

Detailed Specifications

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

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18-Slot PXI Express High-Availability Chassis

NI PXIe-1066DC



- Hot-swappable, redundant (available) power supplies
- Hot-swappable, front-accessible, redundant cooling fans
- 210 to 300 VDC input rating
- Accepts 3U PXI, PXI Express, CompactPCI, and CompactPCI Express modules
- Up to 1 GB/s per-slot dedicated bandwidth (x4 PCI Express)
- Fixed front-panel I/O: status LEDs, 10 MHz Ref CLK, Remote Inhibit/Fault Connector, Remote Monitoring, DC Power Input
- Complies with CompactPCI/PXI Express Specification

Overview

The NI PXIe-1066DC 18-slot chassis adds high-availability features to the PXI Express platform to maximize system uptime. Built on the NI PXIe-1065 backplane architecture, the NI PXIe-1066DC incorporates hot-swappable, redundant DC power supplies as well as hot-swappable, front-accessible, redundant cooling fans. These high-availability features improve the mean time between failures (MTBF) and mean time to repair (MTTR) of the PXI system.

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Application and Technology

Maximize System Uptime

0 to 50 °C extended temperature range
4600 m maximum altitude
Remote power supply, temperature, and fan health monitoring via Ethernet port
Hot-swappable, redundant power supplies and cooling fans

Multichassis Synchronization

PXI Express system timing slot for tight synchronization across chassis
Front CLK10 I/O connectors
Switchless CLK10 routing

Optional Features

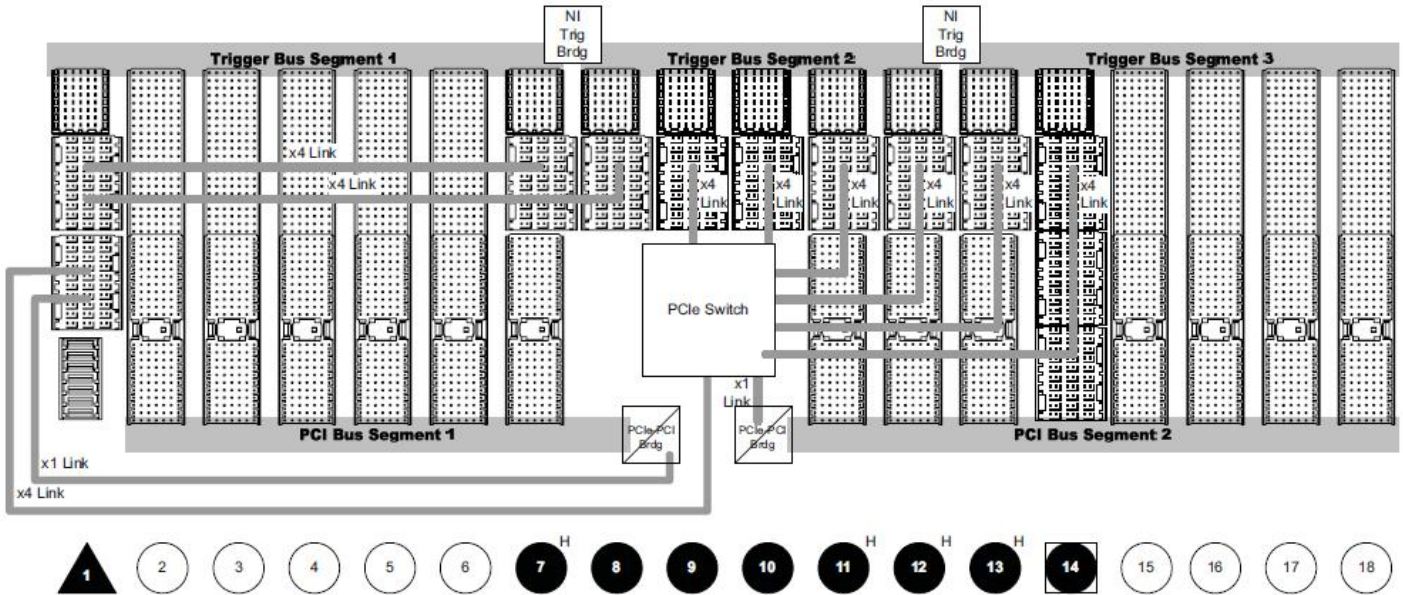
Front and rear rack-mount kits
Replacement power supplies and fans
Filler panels
Slot blockers for improved cooling performance
NI system assurance programs

Slot	PXI Express System	PXI Express Peripheral	Hybrid	PXI
Bus Signaling	PCI Express	PCI Express	PCI (32/33) PCI Express (x4)	PCI (32/33)
Bandwidth	3 GB/s dedicated for PXI Express (3 x4 links) 132 MB/s shared for PXI	1 GB/s dedicated	132 MB/s shared (PXI) or 1 GB/s dedicated (PXI Express)	132 MB/s shared
Number of Slots	1	4 ¹	4	9

¹ Includes one system timing slot.

