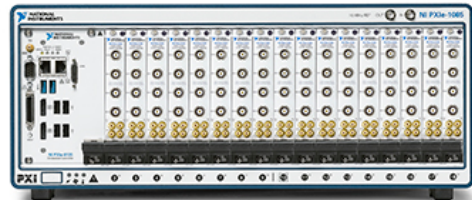Ordering Information | Detailed Specifications

For user manuals and dimensional drawings, visit the product page resources tab on ni.com.

Last Revised: 2014-11-06 07:15:02.0

NI PXIe-5162

- 1.5 GHz analog bandwidth
- Sampling rates of 5 GS/s (1 ch active) and 1.25 GS/s (4 ch active)
- 10-bit vertical resolution with input ranges from 50 mVpk-pk to 50 Vpk-pk
- 4 independently configurable channels with 50 Ω and 1 MΩ input impedance paths

- Data transfer rates of >600 MB/s from device to host
- 1-slot, 3U PXI Express form factor
- 2 channels and 4 channels versions available

Overview

The NI PXIe-5162 digitizer/oscilloscope delivers a new level of performance in the small-form-factor, low-power PXI platform. Its flexibility makes it an ideal general-purpose instrument for test and measurement applications. Each of the four analog input channels can acquire up to 5 GS/s with 1.5 GHz of bandwidth on the 50 Ω path and 300 MHz on the 1 MΩ path. For high-channel applications, the analog-to-digital-converter provides two channels to sample up to 2.5 GS/s or four channels to sample up to 1.25 GS/s with 1.5 GHz analog bandwidth on the 50 Ω path. To manage the large data sets, the NI PXIe-5162 is equipped with deep onboard memory and a PCI Express x4 Gen 1 link to the PXI Express backplane.

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Comparison Tables

Model Number	Form Factor	Max. Sample Rate	Max. Bandwidth	Resolution	Input Impedance	Signal Coupling	Channel Count	PXI Slot Count
NI PXI-5114	PXI	250 MS/s	125 MHz	8-bit	50 Ω / 1 MΩ	AC / DC	2	1
NI PXI-5152	PXI	2 GS/s	300 MHz	8-bit	50 Ω / 1 MΩ	AC / DC	2	1
NI PXI-5153	PXI	2 GS/s	500 MHz	8-bit	50 Ω	AC / DC	2	1
NI PXI-5154	PXI	2 GS/s	1 GHz	8-bit	50 Ω	AC / DC	2	1
NI PXIe-5162	PXI Express	5 GS/s	1.5 GHz	10-bit	50 Ω / 1 MΩ	AC / DC	4	1
NI PXIe-5185	PXI Express	12.5 GS/s	3 GHz	8-bit	50 Ω / 1 MΩ	AC / DC	2	3
NI PXIe-5186	PXI Express	12.5 GS/s	5 GHz	8-bit	50 Ω / 1 MΩ	AC / DC	2	3
NI 5772	NI FlexRIO Adapter Module	1.6 GS/s	2 GHz	12-bit	50 Ω	AC	2	1
NI 5771	NI FlexRIO Adapter Module	3 GS/s	900 MHz	8-bit	50 Ω	DC	2	1

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Application and Technology

The NI PXIe-5162 digitizer offers the familiar analog front end of a traditional oscilloscope with the added benefits of flexible software, improved measurement performance, and simplified channel expansion. Common applications include:

- Automated test of electronic devices

- Radar prototyping and testing
- High-channel-count physics experiments
- Image capture and recording with tight synchronization
- Portable diagnostic test and debugging for military/aerospace

Top Features	Technical Benefits
4 channels	High density, up to 68 channels in 4U 19 in. rack space
5 GS/s, 1.5 GHz bandwidth	Sufficient performance for a wide variety of applications
10-bit resolution	Superior measurement precision compared to traditional 8-bit high-speed digitizers
10 input ranges	Improved resolution over a wide range of signals from 50 mV$_{pk-pk}$ to 50 V$_{pk-pk}$
1 MΩ/50 Ω input impedance	Flexibility for both high-speed signal paths (50 Ω) and noninvasive measurements (1 MΩ)
2 GB onboard memory	Deep acquisition memory to store up to 1024 MS
x4 Gen 1 PXI Express Link	High throughput, over 600 MB/s of continuous streaming

Table 1. NI PXIe-5162 features address the key challenges in automated test.

High-Performance Front End, Digital Back End Optimized for Automated Test

Using a 10-bit, 5 GS/s analog-to-digital converter (ADC), the NI PXIe-5162 provides high-speed sampling with four times the vertical resolution of a traditional box instrument. To capture these small signal changes, the front end of the digitizer was carefully designed to reduce noise and distortion, resulting in seven effective number of bits (ENOB) at 1 GHz of analog bandwidth. Each channel on the NI PXIe-5162 is equipped with 50 Ω and 1 MΩ input impedance paths, input ranges spanning from 50 mV$_{pk-pk}$ to 50 V$_{pk-pk}$, selectable filters, and AC or DC coupling options. Once the analog signal is converted, the digital signal output can be sent to an NI FlexRIO FPGA coprocessor for inline processing with the NI LabVIEW FPGA Module or back to the host CPU for post-processing. Data is transferred over the high-speed PCI Express x4 Gen 1 link to the PXI Express backplane.

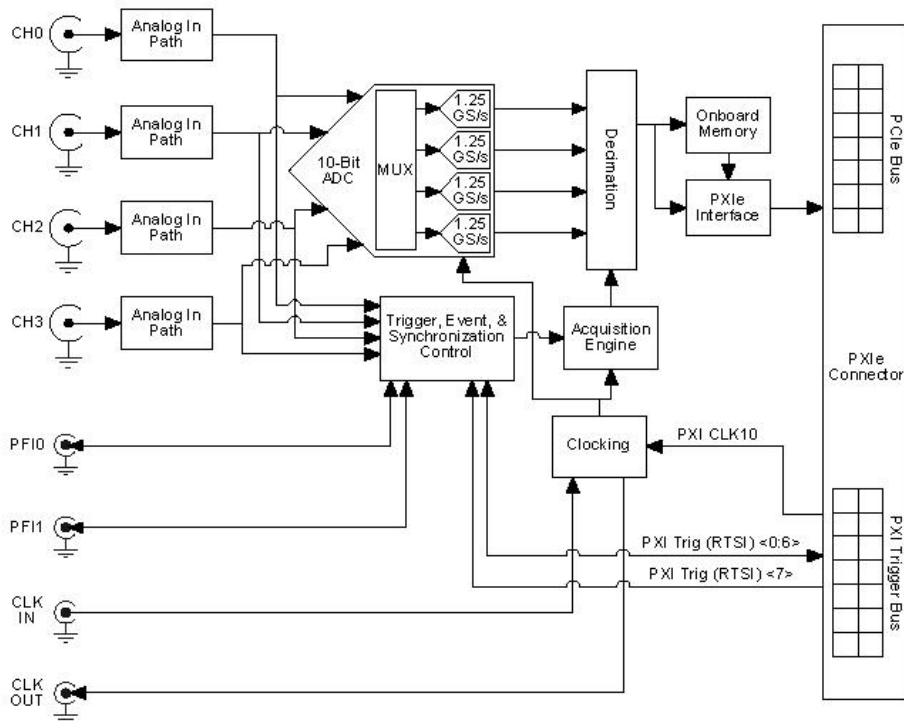The result is a digitizer with leading analog performance optimized for automated test applications.

