Ordering Information | Detailed Specifications

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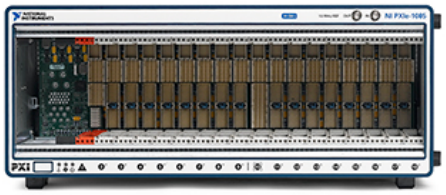
18-Slot, All-Hybrid PXI Express Chassis

NI PXIe-1085



- 16 hybrid slots, 1 PXI Express system timing slot
- Up to 8 GB/s per-slot dedicated bandwidth, 24 GB/s system bandwidth
- 925 W total power for 0 to 55 °C
- 38.25 W power and cooling capability per slot
- Ethernet port to monitor chassis component health
- Hot-swappable rear cooling fans
- Removable power supply
- Variable speed fan controller optimizes cooling and acoustic emissions
- Accepts 3U PXI, PXI Express, CompactPCI, and CompactPCI Express modules
- Complies with PXI and CompactPCI specifications

Overview

The NI PXIe-1085 18-slot chassis features a high-bandwidth, all-hybrid backplane to meet a wide range of high-performance test and measurement application needs. The hybrid connector type in every peripheral slot enables the most flexibility in terms of instrumentation module placement. It also incorporates all the features of the latest PXI specification including support for both PXI and PXI Express modules with a built-in 10 MHz reference clock, PXI trigger bus, and PXI star trigger for PXI modules and a built-in 100 MHz reference clock, SYNC100, and PXI differential star trigger for PXI Express modules.

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Application and Technology

High Performance

- Up to 8 GB/s per-slot in all slots, 24 GB/s system bandwidth
- All hybrid peripheral slots
- 925 W from 0 to 55 °C without derating
- 38.25 W power and cooling per-slot for filled chassis

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 supply and fans
- Filler panels
- Slot blockers for improved cooling performance
- System assurance programs

Slot	PXI Express System (Controller)	Hybrid (PXI)
Bus Signaling	PCI Express Gen 3 (1 x16, 1 x8)	PCI Express Gen 3 (x8) PCI (32/33)
Bandwidth (theoretical)	24 GB/s dedicated for PXI Express 132 MB/s shared for PXI	8 GB/s dedicated (PXI Express)[1] 132 MB/s shared (PXI)
Number of Slots	1	16

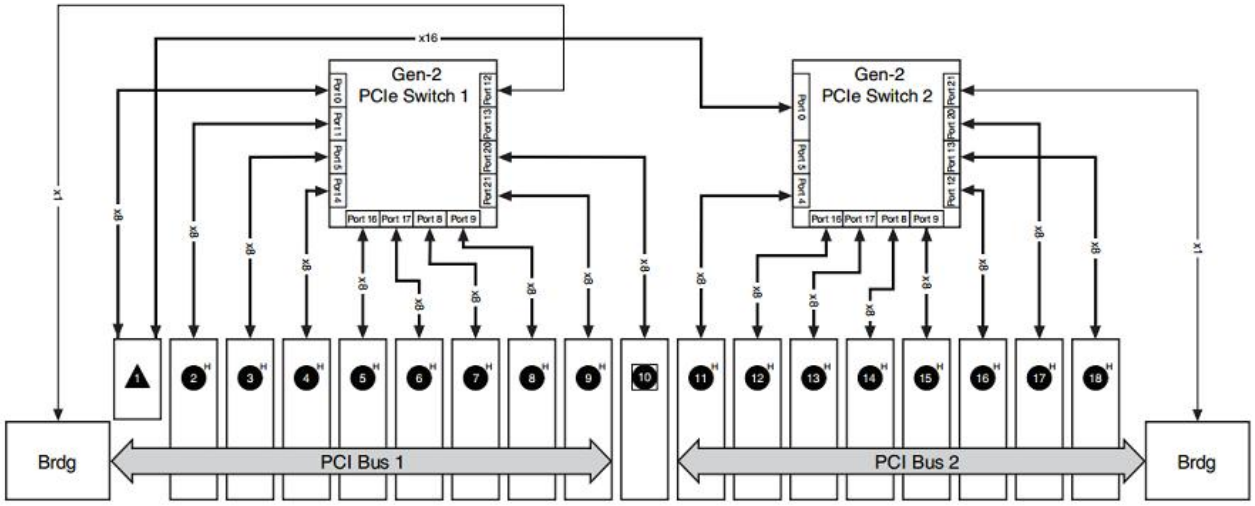
[1] Each slot provides up to 4 GB/s dedicated bandwidth; however, 12 GB/s total bandwidth is shared across all devices.