Slot Types Accept PXI and PXI Express Modules

The NI PXIe-1066DC is a hybrid chassis, and has the best combination of PXI Express PXI Hybrid and PXI peripheral slots. Its backplane design enables higher bandwidth systems and provides the flexibility to work with both PXI and PXI Express modules. The PXI Express system slot offers three x4 PCI Express links (1 GB/s single direction per link) and a x1 PCI Express link to a PCI Express-to-PCI translation bridge on the backplane. The PXI Express slots feature up to a 1 GB/s per-slot, per-direction dedicated bandwidth through a x4 PCI Express link connection. The PXI Express system timing slot provides a x4 PCI Express link to the system slot and accepts a PXI Express module or a PXI Express system timing controller for advanced timing and synchronization. The four PXI Express hybrid slots deliver connectivity to either a x4 PCI Express link to the system slot or to the 32-bit, 33 MHz PCI bus on the backplane. The nine remaining PXI slots provide connectivity to the 32-bit, 33 MHz PCI bus on the backplane.



NI PXIe-1066DC Chassis Backplane

Redundant, Hot-Swappable Power Supplies and Fans

The NI PXIe-1066DC chassis includes a removable lower tray that houses the redundantly stacked cooling fans and redundant (available) DC power supplies. You can replace failed cooling fans from the front of the chassis and a failed power supply from the rear of the chassis without powering down the system. The power supply/fan tray also facilitates full serviceability from the front of the chassis. These redundant, hot-swappable components lower the mean time to repair (MTTR) and improve the mean time between failures (MTBF) of the chassis.



NI PXIe-1066DC Chassis Hot-Swappable Fans and Power Supplies

The *Availability* (A_v) rating of a system represents the percentage of time that the system can perform its intended function (uptime) during the timeframe that the system is expected to perform this function, with the goal being 100 percent availability.

The inherent availability is defined by the following equation:

$$A_v = \text{MTBF} / (\text{MTBF} + \text{MTTR})$$

Where MTBF = Mean Time Between Failure and MTTR = Mean Time to Repair

More practically, availability is defined as the following:

$$A_{vp} = \text{Uptime} / (\text{Uptime} + \text{Downtime})$$

To calculate the availability of the NI PXIe-1066DC chassis:

$$\text{MTBF} = 305,782$$

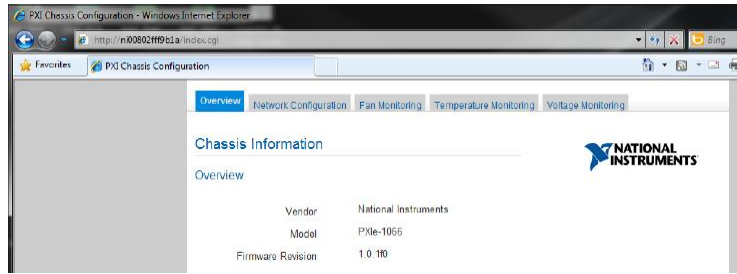
$$\text{MTTR} = 40 \text{ minutes}$$

$$\text{Therefore, } A_v = 305,782 / (305,782 + 0.67) = .999998 = 99.9998\% \text{ or 5 nines}$$

NI PXI Chassis are designed to meet most system uptime requirements. The addition of high availability features, including redundant, hot-swappable fans and power supplies, improve the availability of a PXI chassis (in this case, the NI PXIe-1066DC) to beyond five nines.

Power Supply, Temperature, and Fan Monitoring

The NI PXIe- 1066DC chassis monitors power supply health/voltages, air intake temperature, and fan health/speed. It also provides any failure feedback to the user via status LEDs located on the front bezel and tray of the chassis. Furthermore, you can monitor this chassis health information remotely over a network through the Ethernet connection on the front of the chassis. Through the remote monitoring Ethernet interface of the chassis, you can access a Web page with information about the current chassis operating parameters.



