NI PXI-1056

3U/6U Dual Stack Chassis for PXI

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Last Revised: 2014-11-06 07:14:48.0

3U/6U Dual-Stack Chassis for PXI

NI PXI-1056

- Combinations ranging from (7) 6U and (3) 3U slots up to (17) 3U slots plus a controller
- Accepts all NI remote, embedded, and real-time controllers
- Temperature-controlled fan speed
- 6 front-panel LEDs for chassis monitoring – voltage rails, temperature, and fans
- PXI and 3U CompactPCI module compatibility
- Accepts a 4-slot 3U embedded controller
- Software-programmable trigger routing between bus segments

Overview

The NI PXI-1056 is a 3U/6U dual-stack chassis that accommodates a 4-slot controller and combinations of 6U and 3U modules, from up to seven 6U modules and three 3U modules to a total of seventeen 3U modules. A 6U module is twice the height of a 3U module, and the PXI-1056 dual stacks 3U modules sideways in the chassis. It accepts all NI PXI embedded and remote controllers, including those that have the ability to run Windows or LabVIEW Real-Time OSs. The chassis is designed for applications where custom 6U modules or high-end RF modules, available in 6U format, need to be used in a single system with 3U modules commercially available from multiple vendors. More than 1,150 PXI/CompactPCI products are available in the 3UPXI format, so you have a large selection of 3U modules to choose from.

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Application and Technology

High Reliability

- 0 to 55 °C extended temperature range
- Overcurrent protection, no fuse to replace
- Removable modular power supply shuttle
- Remote voltage, temperature, and fan monitoring through RS232 connection

Multichassis Synchronization

- Reference clock input and output for synchronization across chassis
- External reference clocks automatically detected by chassis backplane

Optional Features

- Carrying handle and feet for portability
- Rear rack-mount kit
- 3U subtract dividers (4 widths)
- Two 3U-to-6U module adapters

National Instruments Dual-Stack Architecture

The PXI-1056 is a low-profile chassis with a 4U height that easily fits in a 19 in. rack. Slot 1, the controller slot, accepts up to a 4-slot embedded controller. Three additional 3U modules fit in slots 2, 3, and 4 above the controller in section 1. Sections 2 and 3 accommodate either seven 6U modules or a combination of 6U modules and dual-stacked 3U modules. Although the PXI-1056 can theoretically accept up to seventeen 3U modules (14 dual-stacked and 3 above the controller), NI recommends the NI PXI-1045 18-slot chassis for a system using seventeen 3U modules.

Power, Chassis Status Indicators, and Cooling

The PXI-1056 chassis provides power over the entire operating range of 0 to 55 °C with a robust power supply located in a removable power shuttle with an MTTR of less than 5 minutes. Six dual-color LED indicators on the front panel indicate chassis status. Four indicate the status of voltage rails (+3.3, 5, +12, -12 V), one indicates fan status (FAN), and another indicates an over temperature condition (TEMP). There is also an AUTO/HIGH fan-speed selector switch that adjusts fan speed based on the chassis inlet temperature.

Backplane Triggering, Timing, and Synchronization

The PXI-1056 backplane uses the 32-bit PCI bus and is interoperable with 5 V and universal PXI-compatible modules. Additionally, 64-bit CompactPCI modules are compatible with and function in the chassis in 32-bit mode. The PXI-1056 is fully compliant with PXI timing and synchronization standards. The chassis includes a 10 MHz system reference clock that is supplied independently to each peripheral slot to provide a maximum slot-to-slot skew of 250 ps. For triggering and handshaking needs, the chassis provides the PXI

trigger bus and PXI star trigger. The PXI bus segment slots share eight PXI trigger bus lines. The star trigger slot (slot 2) provides dedicated equal-length trigger lines for passing precise trigger signals between slot 2 and peripheral slots 3 through 15. The star trigger slot can also source external reference clocks, which are automatically detected by the chassis backplane, with a precise PXI timing device.

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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 PXI-1056			
Converts 5 6U Slots to 10 3U Slots	779469-05	No accessories required.	
PXI-1056 Rear Rack-Mount Kit	193830-01	No accessories required.	
6U Front Panel Adapter for installing 3U Modules in 6U Chassis	777763-01	No accessories required.	
Converts 4 6U Slots to 8 3U Slots	779469-04	No accessories required.	
Converts 1 6U Slots to 2 3U Slots	779470-01	No accessories required.	
Converts 3 6U Slots to 6 3U Slots	779469-03	No accessories required.	
Converts 2 6U Slots to 4 3U Slots	779469-02	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.

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.

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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.

