FiberPlex FPX6000 Series

Audio, Video, and Peripherals over IP Gateway

User Manual

CE

This is a Class A device and is not intended for use in a residential environment.

REGULATORY MODEL NUMBER: FP101ED4

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Part Number: **50000137, Rev. A**
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Trademark Statement

Patton is a registered trademark of Patton Electronics Company in the United States and other countries. *FiberPlex* is a trademark licensed to Patton Electronics Company. All other trademarks presented in this document are the property of their respective owners.

Warranty Information

The software described in this document is furnished under a license and may be used or copied only in accordance with the terms of such license.

Patton Electronics warrants all FiberPlex devices to be free from defects, and will—at our option—repair or replace the product should it fail within one year from the first date of the shipment.

This warranty is limited to defects in workmanship or materials, and does not cover customer damage, abuse or unauthorized modification. If the product fails to perform as warranted, your sole recourse shall be repair or replacement as described above. Under no condition shall **Patton Electronics** be liable for any damages incurred by the use of this product. These damages include, but are not limited to, the following: lost profits, lost savings and incidental or consequential damages arising from the use of or inability to use this product. **Patton Electronics** specifically disclaims all other warranties, expressed or implied, and the installation or use of this product shall be deemed an acceptance of these terms by the user.

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About this guide

This guide describes the FiberPlex™ FPX6000 Series Audio, Video, and Peripherals over IP Gateway hardware installation and basic configuration.

This manual supports the following models:

- FPX6000R/A3/PD48
- FPX6000T/A3/PD48

Audience

This guide is intended for the following users:

- Operators
- Installers
- Maintenance technicians

Structure

This guide contains the following chapters and appendices:

- Chapter 1 on page 10 provides information about FPX6000 features and capabilities
- Chapter 2 on page 15 describes FPX6000 hardware
- Chapter 3 on page 24 describes how to install the FPX6000 hardware
- Chapter 4 on page 26 covers maintaining and servicing the device
- Chapter 5 on page 29 contains information on contacting Patton technical support for assistance
- Appendix A on page 32 contains compliance and regulatory information for the device
- Appendix B on page 35 contains specifications for the device

For best results, read the contents of this guide *before* you install the device.

Precautions

Notes and warnings, which have the following meanings, are used throughout this guide to help you become aware of potential extender problems. *Warnings* are intended to prevent safety hazards that could result in personal injury.

Note Highlights a helpful tip to help the user work more efficiently.

The alert symbol and IMPORTANT heading calls attention to important information.

The shock hazard symbol and WARNING heading indicate a potential electric shock hazard. Strictly follow the warning instructions to avoid injury caused by electric shock.

Safety when working with electricity

The FiberPlex device contains no user serviceable parts, and is not be opened by the user. The equipment shall be returned to Patton Electronics for repairs or repaired by qualified service personnel.

For AC powered units, ensure that the power cable used meets all applicable standards for the country in which it is to be installed, and that it is connected to a wall outlet which has earth ground.

Do not work on the system or connect or disconnect cables during periods of lightning activity.

Safety when working near hot surfaces

This warning label on the device means that the surface of the device may be hot. To avoid personal injury, be careful when touching the device while it is operating.

General observations

- Clean the case with a soft slightly moist anti-static cloth
- Place the unit on a flat surface and ensure free air circulation
- Avoid exposing the unit to direct sunlight and other heat sources
- Protect the unit from moisture, vapors, and aggressive liquids

Chapter 1 General Information

Chapter contents

FiberPlex FPX6000 Series overview

Patton's FPX6000 (see figure 1 and figure 2) enables 8 audio channels (transmit or receive) and 1 HDCP (encryption support) video channel (transmit or receive) to be easily inserted onto an existing Ethernet network backbone without suffering the performance issues and management difficulties associated with audio and video over IP.

