

PXES-2596

User's Manual

3U 9-Slot Gen3 PXI Express Chassis



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Part Number:	50M-70434-1000

Preface

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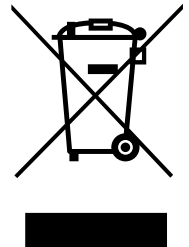
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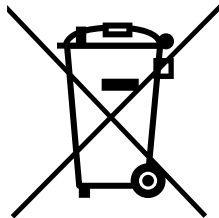
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Revision History

Revision	Description	Date
0.1	Preliminary release	2025-09-18
0.2	Specifications and fan descriptions updated	2025-11-07
0.3	Rack mount illustrations updated	2025-11-13
0.4	Specifications and safety instructions updated	2025-11-27
0.5	Backplane PCIe bus topology diagram updated	2026-01-26

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1 Introduction

The ADLINK PXES-2596 is a 9-slot PXI Express all hybrid chassis. It features 1 system slot and 8 hybrid slots, supporting CompactPCI, PXI, CompactPCI Express, and PXI Express modules for maximum flexibility. Built on a two-link PXI Express architecture with 16GB/s system bandwidth, all peripheral slots support PCIe Gen3 x4, providing up to 4GB/s per slot.

For expanded configurations, a 12-slot version called PXES-2596E is also available, featuring 1 system slot, 8 hybrid slots, and 3 additional PXI Express peripheral slots. This provides greater slot density and price-performance ratio.

Additionally, both versions support single-board sales and features an ATX power design without a power board, simplifying integration and making it easier for single-board customer usage.

The chassis integrates a smart monitoring system that reports fan speed, system voltages, and internal temperature in real time. A 500W ATX power supply ensures stable operation for up to 50°C with superior cooling performance.

1.1 Packing List

- PXES-2596 Chassis
- Power cords
- Filler panel kit for unused/reserved slots including one 3-slot panel and eighteen 1-slot panels
- Optionally mount the chassis onto a server or similar rack using the Rack-Mount kit(G) (part number 91-95115-0010
- PXES-2590).

1.2 Features

- PXI™-5 PXI Express hardware specification Rev.1.0 compliant
- 9-slot PXI Express chassis with one system slot and eight hybrid peripheral slots
- Two-link PXI Express chassis
- Up to 16 GB/s system bandwidth
- Up to 4GB/s peripheral bandwidth for all slots
- 0°C to 50°C extended operating temperature range
- Intelligent chassis managementSBC-FM-4U5C function module
 - Automatic fan speed control
 - Chassis status monitoring and reporting
- SMA internal connectors for 10 MHz clock input/output
- Industrial-grade ATX power supply
- Power, temperature, and fan monitoring LEDs

1.3 Specifications

The PXES-2596 complies with the PXI™-5 Specification Rev.1.0 and accepts all modules compliant with the PXITM-5 and Compact PCI specification.

Power Supply

AC Input (*guaranteed by power supply design)			
Input voltage range		115 to 240 VAC	
Input voltage frequency		47 to 63 Hz	
Input current rating			
115 VAC		8 A	
230 VAC		4 A	
DC Output			
Maximum 500W (including system controller)		500 W	
VDC	Maximum	Load Regulation	Maximum Ripple & Noise
+5V	40 A	±5%	60 mV
+12V	32 A	±5%	120 mV
-12V	(Transferred by 12V)	±5%	120mV
+3.3V	30 A	±5%	60mV
5Vsb	2 A	±5%	60 mV

10 MHz System Reference Clock (10 MHz REF)	
Maximum clock skew between slots	300 ps
Built-in 10 MHz clock Accuracy	± 25 ppm
100 MHz System Reference Clock: PXIe_CLK100	
Maximum slot-to-slot skew	100 ps
Accuracy	±25 ppm
10 MHz clock output/input (internal connector)	
BNC Output amplitude (internal connector)	1 Vpk-pk ±20% square-wave into 50 Ω 2 Vpk-pk unloaded
BNC Output impedance (internal connector)	50 Ω ±5 Ω
Frequency input requirement	10 MHz ±100 PPM
Input signal (10MHz REF In BNC)	100 mVPP to 5 VPP(square or sine)
Input impedance (10MHz REF In BNC)	50 Ω ±5 Ω

Input signal (PXI_CLK10_IN on fifth slot)	5 V or 3.3 V TTL signal
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Cooling	
Fans	2 sets of 210.38 CFM fans
Per-slot cooling capacity	58 W (verified by 40°C chamber test) 38 W (verified by 50°C chamber test)
Physical	
Slots	9 (1x system slot, 8x hybrid peripheral slots) 12 (1x system slot, 8x hybrid peripheral slots, 3x peripheral slots)
Chassis Dimensions	302.16 (W) x 177.8 (H) x 457 (D) mm
Backplane Dimensions	287.88 mm (W) X 165.45 mm (H)
Chassis Weight	11 kg (24.3 lb)