Slot Types Accept PXI and PXI Express Modules

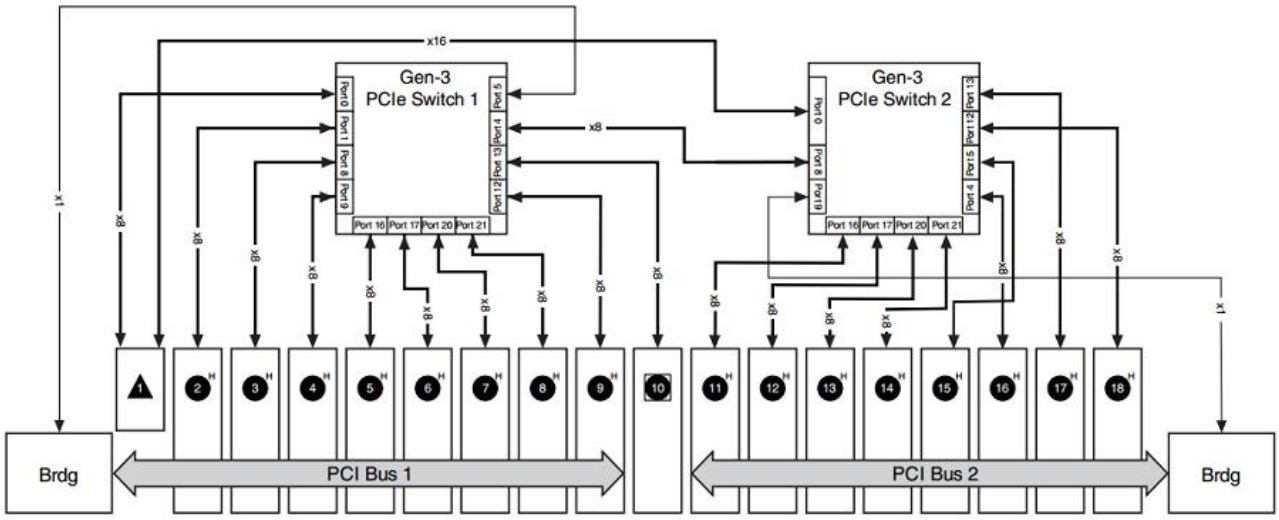
This chassis enables higher-bandwidth systems and provides the flexibility you need to work with both hybrid-compatible PXI and PXI Express modules. There are a total of 16 PXI hybrid-compatible slots and one PXI Express system timing slot that can accept either a PXI Express system timing module or PXI Express module.

The PXI Express system slot offers one x16 and one x8 PCI Express Gen 3 link to two switches. Each switch provides a x8 PCI Express link to eight or nine peripheral slots. Also, each slot is capable of up to 8 GB/s dedicated bandwidth; however, 24 GB/s total bandwidth is shared across all devices.

There are also two x1 PCI Express links to two PCI Express-to-PCI translation bridges on the backplane. The PXI Express system timing slot accepts a PXI Express module or a PXI Express system timing controller for advanced timing and synchronization. The PXI Express hybrid slots deliver connectivity to either a x8 PCI Express link or to the 32-bit, 33 MHz PCI bus on the backplane.