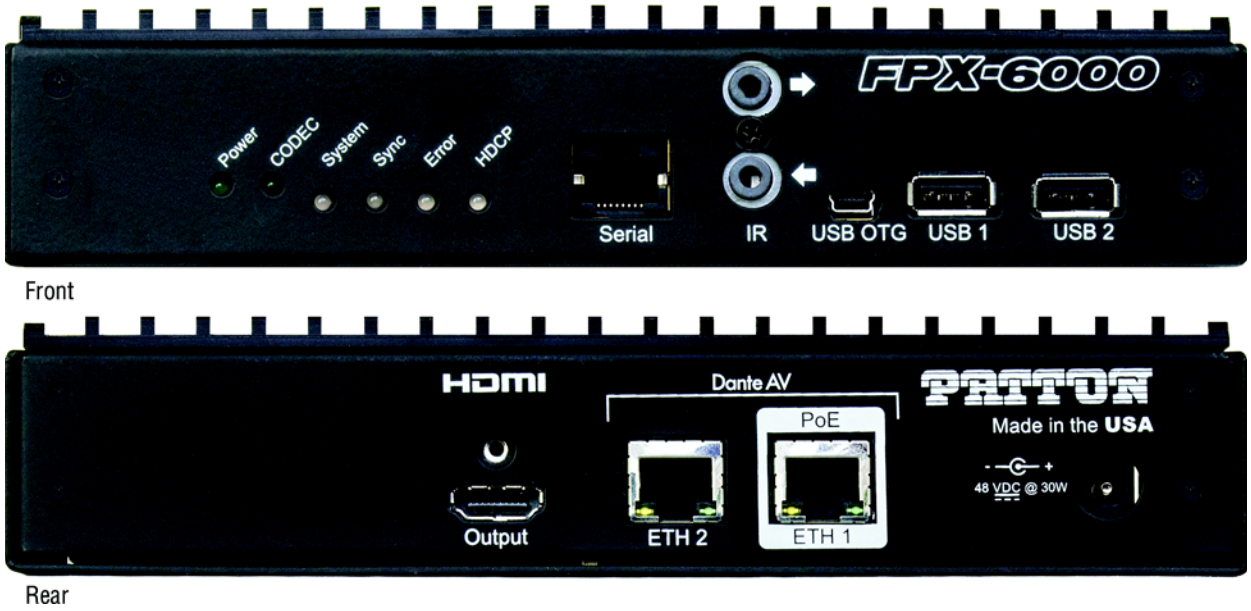

Figure 1. FPX6000R/A3/PD48—Decoder—Rx Device

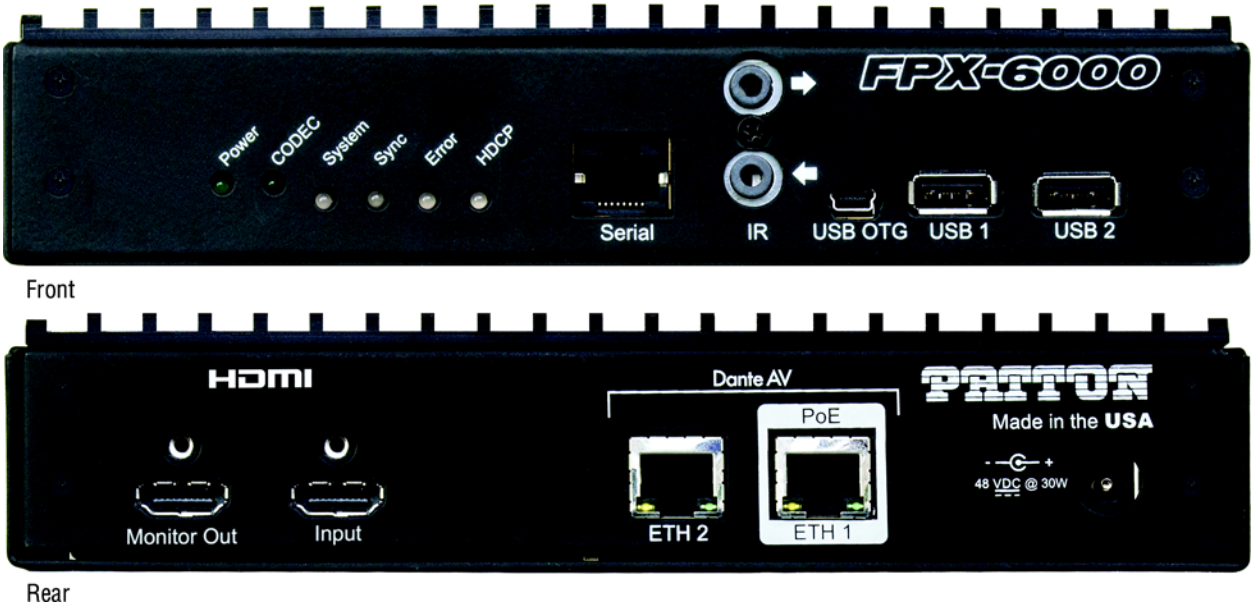

Figure 2. FPX6000T/A3/PD48—Encoder—Tx Device

Dante's sub-microsecond synchronization of audio and video eliminates alignment problems-this is accomplished by having a single network clock for the entire system in sync regardless of the number of endpoints, transporting audio and video with low deterministic latency.

In addition to providing high performance audio and video over IP, the FPX6000 is loaded with peripheral connectivity options including USB2.0 and USB OTG for keyboard and mouse, infrared for remotes, even serial signals for PTZ control and more…all over IP!

The Dante Controller makes routing, controlling and monitoring your audio and video traffic and endpoints as simple as clicking a button. Figure 3 is a typical application for the FPX6000.