Figure 1. You can independently configure the NI PXIe-5162 input impedance, vertical ranges, and signal coupling on a per channel basis.

Simplified Channel Expansion

For applications requiring high-channel density, the single-slot NI PXIe-5162 includes four analog input channels that are capable of simultaneously digitizing signals at a rate of 1.25 GS/s. The modular PXI platform makes it possible to fit up to 68 channels in a compact 18-slot PXI chassis. Configuring the triggering and clock synchronization of the individual modules using the NI-TClk API makes the system appear as one multichannel oscilloscope with 100 ps of skew between modules. This greatly simplifies the user experience. Moreover, this easy-to-set-up channel expansion extends to all NI PXI digitizers, arbitrary waveform generators, and high-speed digital I/O modules. To manage these large data sets, each module is capable of delivering high-data throughput at rates greater than 600 MB/s.

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Figure 2. With the density of the NI PXIe-5162 digitizer, you can create a 68-channel software-defined oscilloscope.

Flexible Software

Unlike vendor-defined box instruments, modular digitizers are defined and customized through software. Basic functions are available through the NI-SCOPE Soft Front Panel, an interactive UI that is shipped with PXI digitizers. You can also build fully automated applications using the NI-SCOPE driver, which provides over 40 digitizer examples to accelerate development time. The IVI-compliant NI-SCOPE driver provides abstracted APIs for use with NI LabVIEW, NI LabWindows™/CVI, and NI Measurement Studio for Visual Studio. It also includes more than 50 built-in measurement and analysis functions. For comprehensive data analysis and visualization, LabVIEW is shipped with over 850 signal processing and mathematics functions.
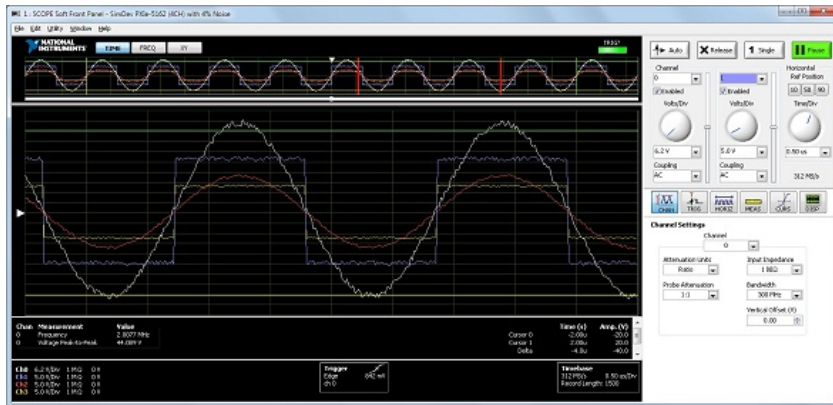

Figure 3. The NI-SCOPE Soft Front Panel is shipped with all NI digitizers to simplify interactive measurements.
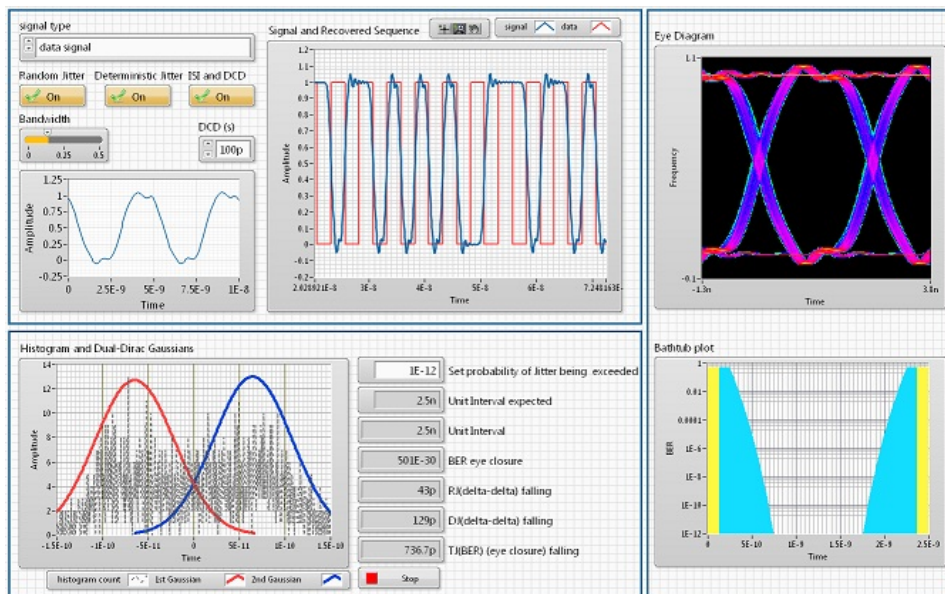

Figure 4. You can pair NI digitizers with the NI LabVIEW Jitter Analysis Toolkit to perform signal integrity measurements.

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Ordering Information

For a complete list of accessories, visit the product page on ni.com.

Products	Part Number	Recommended Accessories	Part Number
NI PXIe-5162			
NI PXIe-5162 - 4 Channel, 2 GB Onboard Memory	782622-06	No accessories required.	
NI PXIe-5162 - 2 Channel, 2 GB Onboard Memory	782622-05	No accessories required.	
NI PXIe-5162 - 2 Channel, 64 MB Onboard Memory	782622-01	No accessories required.	