Environmental	
Storage	Ambient temperature: -20 to 70°C Relative humidity: 10 to 90%, noncondensing
Operating	Ambient temperature: 0 to 50°C Relative humidity: 10 to 90%, noncondensing
Functional shock	30 G, half-sine, 11 ms pulse duration
Random Vibration	Operating: 5 to 500 Hz, 0.3 Grms, 3 axes Nonoperating: 5 to 500 Hz, 2.46 Grms, 3 axes
Certification	
Safety	EN 61010-1 EN 61010-2-201
Electromagnetic Compatibility	Emissions: EN 55011 Class A Immunity: EN 61326-1
CE Compliance	Meets essential requirements of applicable European Directives, as amended for CE Marking: Low-Voltage Directive (safety): 73/23/EEC Electromagnetic Compatibility Directive (EMC): 9/336/EEC

1.4 Schematics

Please note that all dimensions are shown in mm (milli- meters)

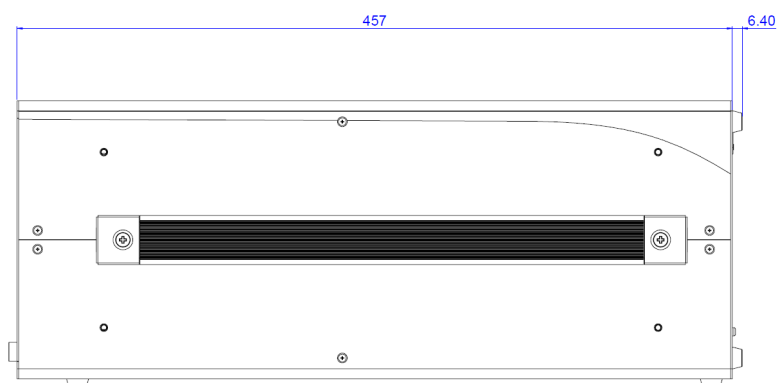
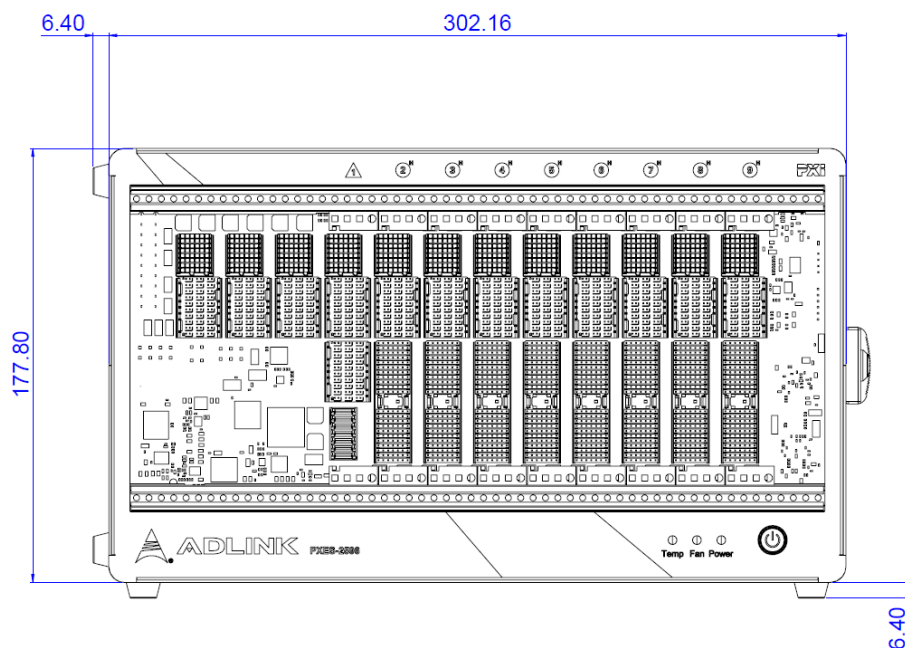


