3-1 High Speed Multifunction Board

PCI-2602U

NEW

Universal PCI , 1 MS/s High-speed, 16-channel Analog Input, 2-channel Analog Output and 32-channel DI/O Multifunction Board

Features

- Universal PCI (3.3 V/5 V) Interface, Plug & Play
- Supports Card ID (SMD Switch)
- 2-channel 16-bit Voltage Output
  - 512-sample Hardware FIFO for Analog Pattern Generator
- 32-channel Programmable DI/DO
  - 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
  - AD Trigger Mode: Software Trigger, Post-trigger, Middle-Trigger, Delay-Trigger
  - AD Data Transfer: Polling, Interrupt, DMA
  - AD Continuous Capture
  - AD Auto-calibration Function

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)

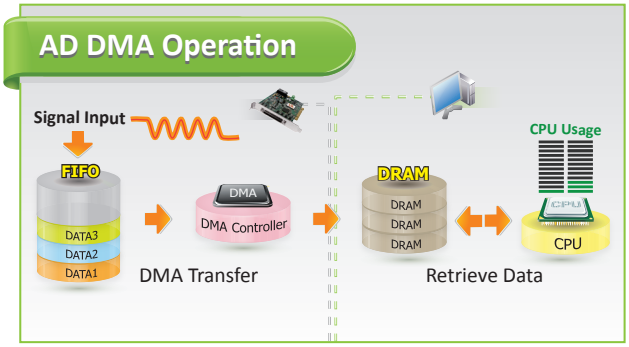
Programmable Digital Input filters can be employed to remove noise, glitches, and spikes on Digital Input ports, as well as to denounce the signal from the switch and relays in noisy industrial environments to prevent false readings caused by noise. The filter for the Digital Input channel can be configured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

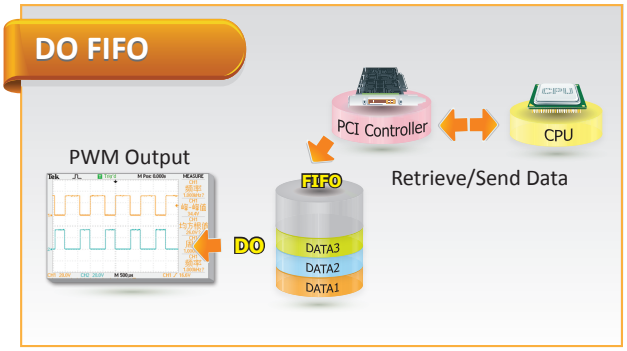
❸ Analog Pattern Generator (DA)

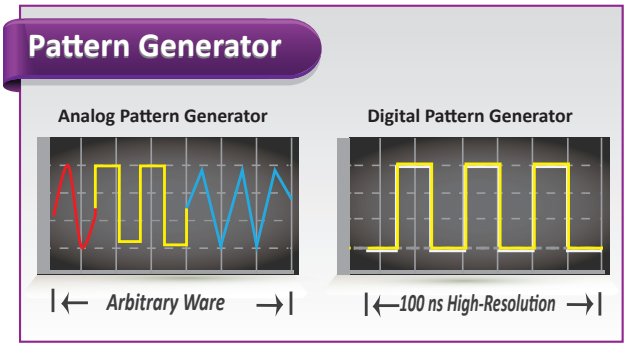
The PCI-2602 can be used to generate arbitrary wave shapes on a single Analog Output port based on user-defined waveform patterns. The Analog Pattern Generator operates at a full 20 MHz rate and is suitable for control systems or radar simulation, etc. The user-defined waveform pattern is stored in the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

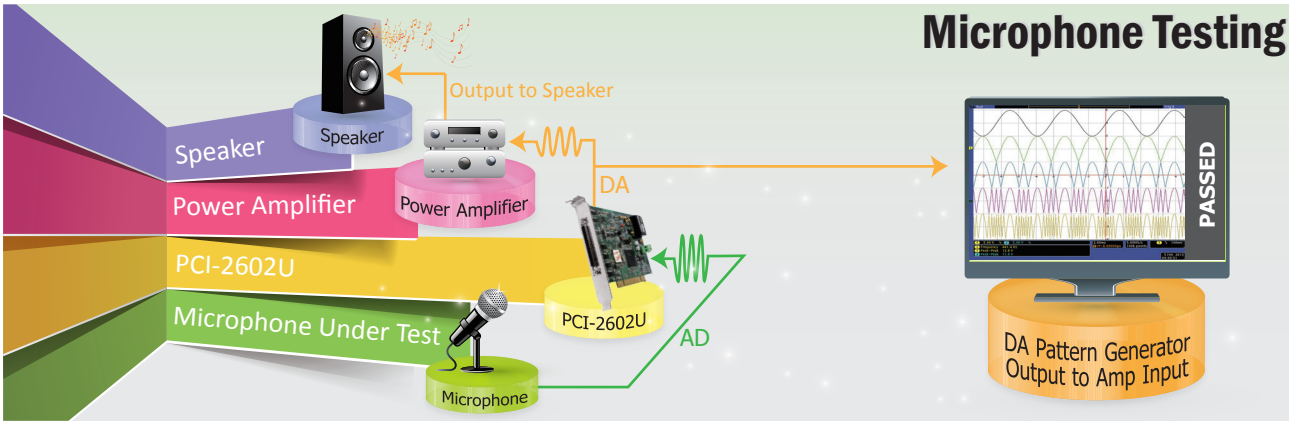
❹ Digital Pattern Generator (DO)