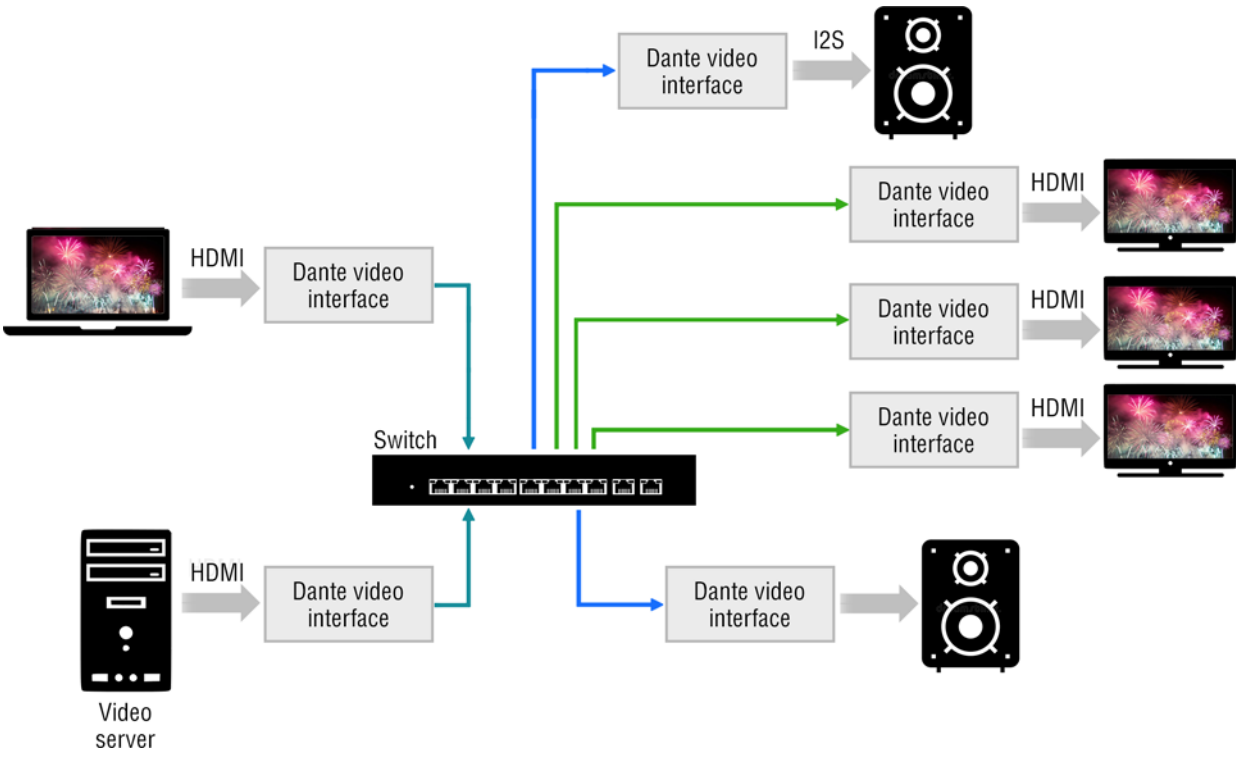

Figure 3. Typical AV distribution application

Product software features

The FPX6000 Series utilizes Dante Controller, which includes the Dante Updater. Dante Updater connects to a library of firmware updates from manufacturers of Dante-enabled products, including Patton, and makes it easy to keep your products up-to-date.

Devices are automatically discovered and correlated with the proper firmware for error-free deployment of updates. With Dante Updater, you can quickly and safely take advantage of all the latest features and capabilities of Dante and Dante AV as well as Patton's product updates.

Additional key features

- View all Dante-enabled audio devices and their channels on the network
- View and edit device clock and network settings

- Route audio between devices, and view the state of existing audio routes
- Rename devices and channels using your own friendly names
- View comprehensive, configurable event logs
- Check for and deploy Dante firmware updates
- Save and reapply audio routing presets
- Edit presets offline, and apply as configurations for new network deployments
- Change sample rates and clock settings
- View multicast bandwidth across the network
- Customize the receive latency (latency before playout)
- View transmit and receive bandwidth for each device
- View device performance information, including latency stats, clock stability stats and packet errors
- Lock and unlock devices
- Filter device lists by name, sample rate, latency and other parameters

Product hardware features

Listed below are a few of the most important capabilities of the FPX6000 series. For more detailed specifications, go to appendix B, "Specifications" on page 35.

- Full support of Dante audio and video protocols
- 1-Gbps network interface
- Support for audio and video unicast and multicast
- 15 audio flows
- 1 video flow
- 32-bit wide video interface capable of processing code streams up to 800 Mbps
- HDCP 2.3 encryption over IP with secure EEPROM for key storage
- 8 audio channels from 44.1 kHz to 192 kHz
- Tuneable audio delay to facilitate lip-sync control
- Firmware updateable over the network
- Supports updates for the control processor and codec
- Supported by Dante Controller
- Custom plug-in support in Dante Controller for configuring HDMI and codec components
- Extended Dante API for video and ancillary channels

Package contents

- Transmitter package contents include the FPX6000T/A3/PD48

- Receiver package contents include the FPX6000R/A3/PD48

Optional accessories

- _____ - VESA Mount
- _____ - Single unit ½ space 1U Rackmount kit
- _____ - Dual unit single space 1U Rackmount kit
- _____ - Power Supply

Chapter 2 Hardware Description

Chapter contents

Front panel

Front panel ports and LEDs of the FPX6000 Series AV-over-IP Gateway are shown in figure 4 and described in table 1.

