

24-Bit Flexible Resolution Digitizer

NI PXI-5922

- From 24 bits up to 500 kS/s to 16 bits at 15 MS/s
- 2 simultaneously sampled channels
- ± 1 and ± 5 V input ranges
- -108 dBc SFDR up to 100 kHz
- -120 dBFS rms noise
- -170 dBFS/Hz noise density
- Deep onboard memory up to 256 MB/channel
- 50 Ω or 1 M Ω software-selectable input impedance
- Integrated antialias protection for all sampling rates

Calibration

- Linearity, gain, offset, and input bias current self-calibration
- 2-year external calibration interval

Operating Systems

- Windows 2000/NT/XP

Recommended Software

- LabVIEW
- LabVIEW Toolkits
 - Spectral Measurements Toolkit
 - Modulation Toolkit
 - Sound and Vibration Toolkit
- LabWindows/CVI
- Measurement Studio
- SignalExpress

Other Compatible Software

- Visual Basic
- C/C++

Driver Software (included)

- NI-SCOPE
- Scope Soft Front Panel

NEW



Overview

The National Instruments PXI-5922 flexible resolution digitizer features two simultaneously sampled channels, with variable resolution. The NI PXI-5922 can trade sampling rate for resolution to sample anywhere from 24 bits at rates less than 500 kS/s to 16 bits at 15 MS/s.

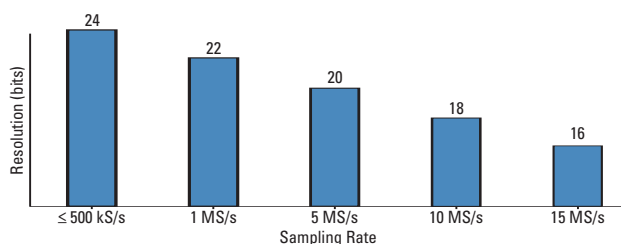


Figure 1. Frequency versus Resolution of the PXI-5922 Flexible Resolution Digitizer

By combining the PXI-5922 with software such as LabVIEW 7.1, you can create numerous different types of instruments, such as DC and rms voltmeters, audio analyzers, frequency counters, spectrum analyzers, IF digitizer, or I/Q modulation analyzers. The PXI-5922 has low noise as well as low distortion, which is possible because of the NI Flex II ADC.

Analog Input Performance

The PXI-5922 is a low-noise, low-distortion digitizer with rms noise as low as -120 dBFS at sampling rate of 50 kS/s, and spurious-free dynamic range (SFDR) as high as -108 dBc for dynamic signals all the way up to 100 kHz in frequency. This high dynamic performance is achieved with the development of the next generation flexible resolution analog-to-digital converter – the Flex II ADC, a portion of which is implemented on a fully custom analog ASIC designed by National Instruments. The Flex II ADC is an enhanced multibit delta-sigma ($\Delta\Sigma$) converter that uses a patented linearization technique to reduce the harmonics inherent to multibit delta-sigma converters (See Figure 3 for an illustration). The result is a high dynamic range over a wide range of sampling rates.

