60 MS/s, 60 MHz, 12-Bit, 8-Channel Digitizers

NI 5105

- 8 channels simultaneously sampled at 12-bit resolution
- 60 MS/s real-time sampling
- 60 MHz bandwidth
- 50 mV_{pp} to 30 V_{pp} input range
- 72 dBc SFDR
- 16, 128, or 512 MB of onboard memory
- Edge, window, hysteresis, and digital triggering

Calibration

- Gain, offset, frequency response, and timing self-calibration
- 2-year external calibration interval

Operating Systems

- Windows Vista/XP/2000
- LabVIEW Real-Time

Recommended Software

- LabVIEW
- LabWindows™/CVI
- Measurement Studio for Visual Studio
- LabVIEW SignalExpress

Driver Software (included)

- NI-SCOPE driver
- LabVIEW Express VIs
- Scope Soft Front Panel

Overview

Applications
Imaging
Ultrasonic nondestructive test
Optical coherence tomography
Medical imaging
Aerospace/Defense
RADAR, SONAR, and LIDAR
Satellite
Signal intelligence
Consumer Electronics
DVD, DVD-R, and PVR
Set-top box
Gaming console
Communications
xDSL

National Instruments 5105 high-resolution digitizers feature eight 60 MS/s simultaneously sampled input channels with 12-bit resolution, 60 MHz bandwidth, and up to 512 MB of memory in a compact, 3U PXI/PXI Express or PCI device. An NI 5105 uses the National Instruments Synchronization and Memory Core (SMC) architecture, so you can combine multiple devices to build up to 136 phase-coherent channels in a single PXI chassis. You can also synchronize an NI 5105 with other analog and digital instruments to create mixed-signal test systems. An NI 5105 is ideal for a wide range of applications including ultrasonic nondestructive test (NDT), medical imaging, scientific research, military/aerospace, and consumer electronics.

Eight 60 MS/s, 12-Bit Input Channels for Time and Frequency Analysis

- 60 MHz input bandwidth with antialias and noise filters
- >72 dBc spurious-free dynamic range (SFDR)
- Independent channel-selectable 50 mV_{pp} to 30 V_{pp} input ranges
- Independent channel-selectable 50 Ω or 1 MΩ input impedance
- 2-year calibration interval and 0 to 55 °C operating temperature

Deep Onboard Memory

- 16, 128, or 512 MB of onboard memory
- Capture more than 1 million triggered waveforms in multiple record mode, with hardware trigger rearming
- Stream data continuously from onboard memory to host memory or disk

Triggering, Clocking, and Synchronization

- Edge, window, hysteresis, and digital triggering
- Pretrigger and posttrigger acquisition in single- and multiple-record mode
- Internal 60 MHz clock or external clock from 4 to 65 MHz
- Phase lock to PXI 10 MHz reference or external reference from 1 to 20 MHz
- Timestamp-triggered events with 100 ps resolution

Software

- IVI-compliant NI-SCOPE driver for NI LabVIEW and LabWindows/CVI as well as Microsoft C++ and Visual Basic with more than 50 built-in measurements
- Scope Soft Front Panel for interactive control

Ordering Information

NI PXI-5105 .....779685-0M[1]

NI PCI-5105 .....779686-0M[1]

[1]M (onboard memory): 1 (16 MB), 2 (128 MB), 3 (512 MB)

Includes NI-SCOPE driver and Scope Soft Front Panel.

Recommended PXI Switch

NI PXI-2593 (500 MHz mux/matrix) 778793-01

BUY NOW!

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

NATIONAL INSTRUMENTS™

Specifications

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

Acquisition System

Number of channels..... 8 simultaneously sampled
Vertical resolution..... 12 bits
Bandwidth (-3 dB)

Full-Scale Input Range	50 Ω	1 MΩ
All except 50 mV	60 MHz	60 MHz
50 mV	55 MHz	35 MHz

Bandwidth limit filters
(software selectable)..... 24 MHz antialias
Maximum sample rate..... 60 MS/s real-time
Onboard sample memory..... 16, 128, or 512 MB
Multirecord mode
Maximum number of records..... Onboard memory/(512 B x number of enabled channels)
Input impedance..... 50 Ω and 1 MΩ ll 50 pF, software selectable
Full-scale input range
50 Ω..... 50 mV, 200 mV, 1 V, 6 V
1 MΩ..... 50 mV, 200 mV, 1 V, 6 V, 30 V
Maximum input overload
50 Ω..... 7 V_{rms} with l peaks l ≤10 V
1 MΩ..... l peaks l ≤42 V
Input coupling..... AC, DC (AC coupling on 1 MΩ only)
AC coupling cutoff frequency (-3 dB).. 12 Hz

