NI PXI/PCI-5402/5406 Specifications

14/16-Bit, 20/40 MHz Arbitrary Function Generator

> このドキュメントには、日本語ページも含まれています。

This document lists specifications for the NI PXI/PCI-5402/5406 (NI 5402/5406) arbitrary function generator. Unless otherwise noted, the following conditions were used for each specification:

- Analog filter enabled.
- Interpolation set to maximum allowed factor for a given sample rate.
- Signals terminated with 50 Ω.
- Full operating temperature range.

Specifications describe the warranted, traceable product performance over ambient temperature ranges of 0 °C to 55 °C, unless otherwise noted.

Typical values describe useful product performance beyond specifications that are not covered by warranty and do not include guardbands for measurement uncertainty or drift. Typical values may not be verified on all units shipped from the factory. Unless otherwise noted, typical values cover the expected performance of units over ambient temperature ranges of 15 °C to 35 °C with a 90% confidence level, based on measurements taken during development or production.

Nominal values (or supplemental information) describe additional information about the product that may be useful, including expected performance that is not covered under Specifications or Typical values. Nominal values are not covered by warranty.

Specifications are subject to change without notice. For the most recent NI 5402/5406 specifications, visit `ni.com/manuals`.

To access all the NI 5402/5406 documentation, navigate to **Start» All Programs»National Instruments»NI-FGEN»Documentation**.

⚠ **Hot Surface** If the NI 5402/5406 has been in use, it may exceed safe handling temperatures and cause burns. Allow the NI 5402/5406 to cool before removing it from the chassis.

Electromagnetic Compatibility Guidelines

This product was tested and complies with the regulatory requirements and limits for electromagnetic compatibility (EMC) as stated in the product specifications. These requirements and limits are designed to provide reasonable protection against harmful interference when the product is operated in its intended operational electromagnetic environment.

This product is intended for use in industrial locations. There is no guarantee that harmful interference will not occur in a particular installation, when the product is connected to a test object, or if the product is used in residential areas. To minimize the potential for the product to cause interference to radio and television reception or to experience unacceptable performance degradation, install and use this product in strict accordance with the instructions in the product documentation.

Furthermore, any changes or modifications to the product not expressly approved by National Instruments could void your authority to operate it under your local regulatory rules.

⚠ **Caution**   When operating this product, use shielded cables and accessories.

Contents

Waveform Characteristics
(CH 0 Analog Output, Front Panel Connector)

Specification	Value		Comments
Number of Channels	1		—
Connector	BNC		—
Output Voltage Characteristics			
DAC Resolution	**NI 5402**	**NI 5406**	—
	14 bits	16 bits	
Maximum Voltage	± 5 V (AC_{pk} + DC)		—
Amplitude and Offset			
Amplitude Range	5.64 $mV_{pk\text{-}pk}$ to 10 $V_{pk\text{-}pk}$ (50 Ω load) 11.28 $mV_{pk\text{-}pk}$ to 20 $V_{pk\text{-}pk}$ (High-impedance load)		NI-FGEN compensates for user-specified resistive loads.
Amplitude Resolution	< 0.06% (0.004 dB) of amplitude range		—
Offset Range	Square waveforms: $\pm 50\%$ of amplitude range All other waveforms: ± 5 V		Output limited by *Maximum Voltage* specification.
Accuracy			
AC Amplitude Accuracy	+2.0% of amplitude +1 mV −1.0% of amplitude −1 mV		50 kHz sine wave. High-impedance load.
Offset Accuracy	$\pm 0.5\%$ of offset ± 2 mV $\pm 0.5\%$ of amplitude		High-impedance load.
Output Characteristics			
Output Impedance	Selectable 50 Ω nominal or 75 Ω nominal		—
Output Enable	Selectable		When disabled, CH 0 output is terminated with a 1 W resistor with a value equal to the selected Output Impedance.