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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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Detailed Specifications

Caution If the PXI-1056 chassis is used in a manner inconsistent with the instructions or specifications listed by National Instruments, the protective features of the chassis may be impaired.

This appendix contains specifications for the PXI-1056 chassis

Electrical

AC Input	
Input voltage rating	100–240 VAC
Operating voltage range	90–264 VAC
Input frequency	50/60 Hz
Operating frequency range	47–63 Hz
Input current rating	10–5 A
Over-current protection	12 A circuit breaker
Line regulation	
3.3 V	<±1%
5 V	<±1%
±12 V	<±1%
Efficiency	70% typical
Power disconnect	The AC power cable provides main power disconnect. Depressing the front-panel power switch controls the internal chassis power supply that provides DC power to the CompactPCI/PXI backplane.
DC Output	

DC current capacity (I_{MP})	
Voltage	**Maximum Current**
+3.3 V	40 A
+5 V	59 A
+12 V	9 A
–12 V	4.5 A

Load regulation

Voltage	Load Regulation
+3.3 V	<0.5%
+12 V	<0.5%
+5 V	<0.5%
–12 V	<0.5%

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Maximum ripple and noise (20 MHz bandwidth)	
Voltage	**Maximum Ripple and Noise**
+3.3 V	50 mV_{pp}
+12 V	120 mV_{pp}
+5 V	50 mV_{pp}
–12 V	120 mV_{pp}

Caution Be sure to limit DC output to 500 W above 50° C.

Over-current protection	All outputs protected from short circuit and overload with automatic recovery when the short or overload is

	removed.
Over-voltage protection	
3.3 V, 5 V, +12 V, –12 V	130% above nominal output voltage
Power supply shuttle MTTR	Replacement in under 5 minutes

Chassis Cooling

Per slot cooling capacity	Slot cooling capacity is 25 W with fan speed set to HIGH
Slot airflow direction	P1 to P2, bottom of module to top of module
Module cooling	
System	Forced air circulation (positive pressurization) through one 220 cfm fan with HIGH/AUTO speed selector
Intake	Right rear of chassis
Exhaust	Along left side of chassis
Power supply cooling	
System	Forced air circulation through integrated fan
Intake	Right rear of chassis
Exhaust	Along left side of chassis

Safety

The PXI-1056 was designed to meet the requirements of the following standards of safety for electrical equipment for measurement, control, and laboratory use:

- EN 61010-1, IEC 61010-1
- UL 61010-1
- CAN/CSA-C22.2 No. 61010-1

Note For UL and other safety certifications, refer to the product label, or visit ni.com/certification, search by model number or product line, and click the appropriate link in the Certification column.

Electromagnetic Compatibility

EMC	CE, C-Tick, and FCC Part 15 (Class A) compliant
Emissions	EN 55011 Class A @ 10 m FCC Part 15A above 1 GHz
Immunity	Evaluated to EN 61326:1997 + A2:2001, Table 1

Note For EMC compliance, operate this device with shielded cabling.

CE Compliance CE

This product meets the essential requirements of applicable European Directives, as amended for CE marking, as follows:

Low-Voltage Directive (safety)	73/23/EEC
Electromagnetic Compatibility Directive (EMC)	89/336/EEC

Note Refer to the Declaration of Conformity (DoC) for this product for any additional regulatory compliance information. To obtain 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

Operating temperature	0 to 55 °C
Storage temperature	–40 to 71 °C
Relative humidity	
Operating	10 to 90% non condensing
Nonoperational (storage)	5 to 95% non conducting
Shock	
Operational	30 g peak, half sine, 11 ms pulse
Nonoperational	30 g, half sine, 11 ms pulse
Operating location	Indoor use
Random vibration	
Operational	5 to 500 Hz, 0.31 g_{RMS}
Nonoperational	5 to 500 Hz, 2.46 g_{RMS}
Altitude	2,000 m
Measurement Category	II
Pollution Degree	2

