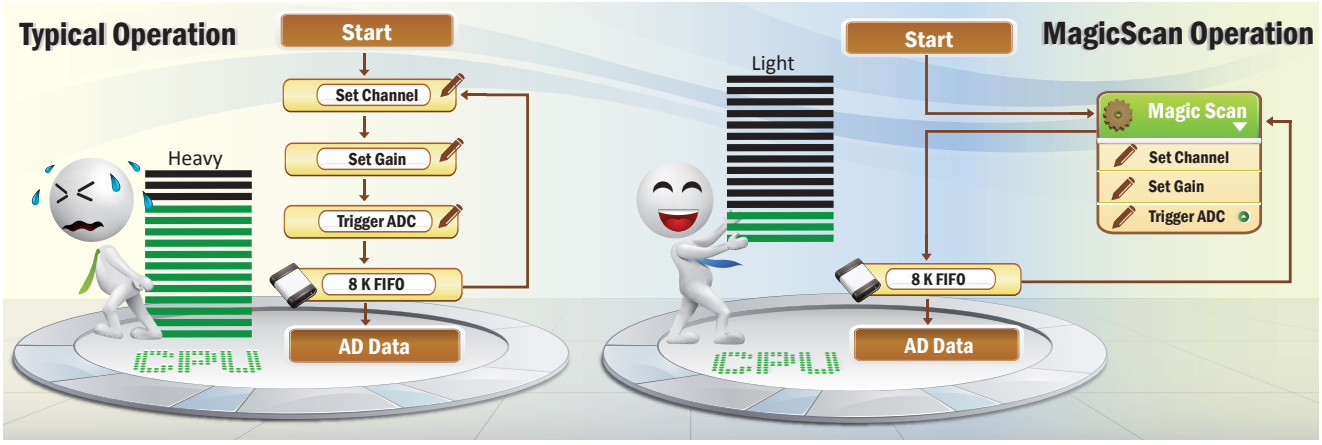


❺ AD Continuous Capture

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.

❻ 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.



❼ 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.

❽ 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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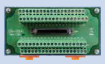
Pin Assignments

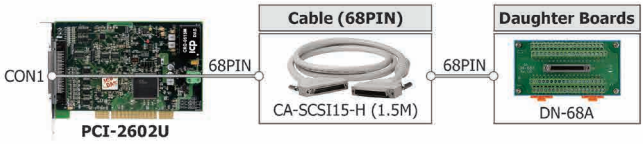
Pin Assignment	Terminal	No.	Pin Assignment
+5 V (Output)	1	35	+12 V (Output)
Ext_TRG	2	36	Cnt0_GATE
Trg_GATE	3	37	Cnt0_OUT
Pacer_OUT	4	38	Cnt0_CLK
D_GND	5	39	D_GND
PD7	6	40	PD6
PD5	7	41	PD4
PD3	8	42	PD2
PD1	9	43	PD0
PC7	10	44	PC6
PC5	11	45	PC4
PC3	12	46	PC2
PC1	13	47	PC0
D_GND	14	48	D_GND
PB7	15	49	PB6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



Hardware Specifications

Hardware	
Card ID	Yes (4-bit)
Connector	SCSI II 68-pin x 1
Analog Input	
Channels	16 Single-ended/8 Differential
Range	Gain: 0.4, 0.8, 1.6 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	1 MS/s
Overvoltage 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 Capability	±5 mA
Slew Rate	8.33 V/μs
FIFO Size	512 Samples
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	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
Humidity	5 ~ 85% RH, Non-condensing

Ordering Information

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

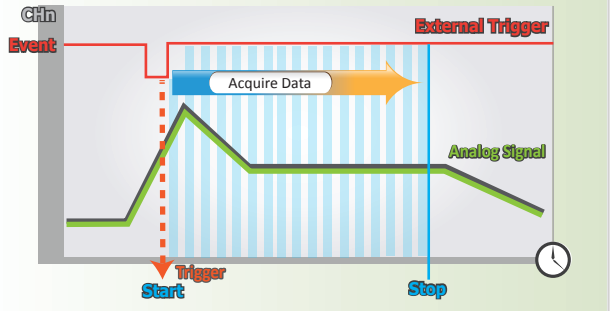
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⑨ AD External Trigger

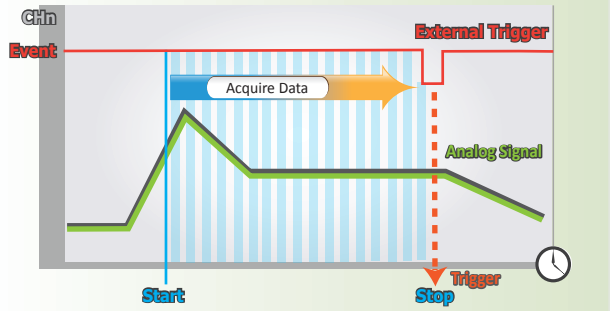
Synchronization of the data acquisition process relative to an external event is an important criterion in many applications. For example, user may want to collect data after receiving a pulse signal from an encoder or when the temperature of a chamber exceeds a critical value. In such instances, the 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**

