200 MS/s, 16-Bit Arbitrary Waveform Generator

NI PXI-5422

- 16-bit resolution, 200 MS/s sampling rate
- 8, 32, 256, or 512 MB of onboard memory
- 80 MHz analog bandwidth
- Multimodule synchronization with <20 ps_{rms} skew
- Time and frequency-domain waveform creation software
- Function generator emulation mode for easy standard waveform generation
- External clock and reference inputs
- 16-bit LVDS digital pattern output (32, 256, and 512 MB models)

Operating Systems
- Windows 2000/NT/XP

Recommended Software
- NI Modulation Toolkit
- LabVIEW
- LabWindows/CVI
- Measurement Studio

Driver Software (included)
- NI-FGEN
- LabVIEW Express VIs
- FGEN Soft Front Panel
- NI Analog Waveform Editor (with 32, 265 and 512 MB models)

Calibration
- Gain, offset and timing self-calibration
- 2 year external calibration cycle

NEW

Description

The National Instruments PXI-5422 is a 200 MS/s arbitrary waveform generator featuring 16-bit resolution and up to 512 MB of onboard memory in a compact, 1 slot 3U PXI module. Because the NI PXI-5422 uses the PCI-based PXI platform, waveforms can be downloaded at up to 84 MB/s, far faster than traditional GPIB-based instruments. Using the Synchronization and Memory Core (SMC) architecture of the PXI-5422, you can create mixed signal test systems by synchronizing the generator with digitizers and digital waveform generator/analyzers or synchronize multiple arbitrary waveform generators to form a phase-coherent multichannel generator.

Exceptional Time and Frequency-Domain Performance

- 1.8 ns rise time, 6% pulse aberration
- -60 dBc (0.1%) total harmonic distortion (THD) at 10 MHz
- -139 dBm/Hz average noise density
- -81 dBc intermodulation distortion (IMD) with intermediate frequency (IF) optimized direct path
- < 1.3 ps_{rms} jitter -138 dBc/Hz phase noise (10 MHz carrier, 10 kHz offset)

Triggering and Sequencing

- Four triggering modes – single, continuous, stepped, and burst
- Up to 2 million waveform segments
- Up to 3 million sequence instructions (links and loops)
- Segment looping up to 16,777,216 times or infinitely

Timing and Synchronization

- Multi-instrument synchronization with <20 ps_{rms} of skew
- 3 sample clock sources – Divide-by-N, High-Resolution, and External.
- 1.06 µHz sample rate resolution with high-resolution clock
- Phase lock to external reference or the PXI 10 MHz reference clock

Software

- NI Analog Waveform Editor for creating frequency and time-domain signals
- NI-FGEN instrument driver with LabVIEW Express VIs for function and arbitrary waveform generation
- FGEN Soft Front Panel for interactive control

Applications
Communications
Digitally modulated I/Q signals
Direct to IF modulated signals
Semiconductor
Imaging sensors (CCD, CMOS)
Display devices (LCD)
Biomedical devices
Mixed signal devices
Automotive
Telematics systems
Antilock brake systems
Aerospace/Defense
Avionics
Radar
Scientific Research
Analytical instruments

Ordering Information

NI PXI-5422 ....779087-0M[1]
Includes SMB112 cable, NI-FGEN, and FGEN Soft Front Panel.
32, 256, and 512 MB models include NI Analog Waveform Editor.
[1] M (onboard memory): 1 (8 MB), 2 (32 MB), 3 (256 MB), 4 (512 MB)

Recommended PXI Switch
NI PXI-2593 778793-01

BUY NOW!

For complete product specifications, pricing, and accessory information, call (866) 265-9891 (U.S. only) or go to ni.com and search on a four-digit model number listed above.

NATIONAL INSTRUMENTS™

200 MS/s, 16-Bit Arbitrary Waveform Generator

Specifications

General

Number of channels	1
DAC resolution	16 bits
Maximum sampling rate	200 MS/s
Output paths	1. Main Output Path setting with driver selected Low Gain Amplifier or High Gain Amplifier
	2. Direct Path optimized for IF applications

Recommended Maximum Output Frequencies

Direct Path	80 MHz
Low Gain Path	80 MHz
High Gain Path	40 MHz up to 12 V_{pp} (80 MHz up to 8 V_{pp})

Analog Output

Amplitude range (full scale)

Main output path	12 V_{pp} to 5.64 mV_{pp} (50 Ω load)
Direct path	1 V_{pp} to 0.707 V_{pp} (50 Ω load)
Offset range	±50% of Amplitude Range (Signal plus offset not to exceed amplitude range)
Output impedance	50Ω or 75Ω, software selectable
DC Accuracy	±0.4% of Amplitude ±0.05% of offset ±1 mV
AC amplitude accuracy	± 1.0% of Amplitude ± 1 mV at 50 kHz
Output filter	Software enabled seven-pole elliptical analog filter available on Main Output Path

Low Gain Passband Flatness (Typical)
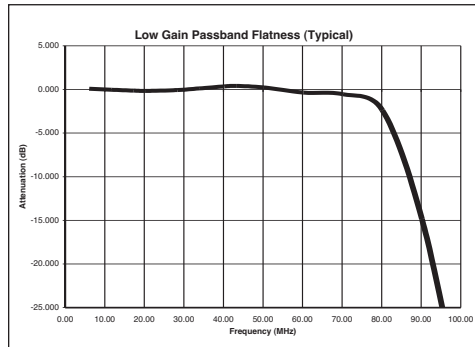
Rise time	< 1.8 ns for Main Output Low Gain Path
Fall time	< 2.1 ns for Main Output Low Gain Path
Pulse Aberration	< 6 % for Main Output Low Gain Path