NI PXIe- 1066DC Chassis Remote Monitoring Web Page

Fixed Front- Panel I/O

The NI PXIe- 1066DC includes IN/OUT SMA connectors for the 10 MHz reference clock on the front of the chassis, for easier access to external master clock references. When the backplane detects a 10 MHz signal on the IN connector, it phase locks PXI_CLK10, PXIe_CLK100, and PXIe_SYNC100 to the external clock. The OUT connector provides a buffered, non-TTL version of the 10 MHz reference clock.

The NI PXIe- 1066DC features remote power inhibit and voltage monitoring through a 4-pin connector on the front of the chassis. Use this connector to switch off power or monitor the power remotely in the chassis.

Optimized Cooling and Acoustic Emissions

The NI PXIe- 1066DC chassis integrates six double- stacked PWM system fans to provide forced- air cooling that meets the increased cooling demands of PXI Express and CompactPCI Express. It offers a HIGH fan setting to maximize cooling at any ambient temperature and an AUTO fan setting to minimize acoustic emissions at ambient temperatures below 30 °C. The chassis monitors air intake temperature and adjusts fan speed accordingly. With this technology, the NI PXIe- 1066DC achieves acoustic noise levels as low as 49.8 dBA (sound pressure level measured at operator position according to ISO 7779).

Software System Configuration

The NI PXIe- 1066DC chassis is configured with NI Measurement & Automation Explorer (MAX). With this software configuration tool, you can easily configure NI PXIe- 1066DC systems without time- consuming manual installation of initialization files. MAX creates the pxisys. ini file that defines the layout and parameters of your PXI system including chassis, controller, and plug- in modules.

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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.

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.

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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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Detailed Specifications

This appendix contains specifications for the NI PXIe- 1066DC chassis.



Caution Specifications are subject to change without notice.

Electrical

AC Input

Input voltage range	210 to 300 VDC
Input current rating	3.5–6.0 A
Over- current protection	10 A power supply fuse, nonreplaceable
Efficiency	70% typical
Power disconnect	The DC power cable provides main power disconnect. The front panel power switch causes the internal chassis power supply to provide DC power to the CompactPCI/PXI Express backplane. You also can use the front panel terminal block 4- pin connector and power mode switch to control the internal chassis power supply.

DC Output

DC current capacity (I_{MP})	
Voltage	Maximum Current
+3.3 V	50 A
+5 V	42 A
+12 V	50 A
–12 V	4 A
5 V _{AUX}	1.5 A



Note Maximum combined +12 V and –12 V power is 588 W.

Backplane pin current capacity						
Slot	+5 V	V (I/O)	+3.3 V	+12 V	–12 V	5 V _{AUX}
System Controller Slot	15 A	-	15 A	30 A	-	1 A
System Timing Slot	-	-	6 A	4 A	-	1 A
Hybrid Peripheral Slot with PXI- 1 Peripheral	6 A	5 A	6 A	1 A	1 A	-
Hybrid Peripheral Slot with PXI- 5 Peripheral	-	-	6 A	4 A	-	1 A
PXI-1 Peripheral Slot	6 A	11 A	6 A	1 A	1 A	-

Note Total system slot current should not exceed 45 A.

PCI V(I/O) pins in PXI-1 peripheral slots and hybrid peripheral slots are connected to +5 V.

The maximum power dissipated in the system slot should not exceed 140 W.

The maximum power dissipated in a peripheral slot should not exceed 38.25 W.

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

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}

Over- current protection	All outputs protected from short circuit and overload with automatic recovery
Over- voltage protection	
3.3 V and 5 V	Clamped at 25 to 40% above nominal output voltage
Power supply MTTR	Replacement in under 1 minute

Chassis Cooling

Module cooling system	
NI PXIe- 1066DC	Force air circulation (positive pressurization) through six 150 cfm fans (three sets of dual stacked fans) with High/Auto speed selector.
Slot airflow direction	Bottom of module to top of module
Module cooling intake	Bottom of chassis
Module cooling exhaust	Along top of chassis
Power supply cooling system	Forced air circulation through integrated fan
Power supply cooling intake	Rear of chassis
Power supply cooling exhaust	Top of chassis

Environmental

Maximum altitude	4600 m (800 mbar) (at 25 ° C ambient)
 Note Fan speed selector must be set to High to meet the maximum altitude specification.	

Pollution Degree	2
For indoor use only.	

