PCIe-9814

4-CH 12-Bit 80 MS/s PCI Express Digitizer



Introduction

The ADLINK PCIe-9814 is a PCI Express digitizer providing speedy, high quality data acquisition. Each of the four input channels supports up to 80MS/s sampling, with 12-bit resolution A/D converter. This allows simultaneous recording of signals on all channels with no interchannel phase delay. The extremely large on-board memory enables long recording times even at the highest sampling rates.

Unlike parallel PCI buses, PCI Express slots utilize serial point-to-point connection. Each connection pair (lane) can achieve burst connection speeds of 250MB/s. The PCIe-9814, based on x4 lane slot PCI Express technology, provides a clear advantage in that direct connection of each slot allows full transfer bandwidth for each individual card. The ADLINK PCIe-9814 x4 digitizer can be used in any standard PCI Express slot, x4, x8, or x16.

Features

- **Up to 80 MS/s sampling**
- **4 simultaneous analog inputs**
- **High resolution 12-bit ADC**
- **Up to 40 MHz bandwidth for analog input**
- **1 GB onboard storage memory**
- **Programmable input voltage range of ±0.5V, ±1V, ±5V, or ±10V**
- **Scatter-Gather DMA data transfer for high speed data streaming**
- **Provide 10 or 20 MHz digital onboard filter (FPGA)**
- **Provide PLL module for precise synchronization (PCIe-9814P only)**
- **Support for:**
  - **One external digital trigger input**
  - **One external clock input**
  - **Three SDI inputs**
- **Full auto-calibration**

Supported Operating Systems

- Windows 7/8 x64/x86, Linux

Driver and SDK

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

Specifications

Analog Input

- Number of channels: 4 single-ended
- Input impedance: 50Ω or 1MΩ, software selectable
- Input coupling: DC
- Input signal range: ±0.5V, ±1V, ±5V, or ±10V
- Overvoltage protection: ±30V@ 1M Ω, ±10V and ±5V ; ±10V@ 1M Ω, ±1V and ±0.5V ; ±10V sine wave/7 Vrms@ 50 Ω, all ranges
- ADC resolution: 12 bits
- Bandwidth: 40MHz
- Offset Error:

Range	Offset Error
±0.5V, ±1V	±0.5 mV
±5V	±4 mV
±10V	±10 mV

- Gain Error:

Input Impedance	Range	Gain Error
50Ω	All Range	±1%
1MΩ	±0.5V, ±1V, ±5V	±0.5%
	±10 V	±1%

- Crosstalk: from DC to 10 MHz

Range	Crosstalk
±0.5V	-80 dB
±1V, ±5V, ±10V	-90 dB

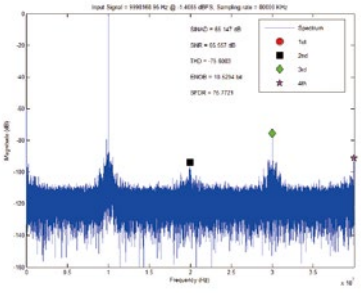
- System Noise:

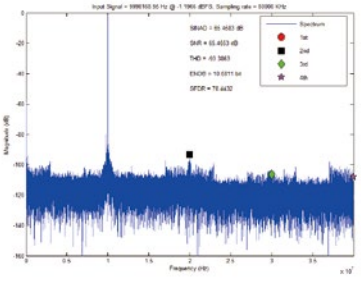
Range	System Noise (RMS)
±0.5V	150 uV
±1V	300 uV
±5V	1.5 mV
±10V	2.5 mV

- Spectral Characteristics:

  Sampling rate: 80MS/s, 10MHz -1dBFS input signal

Input Range	SNR	THD	SFDR
50Ω with digital filter OFF			
±0.5V, ±1V, ±5V	64 dB	-74 dB	76 dB
50Ω with digital filter ON			
±0.5V, ±1V, ±5V	65 dB	-93 dB	78 dB
1MΩ with digital filter OFF			
±0.5V, ±1V	64 dB	-71 dB	72 dB
±5V	64 dB	-73 dB	74 dB
±10V	64 dB	-75 dB	76 dB
1MΩ with digital filter On			
All Range	65 dB	-93 dB	78 dB





PCI EXPRESS®

Trigger

- Trigger Sources
  - Software
  - External digital trigger
  - Analog trigger from CH0 ~ CH3
  - SSI
- Trigger Modes
  - Post-trigger
  - Pre-trigger
  - Middle trigger
  - Delay trigger
- External Digital Trigger Input
  - Source: Front panel SMB connector
  - Compatibility: 3.3V TTL, 5V tolerance
  - Input high threshold: 2.0V
  - Input low threshold: 0.8V
  - Maximum input overload: -0.5 V to +5.5 V
  - Trigger polarity: rising or falling edge
  - Pulse width: 20 ns minimum

Timebase

- Sample clock source
  - Internal: onboard clock (oscillator)
  - External: CLK IN (front panel)
- Sample clock frequency
  - Internal: 1.22K Hz ~ 80M Hz
  - External: 20M Hz ~ 80M Hz (CLK IN)
  - Internal timebase accuracy: < ±25 ppm
- External sample clock input range : 1Vpp ~ 5Vpp
- External reference clock source
  - SDI0 (Front panel, only PCIe-9814P)
- External reference clock frequency: 10M Hz
- External reference clock input range : 3.3V ~ 5V TTL

Data Storage and Transfer

- 1 GB onboard memory, shared among four analog inputs
- Scatter-Gather DMA data transfer Onboard Reference

Onboard Reference

- +1.8V, +0.9V and +0.45V onboard reference voltage
- < 3 ppm/°C reference temperature drift
- 15 minutes recommended warm-up

General Specifications

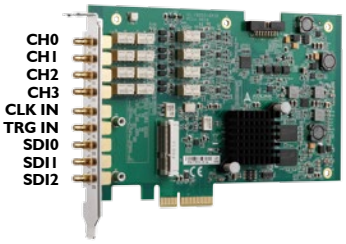
- I/O Connector:
  - SMB x 4 for analog inputs
  - SMB x 1 for external trigger input
  - SMB x 1 for external sample clock input
  - SMB x 3 for synchronous digital input
    (SDI0 can be shared with Ref clock input, only PCIe-9814P)
- Dimensions (not including connectors):
  - 167.64 (W) x 106.68 (H) mm (6.53" x 4.16")
- Bus Interface:
  - PCI Express gen 1 x4
- Ambient Temperature (Operational):
  - 0°C to 50°C (32°F to 122°F)
- Ambient Temperature (Storage):
  - -20°C to 80°C (-4°F to 176°F)
- Relative Humidity:
  - 10% to 90%, non-condensing Certifications
- Power Consumption:

	PCIe-9814		PCIe-9814P	
Power Rail	Standby (mA)	Full load (mA)	Standby (mA)	Full load (mA)
+3.3V	20	20	20	20
+12V	425	505	655	715
Total Power(W)	5.116	6.126	7.926	8.646

Certifications

- EMC/EMI: CE, FCC Class A

IO connector definition



Ordering Information

■ PCIe-9814
4-CH 12-Bit 80 MS/s PCI Express Digitizer

■ PCIe-9814P
4-CH 12-Bit 80 MS/s PCI Express Digitizer with PLL module

SSI Bus Cables (for multiple card synchronization)

■ ACL-eSSI-2/3/4
SSI bus cable for two, three, and four devices