Specification	Value	Comments
Maximum Output Overload	The CH 0 output terminal can be connected to a 50 Ω, ±12 V source without sustaining any damage. No damage occurs if the CH 0 output is shorted to ground indefinitely.	—
Waveform Summing	Outputs of multiple NI 5402/5406 signal generators can be connected together.	—
Phase Adjustment	−180° to +180°	—
Digital Interpolation Filter	Selectable Finite Impulse Response (FIR) filter. Available interpolation factors are 2 or 4.	The digital filter is not available for use for Sample clock rates below 10 MS/s.
Analog Filter	Selectable 7-pole elliptical filter	—
Frequency Resolution	0.355 µHz	—

Maximum Frequencies for Common Functions

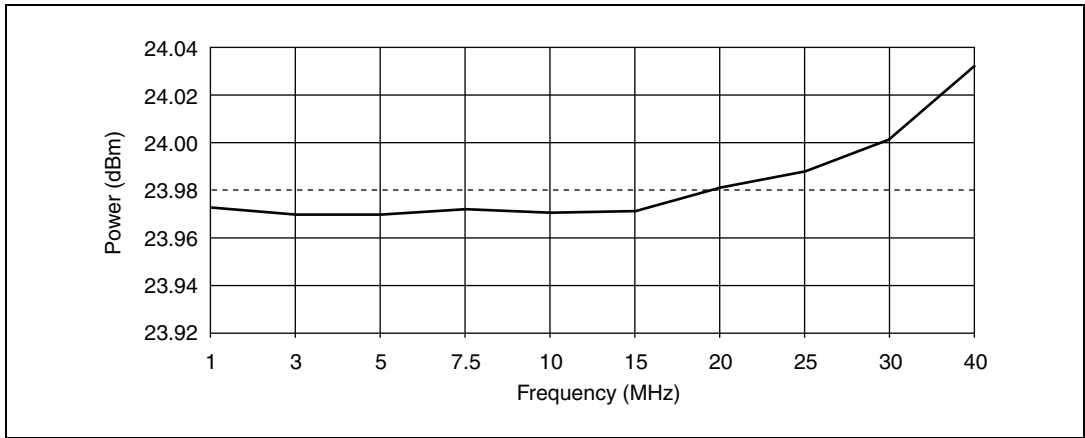| Function	NI PXI/ PCI-5402	NI PXI/ PCI-5406	Maximum Sample Rate	Comments
Sine	20 MHz	40 MHz	400 MS/s	The minimum frequency is 0 Hz.
Square	20 MHz	25 MHz	400 MS/s	
Ramp	1 MHz	5 MHz	100 MS/s	
Triangle	1 MHz	5 MHz	100 MS/s	
User-Defined	20 MHz	40 MHz	400 MS/s	Interpolation set to 4.
Noise	—	—	100 MS/s	—

Figure 1. Nominal Passband Flatness, Expected Voltage 10 V$_{pk-pk}$ (23.98 dBm)
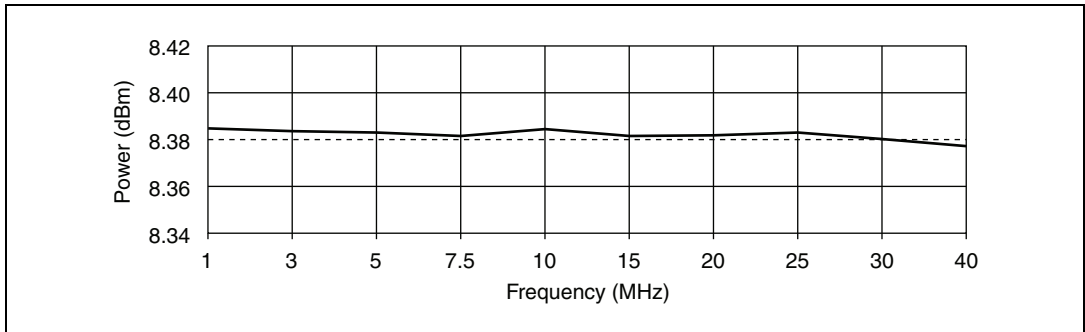

Figure 2. Nominal Passband Flatness, Expected Voltage 1.66 V$_{pk-pk}$ (8.38 dBm)

Note Figures 1 and 2 were acquired with the Rohde & Schwarz NRVS Power Meter using the NRV-Z51 Thermal Power Sensor.