Figure 1: Right Side View

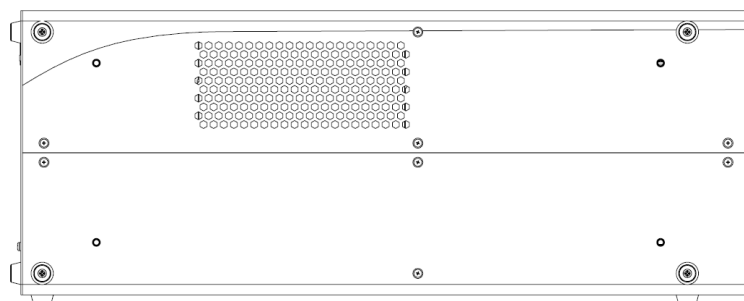


Figure 2: Left Side View

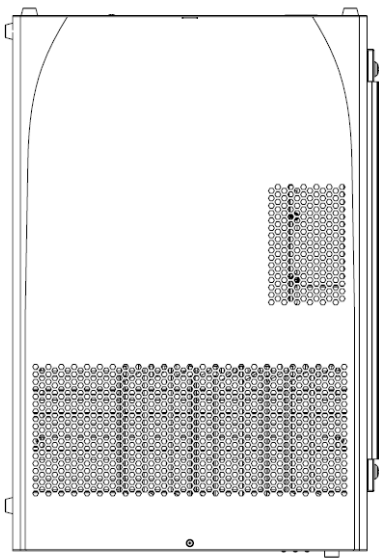


Figure 3: Top View

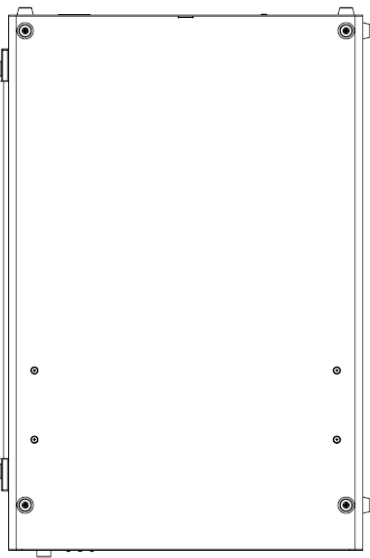


Figure 4: Bottom View

1.5 Connectors, I/O, Controls

1.5.1 Front Panel

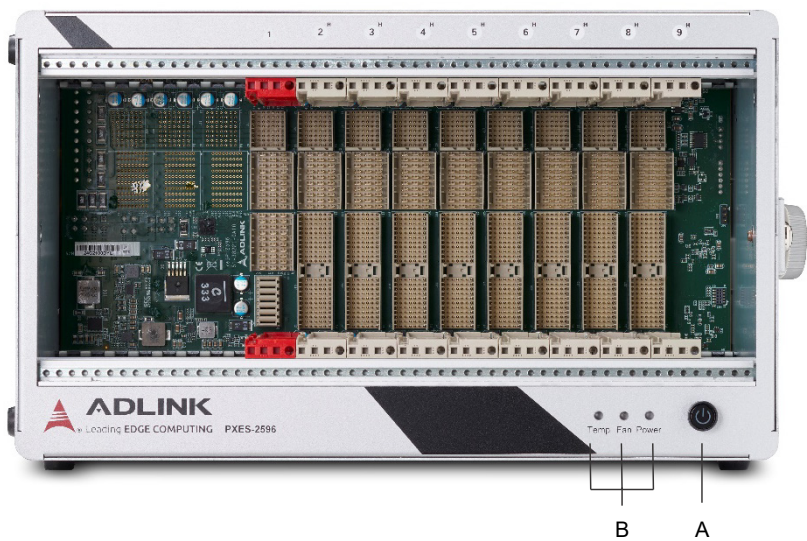


Figure 5: PXES-2590 Front Panel

	Feature	Details
A	Power	Powers the chassis on/off (when INHIBIT on rear panel (not shown) is set to “DEF”)
B	Chassis Status	Temperature, Fan, and Power (L to R), functions as follows

Status	Power (Blue)	Fan (Green)	Temperature (Amber)
Off	Chassis is powered down.	Chassis is powered down.	Chassis is powered down or operating normal
On (Lit)	Chassis is powered on and operating normally.	Fans operating normally	N/A
Blinking	One or more power rails exceeds threshold settings (defaults are $\pm 5\%$ for 3.3V, 5V, +12V, and -12V, get voltage reading via chassis monitor utility).	One or more fans falls below threshold speed or no updates for a long period (configurable, default is 800RPM)	One or more temperature sensors exceeds threshold temperature. (configurable, default 70°C) TBD ES2 Thermal EVT

1.5.2 Rear Panel

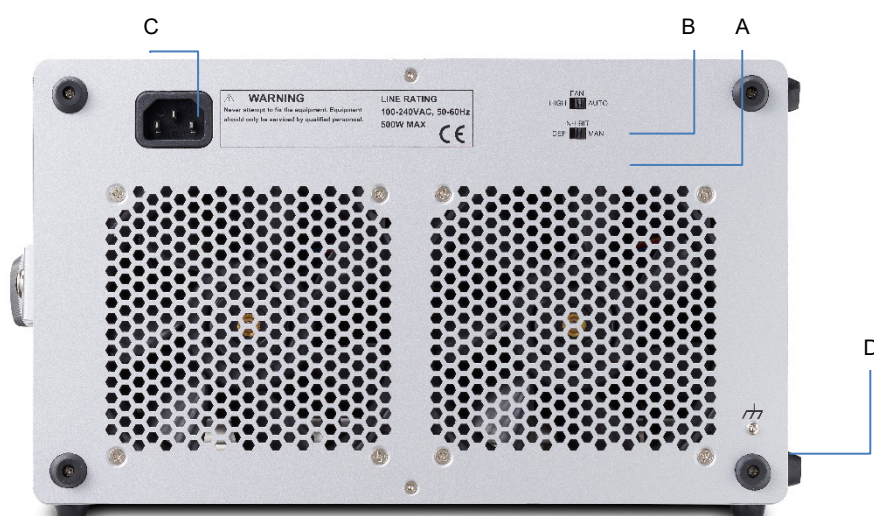
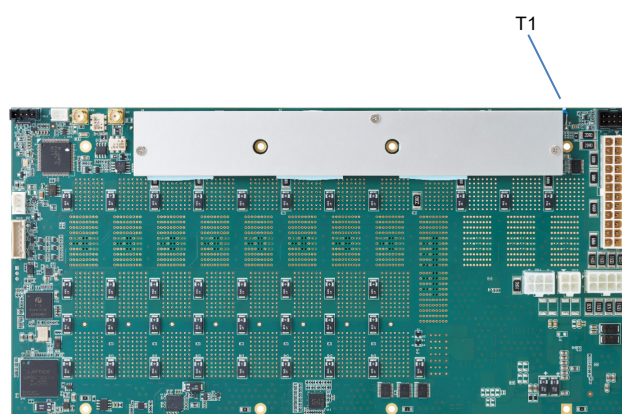
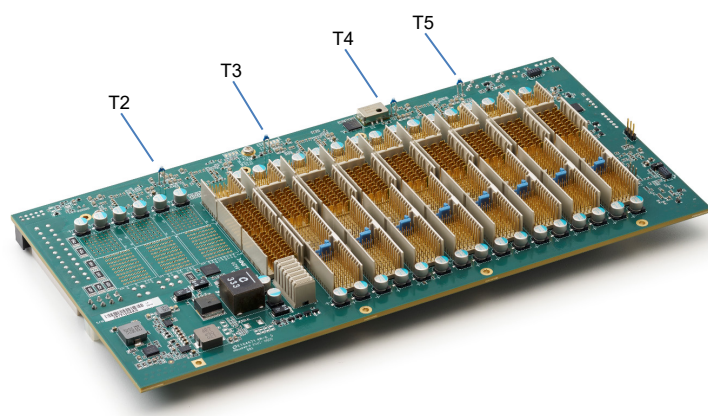