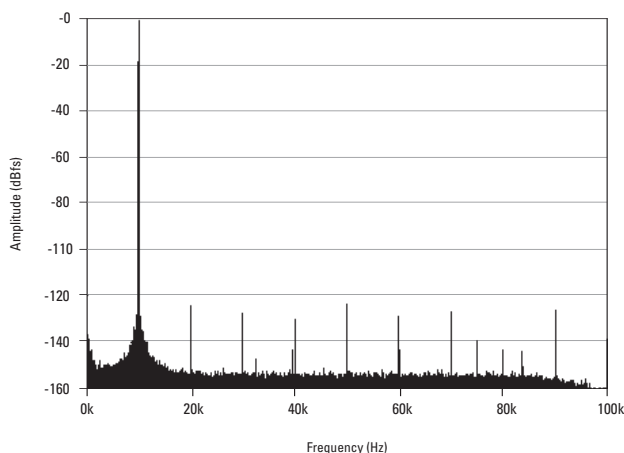


Figure 2. FFT of a Pure 10 kHz Sine Wave Acquired Using the PXI-5922

24-Bit Flexible Resolution Digitizer

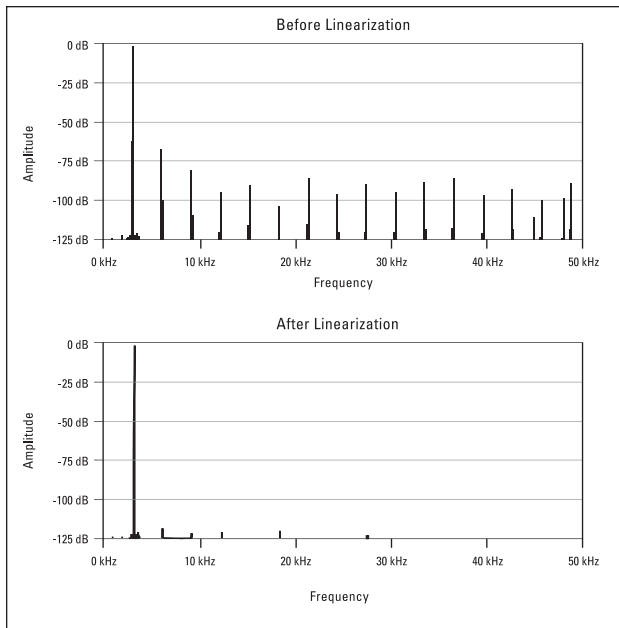


Figure 3. FFT Plot of a Pure 3 kHz Sine Wave Applied to the 6-Bit Delta-Sigma ADC Before and After Linearization

Deep Onboard Memory

The PXI-5922, based on the SMC architecture, comes with 8, 32, or 256 MB of high-speed memory per channel (2, 8, or 64 million samples). The PXI-5122 can acquire more than 400,000 triggered waveforms without software intervention in multiple-record acquisition mode, for applications such as RADAR, ultrasound, and event detection, that require short trigger rearm times. The PXI-5922 can stream data continuously from onboard memory to host memory for longer acquisitions and streaming to disk. The high-speed PXI bus and the scatter-gather bus mastering capabilities of the NI MITE ASIC move data to the computer at speeds up to 100 times faster than traditional instrument interfaces, thereby dramatically decreasing overall test time.

Timing and Synchronization

An advanced 120 MHz clock generator produces the low-jitter, low-phase-skew clock for the precise clocking and stable synchronization necessary for high-speed, high-resolution digitizers. Synchronize multiple instruments using the PXI backplane 10 MHz reference clock or an external reference ranging from 1 to 20 MHz in 1 MHz increments. You can also export the reference clock through the front CLK OUT connector. Because the PXI-5922 is built on the SMC architecture, you can synchronize two or more digitizers for high-channel-count applications, and build mixed-signal test systems using SMC-based digitizers, arbitrary waveform generators, and digital waveform generator/analyzers using TClk technology.

Calibration

Every PXI-5922 is factory calibrated to verify that it meets NIST-traceable standards. The PXI-5922 has an onboard calibration circuit that corrects for environmental effects on linearity, gain, offset, and input bias current. You can perform self-calibration to ensure that your board is within specifications. The PXI-5922 also offers a 2-year calibration cycle, reducing your downtime. When you want to externally calibrate your device, return your digitizer to National Instruments or ship it to a qualified metrology lab for routine calibration.

Software

Every National Instruments high-speed digitizer comes with the IVI-compliant NI-SCOPE driver, which is fully compatible with NI LabVIEW, LabWindows/CVI, and Measurement Studio, as well as Microsoft Visual C++ and Visual Basic. NI-SCOPE includes more than 50 built-in measurement and analysis functions, and an interactive Scope Soft Front Panel. The Spectral Measurements Toolkit gives you sophisticated frequency-domain measurements such as power in-band, multiple peak search, and 3D spectrogram, for applications in communications, laser, signal intelligence, and avionics.

Ordering Information

| | |
|----------------------|-----------|
| NI PXI-5922 | |
| 8 MB/channel | 779153-01 |
| 32 MB/channel | 779153-02 |
| 256 MB/channel | 779153-03 |

Includes NI-SCOPE and Scope Soft Front Panel. The 32 and 256 MB/channel models also include the Spectral Measurements Toolkit.

Accessories

| | |
|--|------------|
| 9-pin DIN to BNC for AUX I/O connector | |
| Aux110 | 189919-0R5 |

BUY NOW!

For complete product specifications, pricing, and accessory information, call (800) 813-3693 (U.S. only) or go to ni.com/digitizers.

24-Bit Flexible Resolution Digitizer

Specifications

These specifications are valid for 0° to 55° C, unless otherwise stated.

