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Find the *National Instruments PXI-5112* at our website: *Click HERE*

100 MHz, 100 MS/s 8-Bit Digitizers

NI 5112

- 2 channels simultaneously sampled at 8-bit resolution
- 100 MS/s real-time and 2.5 GS/s random-interleaved sampling
- 100 MHz bandwidth
- ±25 mV to ±25 V input range with maximum DC offset of ±37 V
- Deep memory of 16 or 32 MB/channel with multirecord capture mode
- Timestamping of records to 2 ns accuracy
- 1 M or 50 input impedance, software programmable

Models

- NI PCI-5112
- NI PXI-5112

Operating Systems

- Windows 2000/NT/XP

Recommended Software

- LabVIEW
- LabWindows/CVI
- Measurement Studio

Other Compatible Software

- Visual Basic
- C/C++

Driver Software (included)

- NI-SCOPE

Calibration Certificate Included

See page 21.



Overview

The NI 5112 digitizers feature deep onboard acquisition memory, wide analog bandwidth, and a large analog input range in a low-cost, compact package. Because NI 5112 digitizers are based on the high-speed PCI bus, acquiring and processing large waveforms is much faster than with comparable GPIB-based instruments. As a result of this improved transfer rate, you can take measurements faster and decrease overall test time.

Hardware

Analog Input

An NI 5112 has two analog input channels that accept signals ranging from ±0.025 V to ±25 V, variable in 10 percent steps. The analog input stage features a selectable input impedance of 1 M or 50 , selectable AC or DC coupling, and onboard self-calibration. Each channel features programmable DC offset up to 20 times the input range, depending on the range selected. Available AC coupling or DC offset increases the dynamic range of signals that you can measure. You can impose a 20 MHz hardware bandwidth limit for each channel to remove unwanted high-frequency noise from your measurements.

Acquisition System

Each of the two analog input channels has its own 100 MS/s, 8-bit analog-to-digital converter (ADC), so you can simultaneously acquire data on each channel sampled at rates from 100 MS/s to 1 S/s. With the NI 5112 high-precision timing circuitry, you can sample repetitive signals at rates up to 2.5 GS/s.

Deep Onboard Acquisition Memory

NI 5112 digitizers have 16 or 32 MB per channel of onboard acquisition memory to which the device acquires data before transferring it to the host PC memory. An NI 5112 uses the scatter-gather bus master capability of the PCI-MITE to move data to host memory at much higher speeds than traditional instrument interfaces. With double-buffering capability, data can stream to host memory continuously in single-shot mode or in multiple-record mode. This transfer speed is one reason why computer-based measurement systems decrease overall test time.

Timestamping

NI 5112 digitizers are equipped with the NI-TIO ASIC, a state-of-the-art counter and timing I/O ASIC developed by National Instruments. The NI-TIO digitizer timing engine provides timestamping of records to 2 ns accuracy for real-time sampling and 100 ps accuracy for random-interleaved sampling (RIS). Timestamping also works in multiple-record acquisition mode. With fast rearm times, you can timestamp triggered events for up to 130 days with 2 ns accuracy in real-time sampling mode.

Clock Generation

When building multidevice measurement systems, routing a precise clock to each device can be challenging. An NI 5112 uses an advanced 100 MHz clock generator, insensitive to jitter on a reference clock, to produce a low-jitter, low-phase-skew clock for synchronization and precise clocking of several devices. The PXI-5112 can synchronize to the PXI backplane 10 MHz clock or external reference clock. With this technology, several PXI-5112 modules can synchronize their clocks without external cables. The PCI-5112 can also be synchronized using the RTSI bus or external reference clock.

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100 MHz, 100 MS/s 8-Bit Digitizers

Triggering

NI 5112 digitizers have three trigger sources – analog, digital, and software control. The analog trigger is derived by comparing the waveform to either one threshold or two thresholds forming a hysteresis condition. You can use analog triggers on either an analog input channel or a dedicated trigger channel. Digital triggers come from the RTSI bus on the PCI-5112, the PXI trigger bus on the PXI-5112, or from external digital connectors (an SMB and a 9-pin AUX connector for PXI-5112 or two SMB connectors for the PCI-5112). With an NI 5112 you can specify the number of samples to acquire before and after a trigger event occurs. These pretrigger and posttrigger settings also apply when the device is operating in multiple-record mode.