Specification	Value		Comments
Sine Waves			
Passband Flatness	±0.4 dB (±5%)		With respect to 50 kHz.
Spurious-Free Dynamic Range (SFDR)[1] with Harmonics	**NI 5402**	**NI 5406**	Typical. Measured from DC to 50 MHz. Also called harmonic distortion.
	< 10 MHz = 50 dB 10 to 20 MHz = 45 dB	< 10 MHz = 50 dB 10 to 40 MHz = 45 dBc	
[1] Dynamic range is defined as the difference between the carrier level and the largest spur.			

Specification	Value		Comments
Spurious-Free Dynamic Range (SFDR) without Harmonics	**NI 5402**	**NI 5406**	Typical. Measured from DC to 50 MHz.
	70 dB	< 20 MHz = 70 dB 20 to 40 MHz = 60 dB	
Total Harmonic Distortion (THD)	$\leq$1.66 $V_{pk\text{-}pk}$	>1.66 $V_{pk\text{-}pk}$	Includes the 2nd through the 6th harmonics. [*] Typical
DC to 1 MHz	−60 dBc[*]	−58 dBc[*]	
NI 5402: 1 to 20 MHz	−41 dBc	−32 dBc	
NI 5406: 1 to 40 MHz	−41 dBc	−32 dBc	
Signal to Noise and Distortion (SINAD)	$\leq$1.66 $V_{pk\text{-}pk}$	>1.66 $V_{pk\text{-}pk}$	Measured from DC to 50 MHz.
DC to 1 MHz	58 dBc	58 dBc	
NI 5402: 1 MHz to 20 MHz	41 dBc	32 dBc	
NI 5406: 1 MHz to 40 MHz	41 dBc	32 dBc	
Average Noise Density	−114 dBm/Hz		—
Phase Noise Density	100 Hz: −100 dBc/Hz 1 kHz: −110 dBc/Hz 10 kHz: −120 dBc/Hz		Sine wave at 10 MHz.
Jitter (RMS)	< 4.0 ps rms		Integrated from 100 Hz to 100 kHz. Sine wave at 10 MHz.

Notes:
1. Spectral characteristics may degrade when offset is applied.
2. Spectral characteristics at low amplitudes are limited by a −148 dBm/Hz noise floor.
3. Output amplitude of −1 dBFS is used for all spectral specifications.

Specification	Value		Comments
Square Waves			
Pulse Response	Rise/Fall Time	Aberration (undershoot/ overshoot)	Typical
	<12 ns	<5%	
Duty Cycle	**NI 5402**	**NI 5406**	You can adjust duty cycle from 20 to 80% at higher frequencies, but the signal integrity degrades. For better waveforms at these duty cycles, use the SYNC OUT connector.
	< 10 MHz = 20 to 80% 10 to 20 MHz = 50%	< 10 MHz = 20 to 80% 10 to 40 MHz = 50%	
Jitter (RMS)	0.01% of period + 500 ps (typical, <2 MHz) 0.1% of period + 70 ps ($\geq$ 2 MHz)		Integrated from 100 Hz to 100 kHz.
User-Defined			
Waveform Size	16,384 samples		—

Frequency List Mode

Specification	Value	Comments
Frequency Steps	1 to 58,235 steps	—
Step Duration	1 ms to 21 s	—

Sample Clock
(Internal 100 MHz VCXO)

