

1. PCIe/PXIe-9516,9515 Specifications

Dynamic Signal Analyzer Module



Overview

PCIe/PXIe-9516, 9515 series are designed for dynamic signal acquisition, such as structural health monitoring, noise, vibration, harshness (NVH) measurement, and phased array data acquisition. They provide up to 16 simultaneous sampling analog input channels, software-configurable AC/DC input coupling, anti-aliasing filters, and per-channel selectable IEPE conditioning. With 24-bit ADC, carefully designed built-in anti-aliasing passband filter and 6 gain stages, PCIe/PXIe-9516 series provides highly flat passband, sharp -3dB roll-off point and very low noise, which make it suitable for high precision, high dynamic range signal acquisition, especially for low-level signal measurement. With the help of high throughput PCI Express bus and multi-core optimized driver, PXIe-9516 series can provide high-performance data throughput.

1.1 Main Features

- 16 channels (9516) / 8 channels (9515)
- Synchronous acquisition
- Per-channel software-configurable AC/DC input coupling. 4mA IEPE conditioning support
- Up to 6 voltage ranges
- 24 bits resolution ADC
- Maximum sampling rate of 256 kS/s
- DMA for analog input
- Analog/Digital/Software trigger

1.2 Input Characteristic

Number of channels	16 (9516) / 8 (9515)
Input configuration	Pseudo-differential
Input coupling	AC/DC , selectable per channel
ADC resolution	24 bits
ADC type	Delta-sigma
Sample rate range	62.5 S/s-256 kS/s
FIFO buffer size	128 M samples
Data transfers	DMA
Positive terminal maximum working voltage	±12.5 V
Negative terminal maximum working voltage	±1 V
Positive terminal overvoltage protection (Voltages with respect to chassis ground)	±50 V
Negative terminal overvoltage protection (Voltages with respect to chassis ground)	±1.7 V
Input range	±0.3125V/±0.625 V/±1.25 V/±2.5 V/±5 V/±10 V
Input impedance (Between positive input and negative input)	10 MΩ 35 pF
Input impedance (Between negative input and chassis ground)	50 Ω
CMRR(Input frequency<20 kHz)	52 dB
IEPE Current	4 mA (software selectable, per channel)
IEPE Compliance	32 V
IEPE open	Software readable
IEPE short	Software readable
Channel input impedance with IEPE enabled (1 kHz)	>250 kΩ
IEPE Current noise	100 pA/√Hz

Table 1 Input Characteristic

1.3 Flatness

Flatness (51.2kS/s, for 1Hz - 20.48kHz input)	±0.003 dB
Flatness (128kS/s, for 20.48kHz - 51.2kHz input)	±0.02 dB
Flatness (256kS/s, for 51.2kHz - 102.4 kHz input)	±0.05 dB

Table 2 Flatness

1.4 Dynamic Characteristics

Alias Rejection	108 dBc
-3dB Bandwidth	0.433 * Fs
-3 dB cutoff frequency in AC Couple mode	0.4 Hz
-0.1 dB cutoff frequency in AC Couple mode	4.5 Hz
Idle channel noise ($\pm 10V$, 51.2kS/s)	-94 dBVrms (20 uVrms)
Idle channel noise ($\pm 0.3125V$, 51.2kS/s)	-112 dBVrms (3 uVrms)
Idle channel noise ($\pm 10V$, 256kS/s)	-87 dBVrms (45uVrms)
Idle channel noise ($\pm 0.3125V$, 256kS/s)	-105 dBVrms (6uVrms)
Spectral noise density (at $\pm 0.3125V$, around 1kHz)	20nVrms/VHz
Dynamic range($\pm 10V$ 51.2kS/s)	112 dB
Dynamic range($\pm 0.3125V$ 51.2kS/s)	101 dB
Dynamic range($\pm 10V$ 256kS/s)	106 dB
Dynamic range($\pm 0.3125V$ 256kS/s)	94 dB
Spurious free dynamic range (SFDR) ($\pm 5V$)	105 dBc
Spurious free dynamic range (SFDR) ($\pm 0.3125V$)	100 dBc
Total harmonic distortion plus noise (THD+N) ($\pm 5V$ 51.2kS/s)	-96 dBc
Total harmonic distortion plus noise (THD+N) ($\pm 0.3125V$ 51.2kS/s)	-84 dBc
Total harmonic distortion plus noise (THD+N) ($\pm 5V$ 256kS/s)	-95 dBc
Total harmonic distortion plus noise (THD+N) ($\pm 0.3125V$ 256kS/s)	-81 dBc
Crosstalk for adjacent ($\pm 10V$ for 1kHz in)	-120 dBc
Crosstalk for adjacent ($\pm 0.3125V$ for 1kHz in)	-110 dBc
Crosstalk for adjacent ($\pm 10V$ for 102.4kHz in)	-92 dBc
Crosstalk for adjacent ($\pm 0.3125V$ for 102.4kHz in)	-92 dBc
Filter Delay (Max, Normal Filter Mode)	37 Samples
Interchannel phase mismatch ($\pm 10V$ for 20kHz in)	<0.17°
Interchannel phase mismatch ($\pm 0.3125V$ for 20kHz in)	<0.30°
Interchannel phase mismatch ($\pm 10V$ for 102.4kHz in)	<0.64°
Interchannel phase mismatch ($\pm 0.3125V$ for 102.4 kHz in)	<1.35°