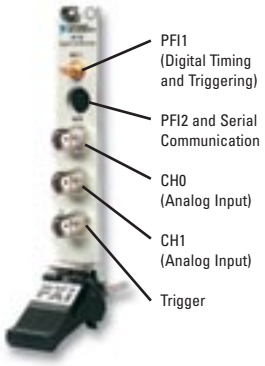


Figure 1. I/O Connector for the PXI-5112

NI 5112 devices use the National Instruments NI-TIO timing ASIC as its timing engine. You can synchronize several NI-TIOs between devices to ensure that acquisitions involving multiple devices have consistent timing information. The PXI-5112 can drive and receive the star trigger lines on the PXI backplane. The star trigger lines are evenly matched across the PXI backplane to achieve skews of <1 ns between triggers to several PXI star receiver modules.

Multi-Instrument Synchronization

A synchronization bus (RTSI bus for PCI or the PXI trigger bus for PXI) routes timing and trigger signals between two or more NI 5112 modules or other National Instruments products. Multi-instrument synchronization includes triggering several measurement devices with a signal from a single instrument and synchronizing all the instruments to the same clock. With these advanced synchronization techniques, you can:

- Synchronize several PXI-5112 digitizers to create a 26-channel, 100 MHz oscilloscope in PXI
- Synchronize the PXI-5112 to the NI PXI-5411 arbitrary waveform generator, to accomplish stimulus-response measurements
- Synchronize the PXI-5112 to NI PXI-259x switches to test numerous test points

Calibration

Every NI 5112 is factory calibrated and is shipped with a calibration certificate verifying that it meets NIST-traceable standards. An NI 5112 has an onboard calibration generator that corrects for any environmental effects on gain and offset. You can perform self-calibration (or internal calibration) to ensure that your device is within specifications to an environmental temperature drift of ±2 °C. If you want to externally calibrate your device, return your NI 5112 to National Instruments or ship it to a qualified metrology lab for recalibration.

Please see page 21 or visit ni.com/calibration for more information about calibration services.

Software

Every National Instruments high-speed digitizer comes with the NI-SCOPE instrument driver, which is optimized for use in NI LabVIEW, LabWindows/CVI, and Measurement Studio as well as Microsoft Visual C++, and Visual Basic. With more than 50 built-in measurement and analysis functions including time and frequency domain measurements, digital filters, windows, histograms, and waveform math, you can build automated test solutions in minimal time. Further customize your waveform analysis using LabVIEW, LabWindows/CVI, DIAdem, and TestStand. NI high-speed digitizers also include the interactive SCOPE Soft Front Panel to help you get started quickly and troubleshoot throughout the development process.

Ordering Information

NI PCI-5112
- 16 MB/channel 778076-01
- 32 MB/channel 778073-01

NI PXI-5112
- 16 MB/channel 777758-01
- 32 MB/channel 777756-01

Includes the NI 5112 hardware, NI-SCOPE, and SCOPE Soft Front Panel.

Accessories

Recommended PXI Switch
- NI PXI-2593 778793-01

Switchable 1/10x probes
- SP200B 763391-01

See page 474 for accessory and cable information.

For information on extended warranty and value added services, see page 20.

BUY ONLINE!

Visit ni.com/products and enter pxi5112 or pci5112.

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100 MHz, 100 MS/s 8-Bit Digitizers

Specifications

Within 24 hours and 2 °C of last self-calibration unless otherwise noted.