Operating Environment

Ambient temperature range	0 to 50 ° C (Tested in accordance with IEC- 60068-2- 1 and IEC- 60068-2- 2. Meets MIL-PRF- 28800F Class 3 temperature limits.)
Relative humidity range	10 to 90%, noncondensing (Tested in accordance with IEC- 60068-2- 56.)

Storage Environment

Ambient temperature range	-40 to 71 ° C (Tested in accordance with IEC- 60068-2- 1 and IEC- 60068-2- 2. Meets MIL-PRF- 28800F Class 3 limits.)
Relative humidity range	5 to 95%, noncondensing (Tested in accordance with IEC- 60068-2- 56.)

Shock and Vibration

Operational shock	30 g peak, half- sine, 11 ms pulse (Tested in accordance with IEC- 60068-2- 27. Meets MIL-PRF- 28800F Class 2 limits.)
Random Vibration	
Operating	5 to 500 Hz, 0.3 g _{rms}
Nonoperating	5 to 500 Hz, 2.4 grms (Tested in accordance with IEC- 60068-2- 64. Nonoperating test profile exceeds the requirements of MIL- PRF- 28800F, Class 3.)


Acoustic Emissions

Sound Pressure Level (at Operator Position)

(Tested in accordance with ISO 7779. Meets MIL-PRF- 28800F requirements.)	
Auto fan (up to ~30 °C ambient)	49.8 dBA
High fan	69.0 dBA

Sound Power

Auto fan (up to ~30 °C ambient)	59.7 dBA
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 **Note** Specifications are subject to change without notice.

Safety Standards

This product is designed to meet 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 (IEC 61326): 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 the standards applied to assess the EMC of this product, refer to the *Online Product Certification* section.

 **Note** For EMC compliance, operate this device with shielded cables.

CE Compliance

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


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

Environmental Management


National Instruments 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 *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.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.)


Backplane

Size	3U- sized; one system slot (with three system expansion slots) and 17 peripheral slots. Compliant with IEEE 1101.10 mechanical packaging. PXI Express Specification compliant. Accepts both PXI Express and CompactPCI (PICMG 2.0 R 3.0) 3U modules.
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

System Synchronization Clocks (PXI_CLK10, PXIe_CLK100, PXIe_SYNC100)





10 MHz System Reference Clock: PXI_CLK10

Maximum slot-to- slot skew	500 ps
Accuracy	±25 ppm max. (guaranteed over the operating temperature range)
Maximum jitter	5 ps RMS phase- jitter (10 Hz- 1 MHz range)
Duty- factor	45%–55%
Unloaded signal swing	3.3 V ±0. 3 V