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Support and Services

System Assurance Programs

NI system assurance programs are designed to make it even easier for you to own an NI system. These programs include configuration and deployment services for your NI PXI, CompactRIO, or Compact FieldPoint system. The NI Basic System Assurance Program provides a simple integration test and ensures that your system is delivered completely assembled in one box. When you configure your system with the NI Standard System Assurance Program, you can select from available NI system driver sets and application development environments to create customized, reorderable software configurations. Your system arrives fully assembled and tested in one box with your software preinstalled. When you order your system with the standard program, you also receive system-specific documentation including a bill of materials, an integration test report, a recommended maintenance plan, and frequently asked question documents. Finally, the standard program reduces the total cost of owning an NI system by providing three years of warranty coverage and calibration service. Use the online product advisors at ni.com/advisor to find a system assurance program to meet your needs.

Calibration

NI measurement hardware is calibrated to ensure measurement accuracy and verify that the device meets its published specifications. To ensure the ongoing accuracy of your measurement hardware, NI offers basic or detailed recalibration service that provides ongoing ISO 9001 audit compliance and confidence in your measurements. To learn more about NI calibration services or to locate a qualified service center near you, contact your local sales office or visit ni.com/calibration.

Technical Support

Get answers to your technical questions using the following National Instruments resources.

- **Support** - Visit ni.com/support to access the NI KnowledgeBase, example programs, and tutorials or to contact our applications engineers who are located in NI sales offices around the world and speak the local language.
- **Discussion Forums** - Visit forums.ni.com for a diverse set of discussion boards on topics you care about.
- **Online Community** - Visit community.ni.com to find, contribute, or collaborate on customer-contributed technical content with users like you.

Repair

While you may never need your hardware repaired, NI understands that unexpected events may lead to necessary repairs. NI offers repair services performed by highly trained technicians who quickly return your device with the guarantee that it will perform to factory specifications. For more information, visit ni.com/repair.

Training and Certifications

The NI training and certification program delivers the fastest, most certain route to increased proficiency and productivity using NI software and hardware. Training builds the skills to more efficiently develop robust, maintainable applications, while certification validates your knowledge and ability.

- **Classroom training in cities worldwide** - the most comprehensive hands-on training taught by engineers.
- **On-site training at your facility** - an excellent option to train multiple employees at the same time.
- **Online instructor-led training** - lower-cost, remote training if classroom or on-site courses are not possible.
- **Course kits** - lowest-cost, self-paced training that you can use as reference guides.
- **Training memberships** and training credits - to buy now and schedule training later.

Visit ni.com/training for more information.

Extended Warranty

NI offers options for extending the standard product warranty to meet the life-cycle requirements of your project. In addition, because NI understands that your requirements may change, the extended warranty is flexible in length and easily renewed. For more information, visit ni.com/warranty.

OEM

NI offers design-in consulting and product integration assistance if you need NI products for OEM applications. For information about special pricing and services for OEM customers, visit ni.com/oem.

Alliance

Our Professional Services Team is comprised of NI applications engineers, NI Consulting Services, and a worldwide National Instruments Alliance Partner program of more than 700 independent consultants and integrators. Services range from start-up assistance to turnkey system integration. Visit ni.com/alliance.

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Analog Input

Number of channels
    NI 5162 (2 CH)..Two (simultaneously sampled)
    NI 5162 (4 CH)..Four (simultaneously sampled)

Input type...Reference single-ended

Connectors..BNC

Impedance and Coupling

Note   Impedance and coupling are software-selectable on a per channel basis.

Input impedance, typical
    50 Ω...50 Ω ± 1.5%
    1 MΩ...1 MΩ ± 0.75%

Input capacitance, characteristic[1].........................15 pF

Input coupling..AC, DC

---

[1] 1 MΩ input only.

Figure 1. 50 Ω Input Return Loss and Input VSWR, Characteristic
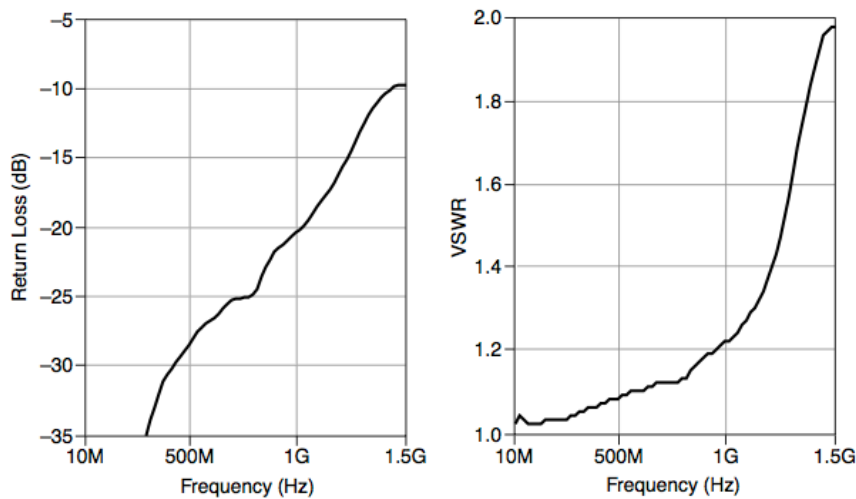
Voltage Levels

Table 1. 50 Ω Full Scale (FS) Input Range and Vertical Offset Range

Input Range (V$_{pk-pk}$)	Vertical Offset Range (V)
0.05 V	±0.5
0.1 V	±0.5
0.2 V	±0.5
0.5 V	±0.5
1 V	±0.5
2 V	±1.5
5 V	0

Table 2. 1 MΩ Full Scale (FS) Input Range and Vertical Offset Range

Input Range (V$_{pk-pk}$)	Vertical Offset Range (V)
0.05 V	±0.5
0.1 V	±0.5
0.2 V	±0.5

Table 2. 1 MΩ Full Scale (FS) Input Range and Vertical Offset Range (Continued)

Input Range (V$_{pk-pk}$)	Vertical Offset Range (V)
0.5 V	±0.5
1 V	±0.5
2 V	±5
5 V	±5
10 V	±5
20 V	±30
50 V	±15

Maximum input overload, characteristic[2]

50 Ω...|Peaks| ≤ 5 V

1 MΩ...|Peaks| ≤ 42 V

Accuracy

Resolution..10 bits

DC accuracy[3]...±[(2% × |Reading - Vertical Offset|)
$\qquad$ + (1.4% × |Vertical Offset|)
$\qquad$ + (0.6% of FS) + 600 µV]

DC drift, characteristic[4].......................................±[(0.1% × |Reading - Vertical Offset|)
$\qquad$ + (0.025% × |Vertical Offset|)
$\qquad$ + (0.03% of FS)] per °C

AC amplitude accuracy[3]......................................±0.5 dB at 50 kHz

AC amplitude drift, characteristic[4]....................±0.01 dB per °C at 50 kHz

---

2 Signals exceeding the maximum input overload may cause damage to the device.
3 Within ±3 °C of self-calibration temperature. This specification is *typical* for peak-to-peak input ranges of 0.05 V to 0.1 V and *warranted* for all other input ranges.
4 Used to calculate errors when onboard temperature changes more than ±3 °C from the self-calibration temperature.