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).







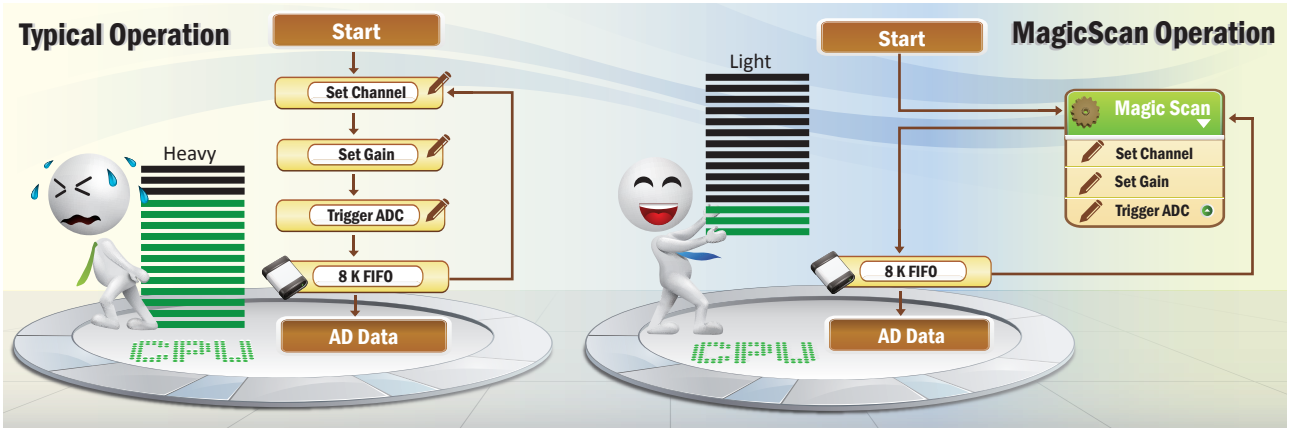


❺ AD Continuous Capture

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.

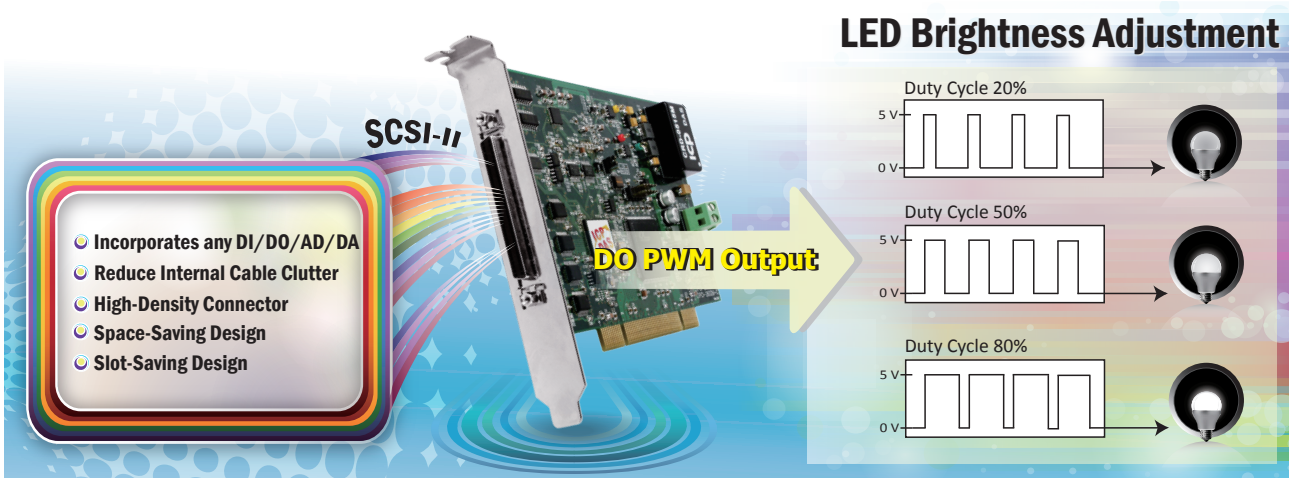


❼ Pulse Width Modulation (PWM, DO)

The PCI-2602U board is also capable of producing PWM signals that can be generated as a digital signal using the Digital Output line(s) from the PA. PWM signals are most commonly used to control a range of functions such as monitoring 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.