 **Note** For other specifications refer to the *PXI-1 Hardware Specification*.

100 MHz System Reference Clock: PXIe_CLK100 and PXIe_SYNC100

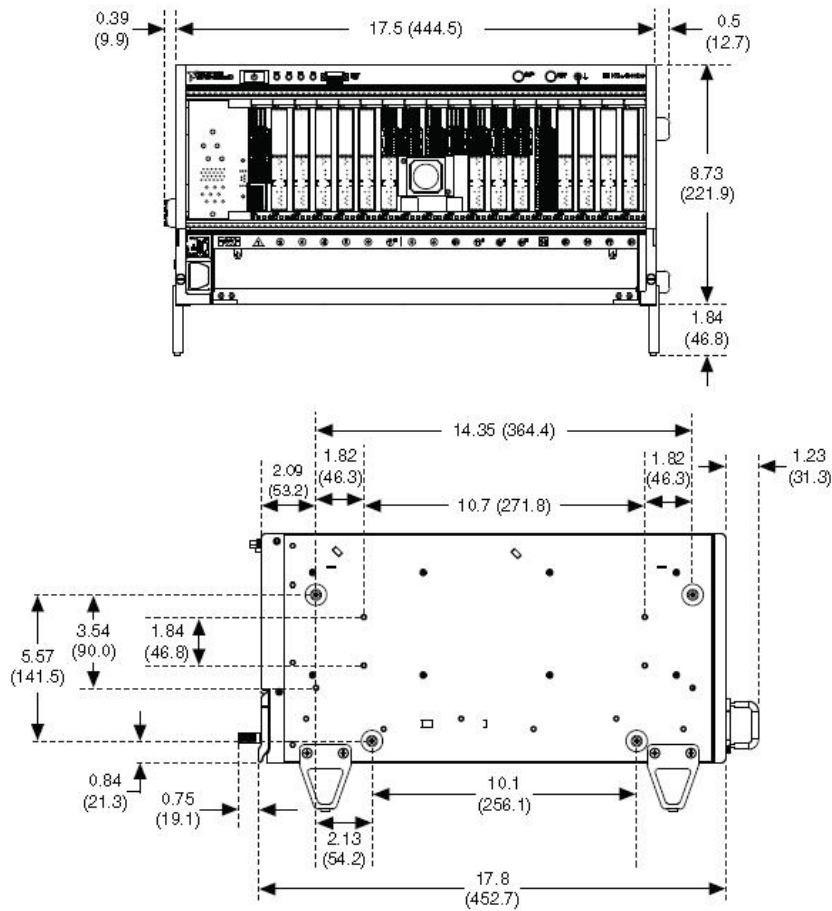
Maximum slot-to- slot skew	100 ps
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Accuracy	±25 ppm max. (guaranteed over the operating temperature range)
Maximum jitter	3 ps RMS phase- jitter (10 Hz– 12 kHz range), 2 ps RMS phase- jitter (12 kHz– 20 MHz range)
Duty- factor for PXIe_CLK100	45%–55%
Absolute single- ended voltage swing (When each line in the differential pair has 50 W termination to 1.30 V or Thévenin equivalent)	400 –1000 mV
 Note For other specifications refer to the <i>PXI-5 PXI Express Hardware Specification</i> .	
External 10 MHz Reference Out (BNC on rear panel of chassis)	
Accuracy	±25 ppm max. (guaranteed over the operating temperature range)
Maximum jitter	5 ps RMS phase- jitter (10 Hz– 1 MHz range)
Output amplitude	1 V _{PP} ±20% square- wave into 50 Ω 2 V _{PP} unloaded
Output impedance	50 Ω ±5 Ω
External Clock Source	
Frequency	10 MHz ±100 PPM
Input amplitude	
Rear panel BNC	200 mV _{PP} to 5 V _{PP} square- wave or sine-wave
System timing slot PXI_CLK10_IN	5 V or 3.3 V TTL signal
Rear panel BNC input impedance	50 Ω ±5 Ω
Maximum jitter introduced by backplane	1 ps RMS phase- jitter (10 Hz– 1 MHz range)
PXIe_SYNC_CTRL	
V _{IH}	2.0–5.5 V
V _{IL}	0–0.8 V
PXI Star Trigger	
Maximum slot-to- slot skew	250 ps
Backplane characteristic impedance	65 Ω ±10%
 Note For PXI slot to PXI Star mapping, refer to the <i>System Timing Slot</i> section of the <i>NI PXIe- 1065 User Manual</i> . For other specifications, refer to the <i>PXI-1 Hardware Specification</i> .	
PXI Differential Star Triggers (PXIe- DSTARA, PXIe- DSTARB, PXIe- DSTARC)	
Maximum slot-to- slot skew	150 ps
Maximum differential skew	25 ps
Backplane differential impedance	100 Ω ±10%
 Note For PXIe slot to PXI_DSTAR mapping, refer to the <i>System Timing Slot</i> section of the <i>NI PXIe- 1066DC User Manual</i> . For other specifications, the NI PXIe- 1066DC complies with the <i>PXI-5 PXI Express Hardware Specification</i> .	
Mechanical	
Overall dimensions	
Standard chassis	
Height	10.59 in. (268.7 mm)
Width	18.39 in. (467.1 mm)
Depth	18.76 in. (476.5 mm)
 Note 0.57 in. (14.5 mm) is added to height when feet are installed. When tilted with front feet extended on table top, height is increased approximately 2.08 in. (52.8 mm) in front and 0.583 in. (14.8 mm) in rear.	
Weight	
With two power supplies	37.6 lb
With single power supplies	31.5 lb
Chassis materials	Sheet Aluminum (5052- H32, 3003- H14, and 6061- T6), Extruded Aluminum (6060- T6), and Cold Rolled Steel, PC-ABS, Santoprene, Nylon
Finish	Conductive Clear Iridite on Aluminum, Electroplated Nickel on Cold Rolled Steel Polyurethane Enamel

The following two figures show the NI PXIe-1065 chassis dimensions. The holes shown are for the installation of the optional rack mount kits. You can install those kits on the front or rear of the chassis, depending on which end of the chassis you want to face toward the front of the instrument cabinet. Notice that the front and rear chassis mounting holes (size M4) are symmetrical.