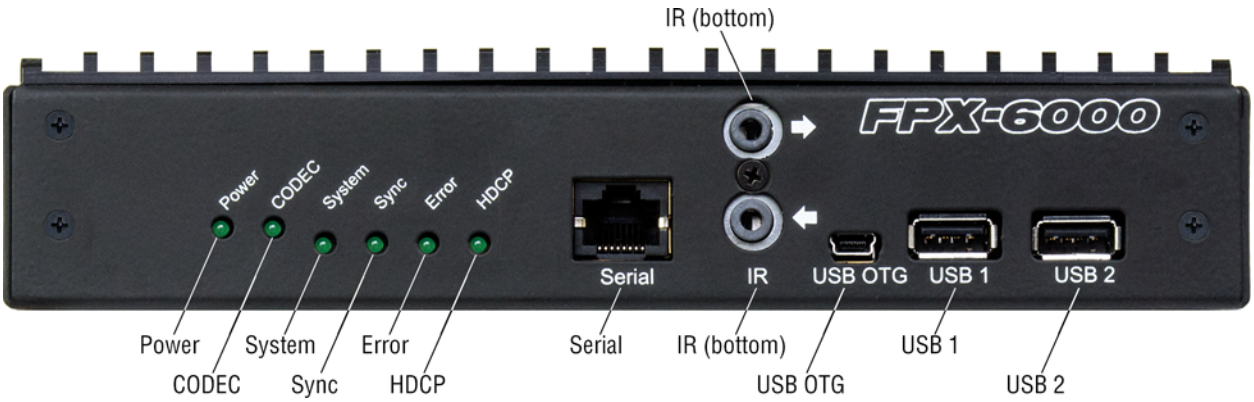

Figure 4. Front panel ports and LEDs (same for Tx and Rx models)

Table 1. Front panel ports and LED descriptions

LEDs/Ports	Description
Power	**Green**: Power is detected
	Off: Power is **not** detected
CODEC	**Green**: Indicates the CODEC is active
	Off: CODEC is **not** active
System	**Solid Green**: All OK
	Amber: Booting up, awaiting sync
	Red: System failed to boot correctly
	Off: No power
Sync	**Solid Green**: Dante network clock slave, sync achieved
	Blinking Green: Dante Network clock master
	Amber: Syncing in progress
	Red: Error achieving sync
	Off: No Power
Error	**Solid Green**: Software running
	Blinking Green: Identify function activated
	Solid or Blinking Red: Software fault or exception
	Off: No power

Table 1. Front panel ports and LED descriptions (Continued)

LEDs/Ports	Description
HDCP	**Solid Green**: Non-HDCP unprotected video sync or source detected
	Blinking Green: HDCP protected content detected
	Solid Red: Invalid non-HDCP video sync or source
	Blinking Red: Failed HDCP negotiation
	Blinking Amber: HDCP negotiation in progress
	Off: No power
Serial	RJ45 port for PTZ control input (RS422/VISCA)
IR (Top)	Output to emitter: 3mm for infrared control over IP
IR (Bottom)	Input from receiver: 3mm for infrared control over IP
USB OTG	Mini-USB OTG port for keyboard and mouse over IP
USB 1	USB 2.0 Type A connector for keyboard and mouse over IP
USB 2	USB 2.0 Type A connector for keyboard and mouse over IP

Encoder rear panel

Rear panel ports of the FPX6000 Series Encoder are shown in figure 5 and described in table 1.

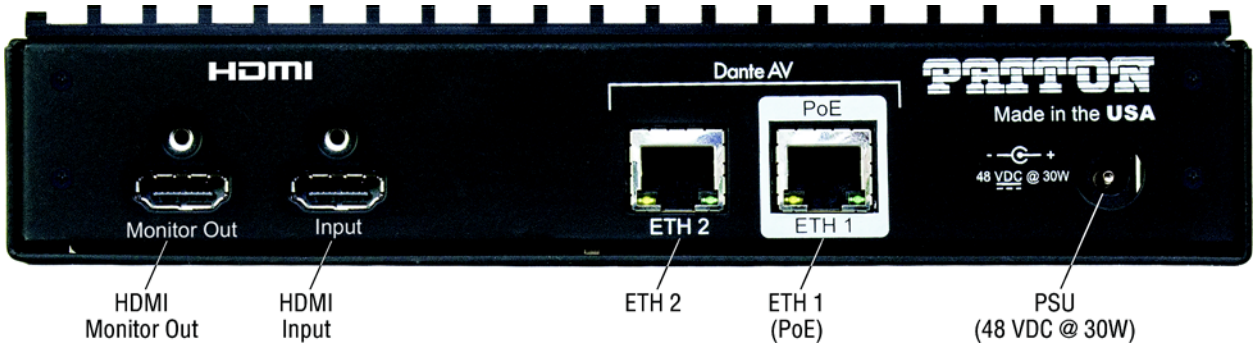

Figure 5. Encoder rear panel ports

Table 2. Encoder rear panel ports descriptions

LEDs/Ports	Description
Monitor Out	Video thru from HDMI Input
HDMI Input	HDMI 2.0/1.4b Video Source Input
ETH2	Used for Daisy Chaining devices
ETH1 (PoE)	Dante Network (Primary Connection) and PoE input
PSU	48 VDC at 30W

Decoder rear panel

Rear panel ports of the FPX6000 Series Decoder are shown in figure 6 and described in table 3.