Backplane	
Size	3U/6U-sized; one 3U system slot (with three system expansion slots) and 17 3U peripheral slots, or any combination up to 7 6U cards and 3U cards. Compliant with IEEE 1101.10 mechanical packaging. PXI Hardware Specification, Revision 2.2 compliant. Accepts both PXI and CompactPCI (PICMG 2.0 R 3.0) 3U and 6U modules.
V(I/O)	+5 V
Backplane bare-board material	UL 94 V-0 Recognized
Backplane connectors	Conforms to IEC 917 and IEC 1076-4-101, and are UL 94 V-0 rated
10 MHz System Reference Clock: PXI_CLK10	
Maximum slot-to-slot skew between slots	250 ps
Built-in 10 MHz clock	
Accuracy	±25 ppm (guaranteed over the operating temperature range)
Maximum jitter	5 ps RMS in 10 Hz to 1 MHz range
External clock sources	
Connectors	Slot 2 J2 (pin D17; refer to Table B-4, P2 (J2) Connector Pinout for the Star Trigger Slot)
Input frequency	10 MHz ±100 ppm or better
Input amplitude Slot 2	5 V or 3.3 V, 10 MHz TTL signal
Maximum jitter introduced by backplane circuitry	1 ps RMS in 10 Hz to 1 MHz range
Mechanical	
Overall dimensions (standard chassis)	
Height	177.8 mm (7.0 in.)
Note 14.5 mm (0.57 in.) is added to height when feet are installed.	
Width	431.8 mm (17.0 in.)
Depth	457.2 mm (18.0 in.)
Weight	11 kg (24.3 lbs)
Chassis materials	Sheet Aluminum (5052-H32, 3003-H14, and 6061-T6), Extruded Aluminum (6060-T6), Cold Rolled Steel, PC-ABS, Santoprene, Nylon
Finish	Conductive Clear Iridite on Aluminum Clear Chromate Zinc Plating on Cold Rolled Steel Polyurethane Enamel

Figures A-1 and A-2 show the PXI-1056 dimensions. The holes shown are for the installation of the optional rack-mount kits as shown in Figure A-3. Notice that the front and rear rack mounting holes (size M4) are symmetrical.

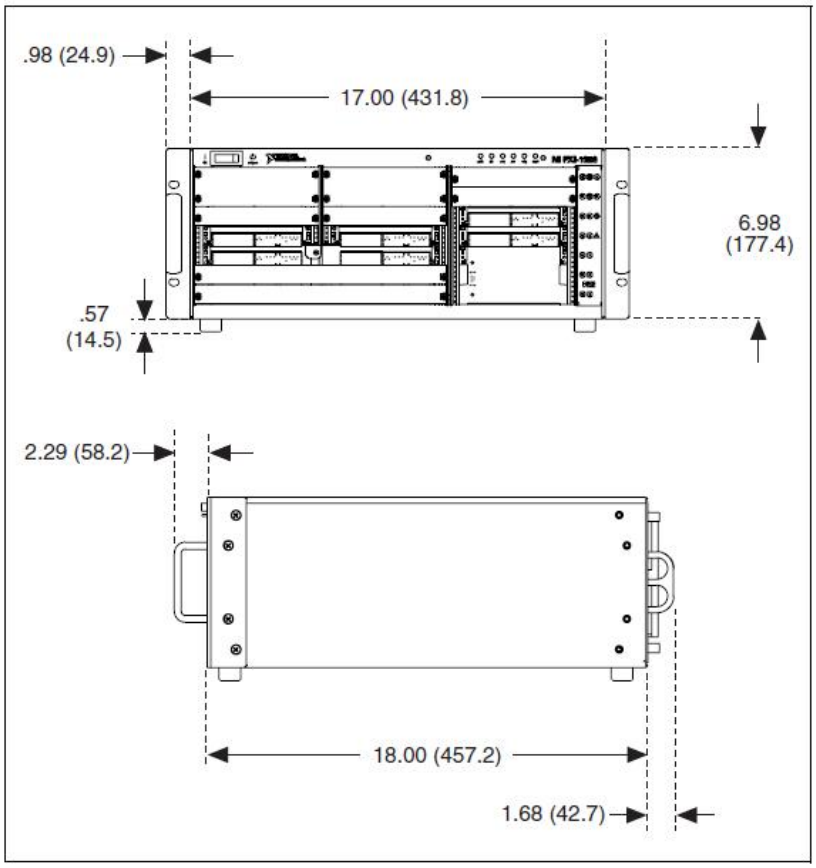


Figure A-1. PXI-1056 Dimensions (Front and Side) in Inches (mm)