Table 3. Crosstalk (CH to/from CH), Characteristic[5]

Input Impedance	Input Frequency	Crosstalk
50 Ω	DC ≤ f ≤ 100 MHz	-60 dB
	100 MHz < f ≤ 700 MHz	-45 dB
	700 MHz < f ≤ 1000 MHz	-40 dB
1 MΩ[6]	DC ≤ f ≤ 100 MHz	-55 dB
	100 MHz < f ≤ 200 MHz	-45 dB

Bandwidth and Transient Response

Bandwidth (-3 dB)[7]

    50 Ω, warranted..1.5 GHz

    1 MΩ[8]..300 MHz

Bandwidth limiting filters....................................20 MHz, 175 MHz

Rise/fall time, typical[9]

    50 Ω...320 ps

    1 MΩ...1.4 ns

AC-coupling cutoff (-3 dB)[10]

    50 Ω[11]..170 kHz

    1 MΩ...17 Hz

---

[5] Measured on one channel with test signal applied to another channel, with same range setting on both channels.

[6] Only valid on peak-to-peak input ranges of 0.05 V to 10 V.

[7] Normalized to 50 kHz.

[8] This specification is *characteristic* for peak-to-peak input ranges of 20 V and 50 V and *typical* for all other input ranges. Verified using a 50 Ω source and 50 Ω feed-through terminator.

[9] 50% FS input pulse.

[10] Verified using a 50 Ω source.

[11] With AC coupling enabled, the DC resistance to ground is 20 kΩ.

Figure 2. NI 5162 Step Response, 50 Ω, 1 V_{pk-pk} Input Range, -0.25 V Programmable Offset, 150 ps Rising Edge, Characteristic
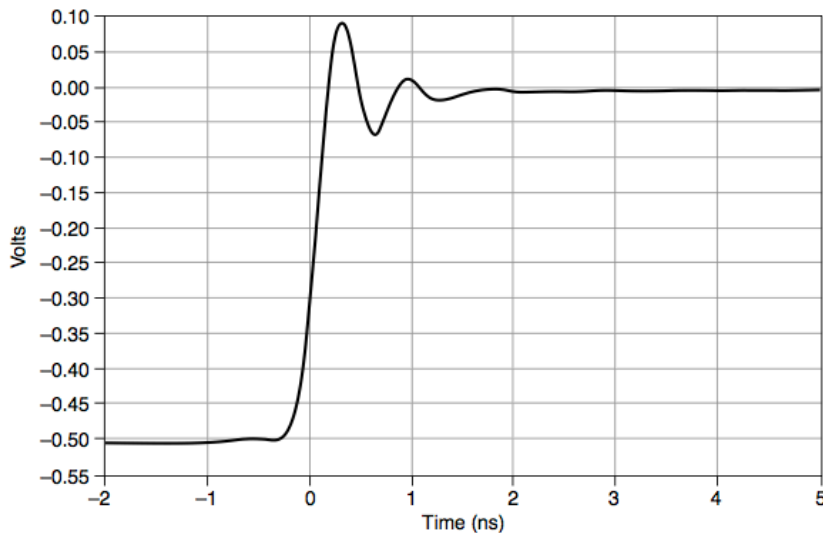
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Figure 3. NI 5162 Step Response, 1 MΩ, 1 V$_{pk-pk}$ Input Range, -0.25 V Programmable Offset, 500 ps Rising Edge, Characteristic
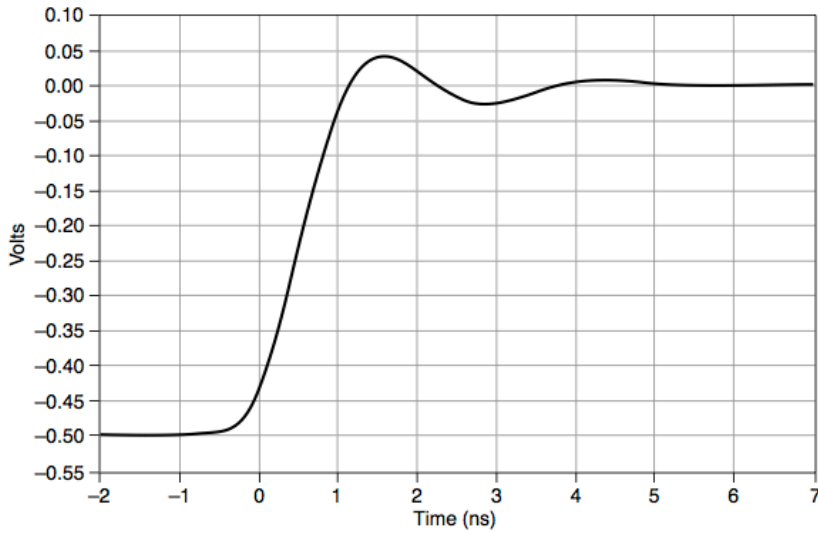