Specification	Value			Comments
Sample Clock Source	Onboard VCXO			Refer to the *Phase-Locked Loop (PLL) Reference Clock* section for more information.
Frequency Accuracy	±25 ppm			PLL Reference source set to **None**.
Interpolation	1 (off), 2, or 4			Applicable to user-defined waveform modes.
Sample Clock Exporting				
Exported Sample Clock Destinations	1. SYNC OUT/PFI 0, PFI 1(BNC connectors) 2. **NI PXI-5402/5406**—PXI_Trig<0..6> (PXI backplane connector) **NI PCI-5402/5406**—RTSI<0..6>			Exported Sample Clocks can be divided by integer K ($1 \leq K \leq 4{,}194{,}304$).
Exported Sample Clock Destinations	Maximum Frequency	Jitter (Typical)	Duty Cycle	Integrated from 100 Hz to 100 kHz.
SYNC OUT/PFI 0, PFI 1	100 MHz	PFI 0: 6 ps rms PFI 1: 12 ps rms	25 to 65%	
PXI_Trig<0..6>	20 MHz	—	—	
RTSI<0..6>	20 MHz	—	—	

Phase-Locked Loop (PLL) Reference Clock

Specification	Value	Comments
Sources	1. REF IN (BNC connector) 2. **NI PXI-5402/5406**—PXI_CLK10 (PXI backplane connector) **NI PCI-5402/5406**—RTSI_7 (PXI RTSI_CLK) 3. None	The PLL Reference Clock provides the reference frequency for the phase-locked loop.
Frequency Accuracy	When you use the PLL (items 1 and 2 above), the frequency accuracy of the NI 5402/5406 is solely dependent on the frequency accuracy of the PLL Reference Clock Source.	If the PLL Reference source is set to **None**, refer to the Sample Clock *Frequency Accuracy*.
Lock Time	Typical: 70 ms, Maximum: 200 ms	—
Frequency Range	5 to 20 MHz in 1 MHz steps Default of 10 MHz. To guarantee locking, the PLL reference clock frequency must be accurate to ±50 ppm.	—
Allowed Duty Cycle Range	40 to 60%	—
Exported PLL Reference Clock Destinations	1. SYNC OUT/PFI 0, PFI 1(BNC connectors) 2. **NI PXI-5402/5406**—PXI_Trig<0..6> (PXI backplane connector) **NI PCI-5402/5406**—RTSI<0..6>	—

TClk Specifications

National Instruments TClk synchronization method and the NI-TClk instrument driver are used to align the Sample clocks on any number of SMC-based modules in a chassis. For more information about TClk synchronization, refer to the *NI-TClk Synchronization Help*, which is located within the *NI Signal Generators Help*.

- Specifications are valid for any number of PXI modules installed in one NI PXI-1042 chassis.

- All parameters set to identical values for each SMC-based module.

- Sample Clock set to 100 MS/s, Divide-by-*N*, and all filters are disabled.

- For other configurations, including multichassis systems, contact NI Technical Support at ni.com/support.

Note Although you can use NI-TClk to synchronize nonidentical modules, these specifications apply only to synchronizing identical modules.

Specification	Value	Comments
Intermodule SMC Synchronization Using NI-TClk for Identical Modules (Typical)		
Skew	500 ps	Caused by clock and analog path delay differences. No manual adjustment performed.
Average Skew After Manual Adjustment	<10 ps	For information about manual adjustment, refer to the *Synchronization Repeatability Optimization* topic in the *NI-TClk Synchronization Help*. For additional help with the adjustment process, contact NI Technical Support at ni.com/support.
Sample Clock Delay/Adjustment Resolution	≤10 ps	—

REF IN
(Reference Clock Input, Front Panel Connector)

Specification	Value	Comments
Connector	BNC	—
Direction	Input	—
Input Voltage Range	Sine wave: 0.63 to 2.8 $V_{pk\text{-}pk}$ into 50 Ω (0 to +13 dBm)	—
	Square wave: 0.2 to 2.8 $V_{pk\text{-}pk}$ into 50 Ω	
Maximum Input Overload	±10 V (AC_{pk} + DC)	—
Input Impedance	50 Ω	—
Input Coupling	AC	—