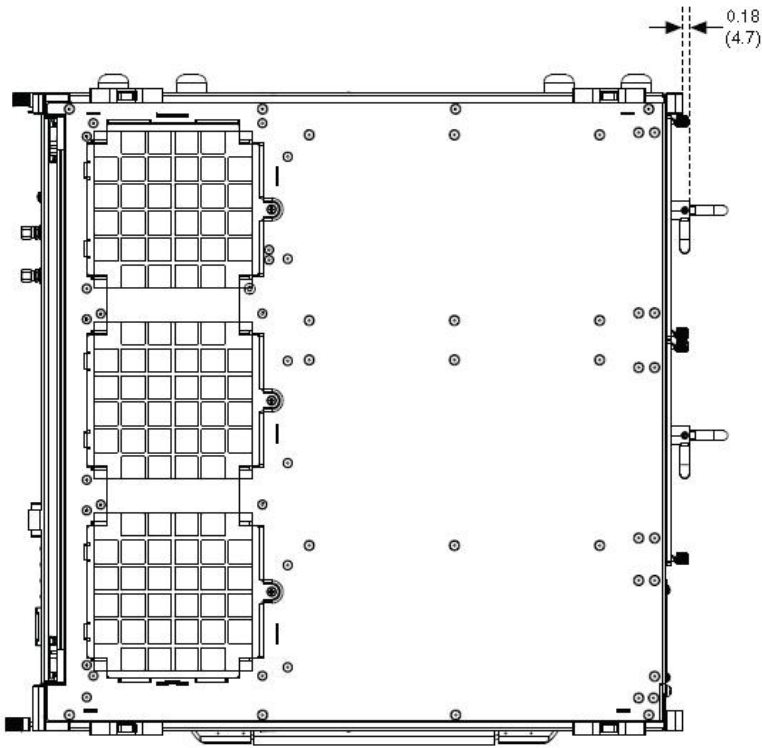
NI PXIe-1066DC Chassis Dimensions (Front and Side)

Dimensions are in inches (millimeters)



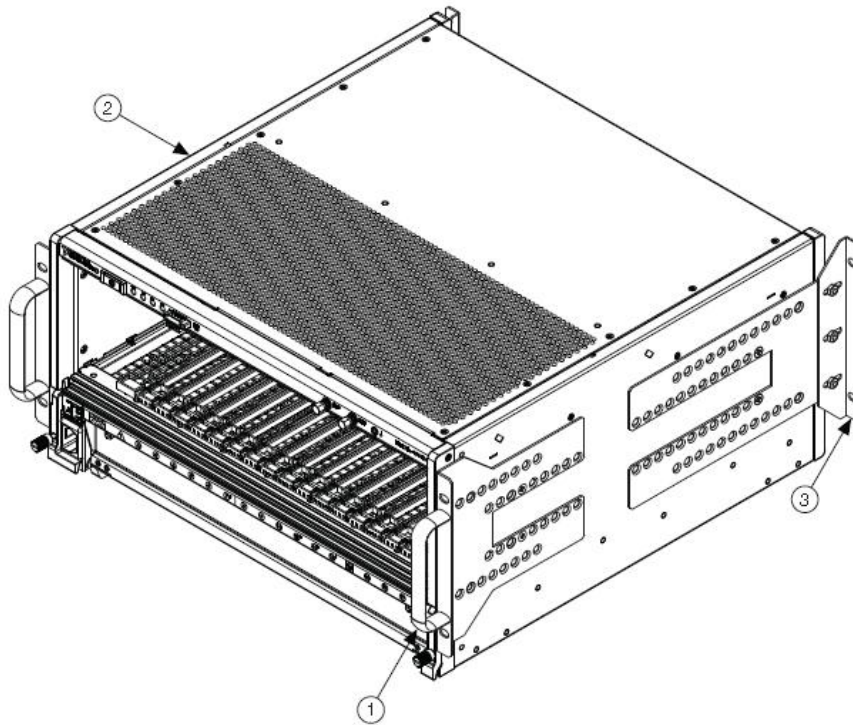
NI PXIe-1066DC Chassis Dimensions (Bottom)

Dimensions are in inches (millimeters)



The following figure shows the chassis rack mount kit components.

NI Chassis Rack Mount Kit Components



1 Front Rack Mount Kit 2 NI Chassis 3 Optional Rear Rack Mount Kit



Note For more information about rack mounting the NI PXIe-1066DC chassis, refer to the printed installation guide included with your rack mount kit.

¹ The operating range is guaranteed by design.