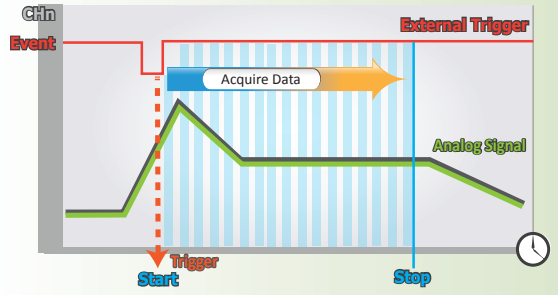


⑨ AD External Trigger

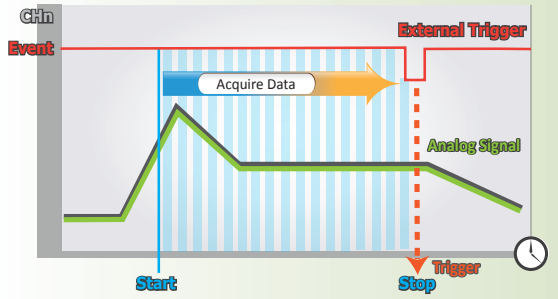
Synchronization of the data acquisition process relative to an external event is an important criterion in many applications. For example, user may want to collect data after receiving a pulse signal from an encoder or when the temperature of a chamber exceeds a critical value. In such instances, the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

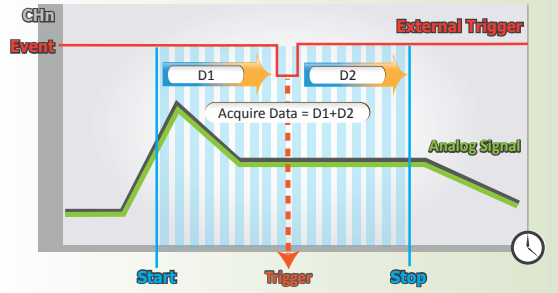
○ **Post-trigger Mode:** In post-trigger mode, the signals are digitized after a trigger condition occurs.



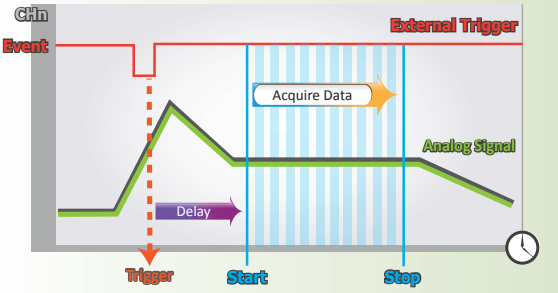
○ **Pre-trigger Mode:** In pre-trigger mode, the signals are digitized before a trigger condition occurs.



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

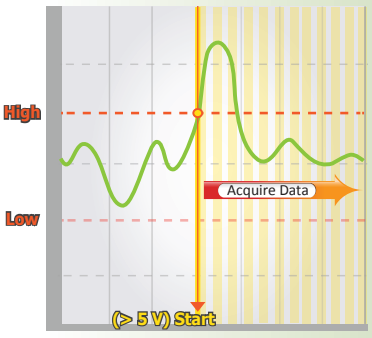


○ **Delay-trigger Mode:** In delay-trigger mode, signal capture begins once the programmed delay period from the trigger has elapsed.