SYNC OUT/PFI 0 and PFI 1
(Programmable Function Interface, Front Panel Connectors)

Specification	Value	Comments
Connectors	Two BNC	—
Direction	Bidirectional	—
Frequency Range	DC to 100 MHz	—
As an Input (Trigger)		
Destination	Start trigger	—
Maximum Input Overload	−2 to +7 V (AC$_{pk}$ + DC)	—
V_{IH}	2.0 V	—
V_{IL}	0.8 V	—
Input Impedance	1 kΩ	—
As an Output (Event)		
Sources	1. Sample Clock divided by integer K ($1 \leq K \leq 4,194,304$) 2. PLL Reference Clock 3. Exported Start Trigger (Out Start Trigger) 4. SYNC OUT	—
Output Impedance	50 Ω	—
Maximum Output Overload	−2 to +7 V (AC$_{pk}$ + DC)	—
V_{OH}	Minimum: 2.9 V (high-impedance load), 1.4 V (50 Ω load)	Output drivers are +3.3 V TTL compatible.
V_{OL}	Maximum: 0.2 V (high-impedance load), 0.2 V (50 Ω load)	
Rise/Fall Time (20 to 80%)	≤2.0 ns	Load of 10 pF

Sync

Specification	Value	Comments
Sync Duty Cycle	20 to 80%	—
Jitter (RMS)	0.01% of period + 500 ps (typical, <2 MHz) 0.1% of period + 70 ps (≥2 MHz)	Integrated from 100 Hz to 100 kHz.

Start Trigger

Specification	Value	Comments
Sources	1. SYNC OUT/PFI 0, PFI 1(BNC connectors) 2. **NI PXI-5402/5406**—PXI_Trig<0..7> (PXI backplane connector) **NI PCI-5402/5406**—RTSI<0..7> 3. **NI PXI-5402/5406**—PXI Star Trigger (PXI backplane connector) 4. Software (use function call) 5. Immediate (does not wait for a trigger. Default.	—
Modes	1. Single 2. Continuous 3. Stepped 4. Burst	Refer to **NI Signal Generators Help»Devices» NI 5402/5406»Triggering» Trigger Modes**.
Edge Detection	Rising, falling, level high, level low	—
Minimum Pulse Width	25 ns	Refer to t_{s1} at **NI Signal Generators Help»Devices» NI 5402/5406»Triggering» Trigger Timing**.

Specification	Value		Comments
Delay from Start Trigger to CH 0 Analog Output	Waveform	Typical Delay	Refer to t_{s2} at **NI Signal Generators Help»Devices» NI 5402/5406»Triggering» Trigger Timing**.
	Sine	1,100 ns	
	Square	1,100 ns + 0.5% of period	
	All Others	900 ns	
Start Trigger Exporting			
Destinations	1. SYNC OUT/PFI 0, PFI 1 (BNC Connectors) 2. **NI PXI-5402/5406**—PXI_Trig<0..6> (PXI backplane connector) **NI PCI-5402/5406**—RTSI<0..6>		—
Delay	65 ns (typical)		Refer to t_{s3} and t_{s4} at **NI Signal Generators Help»Devices» NI 5402/5406»Triggering» Trigger Timing**.
Pulse Width	>150 ns		

Calibration

Specification	Value	Comments
Self-Calibration	An onboard, 24-bit ADC and precision voltage reference are used to calibrate the gain and offset. Square waveform duty cycle is also calibrated. The self-calibration is initiated by the user through the software and takes approximately 105 seconds to complete.	—
External Calibration	The external calibration calibrates the VCXO, voltage reference, self-calibration ADC, flatness, gain, and offset. Appropriate constants are stored in nonvolatile memory.	Also known as factory calibration.
Calibration Interval	Specifications valid within two years of external calibration.	—
Warm-up Time	15 minutes	—