NI PXIe-1085 12 GB/s Chassis Backplane



NI PXIe-1085 24 GB/s Chassis Backplane

Optimized Cooling and Acoustic Emissions

The NI PXIe-1085 chassis integrates three 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-1085 achieves acoustic noise levels as low as 51 dBA (sound pressure level measured at operator position according to ISO 7779).

PXI Timing and Synchronization

For PXI modules, the NI PXIe-1085 backplane is fully compliant with PXI timing and synchronization standards. The chassis includes a 10 MHz reference clock with an accuracy of ±25 parts per million (ppm), less than 5 ps jitter, and a maximum slot-to-slot skew of 1 ns. For triggering and handshaking needs, the NI PXIe-1085 offers the PXI trigger bus and PXI star trigger. PXI modules should be designed for use in PXI hybrid-compatible slots.

For PXI Express modules, in addition to PXI timing and synchronization features, the NI PXIe-1085 backplane supplies a differential 100 MHz reference clock with an accuracy of ±25 ppm, less than 3 ps jitter, and a maximum slot-to-slot skew of 100 ps. The chassis also provides differential star triggers to the PXI Express slots to offer less than 200 ps intermodule skew. With the SYNC100, a peripheral module installed in the NI PXIe-1085 can generate its own CLK10 signal, deriving it from the 100 MHz reference clock.

Individually Replaceable Power Supply and Cooling Fans

The NI PXIe-1085 incorporates the power supply components into a modular unit that you can replace quickly, resulting in a mean time to repair (MTTR) of less than five minutes. Additionally, the three cooling fans are hot-swappable and easily replaceable with access to the rear of the chassis.

Power Supply, Temperature, and Fan Monitoring

The NI PXIe-1085 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 of the chassis. Furthermore, you can monitor the chassis' health information remotely through the use of the Ethernet connection on the rear of the chassis via a web service portal.

External 10 MHz Reference Clock I/O Connectors

This chassis includes IN/OUT SMA connectors for the 10 MHz reference clock on the front of the chassis. 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.

High-Performance Platform

For unlocking the full high-throughput capabilities of the NI PXIe-1085, National Instruments recommends the NI PXIe-8880 embedded controller. The combination of these PXI Express platform products enables more high-performance instruments streaming at their maximum rate to be combined in a single chassis.

Software System Configuration

The NI PXIe-1085 chassis is configured with NI Measurement & Automation Explorer (MAX). With this software configuration tool, you can easily configure NI PXIe-1085 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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Ordering Information

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

Products	Part Number	Recommended Accessories	Part Number
Related Accessories			
18-Slot Chassis Filler Panel Kit (to cover 17 slots)	778646-01	No accessories required.	
NI 14/18-Slot Chassis Rear Rack Mount Kit	778644-02	No accessories required.	
NI PXI Slot Blocker, Set of 5	199198-01	No accessories required.	
Replacement Power Supply for NI PXIe-1085	781719-01	No accessories required.	
NI 14/18-Slot Chassis Front Rack Mount Kit	778644-01	No accessories required.	
Replacement Fan Assembly for NI PXIe-1085	782459-01	No accessories required.	
NI PXIe-1085			
NI PXIe-1085, 18-Slot 3U PXI Express Chassis, 12 GB/s System BW Requires: 1 Cable	781813-01	**Cable:** Shielded - Power Cord, AC, U.S., 125 VAC, 15 A	763830-01
		Cable: Shielded - Power Cord, 240 V, 10 A, North American	763068-01
NI PXIe-1085, 18-Slot 3U PXI Express Chassis, 24 GB/s System BW Requires: 1 Cable	783588-01	**Cable:** Shielded - Power Cord, AC, U.S., 125VAC, 15A	763830-01
		Cable: Shielded - Power Cord, 240 V, 10 A, North American	763068-01

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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.
- **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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Detailed Specifications

This appendix contains specifications for the NI PXIe-1085 chassis.

