

# 24-Bit Flexible-Resolution Digitizers

## NI 5922 **NEW!**

- From 24 bits up to 500 kS/s to 16 bits at 15 MS/s
- 2 simultaneously sampled channels
- $\pm 1$  and  $\pm 5$  V input ranges
- -114 dBc SFDR
- -120 dBFS rms noise
- -170 dBFS/Hz noise density
- Deep onboard memory up to 256 MB/channel
- 50  $\Omega$  or 1 M $\Omega$  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

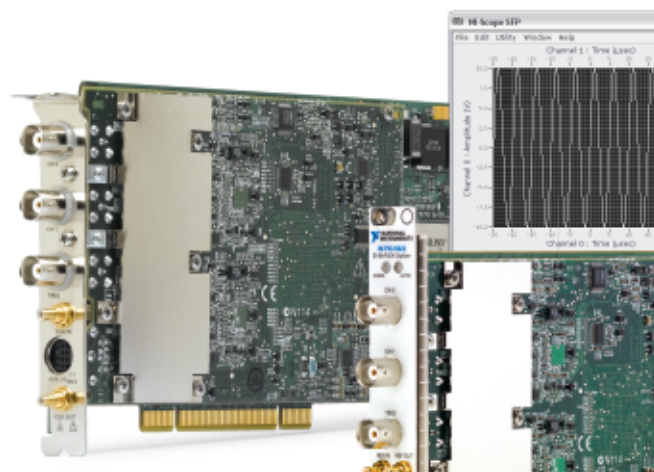
- Windows 2000/XP
- LabVIEW Real-Time
- Linux®

### Recommended Software

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

### Driver Software (included)

- NI-SCOPE
- Scope Soft Front Panel



## Overview

| Applications                              |
|-------------------------------------------|
| <b>Communications</b>                     |
| xDSL                                      |
| Wireless communications                   |
| Baseband I & Q                            |
| <b>Biomedical and Scientific Research</b> |
| Ultrasonic medical imaging                |
| Mass spectrometry                         |
| Particle physics                          |
| <b>Aerospace/Defense</b>                  |
| RADAR, SONAR, and LIDAR                   |
| Satellite                                 |
| Signal intelligence                       |
| <b>Consumer Electronics</b>               |
| Performance Audio Test                    |

National Instruments 5922 flexible-resolution digitizers feature two simultaneously sampled channels, with variable resolution. NI 5922 digitizers 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. By combining an NI 5922 with software such as LabVIEW,

you can create numerous different types of instruments, such as DC and rms voltmeters, audio analyzers, frequency counters, spectrum analyzers, IF digitizers, or I/Q modulation analyzers. NI 5922 digitizers have low noise as well as low distortion, which is possible because of the NI Flex II ADC.

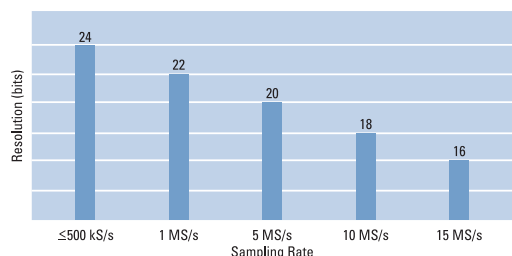


Figure 1. Frequency versus Resolution of NI 5922 Flexible-Resolution Digitizers

### Deep Onboard Memory

- 8, 32, or 256 MB/channel
- Capture more than 400,000 triggered waveforms with multirecord acquisition

- Stream data continuously from onboard memory to host memory or disk

### Timing and Synchronization

Because NI 5922 digitizers are 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 TCik technology.

### Software

- IVI-compliant NI-SCOPE driver for LabVIEW, LabWindows/CVI, and Microsoft C++ and Visual Basic with more than 50 built-in measurements
- Scope Soft Front Panel for interactive control
- NI Spectral Measurements Toolkit for sophisticated frequency-domain measurements in communications, signal intelligence, and avionics applications

## Ordering Information

NI PCI-5922 .....779659-0M<sup>1</sup>  
NI PXI-5922 .....779153-0M<sup>1</sup>

<sup>1</sup>M (memory per channel): 1 (8 MB), 2 (32 MB), 3 (256 MB)

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

## BUY NOW!

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

# 24-Bit Flexible-Resolution Digitizers

## 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)  
Pretigger and posttrigger data points ..... 0 to 100% of full record length  
Input impedance ..... 50  $\Omega$  and 1 M $\Omega$  || 40 pF, software-selectable  
Full-scale input range ..... 2 V<sub>pp</sub> ( $\pm 1$  V) and 10 V<sub>pp</sub> ( $\pm 5$  V)

| Multiple Record Acquisition (0 to 100% pretigger and posttrigger data) |                                    |
|------------------------------------------------------------------------|------------------------------------|
| Memory/Channel                                                         | Maximum Number of Records on Board |
| 8 MB                                                                   | 13,107                             |
| 32 MB                                                                  | 100,000 <sup>1</sup>               |
| 256 MB                                                                 | 100,000 <sup>1</sup>               |

<sup>1</sup>Infinite in streaming configuration.