Figure 4. NI 5162 50 Ω Frequency Response, 1 V$_{pk-pk}$, 5 GS/s, Characteristic
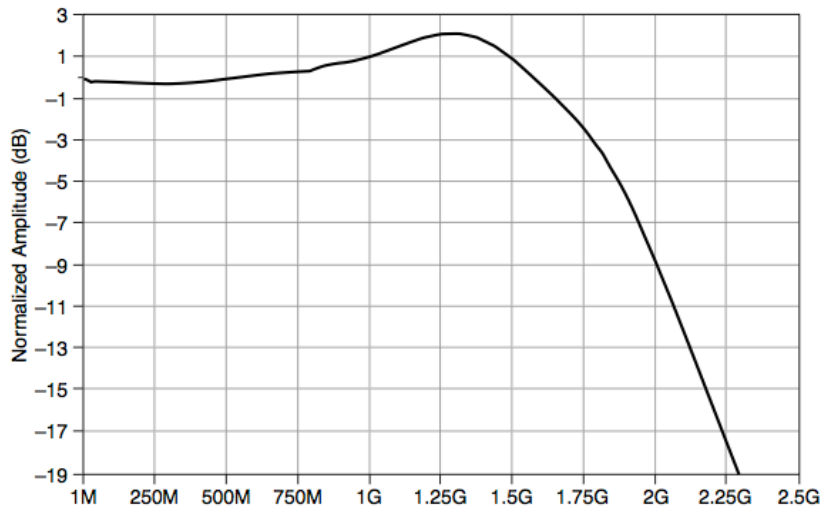

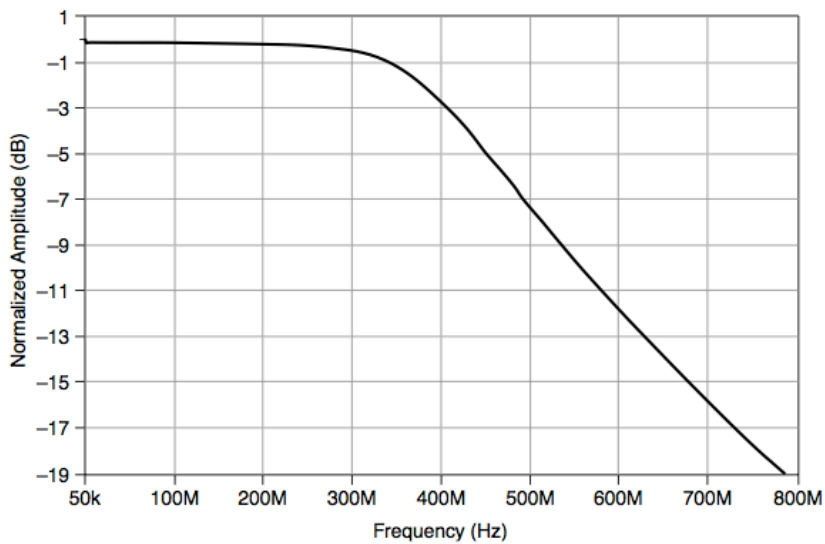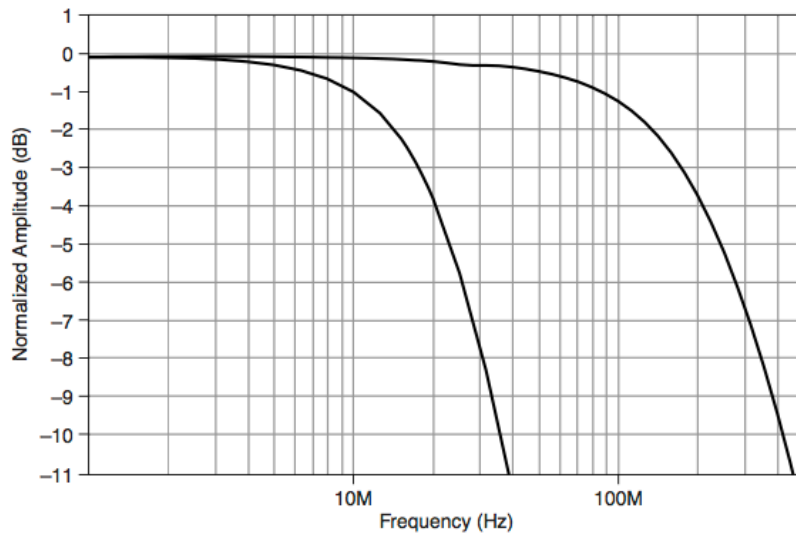Figure 5. NI 5162 1 MΩ Frequency Response, 1 V$_{pk-pk}$, Characteristic

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Figure 6. NI 5162 Bandwidth Limiting Filters Frequency Response, 1 V$_{pk-pk}$, Characteristic

Spectral Characteristics

50 Ω Spectral Characteristics

Table 4. Spurious-Free Dynamic Range (SFDR), Characteristic[12]

Input Frequency	Input Range (V$_{pk-pk}$)	SFDR	
		1.25 GS/s, 2.5 GS/s[13], 5.0 GS/s[13]	2.5 GS/s, 5.0 GS/s
<10 MHz	0.05 V	-52 dBc	-40 dBc
	0.1 V	-52 dBc	-46 dBc
	0.2 V	-56 dBc	-46 dBc
	0.5 V to 5 V	-56 dBc	-50 dBc
≥10 MHz to ≤1 GHz	0.05 V	-46 dBc	-40 dBc
	0.1 V to 5 V	-46 dBc	-46 dBc

---

[12] -1 dBFS input signal corrected to FS. Includes the 2nd through the 5th harmonics. 7.2 kHz resolution bandwidth.
[13] Excludes ADC interleaving spurs.

Table 5. Total Harmonic Distortion (THD), Characteristic[12]

Input Frequency	THD
<10 MHz	-56 dBc
≥10 MHz to ≤1 GHz	-46 dBc

Table 6. Effective Number of Bits (ENOB), Characteristic[12]

Input Frequency	Input Range (V$_{pk-pk}$)	ENOB
<1 GHz	0.05 V	6.0
	0.1 V	6.6
	0.2 V to 5 V	7.0