Table 3 Dynamic Characteristics

Filter Delay in different mode and sample rate		
Sample Rate Range (Sa/s)	Filter Mode	
	Normal Mode	Wide BW Mode
[62.5,4000]	32.898	32.898
(4000, 32000]	35.875	35.875
(32000, 128000]	37	49
(128000,256000]	37	N/A

Table 4 Filter Delay

1.5 DC Couple Measurement Accuracy

Gain error (Operating temperature within 5 °C of last self-calibration temperature)	0.50%
Offset error (Operating temperature within 5 °C of last self-calibration temperature)	±900 µV

Table 5 DC Couple Measurement Accuracy

1.6 AC Couple Measurement Accuracy

Gain error (Operating temperature within 5 °C of last self-calibration temperature):	0.05 dB
Offset error (Operating temperature within 5 °C of last self-calibration temperature):	±10 mV

Table 6 AC Couple Measurement Accuracy

1.7 Time Base

Accuracy	±0.3 ppm
Aging (first year @ + 25°C)	±1.0 ppm
Aging (20 year @ + 25°C)	±4.6 ppm

Table 7 Time Base

1.8 Bus Interface

Bus support	PXIe
Synchronization(PXIe)	CLK_100

Table 8 Bus Interface

1.9 Power Requirements

+3.3 V	3.0 A, maximum, maximum/warranted
+12 V	2.0 A, maximum, maximum/warranted

Table 9 Power Requirements

1.10 Triggers

Trigger Type	Analog / Digital / Software
Analog Trigger Voltage Range	Software Programmable
Trigger Mode	Start / Reference / ReTrigger
Digital Trigger Source	Ext Trigger Pin
Digital Trigger Compatibility	5 V TTL
Interval of ReTrigger	5 Samples

Table 10 Triggers

1.11 Physical

Dimensions	Standard 3U PXI
Weight	0.23 kg

Table 11 Physical

1.12 Environment specification

Operating environment	0-55 °C
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Table 12 Environment specification

1.13 Connector

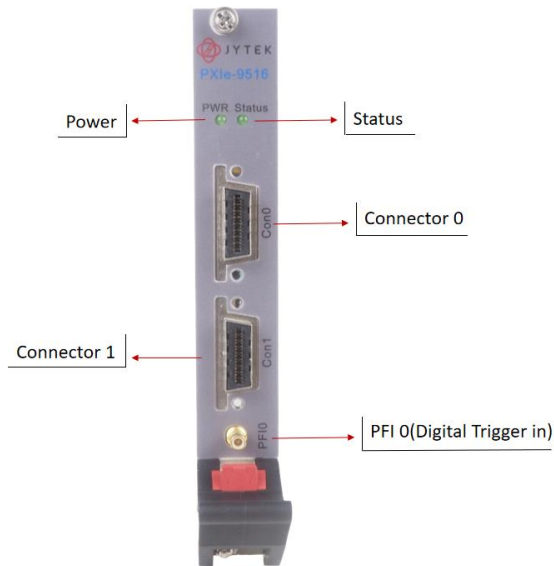


Figure 1 PXIe-9516 Front Panel

1.14 Physical and Environment

Dimensions:	3 U CompactPCI slot
Weight:	220 g

Table 13 Physical Specification

Operating environment:	0-55 °C
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Table 14 Environment Specification

1.15 Special Operating Restriction

The amplitude of the out-of-band signal between 0.3M and 3MHz must be less than 20% of full scale.¹

1, This restriction does not affect applications where PXIe-9516 is connected to the front-end sensors such as microphones and accelerators because these sensors have built-in attenuations so that the out-of-band voltage will not exceed 20% of full scale.

If you have question on this restriction, please contact JYTEK for more information.