Figure 6: PXES-2590 Rear Panel

	Feature	Details
A	Inhibit Switch	In the DEF (default) position, the front panel power button turns the power supply on/off, and in the MAN (manual) position, the INHIBIT pin on the DB-9 connector turns the power supply on/off
B	Fan Switch	In the HIGH position, fans operate at maximum speed, and in AUTO, the fans run based on the monitored chassis temperature
C	Universal Power Inlet	Accepts C13 power outlet-equipped connection
D	Chassis Ground Lug	The ground wire can be crimped to the ground lug, using a crimp tool of the appropriate size, with the other end connected to ground

1.5.3 Backplane Thermal Sensors



1.5.4 PCI Express

Connector pin assignments of the PXI Express System Controller Slot, PXI Express Hybrid Peripheral Slots, and PXI Express Peripheral Slots comply with the default pin assignments as defined in PXI-5 PXI Express hardware specification Rev.1.1.

The PXES-2596 backplane provides a PCIe Gen3 switch fabric, allowing PCI express bus data streams between the system slot and all peripheral slots. The system slot supports up to PCIe 2-link x8 x8 Gen3 lanes, with all peripheral slots supporting up to PCIe x4 Gen3 links individually.

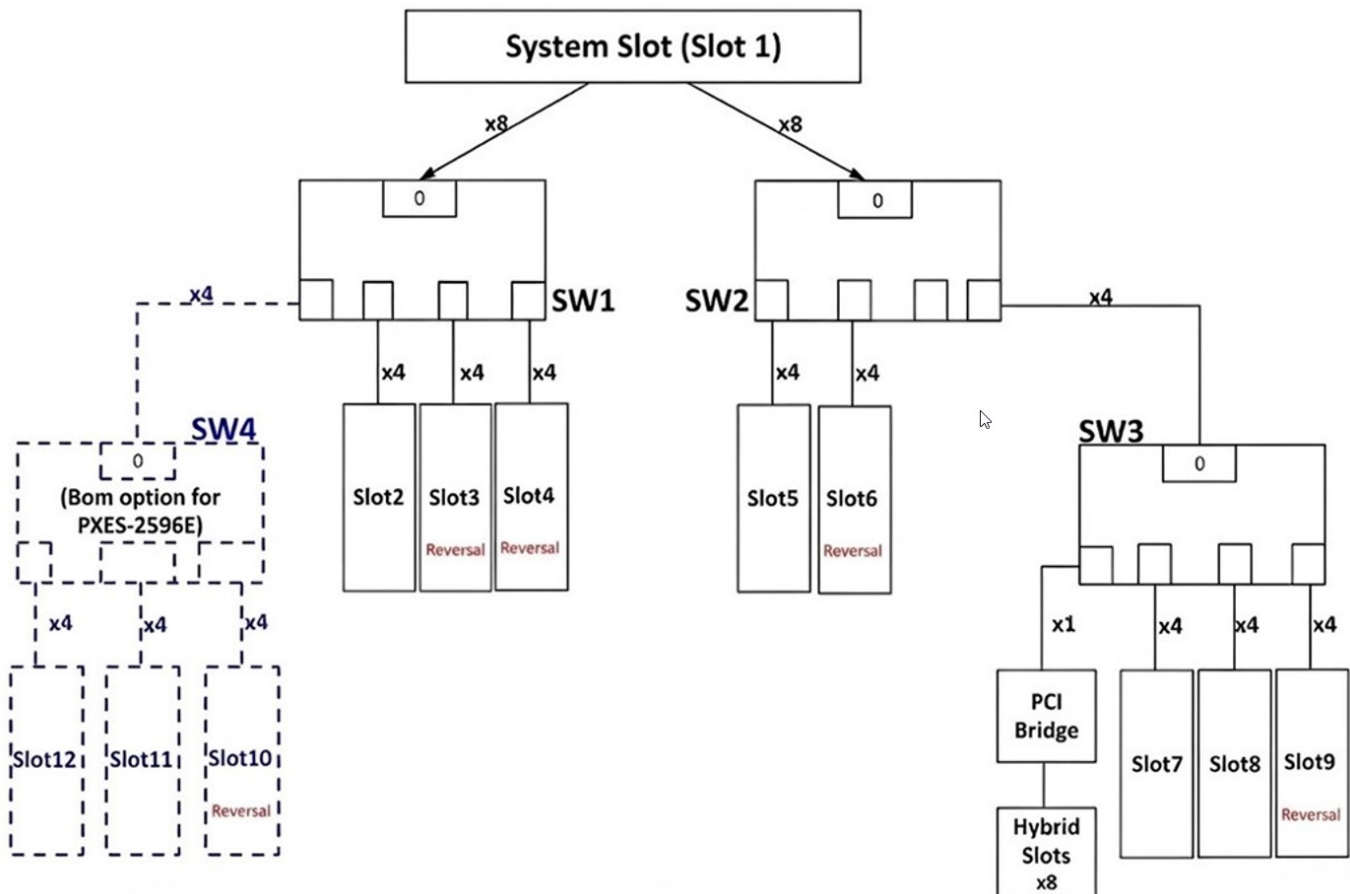


Figure 7: Backplane PCI Express Bus Topology

PXI Express System Controller Slot

The System Controller slot is Slot 1 of the chassis as defined by the PXI specification. The PXES-2596 chassis can accommodate a PXI Express system controller that occupies width up to 4 slots. As defined in the PXI specification, three controller expansion slots allow the controller to expand to the left to prevent the controller from using up peripheral slots.