Figure 7. NI 5162 Single Tone Spectrum, 2.98 dBm Input Signal at Connector, 50 Ω, 1 V$_{pk-pk}$, 5 GS/s, 300 MHz Input Tone, Full BW, Characteristic
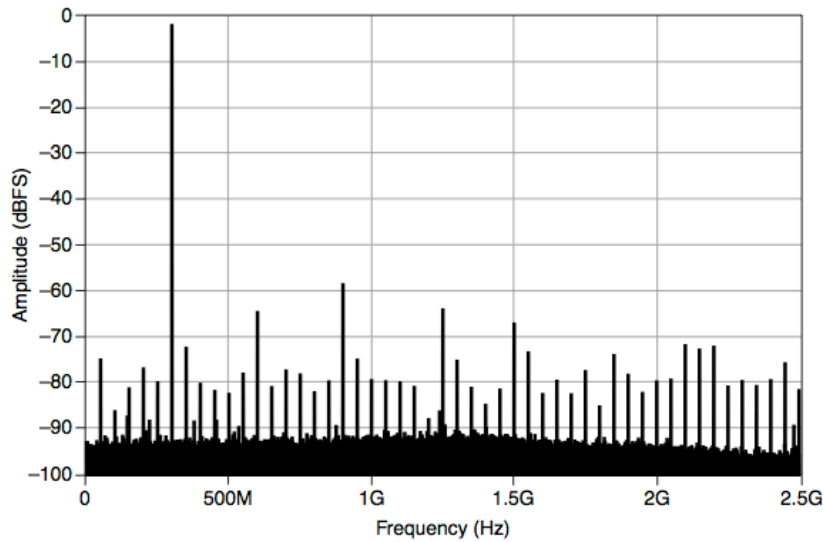
1 MΩ Spectral Characteristics

Table 7. SFDR, Characteristic[14]

Input Frequency	Input Range (V_pk-pk)	SFDR	
		1.25 GS/s, 2.5 GS/s[15], 5.0 GS/s[15]	2.5 GS/s, 5.0 GS/s
<10 MHz	0.05 V to 10 V	-53 dBc	-48 dBc
	20 V	-50 dBc	-44 dBc
≥10 MHz to ≤100 MHz	0.05 V to 0.5 V	-53 dBc	-48 dBc
	1 V to 5 V	-48 dBc	-48 dBc

Table 8. THD, Characteristic[14]

Input Frequency	Input Range (V_pk-pk)	THD
<10 MHz	0.05 V to 10 V	-53 dBc
	20 V	-50 dBc
≥10 MHz to ≤100 MHz	0.05 V to 0.5 V	-53 dBc
	1 V to 5 V	-47 dBc

Table 9. ENOB, Characteristic[14]

Input Frequency	Input Range (V_pk-pk)	ENOB
<10 MHz	10 V to 20 V	7.1
≤100 MHz	0.05 V	6.2
	0.1 V	6.8
	0.2 V to 5 V	7.1

[14] -1 dBFS input signal corrected to FS. Includes the 2nd through the 5th harmonics. 7.2 kHz resolution bandwidth.
[15] Excludes ADC interleaving spurs.

Noise

Table 10. RMS Noise, Typical[16]

Input Impedance	Input Range (V_{pk-pk})	RMS Noise
50 Ω	0.05 V	0.55% of FS
	0.1 V	0.33% of FS
	0.2 V to 5 V	0.28% of FS
1 MΩ	0.05 V	0.55% of FS
	0.1 V	0.33% of FS
	0.2 V to 50 V	0.28% of FS

Skew

Channel-to-channel skew, characteristic

50 Ω to 50 Ω..< 25 ps
1 MΩ to 1 MΩ...< 125 ps
50 Ω to 1 MΩ..< 800 ps

Horizontal

Sample Clock

Sources
Internal...Onboard clock (internal VCO)
External..Front panel SMB connector

Onboard Clock

Real-time sample rate range[17]
One channel enabled...................................76.299 kS/s to 5 GS/s
Two channels enabled[18]............................76.299 kS/s to 2.5 GS/s
Four channels enabled................................76.299 kS/s to 1.25 GS/s

---

[16] 50 Ω terminator connected to input.
[17] Divide by *n* decimation from 1.25 GS/s used for all rates less than 1.25 GS/s. For more information about Sample clock and decimation, refer to the *NI High-Speed Digitizers Help*.
[18] For the NI 5162 (4 CH), supported on channels 0 and 2. For the NI 5162 (2 CH), supported on channels 0 and 1.

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Random Interleaved Sampling (RIS)................Up to 100 GS/s range[19]

Figure 8. NI 5162 Phase Noise (Plotted without Spurs) at 1 GHz, 3 dBm Input Signal, Locked to Onboard Reference Clock, Characteristic
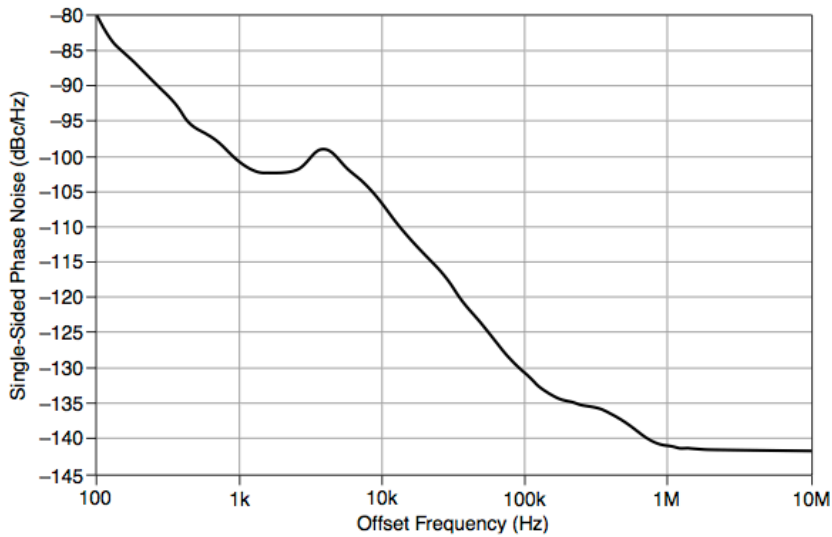
Sample clock jitter, characteristic[20]....................180 fs rms (12 kHz to 10 MHz)

Timebase frequency..2.5 GHz

Timebase accuracy, typical................................±10 ppm

Phase-Locked Loop (PLL) Reference Clock

Sources

    Internal...Onboard 10 MHz Reference

    Internal...PXI_CLK10 (backplane connector)

    External..External 10 MHz to front panel CLK IN

Duty cycle tolerance...45% to 55%

---

[19] With one channel enabled, stepped in multiples of 5 GS/s. With two channels enabled, stepped in multiples of 2.5 GS/s. With four channels enabled, stepped in multiples of 1.25 GS/s.

[20] Includes the effects of the converter aperture uncertainty and the clock circuitry jitter. Excludes trigger jitter.