Caution Specifications are subject to change without notice.

Electrical	
AC Input	
Input voltage rating	100 to 240 VAC
Operating voltage range[1]	90 to 264 VAC
Input frequency	50/60 Hz
Operating frequency range[1]	47 to 63 Hz
Input current rating	12–6 A
Over-current protection	15 A circuit breaker
Line regulation	
3.3 V	<±0.2%
5 V	<±0.1%
±12 V	<±0.1%
Efficiency	70% typical
Power disconnect	The AC power cable provides main power disconnect. Do not position the equipment so that it is difficult to disconnect the power cord. 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 rear-panel 8-pin connector and inhibit mode switch to control the internal chassis power supply.
DC Output	

DC current capacity (I_{MP})	
Voltage	**Maximum Current**
+3.3 V	61 A
+5 V	48 A
+12 V	62 A
–12 V	4 A
5 V_{AUX}	2.0 A

Notes Maximum combined +3.3 V, +5 V, and +12 V power is 699 W.

Maximum total usable power is 701.5 W.

Backplane slot 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	-

Notes 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	50 mV_{pp}
+5 V	50 mV_{pp}
–12 V	50 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 20 to 30% above nominal output voltage
Power supply shuttle MTTR	Replacement in under 5 minutes

Chassis Cooling

Module cooling system	
NI PXIe-1085	Forced air circulation (positive pressurization) through three 169 cfm fans with High/Auto speed selector
Slot airflow direction	Bottom of module to top of module
Module cooling intake	Bottom rear of chassis
Module cooling exhaust	Along both sides and top of chassis

Power supply cooling system	Forced air circulation through two integrated fans
Power supply cooling intake	Right side of chassis
Power supply cooling exhaust	Left side of chassis

Environmental

Maximum altitude	2,000 m (800 mbar) (at 25 °C ambient)
Pollution Degree	2

For indoor use only.

Operating Environment

Ambient temperature range	0 to 55 °C (Tested in accordance with IEC-60068-2-1 and IEC-60068-2-2. Meets MIL-PRF-28800F Class 3 low temperature limit and MIL-PRF-28800F Class 2 high temperature limit.)
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	5 to 500 Hz, 0.3 g_{rms}

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)	51.2 dBA
High fan	64.1 dBA

Sound Power

Auto fan (up to ~30 °C ambient)	60.8 dBA
High fan	75.9 dBA

Note Specifications are subject to change without notice.

Safety

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 is designed to meet the requirements of the following standards of EMC 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 cabling.

CE Compliance CE

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

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 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.htm.

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	1 ns
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
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 *PXI-5 PXI Express Hardware Specification*.

External 10 MHz Reference Out (SMA on front 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 *System Timing Slot* section of the *NI PXIe-1085 User Manual*.
For other specifications refer to the *PXI-1 Hardware Specification*.

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 *System Timing Slot* section of the *NI PXIe-1085 User Manual*.
For other specifications, the NI PXIe-1085 complies with the *PXI-5 PXI Express Hardware Specification*.

Mechanical

Overall dimensions		
Standard chassis		
Height		6.97 in. (177.1 mm)
Width		17.54 in. (445.5 mm)
Depth		20.33 in. (516.4 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		18.28 kg (40.3 lb)
Chassis materials		Sheet Aluminum (5052-H32, 5754-H22), Extruded Aluminum (6063-T5, 6060-T6), Plate Aluminum (6063-T5, 6061-T6), Cold Rolled Steel, Cold Rolled Stainless Steel, Sheet Copper (C110), Santoprene, Urethane Foam, PC-ABS, Nylon, Polycarbonate, Delrin, Polyethylene, Polyamide (FR 106), Neodymium Magnet
Finish		Conductive Clear Iridite on Aluminum, Electroplated Nickel on Cold Rolled Steel, Electroplated Zinc on Cold Rolled Steel, Electroplated Nickel on Copper

Figures A-1 and A-2 show the NI PXIe-1085 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.