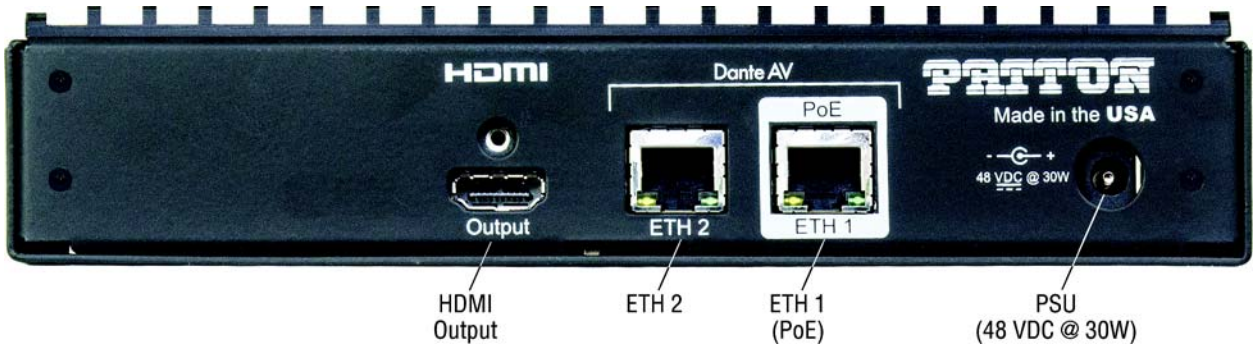

Figure 6. Decoder rear panel ports

Table 3. Decoder rear panel ports descriptions

LEDs/Ports	Description
HDMI Output	HDMI 2.0/1.4b Video Source Output
ETH2	Used for Daisy-Chaining devices
ETH1 (PoE)	Dante Network (Primary Connection) and PoE input
PSU	48 VDC at 30W

Ethernet ports

ETH2: This port can be used to daisy-chain multiple devices, or as a "switch" port, allowing for additional network connectivity (projector, camera, etc). The port does not support PoE.

ETH1 (PoE): This is the Primary Dante Network Connection, and is capable of accepting PoE. Suggested PoE power is 802.3bt Type 3 PSE.

Cabling

For proper performance, always use HDMI 2.0-compliant, premium certified HDMI cables.

Power inputs—PoE and external PSU

PoE: 802.3bt Suggested. 30W minimum

External PSU: Not included. 48VDC @ 30W. Patton Part #_____

Chapter 3 Hardware Installation

Chapter contents

Installation steps

Installation consists of the following:

1. Remove the device from the packing container.
2. Install the FPX6000 onto a mounting surface:
   - For mounting on a VESA-compliant TV or monitor, refer to section "Installing the VESA mounting bracket on a TV or monitor" on page 21.
   - For mounting the device in a 19-inch rack, refer to section "Rack mounting" on page 23.
   - For mounting on a wall, refer to section "Wall mounting" on page 24.
   - For mounting on a desktop or similar flat, sturdy surface, refer to section "Desktop mounting" on page 25
3. Refer to section "Installing cables" on page 25 to connect cables to the device.
4. When all connections are made and the LED indicators show normal operation, the installation is complete.

Installing the VESA mounting bracket on a TV or monitor

Do the following:

Note Mounting holes in the VESA mounting bracket align with the VESA standard used by most TV and display manufacturers. The mount is compatible with 75, 100 or 200 mm VESA hole patterns (see figure 7).

