

# PCI-9820

## 2-CH Up to 130MS/s 14-Bit Digitizer with SDRAM

### Features

- Supports a 32-bit 3.3 V or 5 V PCI bus
- 14-bit A/D resolution
- Up to 60 MS/s sampling rate per channel with internal timebase
- Up to 65 MS/s sampling rate per channel with external timebase
- Up to 130 MS/s sampling rate in "ping pong" mode
- 2-CH single-ended bipolar inputs
- >30 MHz -3dB bandwidth
- Up to 512MB on-board SODIMM SDRAM
- Programmable ranges of  $\pm 1$  V and  $\pm 5$  V
- User-selectable input impedance of 50  $\Omega$  or high input impedance
- Scatter-gather DMA
- Analog and digital triggering
- Fully auto calibration
- Multiple cards synchronization
- Compact, half-size PCB

### Operating Systems

- Windows 98/NT/2000/XP/2003
- Linux

### Recommended Software

- VB/VC++/BCB/Delphi
- DAQBench

### Driver Support

- DAQ-LVIEW PnP for LabVIEW
- DAQ-MATLAB for MATLAB
- DAQBOY for Windows
- WD-DASK for Windows
- WD-DASK/X for Linux



### Introduction

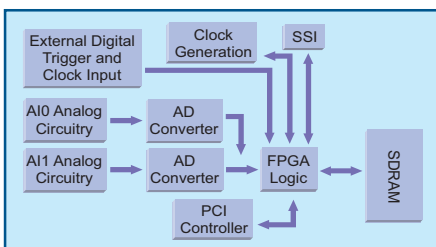
ADLINK PCI-9820 is a 65 MS/s, high-resolution PCI digitizer with deep SODIMM SDRAM memory. The device features flexible input configurations, including programmable input ranges and user-selectable input impedance. With the deep on-board acquisition memory, the PCI-9820 is not limited by the PCI 132 MB/s bandwidth, and can record the waveform for a long period of time. The PCI-9820 is ideal for high-speed waveform capturing, such as radar and ultrasound applications, as well as software radio applications, or those signal digitizing applications which need deep memory for data storage.

### Analog Input

The PCI-9820 device features two analog input channels. The small signal bandwidth of each channel exceeds 30 MHz. The input ranges are programmable as either  $\pm 5$  V or  $\pm 1$  V. The 14-bit A/D resolution makes the PCI-9820 ideal both for time-domain and frequency-domain applications.

### Acquisition System

ADLINK PCI-9820 device uses a pair of 65 MS/s, 14-bit pipeline ADCs to digitize the input signals, and the device provides an internal 60 MHz timebase for data acquisition. The maximum real-time sampling rate is 60 MS/s with internal timebase, and is up to 65 MS/s with external timebase. By using the "ping pong" mode, the sampling rate is up to 120 MS/s with internal timebase or 130 MS/s with external timebase.



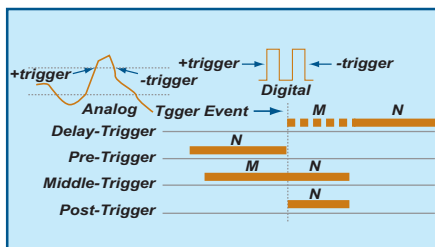
### Acquisition Memory

The PCI-9820 device supports different size of SODIMM SDRAM ranging from 128 MB to 512 MB. The digitized data are stored in the on-board SDRAM before being transferred to the host memory. The PCI-9820 device uses the scatter-gather bus mastering DMA to move data to the host memory. If the data throughput from the PCI-9820 is less than the available PCI bandwidth, the PCI-9820 also features on-board 3k-sample FIFO to achieve real-time transfer bypassing the SDRAM, directly to the host memory.

### Triggering

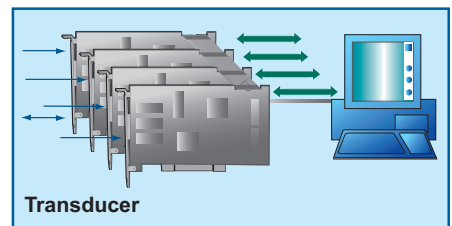
The PCI-9820 device features flexible triggering functionalities, such as analog and digital triggering. The analog trigger features programmable trigger thresholds on rising or falling edges on both input channels. The 5 V/TTL digital trigger comes from SSI interface or the external SMB connector for synchronizing multiple devices.

Post-trigger, pre-trigger, delay-trigger and middle-trigger modes are available to acquire data around the trigger event. The PCI-9820 also features repeated trigger acquisition, so you can acquire data in multiple segments coming with successive trigger events at extremely short rearming interval.



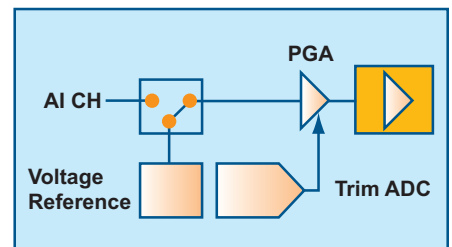
### Multiple-Instrument Synchronization

On the PCI-9820, a synchronization bus (system synchronization interface, SSI) routes timing and trigger signals between one or more PCI-9820 devices. The SSI could reach synchronization between different acquisition hardware by a common trigger signal or a single sample clock for the acquisition of multiple devices.