Acquisition System

Resolution ..... 8 bits
Bandwidth (-3 dB) ..... 100 MHz maximum, 20 MHz typical with BW limit enabled
Number of channels ..... 2 simultaneously sampled
Maximum sample rate ..... 2.5 GS/s repetitive, 100 MS/s single-shot
Onboard sample memory ..... 16 or 32 MB per channel
Multiple record acquisition capability ..... Up to 131,072 records for 16 MB option
Up to 262,144 records for 32 MB option
Calibrated vertical ranges ..... ±25 mV to ±25 V in 10% steps

Vertical Range Settings
±25 mV
±27.5 mV
±30.25 mV
•
•
•
±25 V

Calibrated offset ranges ..... ±500 mV for vertical ranges smaller than 500 mV
±5 V for vertical ranges between 500 mV and 5 V
Up to ±37 V for vertical ranges above 5 V
Note: DC offset should not exceed 42 V – Input range/2
Example: For vertical range of ±10 V, the maximum DC offset allowed is ±32 V
Input protection ..... ±42 V (DC + peak AC)
DC accuracy ..... ±2.5% of range setting
±0.5% of offset setting
Input coupling ..... DC or AC, software selectable
AC coupling cutoff frequency (-3 dB) ..... 11 Hz with 1x probe
1.1 Hz with 10x probe
Input impedance ..... 1 MΩ ll 30 pF or 50 Ω, software selectable

Acquisition Modes

Random Interactive Sampling (RIS) ..... 2.5 GS/s down to 200 MS/s effective sampling rate. repetitive signals only
Real-time sample rate ..... 100 MS/s down to 1 S/s sampling rate
Transient and repetitive signals

Timebase System

Timebase options

PXI	Internal 10 MHz ref clock	PXI backplane 10 MHz	External 10 MHz ref clock (PFI 1 or PFI 2)

Clock accuracy (as master) ..... 50 ppm
Clock input tolerance (as slave) ..... 1% minimum
Clock input levels ..... TTL
Interpolator resolution (repetitive only) ..... 100 ps
Sampling clock frequency ..... 100 MHz fixed, data can be decimated by *n* where
$1 < n < IE6$
Synchronization between devices ..... Slave devices are referenced to Master via PXI bus trigger lines or RTSI, or all modules are synchronized by the PXI 10 MHz

Triggering System

Modes ..... Edge, hysteresis, window, digital, software
Source ..... Ch0, Ch1, TRIG, PFI<1..2>, RTSI <0..6>, PXI Star (for PXI)
Slope ..... Rising/falling
Hysteresis ..... Fully programmable
Coupling ..... DC or AC on CH0, CH1, TRIG
Pretrigger depth ..... Up to 16 or 32 MS*
Posttrigger depth ..... Up to 16 or 32 MS*
Holdoff time ..... 100 µs to 171.79 s
Trigger resolution ..... >1,000 steps in full-scale voltage range
DC accuracy ..... ±2.5% of range setting
±0.5% of offset setting
TRIG input range ..... ±10 V
TRIG input impedance ..... 1 MΩ ll 30 pF or 50 Ω, software selectable
TRIG input protection ..... ±42 V (DC + peak AC)
*Depending on memory option

Calibration

Internal ..... Internal calibration is done on software command. The calibration involves gain, offset, and timing adjustment for all input ranges
Interval ..... 24 hours, or anytime temperature changes beyond ±2 °C from temperature at which last internal calibration was performed
External ..... Internal reference requires external recalibration
Interval ..... 1 year
Warm-up time ..... 15 minutes

Power Requirements

+3.3 VDC ..... 0.5 A
+5 VDC ..... 1.5 A
+12 VDC ..... 80 mA
-12 VDC ..... 120 mA

Dimensions

PCI ..... 10 by 17.5 cm (3.9 by 6.8 in.)
PXI ..... 10 by 16 cm (3.9 by 6.3 in.)
I/O Connectors
Analog inputs CH0, CH1 ..... BNC female
Analog trigger TRIG ..... BNC female
Digital trigger PFI1 ..... SMB female
Digital trigger AUX ..... 9-pin DIN

Environment

Operating temperature ..... 0 to 40 °C
Storage temperature ..... -20 to 70 °C
Relative humidity ..... 10 to 90% noncondensing

Certifications and Compliances

CE Mark Compliance CE

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