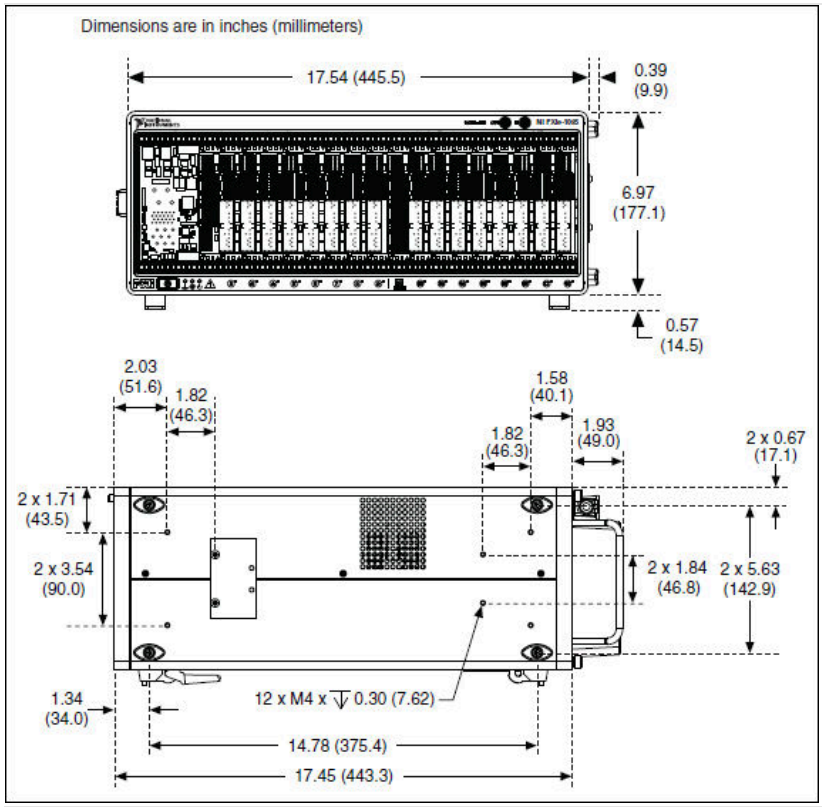


Figure A-1. NI PXIe-1085 Chassis Dimensions (Front and Side)

