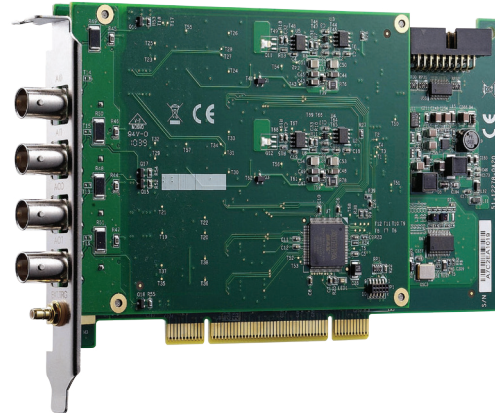


# PCI-9527L

## 24-bit High-Resolution Dynamic Signal Acquisition and Generation Modules

### Features

- 24-bit Sigma-Delta ADC and DAC
- 2-ch simultaneous sampling analog input
- 2-ch simultaneous updated analog output
- 216 kS/s maximum sampling rate with software programmable rate
- Programmable input range:  $\pm 40$  V,  $\pm 10$  V,  $\pm 3.16$  V,  $\pm 1$  V,  $\pm 0.316$  V
- Programmable output range:  $\pm 10$  V,  $\pm 1$  V,  $\pm 0.1$  V
- AC or DC input coupling, software selectable
- Trigger I/O connector for external digital trigger signal
- Supports IEPE output on each analog input, software-configurable



### Introduction

The PCI-9527L is a high-performance, 2-ch analog input and 2-ch analog output dynamic signal acquisition module. This module is specifically designed for audio testing, acoustic measurement, and vibration analysis applications.

The ADLINK PCI-9527L features two 24-bit simultaneous sampling analog input channels. The 24-bit sigma-delta ADC provides a sampling rate up to 216 kS/s at high resolutions, making it ideal for higher bandwidth dynamic signal measurements. The sampling rate can be adjusted by setting the module DDS clock source to an appropriate frequency. All channels are sampled simultaneously and accept an input range from  $\pm 40$  V to  $\pm 0.316$  V. The PCI-9527L analog input supports software selectable AC or DC coupling and 4 mA bias current for integrated electronic piezoelectric (IEPE) sensors.

The ADLINK PCI-9527L also has two channels of 24-bit resolution, high fidelity analog output. The outputs occur simultaneously at software programmable rates up to 216 kS/s. A software programmable output range of  $\pm 0.1$  V,  $\pm 1$  V, and  $\pm 10$  V is available on the output channels.

### Supported Operating System

- Windows 7/10, Linux

### Driver and SDK

- LabVIEW, C/C++, Visual Studio.NET

### Specifications

#### Analog Input

- Number of simultaneously sampled channels: 2
- Input configuration: Differential or pseudo-differential, each channel independently software-selectable
- Input impedance:

| Input Impedance                          | Differential Configuration | Pseudodifferential Configuration |
|--|----------------------------|----------------------------------|
| Between positive input and system ground | 1 M $\Omega$               | 1 M $\Omega$                     |
| Between negative input and system ground | 1 M $\Omega$               | 50 $\Omega$                      |

## Specifications

- Input coupling: AC or DC, software-selectable on each channel
- ADC resolution: 24-bit
- ADC type: Sigma-Delta
- Sampling rate: Up to 216 kS/s maximum, 2 kS/s to 216 kS/s in 454.7  $\mu$ S/s increments
- Input signal range:  $\pm 0.316$  V,  $\pm 1.00$  V,  $\pm 3.16$  V,  $\pm 10.0$  V,  $\pm 40.0$  V
- Integrated Electronic Piezoelectric (IEPE)
  - Current: 4 mA each channel independently software-selectable
  - IEPE compliance: 24 V
- Data transfer: DMA
- FIFO buffer size: 4096 samples shared for AI channels
- Input Common Mode Range:  $\pm 10$  V for both differential and pseudo-differential configuration
- Overvoltage protection
  - Differential input:  $\pm 40$  Vpk
  - Pseudo-differential:
    - Positive terminal:  $\pm 40$  Vpk
    - Negative terminal:  $\pm 10$  Vpk
- AC couple bandwidth
  - -3dB cutoff frequency: 4 Hz
  - -0.1dB cutoff frequency: 24 Hz

| AI Offset Error | Input Range   | Offset        |
|-----------------|---------------|---------------|
|                 | $\pm 40$ V    | $\pm 0.3$ mV  |
|                 | $\pm 10$ V    | $\pm 0.2$ mV  |
|                 | $\pm 3.16$ V  | $\pm 0.1$ mV  |
|                 | $\pm 1$ V     | $\pm 0.04$ mV |
|                 | $\pm 0.316$ V | $\pm 0.04$ mV |

| AI Gain Error | Input Range  |             |
|---------------|--|-------------|
|               | $\pm 40$ V   | $\pm 0.3\%$ |
|               | $\pm 10$ V, $\pm 3.16$ V, $\pm 1$ V, $\pm 0.316$ V | $\pm 0.2\%$ |

| Crosstalk        |                        |
|------------------|------------------------|
| Adjacent channel | Crosstalk<br>< -110 dB |