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External Sample Clock (CLK IN, Front Panel Connector)

Input voltage range, when.....................................-10 dBm through 16 dBm
configured as a sample clock

Maximum input overload, when..........................18 dBm
configured as a sample clock

Impedance..50 Ω

Coupling..AC

Frequency range..1.25 GHz to 2.5 GHz[21]

External Reference Clock In (CLK IN, Front Panel Connector)

Input voltage range, when.....................................200 mV$_{pk-pk}$ to 4 V$_{pk-pk}$
configured as a reference clock

Maximum input overload, when..........................5 V$_{pk-pk}$ with |Peaks| $\leq$ 10 V
configured as a reference clock

Impedance..50 Ω

Coupling..AC

Frequency range[22]..10 MHz

Reference Clock Out (CLK OUT, Front Panel Connector)

Output impedance..50 Ω

Logic type..3.3 V CMOS

Maximum current drive.......................................±10 mA

---

[21] To achieve the same real-time sample rate ranges as the onboard clock, a 2.5 GHz frequency is required.

[22] The PLL Reference clock frequency must be accurate to ±25 ppm.

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Trigger

Supported trigger...Reference (stop) trigger

Trigger types..Edge, Digital, Immediate, Hysteresis, and
Software

Trigger sources

    NI 5162 (2 CH)..CH 0, CH 1, TRIG, PFI 0, PFI 1,
PXI_TRIG <0..6>, and Software

    NI 5162 (4 CH)..CH 0, CH 1, CH 2, CH 3, PFI 0, PFI 1,
PXI_TRIG <0..6>, and Software

Time to Digital Conversion Circuit....................4 ps
time resolution

Rearm time...700 ns

Holdoff..6.4 ns to 27.4 s

Trigger delay, characteristic...............................From 0 to 73,786,976 seconds (28 months)

Analog Trigger (Edge Trigger Type)

Sources

    NI 5162 (2 CH)..CH 0, CH 1, or TRIG[23]

    NI 5162 (4 CH)..CH 0, CH 1, CH 2, or CH 3

Trigger filters, characteristic

    Low-frequency reject.................................150 kHz

    High-frequency reject................................150 kHz

Trigger sensitivity, characteristic.......................3% of FS at ≤100 MHz

Trigger accuracy, characteristic[24].......................5% of FS at ≤100 MHz

Trigger jitter, typical..4.7 ps

---

[23] For specifications on the TRIG input, refer to the *External Trigger (TRIG, Front Panel Connector)* section.

[24] When the impedance settings of the triggering input and the analog input channel are the same. For more information about functionality when using mixed impedances between input channels or external trigger, visit *ni.com/kb* and enter 5W8CFE8P.

External Trigger (TRIG, Front Panel Connector)

Note TRIG is valid only for the NI 5162 (2 CH) device.

Connector...BNC

Impedance..50 Ω or 1 MΩ

Coupling...AC or DC

Input voltage range

    50 Ω...±2.5 V

    1 MΩ..±5 V

Maximum input overload, characteristic

    50 Ω...|Peaks| ≤ 5 V

    1 MΩ..|Peaks| ≤ 42 V

Trigger sensitivity, characteristic........................3% of FS at ≤100 MHz

Trigger accuracy, characteristic[25]........................8% of FS at ≤100 MHz

Trigger jitter, typical..4.7 ps

Digital Trigger (Digital Trigger Type)

Sources[26]

    Front panel SMB connector.........................PFI <0..1>

    Backplane connector..................................PXI_TRIG <0..6>

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

Connector...SMB jack

Direction...Bidirectional

---

[25] When the impedance settings of the triggering input and the analog input channel are the same. For more information about functionality when using mixed impedances between input channels or external trigger, visit *ni.com/kb* and enter 5W8CFE8P.

[26] Sub-sample trigger accuracy not supported on PFI 1 or PXI_TRIG<0..6>.

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As an Input (Trigger)

Destination..Start Trigger (Acquisition Arm),
Reference (Stop) Trigger,
Arm Reference Trigger, Advance Trigger

Input impedance...10 kΩ

V_{IH}...2.0 V

V_{IL}...0.8 V

Maximum input overload...................................-0.5 V to 5.5 V

Maximum frequency...25 MHz

As an Output (Event)

Sources...Ready for Start,
Start Trigger (Acquisition Arm),
Ready for Reference, Arm Reference Trigger,
Reference (Stop) Trigger, End of Record,
Ready for Advance, Advance Trigger,
Done (End of Acquisition),
Probe Compensation[27]

Output impedance, characteristic........................50 Ω

Logic type..3.3 V CMOS

Maximum current drive.......................................±10 mA

Maximum frequency...25 MHz

Waveform Specifications

Onboard memory sizes[28]....................................64 MB or 1 GB

Minimum record length.......................................1 sample

Number of pretrigger samples[29]........................Zero up to full record length

Number of posttrigger samples[29]......................Zero up to full record length

---

[27] 1 kHz, 50% duty cycle square wave, PFI 1 only.
[28] Onboard memory is shared among all enabled channels.
[29] Single-record and multirecord acquisitions.

Maximum number of records in onboard
memory[30]

     64 MB...65,536

     1 GB...100,000

Allocated onboard memory per..........................[(Record length + 448 samples)
record   × bytes/sample], rounded up to an integer
                               multiple of 128 bytes (minimum 512 bytes)

Memory Sanitization

For information about memory sanitization, refer to the *NI PXIe-5162 Letter of Volatility*, which is available at *ni.com/manuals*.

Calibration

External Calibration

External calibration calibrates the onboard references used in self-calibration and the external trigger levels. All calibration constants are stored in nonvolatile memory.

Self-Calibration

Self-calibration is done on software command. The calibration corrects for gain, offset, triggering, and timing errors for all input ranges. Refer to the *NI High-Speed Digitizers Help* for information about when to self-calibrate the device.

Calibration Specifications

Interval for external calibration..........................2 years

Warm-up time...15 minutes

Power

+3.3 VDC...2.2 A

+12 VDC..2.3 A

Total power..34.8 W

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[30] You can exceed these numbers if you fetch records while acquiring data. For more information, refer to the *NI High-Speed Digitizers Help*.

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Software

Driver Software

This device is supported in NI-SCOPE 4.0 or later. NI-SCOPE is an IVI-compliant driver that allows you to configure, control, and calibrate the NI 5162. NI-SCOPE provides application programming interfaces for many development environments.