Spectral Characteristics	Frequency	Direct Path	Low Gain Path	Comments
Total Harmonic Distortion (THD)	20 kHz	-85 dBc (0.006%)	-81 dBc (0.009%)	Amplitude –1 dBFS
	1 MHz	-87 dBc	-63 dBc	2nd through 6th harmonics
	10 MHz	-67 dBc	-60 dBc	
Intermodulation Distortion (IMD)	10 MHz	-80 dBc	-78 dBc	Each tone is -7 dBFS. 200kHz spacing Typical
	40 MHz	-65 dBc	-63 dBc	
	70 MHz	-60 dBc	-55 dBc	

Average Noise Density

	Amplitude Range		Average Noise Density		
Path	V_{pk-pk}	dBm	nV/√Hz	dBm/Hz	dBfs/Hz
Direct Path	1	4	25	-139	-143.0
Low Gain	0.1	-16.0	14	-144	-128.0
Low Gain	2	10.0	45	-134	-144.0
High gain	12	25.6	282	-118	-143.6

Sample Clock

Sources	Internal Divide-by-N, Internal High-Resolution, External CLK IN, External DDC Clk In, PXI star Trigger, PXI_TRIG <0:7>

Frequency resolution

Divide-by-N	(200 MS/s) / N where 1 ≤ N 40
High Resolution	1.06 µHz

System Phase Noise and Jitter

	System Phase Noise Density	System Output Jitter	Comment
Divide-by-N	-138 dBc/Hz (10 kHz offset)	< 1.3 ps rms	10 MHz carrier
High Resolution	-122 dBc/Hz (10 kHz offset)	< 3.0 ps rms	
External Clock	-143 dBc/Hz (10 kHz offset)	< 1.1 ps rms	

Onboard Clock (Internal VCXO)

Frequency accuracy	±25 ppm
PLL reference clock sources	PXI_CLK10, CLK IN

Digital Data and Control, DDC (optional front panel connector)

Data output signals	16 LVDS data lines (ANSI/TIA/EIA-644 compliant)

Start Trigger

Sources	PFI <0:3>, PXI_TRIG<0:6>, PXI Star Trigger, Software, Immediate
Modes	Single, Continuous, Stepped, Burst

Markers

Destinations	PFI <0:1>, PFI <4:5>, PXI_TRIG <0:6>
Quantity	1 Marker per Segment

Waveform and Instruction Memory Utilization

	8 MB Standard	32 MB Option	256 MB Option	512 MB Option
Onboard Memory Size	8,388,608 bytes	33,554,432 bytes	268,435,456 bytes	536,870,912 bytes

Output modes	Function Generator Emulation, Arbitrary Waveform and Arbitrary Sequence
Loop count	1 to 16,777,215. Burst Trigger: Unlimited

Memory Limits	8 MB Standard	32 MB Option	256 MB Option	512 MB Option
Arbitrary Waveform Mode Maximum Waveform Memory	4,194,176 Samples	16,777,088 Samples	134,217,600 Samples	268,435,328 Samples
Arbitrary Sequence Mode Maximum Waveform Memory[1]	4,194,120 Samples	16,777,008 Samples	134,217,520 Samples	268,435,200 Samples
Arbitrary Sequence Mode Maximum Waveforms[1]	65,000 Samples	262,000 Samples	2,097,000 Samples	4,194,000 Samples
Arbitrary Sequence Mode Maximum Segments in a Sequence[2]	104,000 Samples	418,000 Samples	3,354,000 Samples	6,708,000 Samples

Refer to detailed specifications for all trigger modes.
[1]Condition One or two segments in a sequence
[2]Condition: Waveform memory is <4,000 samples.

Power

+3.3 VDC	+5 VDC	+12 VDC	-12 VDC	Total Power	
2.0 A	2.0 A	0.46 A	0.01 A	22.2 W	Typical operating conditions
2.0 A	3.0 A	0.46 A	0.01 A	27.2 W	Maximum overload

Physical

Dimensions	Single 3U PXI slot
Front panel connectors	
CH0	SMB (Jack)
CLK IN	SMB (Jack)
PFI 0	SMB (Jack)
PFI 1	SMB (Jack)
Digital data and control	68-pin VHDCI Female Receptacle

Environment

Operating temperature	0 to +55 °C (Meets IEC-60068-2-1 and IEC-60068-2-2)
Storage temperature	-25 to +85 °C (Meets IEC-60068-2-1 and IEC-60068-2-2)
Relative humidity	10 to 90%, noncondensing (Meets IEC 60068-2-56)

Calibration

Self-calibration	DC gain and offset
External calibration interval	2 years

Certifications and Compliances CE

CE Mark Compliance

Note

Unless otherwise noted, the following conditions were used for each specification:
A. Analog filter enabled
B. Signals terminated with 50Ω
C. Direct path set to 1 Vpk-pk, Low Gain Amplifier Path set to 2 Vpk-pk, and High Gain Amplifier Path set to 12 Vpk-pk
D. Sample clock set to 200 MS/s

Specifications subject to change without notice. Please see detailed specifications for more information.

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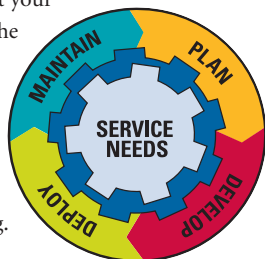
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