Acquisition System

Number of channels 2 simultaneously sampled
single-ended or unbalanced differential
or
1 differential channel
Vertical resolution 16 to 24 bits

| Sampling Rate | Resolution (bits) |
|----------------|-------------------|
| 50 to 500 kS/s | 24 |
| 1 MS/s | 22 |
| 5 MS/s | 20 |
| 10 MS/s | 18 |
| 15 MS/s | 16 |

Alias-free bandwidth 0.4 x sampling rate
Onboard sample memory 8, 32, or 256 MB per channel (2, 8, or 64 million samples)
Pre and post trigger data points 0-100% of full record length

Multiple Record Acquisition (0-100% pre and post trigger data)

| Memory per Channel | Maximum Number of Records |
|--------------------|---------------------------|
| 8 MB | 13,107 |
| 32 MB | 52,428 |
| 256 MB | 419,430 |

Input impedance 50 Ω and 1 MΩ || 40 pF, software selectable
Full scale input range 2 V_{pp} (±1 V) and 10 V_{pp} (±5 V)
Maximum input overload 50 Ω: 7 V_{rms} with |peaks| ≤ 10 V, 1 MΩ: |peaks| ≤ 42 V
Input coupling AC, DC, GND
AC coupling cutoff frequency (-3 dB) 90 Hz

Accuracy

DC accuracy

| Range | 50 Ω and 1 MΩ |
|---------------------------|--------------------------------------|
| 2 V _{pp} (±1 V) | ±(500 ppm (0.05%) of Input + 50 μV) |
| 10 V _{pp} (±5 V) | ±(500 ppm (0.05%) of Input + 100 μV) |

Note: Measured with 1 MΩ input impedance within ±5 °C of self-calibration temperature.

Passband Flatness (referenced at DC)

| Sampling Rate | 50 Ω and 1 MΩ, ±1 V and ±5 V ranges |
|---------------|-------------------------------------|
| 1 MS/s | 0.03 dB |
| 5 MS/s | 0.06 dB |
| 10 MS/s | 0.15 dB |
| 15 MS/s | 0.3 dB |

AC amplitude accuracy (typical at 1 kHz) ± 600 ppm (0.06%)

Channel to Channel Crosstalk

| Input Frequency | Crosstalk |
|-----------------|-----------|
| 100 kHz | ≤ -110 dB |
| 1 MHz | ≤ -100 dB |
| 6 MHz | ≤ -80 dB |

CMRR

Unbalanced differential mode 50 dB
Differential mode See Figure 4

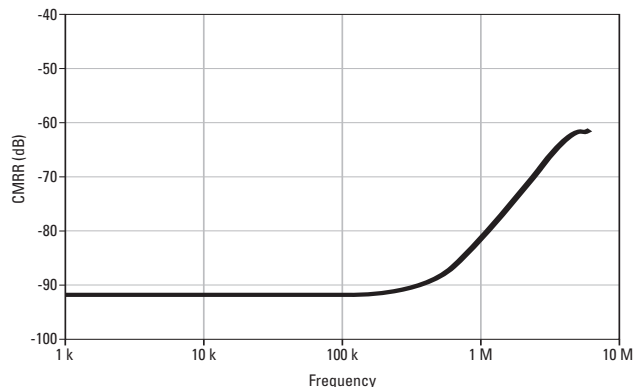


Figure 4. CMRR Versus Frequency for the PXI-5922 in Differential Mode

Spectral Characteristics (typical)

Dynamic performance (-1 dBFS input signal)

| Input Frequency | 10 V _{pp} (±5 V) Input Range | | | |
|-----------------|---------------------------------------|-----------|------------|----------|
| | SFDR (dBc) | THD (dBc) | SINAD (dB) | SNR (dB) |
| 100 kHz | -108 | -106 | 103 | 106 |
| 1 MHz | -96 | -94 | 89 | 91 |

| Input Frequency | 2 V _{pp} (±1 V) Input Range | | | |
|-----------------|--------------------------------------|-----------|------------|----------|
| | SFDR (dBc) | THD (dBc) | SINAD (dB) | SNR (dB) |
| 100 kHz | -103 | -101 | 99 | 103 |
| 1 MHz | -92 | -90 | 87 | 90 |

Note: Sampling rate is 1 MS/s for 100 kHz input and 10 MS/s for 1 MHz input.

Rms Noise

| Sample Rate | 10 V _{pp} (±5 V) Input Range | | 2 V _{pp} (±1 V) Input Range | |
|-------------|---------------------------------------|----------------------|--------------------------------------|----------------------|
| | (dBFS) | (μV _{rms}) | (dBFS) | (μV _{rms}) |
| 50 kS/s | -120 | 3.4 | -117 | 1.0 |
| 100 kS/s | -118 | 4.3 | -115 | 1.2 |
| 1 MS/s | -108 | 13 | -104 | 4.2 |
| 5 MS/s | -101 | 31 | -98 | 8.7 |
| 10 MS/s | -91 | 92 | -91 | 20 |
| 15 MS/s | -79 | 401 | -79 | 80 |

Phase noise density (5 MHz input) <-133 dBc/Hz at 10 kHz,
<-145 dBc/Hz at 100 kHz

Timebase System

Timebase options Internal
Total sample clock jitter ≤3 ps_{rms}
Note: Includes effects of converter aperture and clock circuitry jitter from 100 Hz to 1 MHz.