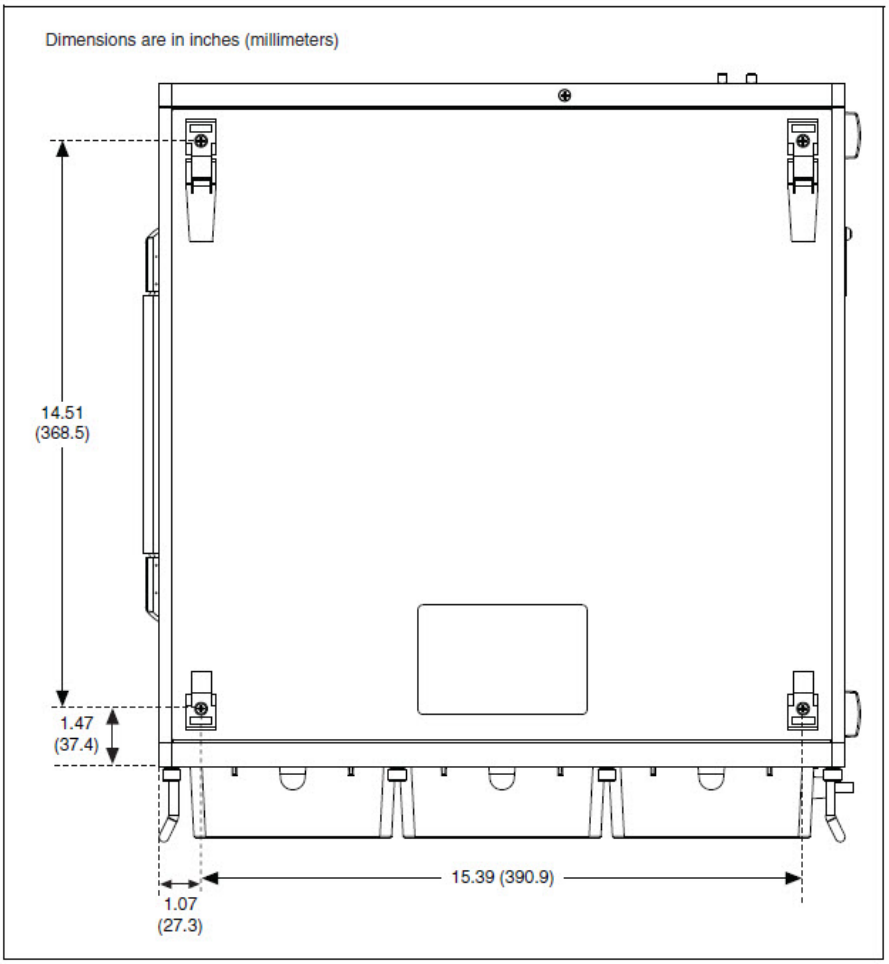
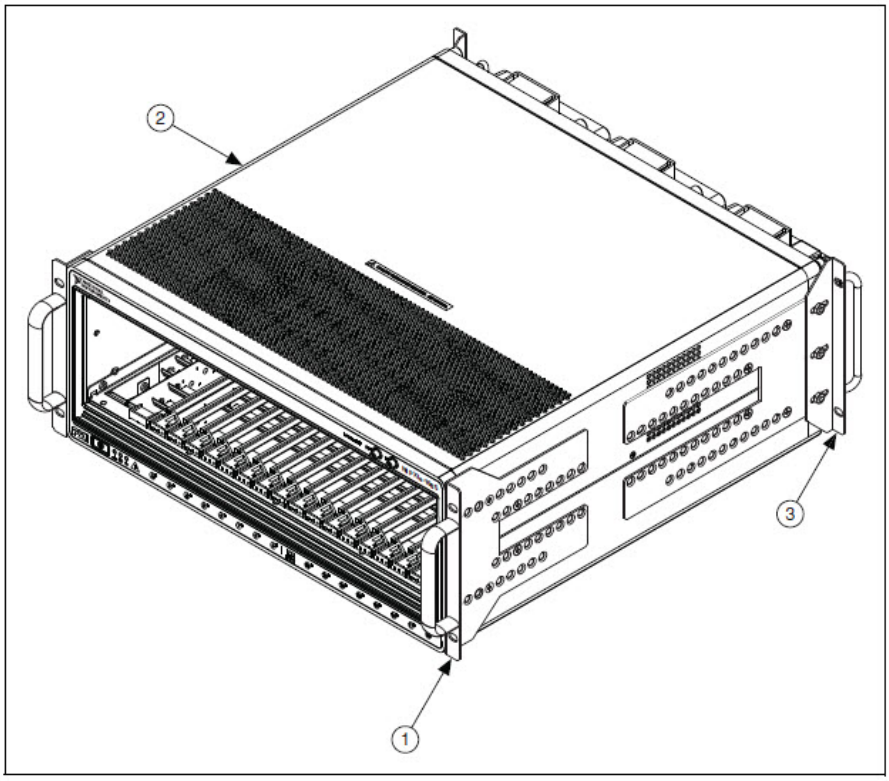


Figure A-2. NI PXIe-1085 Chassis Dimensions (Bottom)

Figure A-3 shows the chassis rack mount kit components.



1	Front Rack Mount Kit	2	NI PXIe-1085 Chassis	3	Optional Rear Rack Mount Kit

Figure A-3. NI Chassis Rack Mount Kit Components

[1] The operating range is guaranteed by design.

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