PXI Express Hybrid Peripheral Slots

8 PXI Express hybrid peripheral slots are provided in the PXES-2596, all connected with PCIe x4 Gen3 lanes. Each can accommodate a 3U PXI Express CompactPCI Express / hybrid slot compatible PXI-1 Compact- PCI peripheral module.

PXI Express Peripheral Slots(2596E)

3 PXI Express peripheral slots are provided in the PXES- 2596E, all slots connected with PCIe x4 Gen3 lanes. Each can only accommodate a 3U PXI Express Compact- PCI Express peripheral module.

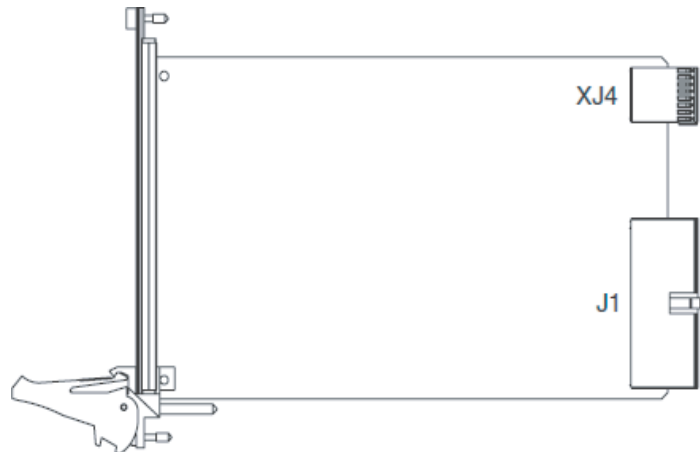


Figure 8: 3U hybrid slot compatible PXI-1 peripheral module

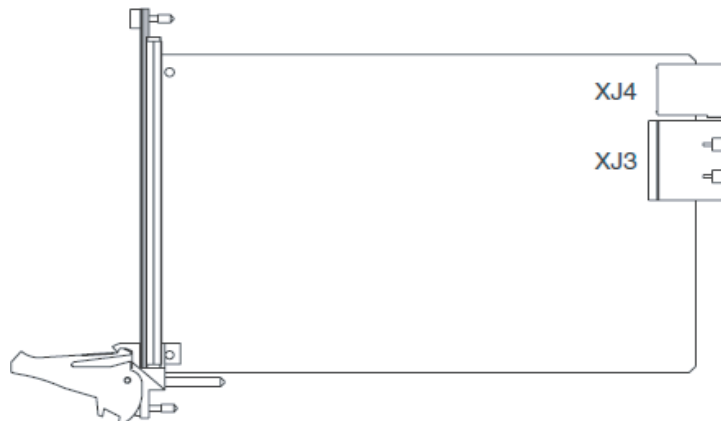


Figure 9: 3U PXI Express peripheral module

Local Bus

The local bus on a PXI backplane is a daisy-chained bus that connects each peripheral slot with adjacent peripheral slots to the left and right. The quantity of local bus lines is decreased from thirteen to one on a PXI Express backplane. The remaining local bus line can transmit analog or digital signals between modules.

Trigger Bus

The trigger bus is an 8-line bus that connects all slots on the PXES-2596, providing inter-module synchronization. PXI and PXI Express modules can exchange trigger or clock signals through the trigger bus, allowing precisely timed response to asynchronous external events the system is monitoring or controlling.