Power

Specification	Value	Comments
+3.3 VDC	1.4 A	—
+5 VDC	See Figure 3.	
+12 VDC	0.11 A	
−12 VDC	0.01 A	
Total Power	17.6 W	
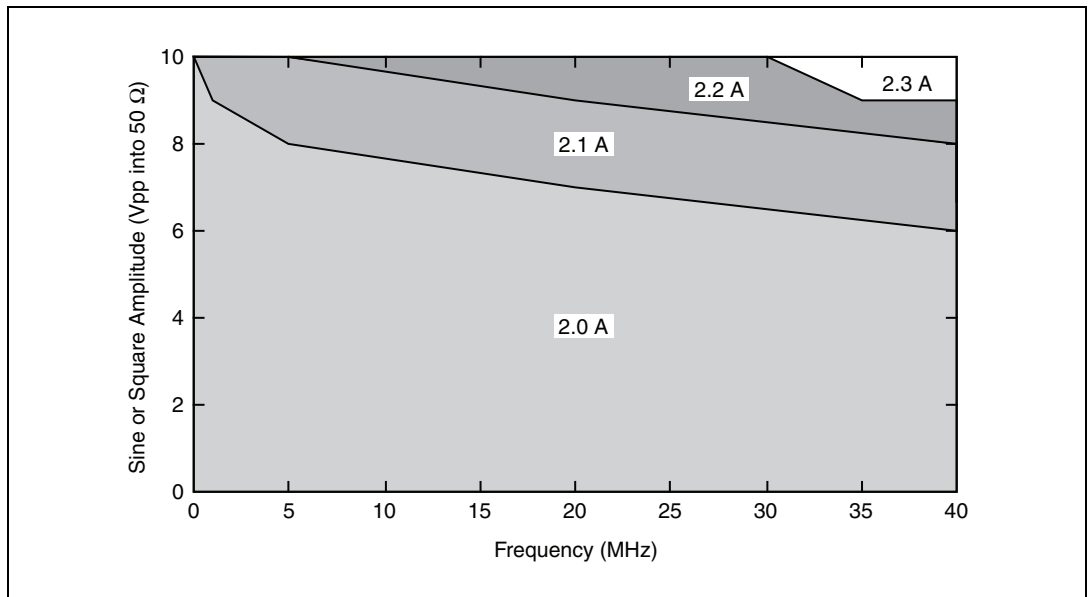
Figure 3. 5 V Current Versus Frequency and Amplitude

Software

Specification	Value	Comments
Driver Software	NI-FGEN is an IVI-compliant driver that allows you to configure, control, and calibrate the NI 5402/5406. NI-FGEN provides application programming interfaces for many development environments.	—
Application Software	NI-FGEN provides programming interfaces for the following application development environments: • LabVIEW • LabWindows™/CVI™ • Measurement Studio • Microsoft Visual C++ .NET • Microsoft Visual C/C++ • Microsoft Visual Basic	—
Interactive Control and Configuration Software	The FGEN Soft Front Panel supports interactive control of the NI 5402/5406. The FGEN Soft Front Panel is included on the NI-FGEN driver media. Measurement & Automation Explorer (MAX) provides interactive configuration and test tools for the NI 5402/5406. MAX is also included on the NI-FGEN media. You can use the NI 5402/5406 with NI SignalExpress.	—

Environment

NI PXI-5402/5406 Environment

✎ **Note** To ensure that the NI PXI-5402/5406 cools effectively, follow the guidelines in the *Maintain Forced-Air Cooling Note to Users* included in the NI 5402/5406 kit. The NI PXI-5402/5406 is intended for indoor use only.