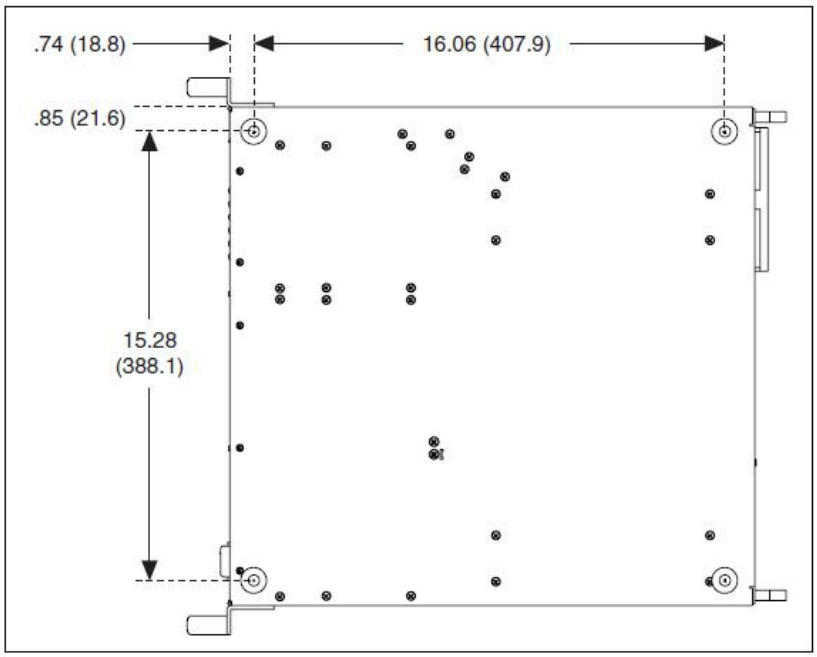
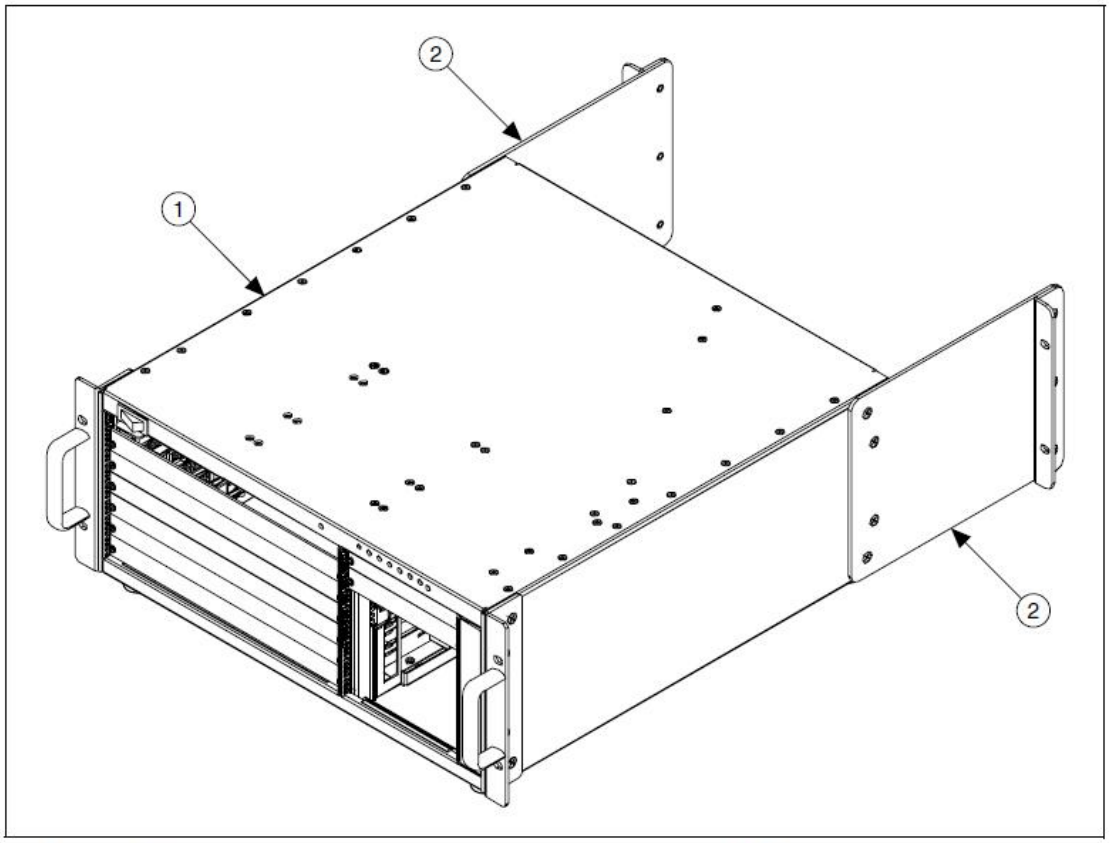


Figure A-2. PXI-1056 Dimensions (Bottom) in Inches (mm)

Figure A-3 shows the PXI-1056 rack-mount kit components.



1	PXI-1056 Chassis	2	Rack Mount Brackets

Figure A-3. PXI-1056 Rack Mount Components

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