

# PCI/PXI-9816/9826/9846

4-CH 16-Bit 10/20/40 MS/s Digitizers with 512 MB Memory



PCI-9816/9826/9846



PXI-9816/9826/9846

## Introduction

The ADLINK PCI/PXI-9816/9826/9846 are 10 MS/s, 20 MS/s, 40 MS/s sampling 16-bit 4-CH digitizers designed for digitizing high frequency and wide dynamic range signals with an input frequency up to 20 MHz. The analog input range can be programmed via software to  $\pm 1\text{ V} / \pm 0.2\text{ V}$  or  $\pm 5\text{ V} / \pm 1\text{ V}$ , based on the model. With a deep onboard acquisition memory up to 512 MB, the PXI/PXI-9816/9826/9846 are not limited by the data transfer rate of the PCI bus to enable the recording of waveforms for extended periods of time.

The PXI/PXI-9816/9826/9846 are equipped with four high linearity 16-bit A/D converters ideal for demanding applications with a high dynamic range such as radar, ultrasound, and software-defined radio.

## Specifications

### Analog Input

- Number of channels: 4 single-ended channels
- Input impedance: 50  $\Omega$  or 1 M $\Omega$ , software selectable
- Input coupling: DC
- Input range: ( $\pm 0.2\text{ V}, \pm 1\text{ V}$ ) or ( $\pm 1\text{ V}, \pm 5\text{ V}$ ), depends on model type
- ADC resolution: 16 bits, 1 in 65536
- Crosstalk:  $< -80\text{ dB}$  from DC to 1 MHz, for all input ranges
- System noise, unit in  $\text{LSB}_{\text{RMS}}$ :

Input Range	PXI-9816D	PXI-9826D	PXI-9846D	PXI-9846W	PXI-9846D
$\pm 0.2\text{ V}$	5.0	6.0	8.0	15.0	8.0
$\pm 1\text{ V}$	3.0	4.0	5.0	7.0	5.0

Input Range	PXI-9816H	PXI-9826H	PXI-9846H	PXI-9846H
$\pm 1\text{ V}$	5.0	6.0	8.0	8.0
$\pm 5\text{ V}$	3.0	4.0	5.0	5.0

- Offset error:

Model Name	PXI-9816D/9826D/9846D/9846W, PCI-9846D
Offset error	$\pm 0.2\text{ mV}$
Model Name	PXI-9846H, PCI-9816H/9826H/9846H
Offset error	$\pm 0.3\text{ mV}$

- Gain error:

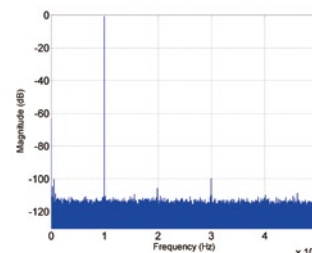
Input Range	PXI-9816D/9826D/9846D/9846W, PCI-9846D
$\pm 0.2\text{ V}$	$\pm 0.1\%$
$\pm 1\text{ V}$	$\pm 0.05\%$
Input Range	PXI-9846H, PCI-9816H/9826H/9846H
$\pm 1\text{ V}$	$\pm 0.1\%$
$\pm 5\text{ V}$	$\pm 0.06\%$

- 3dB Bandwidth, typical:

Input Range	PXI-9816D	PXI-9826D	PXI-9846D/PCI-9846D	PXI-9846DW
@ 50 $\Omega$ and 1 M $\Omega$ input impedance				
$\pm 0.2\text{ V}, \pm 1\text{ V}$	5.1 MHz	9.6 MHz	20 MHz	80 MHz ( $\pm 1\text{ V}$ ) 55 MHz ( $\pm 0.2\text{ V}$ )
Input Range	PCI-9816H	PCI-9826H	PXI-9846H/PCI-9846H	---
@ 50 $\Omega$ input impedance				
$\pm 1\text{ V}, \pm 5\text{ V}$	5.1 MHz	9.6 MHz	20 MHz	---
@ 1 M $\Omega$ input impedance				
$\pm 1\text{ V}, \pm 5\text{ V}$	90 KHz			---