Reference Clock

The PXES-2596 backplane supplies single-ended 10MHz reference clock (PXI_CLK10) and differential 100MHz clock (PXIe_CLK100) to each peripheral slot for inter-module synchronization. The independent buffers drive the clock signal to each peripheral slot.

These common reference clock signals can synchronize multiple modules in a PXI Express chassis. PXI modules with phase-lock loop circuits can lock reference clocks to generate an in-phase time base.

The PXI_CLK10 and PXIe_CLK100 clocks are in-phase according to the PXI-5 specification. Since the external 10MHz clock input can override the onboard 10MHz clock source, a phase-lock loop (PLL) circuit on the backplane synchronizes the PXIe_CLK100 and external 10MHz clock.

2 Getting Started

This chapter describes procedures for installing the PXES-2596 and making preparations for its operation. Please contact ADLINK or authorized dealer if there are any problems during the installation

2.1 Power Supply Budget Considerations

Please review the power consumption of all modules used in the same PXES-2596. The total maximum power consumed by the system module and peripheral modules shall not exceed the DC power supply of the PXES-2596 as defined in DC Power Output.

2.2 Cooling Considerations

The PXES-2596 features an innovative design for heat dissipation, with cooling fans in the rear section of the chassis, drawing cool air through apertures on the bottom for exhaust through the back. This design provides uniform airflow for each PXI slot and exceptional cooling capability. When the chassis is installed in a rack, the cooling design minimizes drawing of hot air from the rear area, where other devices exhaust, while maintaining a steady temperature inside the chassis. For optimal cooling efficiency, retain support feet.

When rack mounting the PXES-2596, at least 1U (44.5 mm/1.75 in.) clearance below the intake apertures is required. Also keep other objects or equipment at a minimum of 76.2 mm (3 in.) away from the outlet apertures in the rear region of the chassis.

2.3 Cooling Configurations

Heat ventilation is related to the installation location, environmental temperature, and total heat generated by the system module and peripherals. The PXES-2596 features a smart fan function to provide sufficient ventilation and minimize noise emission. There is a switch located at rear of the chassis to configure the smart fan operation.

Auto - Enables smart fan function.

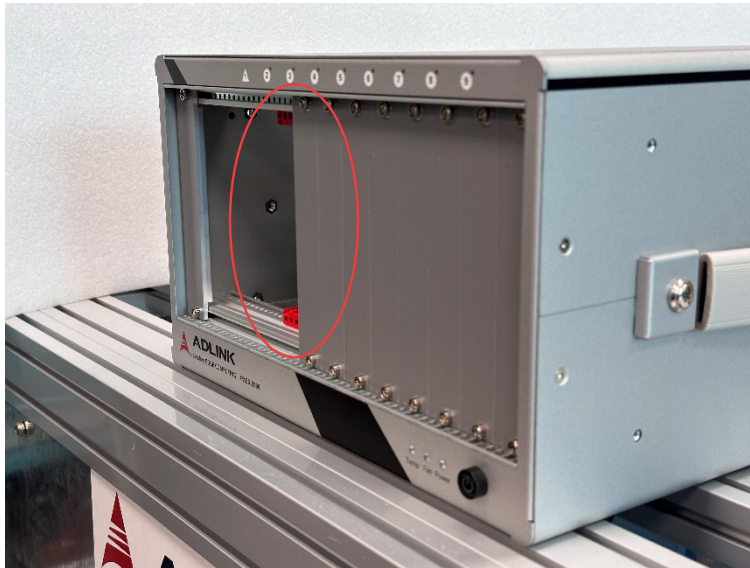
High - Full fan rotation utilization.

2.4 Hardware Installation

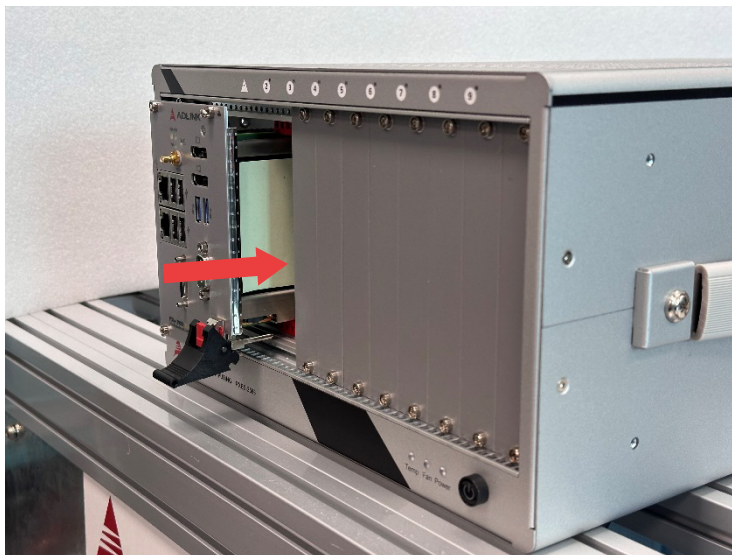
2.4.1 Installing the System Controller

The PXES-2596 incorporates a system controller slot supporting a PXI Express system controller of 3 or 4 slot widths. We recommend the ADLINK PXIe-3987 Controller for use with the PXES-2596.