Maximum input overload ..... 50  $\Omega$ : 7 V<sub>rms</sub> with | peaks |  $\leq 10$  V, 1 M $\Omega$ : | peaks |  $\leq 42$  V  
Input coupling ..... AC, DC, GND  
AC coupling cutoff frequency (-3 dB) ..... 90 Hz

### Accuracy

#### DC Accuracy

**Note:** Measured with 1 M $\Omega$  input impedance within  $\pm 5$  °C of self-calibration temperature.

| Range                           | 50 $\Omega$ and 1 M $\Omega$                 |
|---------------------------------|----------------------------------------------|
| 2 V <sub>pp</sub> ( $\pm 1$ V)  | $\pm 500$ ppm (0.05%) of input + 50 $\mu$ V  |
| 10 V <sub>pp</sub> ( $\pm 5$ V) | $\pm 500$ ppm (0.05%) of input + 100 $\mu$ V |

#### Passband Flatness (referenced at DC)

| Sampling Rate | 50 $\Omega$ and 1 M $\Omega$ , $\pm 1$ V and $\pm 5$ 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) .....  $\pm 600$  ppm (0.06%)

#### Channel-to-Channel Crosstalk

| Input Frequency | Crosstalk      |
|-----------------|----------------|
| 100 kHz         | $\leq -110$ dB |
| 1 MHz           | $\leq -100$ dB |
| 6 MHz           | $\leq -80$ dB  |

#### CMRR

Unbalanced differential mode ..... 50 dB, up to 1 kHz  
Differential mode ..... See Figure 2

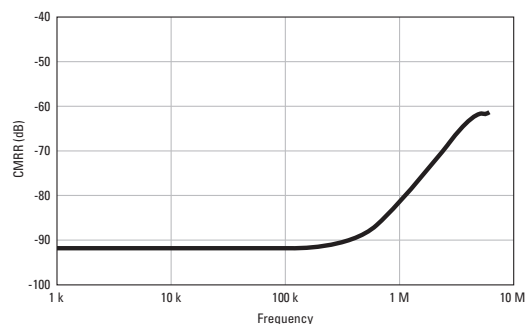


Figure 2. CMRR versus Frequency for the PXI-5922 in Differential Mode

### Spectral Characteristics (typical)

#### Dynamic Performance (-1 dBFS input signal)

| 10 V <sub>pp</sub> ( $\pm 5$ V) Input Range |            |           |            |          |
|---------------------------------------------|------------|-----------|------------|----------|
| Input Frequency                             | SFDR (dBc) | THD (dBc) | SINAD (dB) | SNR (dB) |
| 10 kHz                                      | -114       | -112      | —          | —        |
| 100 kHz                                     | -110       | -108      | 105        | 108      |
| 1 MHz                                       | -96        | -94       | 89         | 91       |

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

| 2 V <sub>pp</sub> ( $\pm 1$ V) Input Range |            |           |            |          |
|--------------------------------------------|------------|-----------|------------|----------|
| Input Frequency                            | SFDR (dBc) | THD (dBc) | SINAD (dB) | SNR (dB) |
| 10 kHz                                     | -109       | -107      | —          | —        |
| 100 kHz                                    | -103       | -101      | 99         | 104      |
| 1 MHz                                      | -92        | -90       | 87         | 90       |

#### Rms Noise

|             | 10 V <sub>pp</sub> (±5 V) Input Range |                            | 2 V <sub>pp</sub> (±1 V) Input Range |                            |
|-------------|---------------------------------------|----------------------------|--------------------------------------|----------------------------|
| Sample Rate | (dBFS)                                | ( $\mu$ V <sub>rms</sub> ) | (dBFS)                               | ( $\mu$ V <sub>rms</sub> ) |
| 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 .....  $\leq 3$  ps<sub>rms</sub>

**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  $8 \leq n \leq 2400$   
Timebase accuracy, typical .....  $\pm 50$  ppm ( $\pm 0.0050\%$ )

#### 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<sub>pp</sub> typical up to 1 MHz  
Time resolution ..... One sample clock period  
Rearm time ..... 144 x sample clock period  
Holdoff ..... From rearm time to (2<sup>32</sup> - 1) x sample clock period

#### External Trigger Channel (TRIG)

Impedance ..... 100 k $\Omega$  || 52 pF  
Range .....  $\pm 2.5$  V  
Coupling ..... DC  
Level accuracy .....  $\pm 0.3$  V up to 100 kHz

#### Power Requirements

|     | +3.3 VDC | +5 VDC | +12 VDC | -12 VDC | Total Power |
|-----|----------|--------|---------|---------|-------------|
| PXI | 2.0 A    | 1.4 A  | 0.33 A  | 0.28 A  | 20.9 W      |
| PCI | 2.0 A    | 2.5 A  | 0.45 A  | 0 A     | 24.5 W      |

#### Calibration

Self-calibration ..... Linearity, gain, offset, and input bias current  
External calibration interval ..... 2 years

#### Certification and Compliances

CE Mark Compliance

See detailed specifications at [ni.com/manuals](http://ni.com/manuals).

For access to certifications, marks, and DoCs, visit [ni.com/certification](http://ni.com/certification).

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## 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](http://ni.com/pxiadvisor).

### Calibration Services

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2006-7999-101-D