- Spectral Characteristics

- Model: PXI-9816D/512
- Input Range:  $\pm 0.2\text{ V}$
- Sampling Rate: 10 MS/s
- SINAD: 76.56 dBc
- SNR: 76.59 dBc
- THD: -95.91 dBc
- ENOB: 12.42 bit
- SFDR: 99.73 dBc



## Features

- PXI specifications Rev.2.2 compliant (PXI-98x6)
- Supports 5 V and 3.3 V PCI signals
- Supports the 32-bit /66 MHz PCI interface
- 4 channels of simultaneous single-ended analog input
- 16-bit high resolution A/D converter
- Up to 10 MS/s, 20 MS/s, and 40 MS/s per channel
- 512 MB on-board memory for data storage
- Software selectable 50  $\Omega$  or 1 M $\Omega$  input impedance
- Programmable input voltage range:  $\pm 0.2\text{ V} / \pm 1\text{ V}$  or  $\pm 1\text{ V} / \pm 5\text{ V}$
- 5.1 MHz, 9.6 MHz, and 20 MHz analog input bandwidth for the PCI/PXI-9816, PCI/PXI-9826 and PCI/PXI-9846, respectively
- Multiple module synchronization via the PXI trigger bus or SSI (System Synchronization Interface)
- Supports scatter-gather DMA transfer
- 89 dBc SFDR, 79 dBc SINAD and 12.9-bit ENOB (PXI-9816)
- Fully auto-calibration

### Operating Systems

- Windows 7/VISTA/XP/2000
- Linux

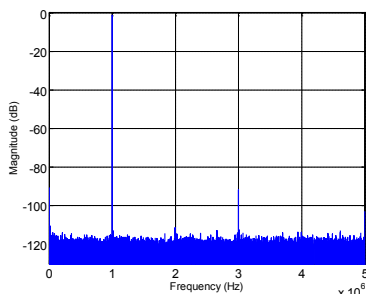
### Recommended Software

- AD-Logger
- VB.NET/VC.NET/VB/VC/BCB/Delphi
- DAQBench

### Driver Support

- DAQPilot for Windows
- DAQPilot for LabVIEW™
- DAQ-MTLB for MATLAB
- WD-DASK for Linux
- WD-DASK/X for Windows

- Model: PXI-9816D/512
- Input Range:  $\pm 1$  V
- Sampling Rate: 10 MS/s
- SINAD: 79.80 dBc
- SNR: 80.19 dBc
- THD: -88.61 dBc
- ENOB: 12.96 bit
- SFDR: 89.08 dBc



- Typical values are measured using 1 MHz sine wave input at 10 MS/s with amplitude at -1 dB at full scale on a  $\pm 1$  V and  $\pm 0.2$  V range using the PXI-9816. Acquired data lengths are in 64 K point, calculated with Hanning window FFT.
- Note that these dynamic parameters may vary from one module to another, with different input signal frequencies and signal amplitudes selected.
- For detailed dynamic test results of other modules, please refer to the user manual or visit the ADLINK website.

#### Timebase

- Sample clock sources
  - Internal: on-board oscillator
  - External: CLK IN (front panel SMB connector), PXI Trigger Bus[0..7], PXI 10 MHz, PXI Star, SSI Bus
- Timebase frequency range
  - PCI/PXI-9816: 1 MHz - 10 MHz
  - PCI/PXI-9826: 1 MHz - 20 MHz
  - PCI/PXI-9846: 1 MHz - 40 MHz

#### Dedicated External Clock Input From Panel

- Connector type: SMB
- Clock type: sine wave or square wave
- Input impedance: 50  $\Omega$
- Input coupling: AC
- Input range: 1 V<sub>p-p</sub> to 2 V<sub>p-p</sub>
- Overvoltage protection: 2.5 V<sub>p-p</sub>

#### Triggering

- Trigger sources:
  - software
  - TRG IO (front panel SMB connector)
  - Analog trigger from CH0 - CH3
  - PXI Star (PXI version)
  - PXI Trigger Bus[0..7] (PXI version)
  - SSI (PCI version)
- Trigger modes: Pre-trigger, post-trigger, middle-trigger, delay-trigger