Measured with  $\pm 10$  V  
Input 1 kHz input tone and -1 dBFS input amplitude

| Index | Fs = 54 kS/s | Fs = 108 kS/s | Fs = 216 kS/s |
|-------|--------------|---------------|---------------|
| SNR   | 103 dB       | 99 dB         | 93 dB         |
| THD   | -114 dB      | -112 dB       | -106 dB       |
| THD+N | -103 dB      | -99 dB        | -93 dB        |

Measure with  $\pm 10$  V input range  
20 Hz~20 kHz input tone and -1 dBFS input amplitude

| Index         | Fs = 54 kS/s | Fs = 108 kS/s | Fs = 216 kS/s |
|---------------|--------------|---------------|---------------|
| Dynamic Range | 105 dB       | 101 dB        | 101 dB        |
| SFDR          | 116 dB       | 113 dB        | 108 dB        |

Measure with  $\pm 10$  V input range  
20 Hz~20 kHz input tone and -60 dBFS input amplitude

### Analog Output

- Number of output channels: 2
- Output configuration:  
Differential or pseudo-differential, each channel independently software-selectable
- DAC resolution: 24-bit
- DAC type: Sigma-Delta
- Update rate:  
1 kS/s to 216 kS/s in 227.3  $\mu$ S/s increments
- FIFO buffer size: 2048 samples for each analog output channel
- Output signal range:  $\pm 0.1$  V,  $\pm 1$  V,  $\pm 10$  V
- Voltage output coupling: DC
- Minimum working load: 600  $\Omega$
- AO Offset error and gain error:

| Output Range | AO Offset Error | AO Gain Error |
|--------------|-----------------|---------------|
| $\pm 0.1$ V  | $\pm 0.05$ mV   | $\pm 0.4\%$   |
| $\pm 1$ V    | $\pm 0.25$ mV   | $\pm 0.4\%$   |
| $\pm 10$ V   | $\pm 1$ mV      | $\pm 0.4\%$   |

- Output impedance:

| Output Range                          | Differential Configuration | Pseudodifferential Configuration |
|---------------------------------------|----------------------------|----------------------------------|
| Between positive and negative outputs | 66 $\Omega$                | 66 $\Omega$                      |

- Analog output, -3dB bandwidth: 110 kHz
- AO THD+N

| Output Range | 20 Hz to 20 kHz, 102.4 kS/s |
|--------------|-----------------------------|
| $\pm 0.1$ V  | -85 dB                      |
| $\pm 1$ V    | -100 dB                     |
| $\pm 10$ V   | -101 dB                     |

### Triggers

- Trigger sources:
  - Software trigger
  - Analog trigger
  - External digital trigger
- Trigger mode:
  - Post-trigger
  - Delay-trigger
  - Re-trigger

# PCI-9527L

## Specifications

- Analog trigger
  - Source: AI0, AI1
  - Trigger level: full scale input range
  - Trigger conditions: positive or negative trigger, software selectable
  - Trigger resolution: 24-bit
- External digital trigger
  - Source: front panel SMB connector
  - Compatibility: 5 V TTL
  - Trigger polarity: rising or falling edge
  - Pulse width: 25 ns minimum

### Timebase source

- Internal (on board): 125 MHz

### General Specifications

- I/O connector
  - BNC x 4 for analog inputs/outputs
  - SMB x 1 for external trigger
- PCI Bus Signaling: Universal PCI, support 3.3 V and 5 V PCI signals
- Dimensions (not including connectors)
  - PCI-9527L: 175 mm (W) x 107 mm (H) (6.82" x 4.17")
- Ambient temperature (Operational):
  - 0°C to 50°C (32°F to 122°F) (PCI version)
- Ambient temperature (Storage):
  - -20°C to 80°C (-4°F to 176°F)
- Relative humidity:
  - 10% to 90% non-condensing

### Calibration

- Onboard reference: +5 V
- Temperature coefficient:  $\leq \pm 5$  ppm/°C
- Recommend Warm-up time: 15 minute
- Power Requirement

| Power Rail | Standby Current (mA) | Full Load (mA) |
|------------|----------------------|----------------|
| +5 V       | 930                  | 2330           |
| +12 V      | 310                  | 350            |

### Certifications

- EMC/EMI: CE, FCC Class AV

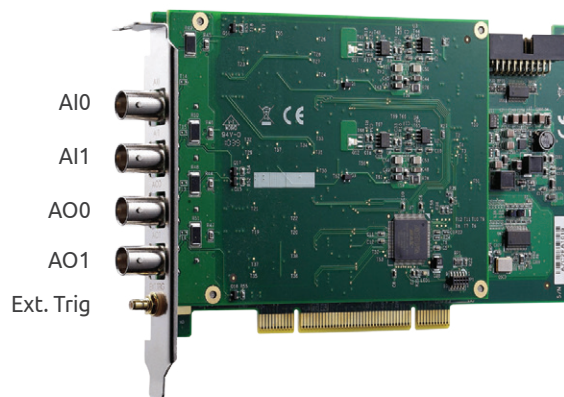
## Cable Accessories

| Cable      | Description              |
|------------|--------------------------|
| SMB-SMB-1M | 1 meter SMB to SMB cable |
| SMB-BNC-1M | 1 meter SMB to BNC cable |

## Ordering Information

- **PCI-9527L**  
2-ch 24-bit 216 kS/s High-Resolution Dynamic Signal Acquisition and Generation module for PCI bus

### IO connector definition



PCI-9527L

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