Internal

Internal sample clock frequency 120 MS/s sampling rate with decimation
by n where 8 ≤ n ≤ 2400
Timebase accuracy, typical ±50 ppm (±0.0050%)

External

External reference clock sources CLK IN (SMB connector), PXI backplane 10 MHz
External reference clock range 1 to 20 MHz in 1 MHz increments

Trigger System

Modes Edge, hysteresis, window, digital, immediate, software
Sources CH 0, CH 1, TRIG, PXI_Trig <0:6>, PFI <0:1>, PXI Star, Software
Slope Rising or falling
Hysteresis Fully programmable
Sensitivity CH 0 and CH 1: 2% FS
TRIG: 0.3 V_{pp} typical up to 1 MHz
Time resolution One sample clock period
Rearm time 144 x sample clock period
Holdoff Up to (2³²-1) x sample clock period

External Trigger Channel (TRIG)

Impedance 100 kΩ || 52 pF
Range ±2.5 V
Coupling DC
Level Accuracy ±0.3 V up to 100 kHz

Power Requirements

| Voltage (VDC) | Typical Current (A) |
|---------------|---------------------|
| +3.3 | 2 |
| +5 | 1.4 |
| +12 | 0.33 |
| -12 | 0.28 |
| Total Power | 20.9 W |

Calibration

Self-Calibration Linearity, gain, offset, and input bias current
External Calibration Interval 2 years

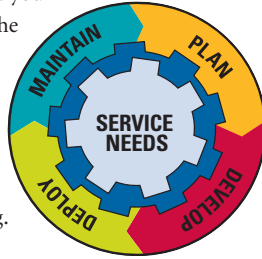
Certification and Compliances

CE Mark Compliance **CE**

For detailed specifications on environmental, safety, and physical dimensions, please visit ni.com/digitizers.

NI Services and Support

NI has the services and support to meet your needs around the globe and through the application life cycle – from planning and development through deployment and ongoing maintenance. We offer services and service levels to meet customer requirements in research, design, validation, and manufacturing. Visit ni.com/services.



Training and Certification

NI training is the fastest, most certain route to productivity with our products. NI training can shorten your learning curve, save development time, and reduce maintenance costs over the application life cycle. We schedule instructor-led courses in cities worldwide, or we can hold a course at your facility. We also offer a professional certification program that identifies individuals who have high levels of skill and knowledge on using NI products. Visit ni.com/training.

Professional Services

Our Professional Services Team is comprised of NI applications engineers, NI Consulting Services, and a worldwide NI Alliance Partner Program of more than 600 independent consultants and integrators. Services range from start-up assistance to turnkey system integration. Visit ni.com/alliance.



OEM Support

We offer design-in consulting and product integration assistance if you want to use our products for OEM applications. For information about special pricing and services for OEM customers, visit ni.com/oem.

Local Sales and Technical Support

In offices worldwide, our staff is local to the country, giving you access to engineers who speak your language. NI delivers industry-leading technical support through online knowledge bases, our applications engineers, and access to 14,000 measurement and automation professionals within NI Developer Exchange forums. Find immediate answers to your questions at ni.com/support.

We also offer service programs that provide automatic upgrades to your application development environment and higher levels of technical support. Visit ni.com/ssp.

Hardware Services

NI Factory Installation Services

NI Factory Installation Services (FIS) is the fastest and easiest way to use your PXI or PXI/SCXI combination systems right out of the box. Trained NI technicians install the software and hardware and configure the system to your specifications. NI extends the standard warranty by one year on hardware components (controllers, chassis, modules) purchased with FIS. To use FIS, simply configure your system online with ni.com/pxiadvisor.

Calibration Services

NI recognizes the need to maintain properly calibrated devices for high-accuracy measurements. We provide manual calibration procedures, services to recalibrate your products, and automated calibration software specifically designed for use by metrology laboratories. Visit ni.com/calibration.

Repair and Extended Warranty

NI provides complete repair services for our products. Express repair and advance replacement services are also available. We offer extended warranties to help you meet project life-cycle requirements. Visit ni.com/services.



ni.com • (800) 813 3693

National Instruments • info@ni.com

© 2005 National Instruments Corporation. All rights reserved. CVI, FlexADC, LabVIEW, Measurement Studio, National Instruments Alliance Partner, NI, ni.com, SCXI, and SignalExpress are trademarks of National Instruments. Other product and company names listed are trademarks or trade names of their respective companies. A National Instruments Alliance Partner is a business entity independent from NI and has no agency, partnership, or joint-venture relationship with NI.