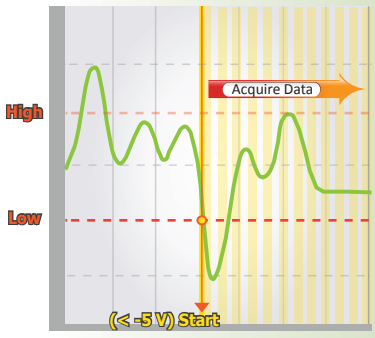


■ **Analog Trigger:** There are six different types of analog trigger, as illustrated below:

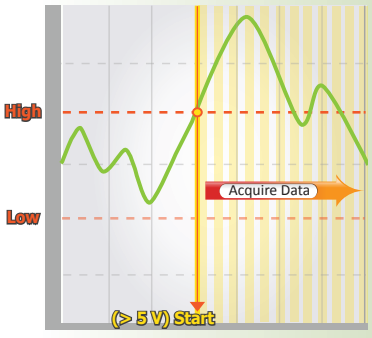
○ Type 1: Above High



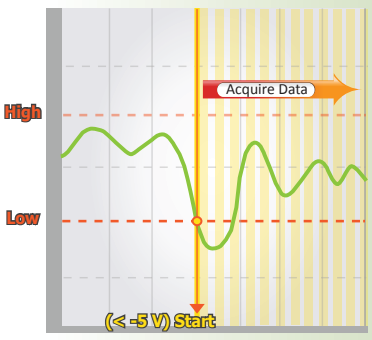
○ Type 2: Below Low



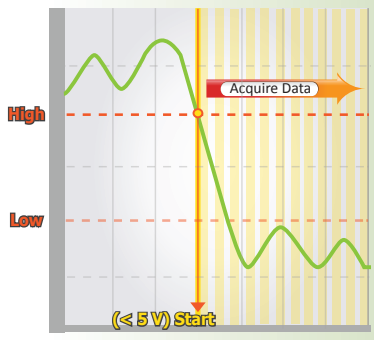
○ Type 3A: Leave-region



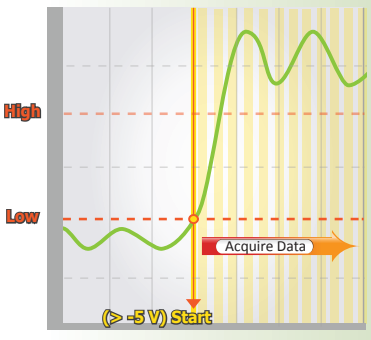
○ Type 3B: Leave-region



○ Type 4A: Entry-region



○ Type 4B: Entry-region



Software

Drivers

- ✓ 32/64-bit Windows XP/2003/2008/Vista/7/8

Sample Programs

- ✓ LabVIEW Toolkit
- ✓ VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

Pin Assignments

Pin Assignment	Terminal No.		Terminal No.	Pin Assignment
+5 V (Output)	01		35	+12 V (Output)
Ext_TRG	02		36	Cnt0_GATE
Trg_GATE	03		37	Cnt0_OUT
Pacer_OUT	04		38	Cnt0_CLK
D_GND	05		39	D_GND
PD7	06		40	PD6
PD5	07		41	PD4
PD3	08		42	PD2
PD1	09		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)

Hardware Specifications

Analog Input	
Channels	16 Single-ended/8 Differential
AD Converter	16-bit, 1 μs conversion time
Sampling Rate	1 MS/s (Max.)
FIFO Size	8192 Samples
Bipolar Range	±10.24 V, ±5.12 V, ±2.56 V
Analog Output	
Channels	2
Resolution	16-bit
FIFO Size	512 Samples
Output Rate	20 MS/s (Max.)
Output Range	±10 V, ±5 V, ±EXT_REF, 0 ~ +10 V, 0 ~ +5 V, 0 ~ EXT_REF
Programmable Digital I/O	
Channels	32 (4-port Programmable)
Digital Input	
Compatibility	5 V/TTL
FIFO Size	512 Samples
Input Voltage	Low: 0.8 V Max.; High: 2.0 V Min.
Digital Output	
Compatibility	5 V/CMOS
DO FIFO Size	512 Samples
Output Voltage	Logic 0: 0.4 V Max.; Logic 1: 2.4 V Min.
Output Voltage	Sink: 6 mA @ 0.33 V Source: 6 mA @ 4.77 V
General	
Bus Type	3.3 V/5 V Universal PCI, 32-bit, 33 MHz
Card ID	Yes (4-bit)
Connectors	Female SCSI II 68-pin x 1
Power Consumption	1 A @ +5 V (Max.)
Operating Temperature	0°C to +60°C
Humidity	5 to 85% RH, Non-condensing

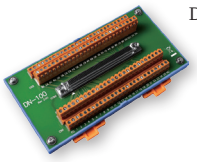
Ordering Information

PCI-2602U CR	Universal PCI, 1 MS/s High-Speed, 16-channel Analog Input, 2-channel Analog Output and 32-channel DI/O (RoHS)

Accessories

DN-68A CR	DIN-Rail Mountable I/O Connector Block with 68-pin SCSI II Female Connector. (RoHs)
CA-SCSI15-H	68-pin SCSI-II Connector Cable, 1.5 m

DN-68A



CA-SCSI15-H