1. Ensure the CPU, memory module(s), and storage device(s) are properly installed on the system controller.
2. Locate the system controller slot (Slot 1).



3. Depress the system controller module's latch to release.



4. Align the module's top and bottom edges with the card guides, and carefully slide the module into the chassis.

5. Lift the latch until the module is securely seated in the chassis backplane.



6. Fasten the screws on the module front panel, and connect all devices to the system controller.



2.4.2 Installing Peripheral Modules

The PXE-2596 supports up to eight peripheral modules.

1. Select an available peripheral slot (2 to 9).
2. Depress the peripheral module's latch and align the module's top and bottom edges with the card guides.



3. Carefully slide the module into the chassis.
4. Lift the latch until the module is securely seated in the chassis backplane.



5. Fasten the screws on the module's front panel.



6. Repeat steps 1 to 5 to install additional PXI peripheral modules.

2.5 Rack Mounting

ADLINK provides hardware for optional installation of the PXES- 2596 to a rack. When mounted in a rack, the Rack-Mount kit(G) (part number 91-95115-0010) allows for adjustable placement of the PXES-2596 further back in the rack, thus allowing ample room at the front of the unit for external mechanical parts (such as cables and mass interconnect modules).

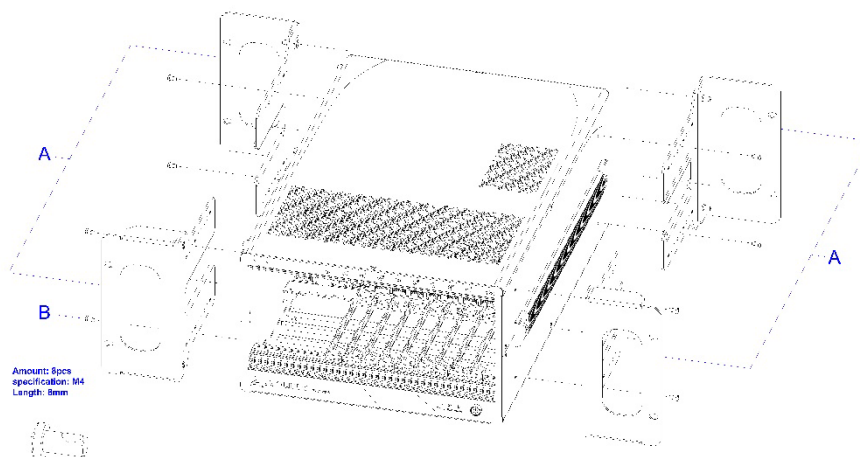


Figure 10: Rack Mount Assembly

Feature	Description
A	Mounting Brackets
B	Screws

To rack mount the PXES chassis, follow the steps below:

1. Remove carrying handle from the chassis right side.
2. Remove the four rubber feet from the chassis left side. Store the feet for later use, as they will not be needed for rack mount use.
3. Install the mounting brackets on both sides of the chassis using the provided M4 screws. Position of the mounting brackets can be adjusted along the screw holes to position the chassis forward or backward as needed.

Install the chassis and kit into the rack using eight screws (not included).

2.6 Powering Up the System

The PXES-2596 is equipped with a 100 VAC to 240 VAC universal power supply unit requiring no input voltage selection.

Do not to perform "hot swapping", replacement, disconnecting or connecting of any components (including cards and cabling) on chassis while the system is powered up. By not observing this Warning, system damage and/or data loss, and physical injury (due to possible shock hazard) may result.

To power up the system:

1. Connect one end of the supplied power cord to the power inlet located at the rear side of the chassis.
2. Plug the other end of the AC power cord to a properly grounded wall socket or power strip.
3. Press the power button. The Power LED (blue) lights up immediately.

2.7 PXES-2596 Software Resources

The following software resources are available for various application requirements.

2.7.1 ADLINK PXI Platform Services (APPS)

ADLINK PXI Platform Services is a software kit consisting of a utility and a group of software services and drivers.

- **ADLINK ChassisWatch**

A GUI application program providing chassis status monitoring and configuration functions that are exclusive for all ADLINK PXI Express chassis.

- **PXI Express Chassis Software Services**

API services and drivers for the PXES-2596 defined in the PXISA PXI-6 Software Specification.

- **PXI Resource Manager**

A Windows background service following the PXI-2 and PXI-6 Software Specification to scan PXI/PXIe controllers, chassis, and peripheral modules and generate PXI system description files accordingly.

- **PXI Trigger Management Software Services**

API services and Trigger Manager defined in PXISA PXI-9 PXI and PXI Express Trigger Management Specification.

Please refer to the ADLINK PXI Platform Services user manual for more information.

2.7.2 MAPS Core DAQ Software & Utility

Automation and Platform Services) software package includes ADLINK DAQ drivers, device management utility (ACE), and PXI configuration settings utility. Please refer to the MAPS Core user manual for more information.