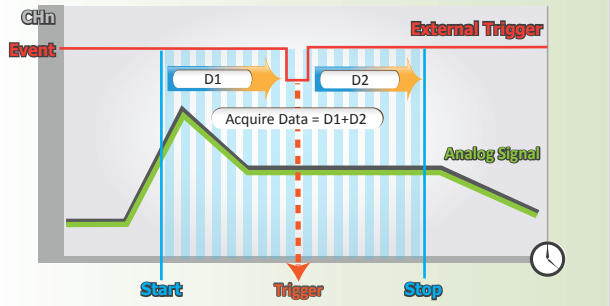
Post-trigger Mode: In post-trigger mode, the signals are digitized after a trigger condition occurs.



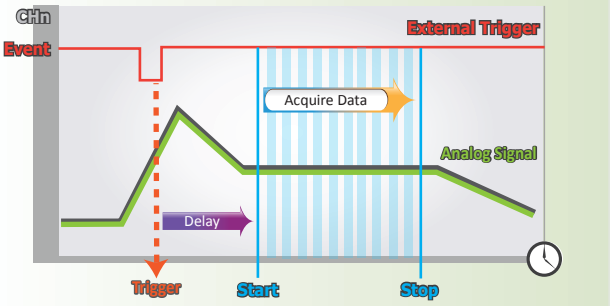
Pre-trigger Mode: In pre-trigger mode, the signals are digitized before a trigger condition occurs.



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

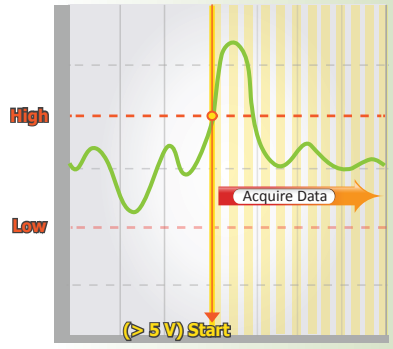


Delay-trigger Mode: In delay-trigger mode, signal capture begins once the programmed delay period from the trigger has elapsed.

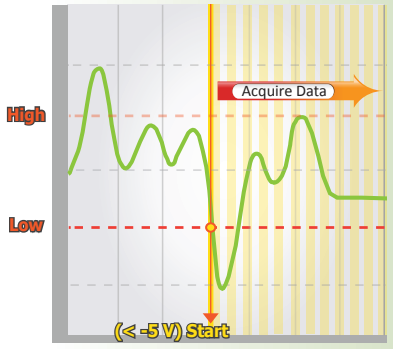


■ **Analog Trigger:** There are six different types of analog trigger, as illustrated below:

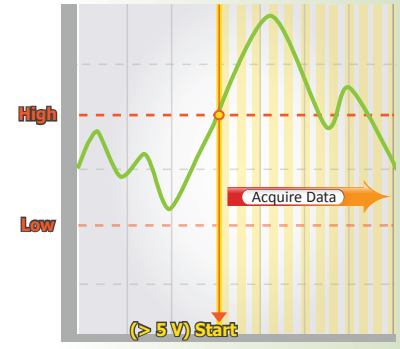
Type 1: Above High



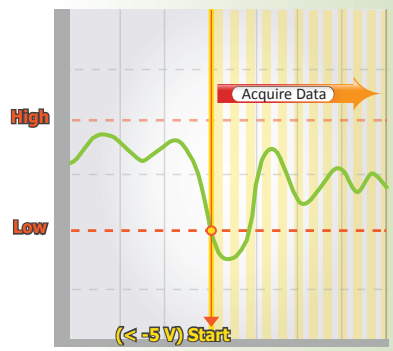
Type 2: Below Low



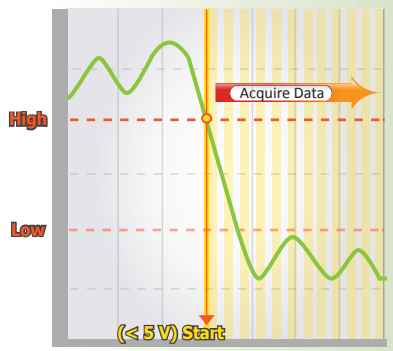
Type 3A: Leave-region



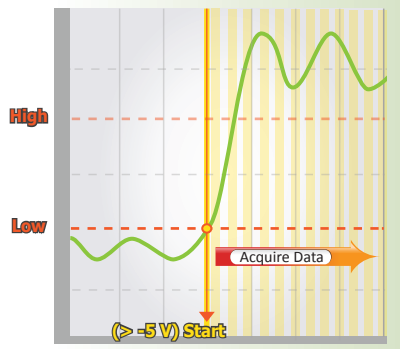
Type 3B: Leave-region



Type 4A: Entry-region



Type 4B: Entry-region



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