### Calibration

The auto-calibration function of the PCI-9820 is performed with trim DACs to calibrate the offset and gain errors of the analog input channels. Once the calibration process is done, the calibration constant will be stored in EEPROM such that these values can be loaded and used as needed by the board. Because all the calibration is conducted automatically by software commands, you don't have to adjust trim pots to calibrate the boards.



**Specifications**

**Analog Input**

- Number of channels: 2 simultaneous-sampled single-ended
- Resolution: 14 bits
- Maximum sampling rate
  - 65 MS/s for 2 inputs
  - 130 MS/s for Ping-Pong mode
- On-board sample memory
  - 128 MB, standard
  - up to 512 MB, optional
- Bandwidth (-3 dB): 30 MHz minimum
- Input signal ranges: (software programmable)  $\pm 5$  V,  $\pm 1$  V
- Input Coupling: DC
- Overvoltage protection

Range	Overvoltage protection
$\pm 5$ V	$\pm 14$ V
$\pm 1$ V	$\pm 5$ V

- Input Impedance (soldering selectable): 50 $\Omega$ , 1.5 M $\Omega$
- Crosstalk: -80 dB, DC to 1MHz
- Total harmonic distortion (THD): -75 dB
- Signal-to-Noise ratio (SNR)

Range	SNR
$\pm 5$ V	66 dB
$\pm 1$ V	62 dB

- Spurious-free dynamic range (SFDR): 75 dB
- Data transfer: bus mastering DMA with scatter-gather

**Auto Calibration**

- On-board reference: +5 V
- Temperature drift: 2 ppm/ $^{\circ}$ C
- Stability: 6 ppm/1000 Hrs

**External Timebase Input**

- Connector: SMB
- Impedance: 50 $\Omega$
- Coupling: AC
- Input amplitude: 1 V<sub>pp</sub> to 2 V<sub>pp</sub>
- Overvoltage protection: 2.5 V<sub>pp</sub>
- Frequency range: 500 kHz - 65 MHz

**Triggering**

- Analog triggering
  - Modes: pre-trigger, post-trigger, middle-trigger, delay-trigger
  - Source: CH0 and CH1
  - Slope: rising/falling
  - Coupling: DC
  - Trigger sensitivity: 256 steps in full-scale voltage range
- Digital triggering
  - Modes: pre-trigger, post-trigger, middle-trigger, delay-trigger
  - Source: external digital trigger from SMB
  - Slope: rising/falling
  - Compatibility: 5 V/TTL
  - Minimum pulse width: 10 ns
- Repeated trigger rearming interval: 2 cycles of timebase
- Pre-trigger depth: 128 MB or 512 MB, depending on memory option
- Post-trigger depth: 128 MB or 512 MB, depending on memory option

**General Specifications**

- I/O connector
  - BNC x 2 for analog inputs
  - SMB x 2 for external digital trigger and external timebase
- Operating temperature: 0 to 50 $^{\circ}$ C
- Storage temperature: -20 to 80 $^{\circ}$ C
- Relative humidity: 5 to 95%, noncondensing
- Power requirements

Power Rail	Current
5 V	895 mA
12 V	295 mA
3.3 V	310 mA (with 128 MB SDRAM) 430 mA (with 512 MB SDRAM)

- Dimensions (not including connectors) 175 mm x 107 mm

**Accessories**

- **SMB-SMB-1M**  
1-meter SMB to SMB cable
- **SMB-BNC-1M**  
1-meter SMB to BNC cable
- **ACL-SSI-2**  
SSI Bus cable for 2 devices
- **ACL-SSI-3**  
SSI Bus cable for 3 devices
- **ACL-SSI-4**  
SSI Bus cable for 4 devices



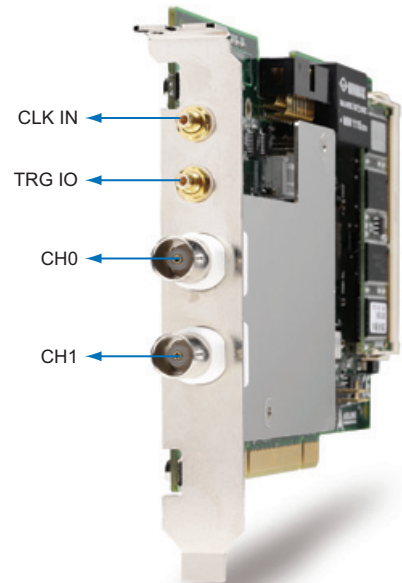
SMB-SMB-1M



SMB-BNC-1M



ACL-SSI-2/3/4



**Ordering Information**

- **PCI-9820D/128-0**  
2-CH 65 MS/s 14-Bit Digitizer with 128 MB Memory
- **PCI-9820D/512-0**  
2-CH 65 MS/s 14-Bit Digitizer with 512 MB Memory

- 1 Software Solutions
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