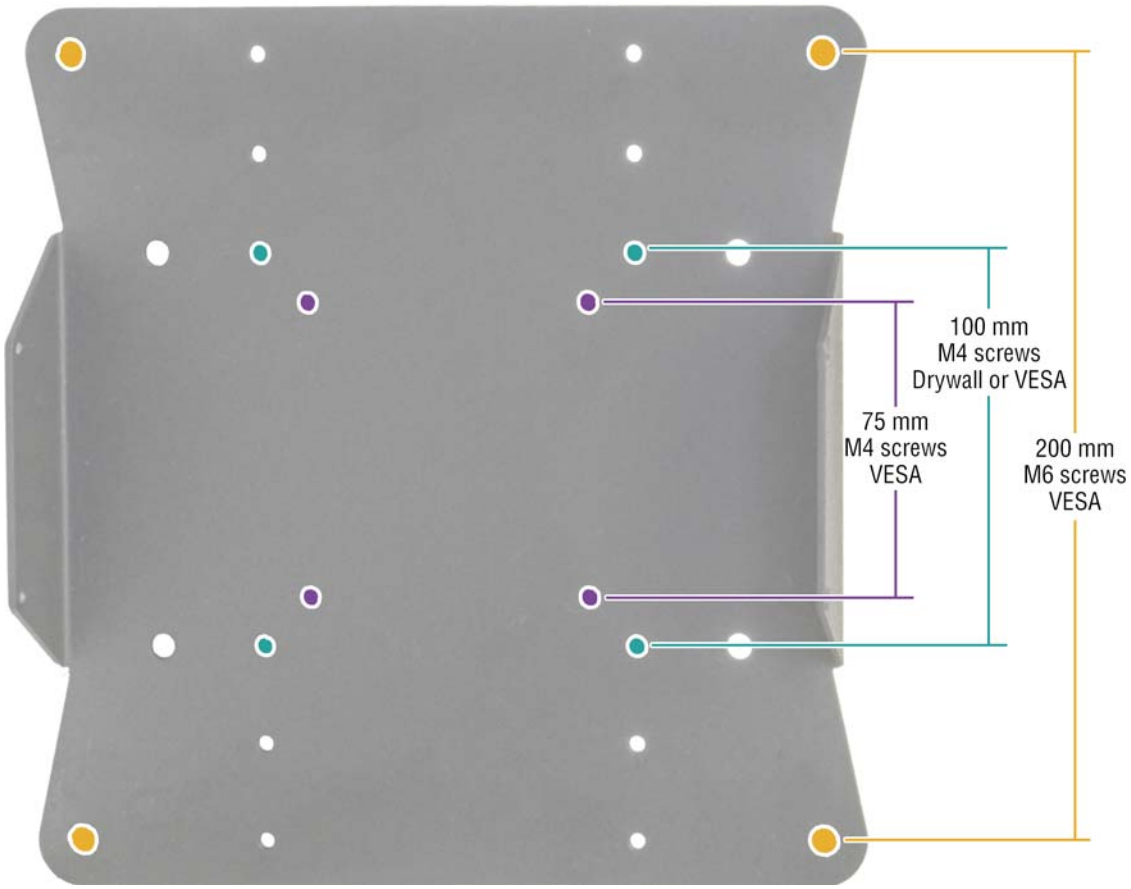

Figure 7. VESA mounting bracket holes

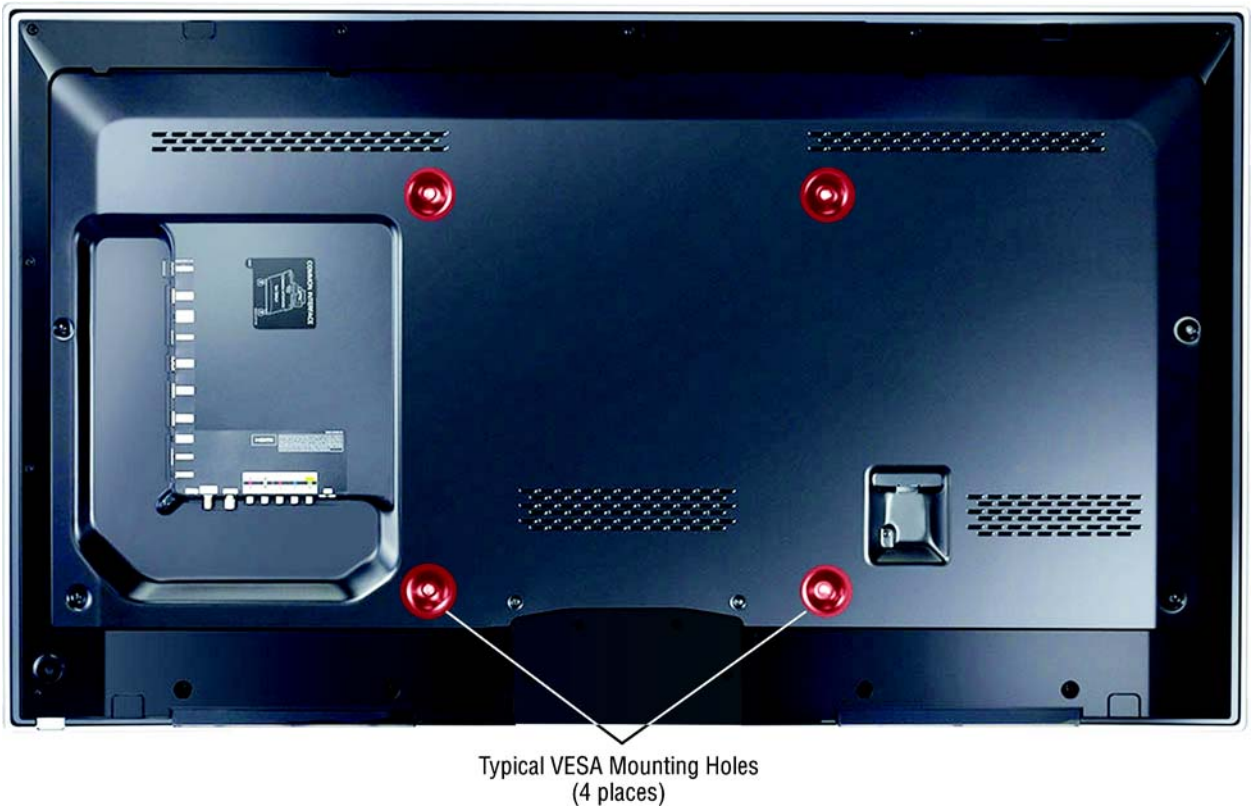

Figure 8. VESA mounting holes example

5. Locate the VESA mounting holes on the rear panel of the TV or monitor (see figure 8).
6. Install the mounting bracket using the screws recommended in the manual that came with the TV or monitor.
7. Place the FPX6000 in the bracket as shown in figure 9 on page 23.
8. Use the 4 mounting screws included with the bracket to secure the FPX6000 in the bracket (see figure 9 on page 23).