Specification	Value	Comments
Operating Temperature	0 to +55 ºC (when installed in an NI PXI chassis). 0 to +45 ºC (when installed in an NI PXI-101*X* or NI PXI-1000/B chassis). Meets IEC 60068-2-1 and IEC 60068-2-2.	—
Storage Temperature	–25 to +85 ºC. Meets IEC 60068-2-1 and IEC 60068-2-2.	—
Operating Relative Humidity	10 to 90%, noncondensing. Meets IEC 60068-2-56.	—
Storage Relative Humidity	5 to 95%, noncondensing. Meets IEC 60068-2-56.	—
Operating Shock	30 g, half-sine, 11 ms pulse. Meets IEC 60068-2-27. Test profile developed in accordance with MIL-PRF-28800F.	Spectral and jitter specifications could degrade.
Storage Shock	50 g, half-sine, 11 ms pulse. Meets IEC 60068-2-27. Test profile developed in accordance with MIL-PRF-28800F.	—
Operating Vibration	5 to 500 Hz, 0.31 g_{rms}. Meets IEC 60068-2-64.	Spectral and jitter specifications could degrade.
Storage Vibration	5 to 500 Hz, 2.46 g_{rms}. Meets IEC 60068-2-64. Test profile exceeds requirements of MIL-PRF-28800F, Class B.	—
Altitude	2,000 m maximum (at 25 °C ambient temperature)	—
Pollution Degree	2	—

NI PCI-5402/5406 Environment

✎ **Note** To ensure that the NI PCI-5402/5406 cools effectively, follow the guidelines in the *Maintain Forced-Air Cooling Note to Users* included in the NI 5402/5406 kit. Also, to maximize airflow and extend the life of the device, leave any adjacent PCI slots empty. The NI PCI-5402/5406 is intended for indoor use only.

Specification	Value	Comments
Operating Temperature	0 to +45 ℃. Meets IEC 60068-2-1 and IEC 60068-2-2.	—
Storage Temperature	–25 to +85 ℃. Meets IEC 60068-2-1 and IEC 60068-2-2.	—
Operating Relative Humidity	10 to 90%, noncondensing. Meets IEC 60068-2-56.	—
Storage Relative Humidity	5 to 95%, noncondensing. Meets IEC 60068-2-56.	—
Storage Shock	50 g, half-sine, 11 ms pulse. Meets IEC 60068-2-27. Test profile developed in accordance with MIL-PRF-28800F.	—
Storage Vibration	5 to 500 Hz, 2.46 g_{rms}. Meets IEC 60068-2-64. Test profile exceeds requirements of MIL-PRF-28800F, Class B.	—
Altitude	2,000 m maximum (at 25 °C ambient temperature)	—
Pollution Degree	2	—

Physical

Specification	Value		Comments
Dimensions	**NI PXI-5402/5406**	**NI PCI-5402/5406**	—
	3U, One Slot, PXI/cPCI Module $21.6 \times 2.0 \times 13.0$ cm $(8.5 \times 0.8 \times 5.1$ in.)	$34.1 \times 2.0 \times 10.7$ cm $(13.4 \times 0.8 \times 4.2$ in.)	
Weight	351 g (12.4 oz)	420 g (14.8 oz)	—
Front Panel Connectors			
Label	Function(s)	Connector Type	—
CH 0	Analog Output	BNC (female)	
REF IN	PLL reference clock input	BNC (female)	
SYNC OUT/PFI 0	Trigger input, sample clock output, exported trigger output, PLL reference clock output, and SYNC OUT	BNC (female)	
PFI 1	Trigger input, sample clock output, exported trigger output, PLL reference clock output, and SYNC OUT	BNC (female)	
NI PXI-5402/5406 Only—Front Panel LED Indicators			
Label	Function		For more information, refer to the *NI Signal Generators Help*.
ACCESS	The ACCESS LED indicates the status of the PCI bus and the interface from the NI 5402/5406 to the controller.		
ACTIVE	The ACTIVE LED indicates the status of the onboard generation hardware of the NI 5402/5406.		

✎ **Note** NI PXI-5402/5406 modules are equipped with a modified PXI Express-compatible backplane connector. This modified connector allows the NI PXI- 5402/5406 to be supported by hybrid slots in a PXI Express chassis.

Compliance and Certifications

Safety

This product meets the requirements of the following standards of safety for electrical equipment for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 61010-1, CSA 61010-1

Note For UL and other safety certifications, refer to the product label or the *Online Product Certification* section.