#### Data Storage and Transfer

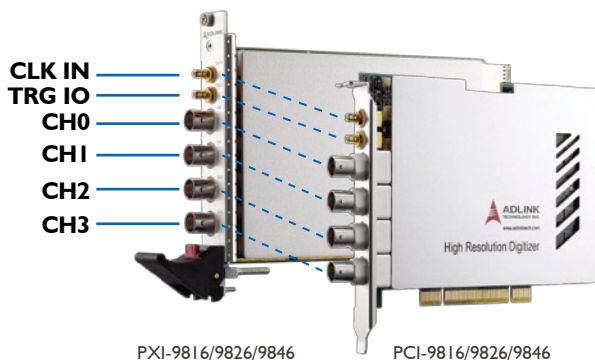
- On-board memory: 512 MB, shared among the four AI channels
- Data transfer: scatter-gather DMA

#### On-board Reference

- On-board reference voltage: +5 V
- Temperature drift:  $\pm 3$  ppm/ $^{\circ}$ C
- Recommended warm-up time: 15 minutes

#### General Specifications

- I/O Connector
  - BNC X4 for analog inputs
  - SMB X2 for external digital trigger and external timebase input
- Dimensions (not including connectors)
  - PCI version: standard height, half length PCI card, 167.64 mm by 106.68 mm
  - PXI version: Single 3U PXI module, 100 mm by 160 mm



- PCI Bus Interface
  - PCI signaling: support 3.3 V and 5 V signaling
  - PCI interface: 32-bit, 66 MHz
- Operating Environment
  - Ambient temperature: 0 $^{\circ}$ C to 55 $^{\circ}$ C (PXI version), 0 $^{\circ}$ C to 50 $^{\circ}$ C (PCI version)
  - Relative humidity: 10% to 90%, non-condensing
- Storage Environment
  - Ambient temperature: -20 $^{\circ}$ C to 80 $^{\circ}$ C
  - Relative humidity: 10% to 90%, non-condensing
- Power Requirement, typical:

Power Rails	PXI/PCI-9816	PXI/PCI-9826	PXI/PCI-9846
3.3 V	0.8 A	0.8 A	0.8 A
5 V	1.4 A	1.5 A	2.0 A
12 V	0.3 A	0.3 A	0.3 A

#### Certifications

- EMC/EMI: CE, FCC Class A

#### Multi-Module Synchronization

- For PXI version of digitizer modules, they can be synchronized through PXI trigger bus, PXI Star and PXI 10 MHz.
- For PCI version of digitizer modules, they can be synchronized through a dedicate interface, SSI (System Synchronized Interface).



SSI bus cable for multiple module synchronization

#### Cable 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

#### Ordering Information

Model Name	Sampling Rate	Input Range	Max. -3dB Bandwidth
PXI-9816H/512	10 MS/s	$\pm 5$ V, $\pm 1$ V	5.1 MHz
PCI-9826H/512	20 MS/s	$\pm 5$ V, $\pm 1$ V	9.6 MHz
PCI-9846H/512	40 MS/s	$\pm 5$ V, $\pm 1$ V	20 MHz
PXI-9846D/512	40 MS/s	$\pm 1$ V, $\pm 0.2$ V	20 MHz
PXI-9816D/512	10 MS/s	$\pm 1$ V, $\pm 0.2$ V	5.1 MHz
PXI-9816H/512	10 MS/s	$\pm 5$ V, $\pm 1$ V	5.1 MHz
PXI-9826D/512	20 MS/s	$\pm 1$ V, $\pm 0.2$ V	9.6 MHz
PXI-9846D/512	40 MS/s	$\pm 1$ V, $\pm 0.2$ V	20 MHz
PXI-9846DW/512	40 MS/s	$\pm 1$ V, $\pm 0.2$ V	80 MHz
PXI-9846H/512	40 MS/s	$\pm 5$ V, $\pm 1$ V	20 MHz

Note: For special features or specifications, such as higher input range or higher bandwidth options, please contact ADLINK for more details.