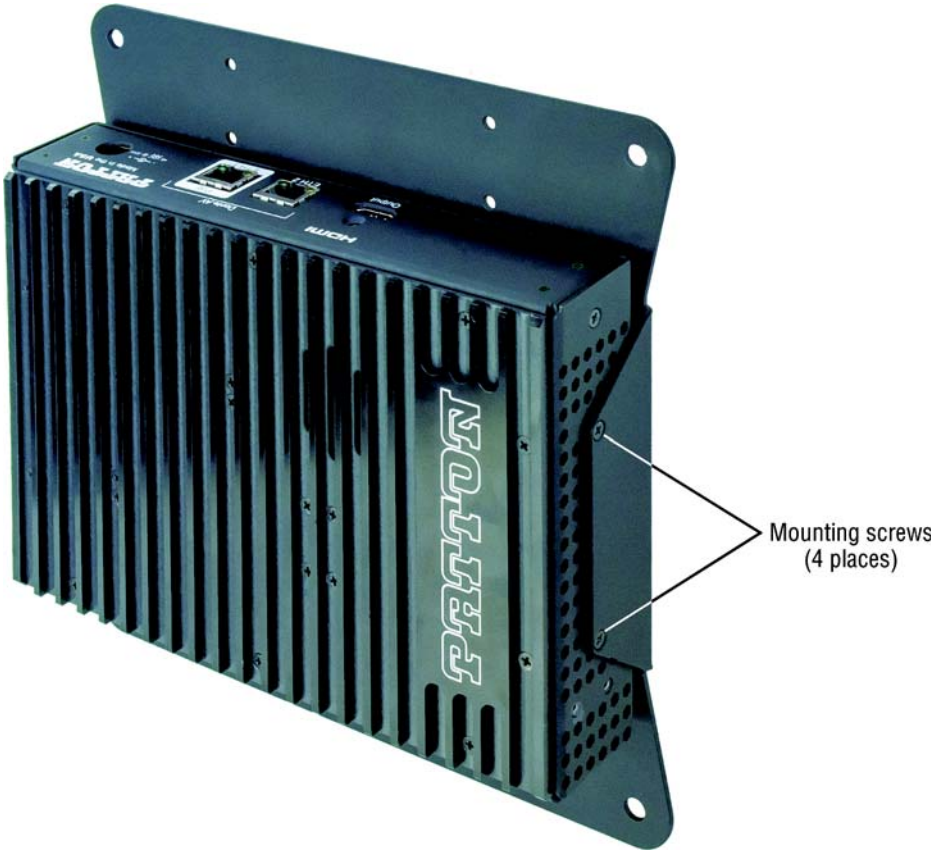

Figure 9. FPX6000 installed in VESA mounting bracket

The FPX6000 is installed in the VESA mounting bracket. Refer to section "Installing cables" on page 25.

Rack mounting

Do the following to install up to two devices in a 19-inch rack using the rack-mounting bracket (see figure 10):

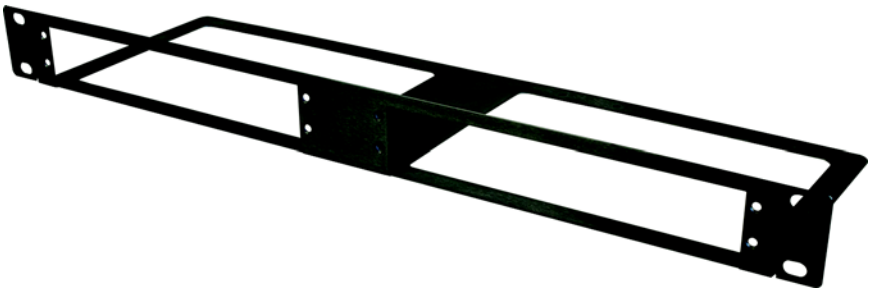

Figure 10. Rack-mounting bracket

1. Place an FPX6000 at one of the mounting locations on the rack-mounting bracket as shown in figure 11. The front panel should be visible through the front of the bracket as shown in figure 11.