3 System Management & Configuration

The PXES-2596 chassis provides advanced system monitoring and control. Chassis conditions, including internal temperature, fan speed, and DC voltage can all be monitored via ADLINK ChassisWatch — a Windows based utility for ADLINK PXIe chassis monitoring and configuration.

Communication with the chassis monitoring control unit is available using an embedded controller, such as the ADLINK PXIe-3987, via ADLINK ChassisWatch to access the SMBus located on the system slot (1st slot).

3.1 ChassisWatch

3.1.1 Chassis Status Monitor

Chassis conditions, including internal temperature, fan speed, and DC voltage can all be monitored by ChassisWatch running on an embedded PXI system controller or remote PC.

3.1.2 Smart Fan

When the Fan switch on the rear panel is set to AUTO, fans run at different speeds based on the measured temperature.

No target temperature needs to be set on PXES-2596, as it uses multiple fixed stages to control the fan speed, as shown in the table below.

Stage	Thermal sensor reading temperature		Corresponding PWN Duty (%)
Event	Move to next stage	Return to last stage	
1	55°C / 131°F	N/A	30
2	65°C / 149°F	51°C / 124°F	40
3	73°C / 163°F	61°C / 142°F	60
4	79°C / 174°F	69°C / 156°F	80
5	N/A	75°C / 167°F	100

Appendix A - Troubleshooting and Maintenance

This Appendix describes basic troubleshooting techniques, as well as instructions for the maintenance of the PXES-2590 chassis.

A.1 Installation Problems

Inability to start the system frequently results from incorrect installation of the system controller, peripheral modules, and other components. Before starting the system, please ensure that:

- ▶ The system controller is properly installed and secured
- ▶ All peripheral modules are properly seated on the slots
- ▶ All cables are properly connected to the system controller and peripheral modules
- ▶ All installed peripheral modules are compatible for use in the chassis
- ▶ The power cord is securely plugged into the chassis power connector and power outlet/wall socket/power strip

If the system fails to start when all installation conditions are met, remove all installed peripheral modules and try again. If the system starts normally, install one peripheral module at a time followed by powering up. You may also try installing the modules into different slots until the desired result is obtained.

A.2 Basic Troubleshooting

Problem	Ensure that:
System fails to power up	▶ The power cord is securely plugged into the chassis power connector and wall socket/power strip ▶ The wall socket/power strip is live ▶ The main power switch on the back of the chassis is turned on ▶ The standby power button on the chassis front panel is turned on
No video output in the external display	▶ The external display is functioning properly ▶ Display settings support external video.
Power LED (blue) is blinking	▶ There is no short circuit by removing all PXI modules (PXI controller and peripheral modules) If the signal persists, contact your dealer for further assistance
Fan LED (green) is blinking	▶ The fan is unobstructed If the signal persists, contact your dealer for further assistance.
Temperature LED (amber) is blinking	▶ Airflow from the outlet apertures is unobstructed and steady; if not, ensure that adequate clearance for the intake apertures is provided If the temperature of exhausted air is normal (below 50°C) but the temperature LED is still blinking, contact your dealer for further assistance.

A.3 Maintenance

1. Handling the Chassis

The PXES-2596 is designed for both rack-mount and benchtop use. When transporting or carrying the chassis, it is recommended that the handle be used, being designed to support the weight of the chassis for superior portability and balance.

The PXES-2596 weighs 11 kg. Please be careful when moving the chassis to avoid any possible injury.

2. Cleaning the Exterior

Make sure that the system is turned off before cleaning the chassis exterior. Wipe the exterior with a clean cloth starting from areas that easily accumulate dust or dirt such as the area in and around the chassis and power supply air intake apertures.

3. Power Requirements

Make sure that the power cord is in good condition before plugging it into the system. It is important to check the reliability of the power source. The PXES-2596 power supply is capable of handling 100 to 240 V AC within the 50 Hz to 60 Hz range. Do not connect the PXES-2596 to an already overloaded circuit.

Safety Instructions

Read and follow all instructions marked on the product and in the documentation before you operate your system. Retain all safety and operating instructions for future use.

- Please read these safety instructions carefully.
- Please keep this User's Manual for later reference.
- Read the specifications section of this manual for detailed information on the operating environment of this equipment.
- When installing/mounting or uninstalling/removing equipment, turn off the power and unplug any power cords/cables.
- To avoid electrical shock and/or damage to equipment:
 - Keep equipment away from water or liquid sources.
 - Keep equipment away from high heat or high humidity.
 - Keep equipment properly ventilated (do not block or cover ventilation openings).
 - Make sure to use recommended voltage and power source settings.
 - Always install and operate equipment near an easily accessible electrical socket-outlet.
 - Secure the power cord (do not place any object on/over the power cord).
 - Only install/attach and operate equipment on stable surfaces and/or recommended mountings.
 - If the equipment will not be used for long periods of time, turn off and unplug the equipment from its power source.
- Never attempt to fix the equipment. Equipment should only be serviced by qualified personnel.
- For indoor use only.
- Altitude during operation: up to 2000 m.
- Over voltage category: OVC II
- Pollution degree: 2
- Ingress protection: X0

Getting Service

Ask an Expert: <https://www.adlinktech.com/en/Askanexpert>

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