Electromagnetic Compatibility

This product meets the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use:

- EN 61326-1 (IEC 61326-1): Class A emissions; Basic immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions
- AS/NZS CISPR 11: Group 1, Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-001: Class A emissions

Note For EMC declarations and certifications, refer to the *Online Product Certification* section.

CE Compliance $\mathsf{C}\,\mathsf{\epsilon}$

This product meets the essential requirements of applicable European Directives as follows:

- 2006/95/EC; Low-Voltage Directive (safety)
- 2004/108/EC; Electromagnetic Compatibility Directive (EMC)

Online Product Certification

To obtain product certifications and the Declaration of Conformity (DoC) for this product, visit ni.com/certification, search by model number or product line, and click the appropriate link in the Certification column.

Environmental Management

NI is committed to designing and manufacturing products in an environmentally responsible manner. NI recognizes that eliminating certain hazardous substances from our products is beneficial to the environment and to NI customers.

For additional environmental information, refer to the *NI and the Environment* Web page at ni.com/environment. This page contains the environmental regulations and directives with which NI complies, as well as other environmental information not included in this document.

Waste Electrical and Electronic Equipment (WEEE)

EU Customers At the end of the product life cycle, all products *must* be sent to a WEEE recycling center. For more information about WEEE recycling centers, National Instruments WEEE initiatives, and compliance with WEEE Directive 2002/96/EC on Waste Electrical and Electronic Equipment, visit ni.com/environment/weee.

电子信息产品污染控制管理办法 （中国 RoHS）

中国客户 National Instruments 符合中国电子信息产品中限制使用某些有害物质指令 (RoHS)。
关于 National Instruments 中国 RoHS 合规性信息，请登录 ni.com/environment/rohs_china。
(For information about China RoHS compliance, go to ni.com/environment/rohs_china.)

Where to Go for Support

The National Instruments Web site is your complete resource for technical support. At `ni.com/support` you have access to everything from troubleshooting and application development self-help resources to email and phone assistance from NI Application Engineers.

A Declaration of Conformity (DoC) is our claim of compliance with the Council of the European Communities using the manufacturer's declaration of conformity. This system affords the user protection for electromagnetic compatibility (EMC) and product safety. You can obtain the DoC for your product by visiting `ni.com/certification`. If your product supports calibration, you can obtain the calibration certificate for your product at `ni.com/calibration`.

National Instruments corporate headquarters is located at 11500 North Mopac Expressway, Austin, Texas, 78759-3504. National Instruments also has offices located around the world to help address your support needs. For telephone support in the United States, create your service request at `ni.com/support` and follow the calling instructions or dial 512 795 8248. For telephone support outside the United States, contact your local branch office:

Australia 1800 300 800, Austria 43 662 457990-0,
Belgium 32 (0) 2 757 0020, Brazil 55 11 3262 3599,
Canada 800 433 3488, China 86 21 5050 9800,
Czech Republic 420 224 235 774, Denmark 45 45 76 26 00,
Finland 358 (0) 9 725 72511, France 01 57 66 24 24,
Germany 49 89 7413130, India 91 80 41190000, Israel 972 3 6393737,
Italy 39 02 41309277, Japan 0120-527196, Korea 82 02 3451 3400,
Lebanon 961 (0) 1 33 28 28, Malaysia 1800 887710,
Mexico 01 800 010 0793, Netherlands 31 (0) 348 433 466,
New Zealand 0800 553 322, Norway 47 (0) 66 90 76 60,
Poland 48 22 328 90 10, Portugal 351 210 311 210,
Russia 7 495 783 6851, Singapore 1800 226 5886,
Slovenia 386 3 425 42 00, South Africa 27 0 11 805 8197,
Spain 34 91 640 0085, Sweden 46 (0) 8 587 895 00,
Switzerland 41 56 2005151, Taiwan 886 02 2377 2222,
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