Application Software

NI-SCOPE provides programming interfaces, documentation, and examples for the following application development environments:

- LabVIEW
- LabWindows™/CVI™
- Measurement Studio
- Microsoft Visual C/C++
- Microsoft Visual Basic

Interactive Soft Front Panel and Configuration

The NI-SCOPE Soft Front Panel version 4.0 or later supports interactive control of the NI 5162. The NI-SCOPE Soft Front Panel is included on the NI-SCOPE DVD.

National Instruments Measurement & Automation Explorer (MAX) also provides interactive configuration and test tools for the NI 5162. MAX is included on the NI-SCOPE DVD.

TClk Specifications

You can use the National Instruments TClk synchronization method and the NI-TClk driver 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 High-Speed Digitizers Help*. For other configurations, including multichassis systems, contact NI Technical Support at *ni.com/support*.

Intermodule SMC Synchronization Using NI-TClk for Identical Modules

Specifications are valid for modules installed in one PXI Express chassis, under the following conditions:

- All parameters are set to identical values for each module.
- Modules are synchronized without using an external Sample clock.
- All filters are disabled.

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

Skew, characteristic[31] ....100 ps

Skew after manual adjustment, ...≤5 ps
characteristic

Sample clock delay/adjustment ....20 fs
resolution

Physical

Front Panel Connectors

Table 11. NI 5162 (2 CH) Front Panel Connectors

Label	Function	Connector Type
CH 0	Analog input	BNC female
CH 1	Analog input	BNC female
TRIG	External analog trigger; signals on the TRIG connector cannot be digitized	BNC female
CLK IN	Reference clock in, sample clock in	SMB jack
CLK OUT	Reference clock out	SMB jack
PFI 0	Digital trigger in/out	SMB jack
PFI 1	Digital trigger in/out, probe compensation, no sub-sample trigger accuracy	SMB jack

[31] Caused by clock and analog path delay differences. No manual adjustment performed. Tested with a NI PXIe-1082 chassis with a maximum slot-to-slot skew of 100 ps.

Figure 9. NI 5162 (2 CH)

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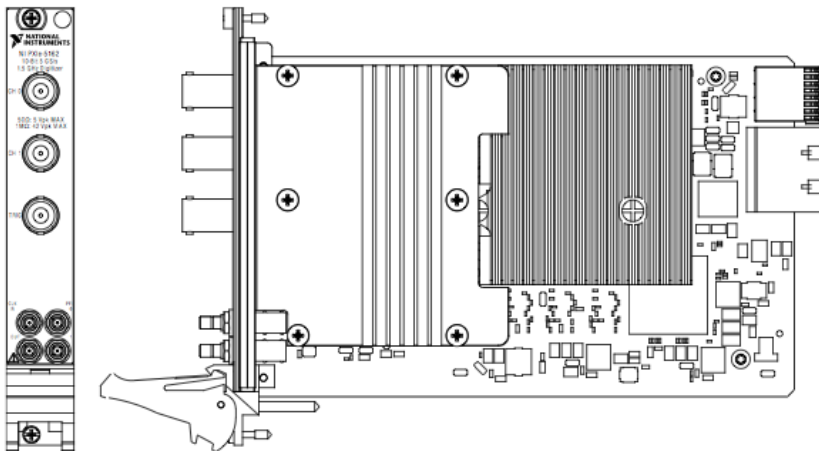
Figure 10. NI 5162 (4 CH)
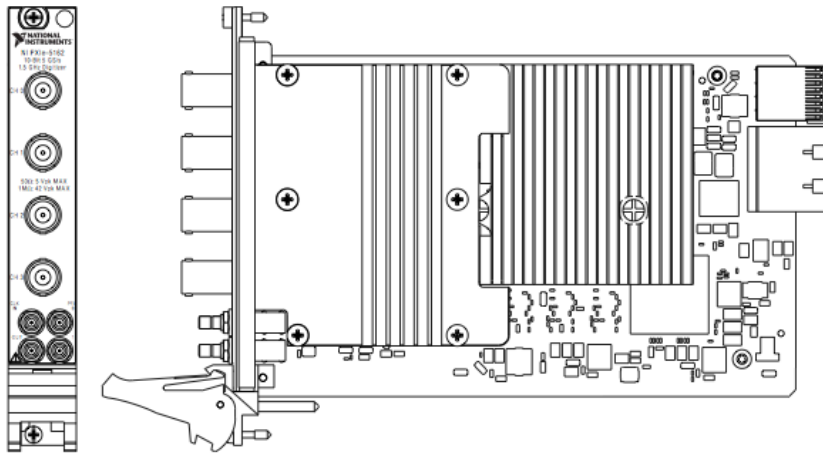
Environment

Maximum altitude...2,000 m (at 25 °C ambient temperature)

Pollution Degree..2

Indoor use only.

Operating Environment

Ambient temperature range................................0 °C to 45 °C (Tested in accordance with IEC-60068-2-1 and IEC-60068-2-2.)

Relative humidity range......................................10% to 90%, noncondensing (Tested in accordance with IEC-60068-2-56.)

Storage Environment

Ambient temperature range................................-40 °C to 70 °C (Tested in accordance with IEC-60068-2-1 and IEC-60068-2-2.)

Relative humidity range......................................5% to 95%, noncondensing (Tested in accordance with IEC-60068-2-56.)

Operational shock...30 g peak, half-sine, 11 ms pulse (Tested in accordance with IEC-60068-2-27. Test profile developed in accordance with MIL-PRF-28800F)

Random vibration

    Operating...5 Hz to 500 Hz, 0.3 g_{rms}

    Nonoperating..5 Hz to 500 Hz, 2.4 g_{rms} (Tested in accordance with IEC-60068-2-64. Nonoperating test profile exceeds the requirements of MIL-PRF-28800F, Class 3.)

Compliance and Certifications

Safety

This product is designed to meet the requirements of the following electrical equipment safety standards 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 In the United States (per FCC 47 CFR), Class A equipment is intended for use in commercial, light-industrial, and heavy-industrial locations. In Europe, Canada, Australia, and New Zealand (per CISPR 11), Class A equipment is intended for use only in heavy-industrial locations.

Note Group 1 equipment (per CISPR 11) is any industrial, scientific, or medical equipment that does not intentionally generate radio frequency energy for the treatment of material or inspection/analysis purposes.

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

CE Compliance $C\epsilon$

This product meets the essential requirements of applicable European Directives, as amended for CE marking, 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 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 not only to the environment but also to NI customers.

For additional environmental information, refer to the *Minimize Our Environmental Impact* 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.htm*.

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.)

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