Accuracy

DC accuracy (0 V offset setting)

50 Ω	1 MΩ
All ranges: ±(1% of input + 0.25% of FS + 600 µV)	50 mV range: ±(1% of input + 0.25% of FS + 600 µV)
	200 mV, 1 V, and 6 V ranges: ±(0.65% of input + 0.25% of FS + 600 µV)
	30 V range: ±(0.75% of input + 0.25% of FS + 600 µV)

Channel-to-channel crosstalk..... ≤-80 dB at 1 MHz

Spectral Characteristics (typical)

Dynamic performance (50 Ω input impedance with 10 MHz, -1 dBFS input signal)

Full-Scale Input Range	SFDR (dBc)	THD (dBc)	SINAD (dB)
50 mV	–	-75	59
200 mV	72	-75	62
1 V	72	-75	62
6 V	72	-75	62

Dynamic performance (1 MΩ input impedance with 10 MHz, -1 dBFS input signal)

Full-Scale Input Range	SFDR (dBc)	THD (dBc)	SINAD (dB)
50 mV	–	-72	50
200 mV	70	-75	59
1 V	65	-65	61
6 V	65	-68	59

SFDR = Spurious-free dynamic range
THD = Total harmonic distortion
SINAD = Signal-to-noise and distortion

RMS Noise (24 MHz filter enabled)

Full-Scale Input Range	50 Ω	1 MΩ
50 mV	19 μV_{rms}	60 μV_{rms}
200 mV	56 μV_{rms}	72 μV_{rms}
1 V	290 μV_{rms}	300 μV_{rms}
6 V	1.68 mV_{rms}	2.16 mV_{rms}
30 V (1 MΩ only)	–	9 mV_{rms}

Timebase System

Timebase options..... Internal, PXI star, external (PFI 1)

Internal

Internal sample clock frequency..... 60 MS/s sampling rate with decimation by n where 1 ≤ n ≤ 65,535
Timebase accuracy..... ±25 ppm (±0.0025%)

External

External clock range..... 8 to 65 MHz, variable with decimation by n where 1 ≤ n ≤ 65,535
External reference sources..... PFI 1 (SMB connector), PXI backplane 10 MHz
External reference range..... 1 to 20 MHz in 1 MHz increments
External clock/reference amplitude.... Sine wave: 0.65 to 2.8 V_{pp} (0 to 13 dBm)
Square wave: 0.2 to 2.8 V_{pp}
External clock/reference impedance.. 50 Ω, AC coupled

Trigger System

Modes..... Edge, hysteresis, window, digital, immediate, software
Sources..... CH 0 to CH 7, PXI_Trig <0..6>, PFI 1, PXI star, software
Slope..... Rising or falling
Hysteresis..... Fully programmable
Sensitivity..... 2% FS

Intermodule SMC Synchronization Using NI-TClk (typical)

Skew..... 500 ps
<10 ps after manual adjustment

Power Requirements (typical)

	+3.3 VDC	+5 VDC	+12 VDC	-12 VDC	Total Power
PXI	1.5 A	1.7 A	200 mA	25 mA	16.15 W
PCI	1.7 A	2 A	20 mA	0 A	15.85 W

Environment

Operating temperature[1]..... 0 to 55 °C (meets IEC-60068-2-1 and IEC-60068-2-2)
Storage temperature..... -40 to 70 °C (meets IEC-60068-2-1 and IEC-60068-2-2)
Relative humidity..... 10 to 90%, noncondensing (meets IEC-60068-2-56)

[1]0 to 45 °C in PXI-101x and 1000/B chassis.

For access to certifications, marks, and DoCs, visit ni.com/certification.

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 NI Professional Services team is composed of NI applications and systems engineers and a worldwide National Instruments 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**.

NATIONAL INSTRUMENTS™
Certified Alliance Partner

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**.

NATIONAL INSTRUMENTS™

ni.com • 800 813 3693
National Instruments • info@ni.com

351444B-01 2006-7317-101-D