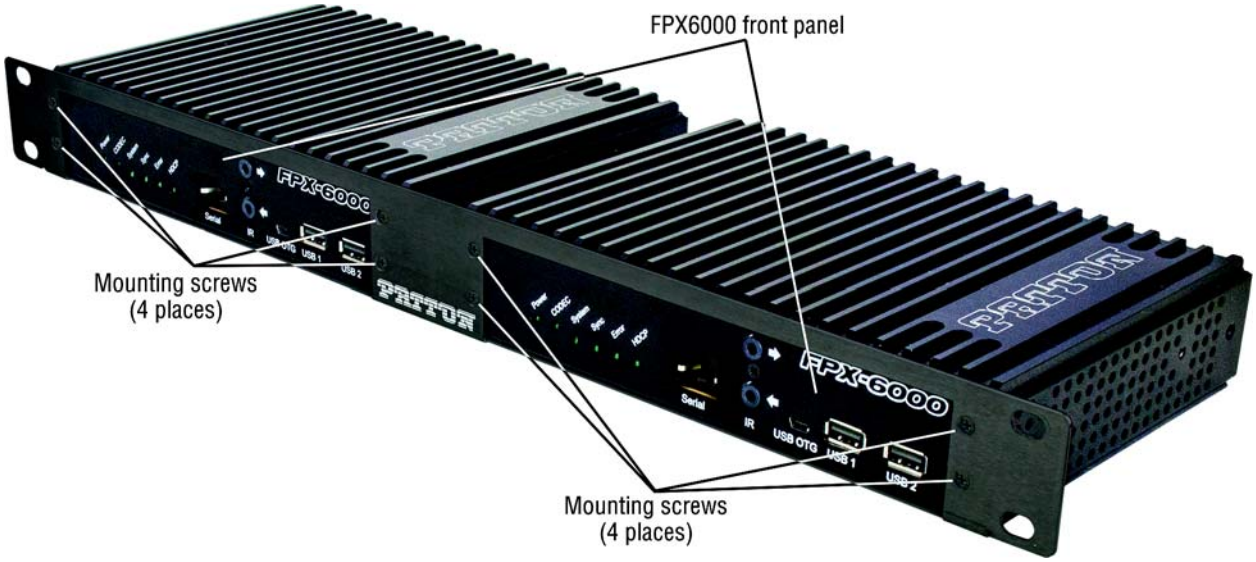

Figure 11. Two FPX6000 devices installed in a rack-mounting bracket

2. Use 4 mounting screws included with the bracket to secure the FPX6000 to the bracket (see figure 11).
3. If there is not another FPX6000 to install in the bracket, go to step 4. Otherwise, use the remaining 4 mounting screws to secure the second FPX6000 to the bracket (see figure 11).
4. Place the rack mounting bracket at the desired location in the rack (verify that the bracket is level), then secure it to the rack using 4 rack screws.

The device or devices are installed in the rack. Refer to section "Installing cables" on page 25.

Wall mounting

Do the following to mount the device on a wall using the VESA mounting bracket (see figure 7 on page 21):

1. Place the VESA bracket at the desired location where it will be installed. Using the 100=mm holes in the bracket as a template (see figure 7 on page 21), make a mark inside each of the 4 holes where the mounting hardware for hanging the device will be installed.
2. Install the bracket using mounting hardware appropriate for the wall material.
3. Place the FPX6000 in the bracket as shown in figure 9 on page 23.
4. Use the 4 mounting screws included with the bracket to secure the FPX6000 in the bracket (see figure 9 on page 23).

The device is installed. Refer to section "Installing cables" on page 25.

Desktop mounting

Place the FPX6000 on a desktop or similar sturdy, flat surface. Allow sufficient space at the rear of the device for cable connections. Additionally, you should consider the need to access the unit for future upgrades and maintenance.

Do not stack multiple devices directly on top of one another, and do not place items on top of the device. If you will be installing equipment above the device, leave at least 2 inches (5 cm) of clearance between the devices.

Furthermore, leave at least 2 inches (5 cm) to the left, right, front, and rear of the device for proper ventilation.

The device is installed. Refer to section "Installing cables".

Installing cables

Do the following:

1. Install cables on the front panel of the FPX6000 (see figure 4 on page 16) as follows:
   - If you are connecting a PTZ control input (RS422/VISCA), attach the cable to the Serial port.
   - If you are connecting a keyboard and mouse equipped with a mini-USB cable, attach it to the USB OTG port.
   - If you are connecting a keyboard and mouse equipped with a USB 2.0 Type A cable, attach it to USB port 1 or 2.
2. If you are installing an FPX6000 Decoder, go to step 3. Otherwise, install cables on the rear panel of the FPX6000 Encoder (see figure 5 on page 17) as follows:
   - Connect a monitor to the Monitor Out port
   - Connect an HDMI 2.0/1.4b video source input to the HDMI Input port
   - Connect the Dante Network Ethernet/PoE cable to the ETH1 port.
   - If you are daisy-chaining multiple devices connect the Ethernet cable to the ETH2 port.
   - Connect the PSU cable to the 48 VDC at 30W port
   - Go to step 4.
3. Install cables on the rear panel of the FPX6000 Decoder (see figure 6 on page 18) as follows:
   - Connect the HDMI 2.0/1.4b video source output to the HDMI Output port
   - Connect the Dante Network Ethernet/PoE cable to the ETH1 port.
   - If you are daisy-chaining multiple devices, connect the Ethernet cable to the ETH2 port.
   - Connect the PSU cable to the 48 VDC at 30W port
4. After the PSU cable has been connected to the 48 VDC at 30W port, and/or the PoE input has been connected to ETH1, verify that the green Power LED (see figure 4 on page 16) is lit. Refer to table 1 on page 16 for LED light indications.

Congratulations! The device or devices have been installed.

Chapter 4 Maintenance and Service

Chapter contents

Maintenance

Clean the device with a dry soft cloth.

Service

Do not open the device for any reason. Contact Patton for service (see Chapter 6 "Contacting Patton for Assistance" on page 29).

Chapter 5 Contacting Patton for Assistance

Chapter contents

Introduction

This chapter contains the following information:

- "Contact information"—describes how to contact Patton technical support for assistance.
- "Warranty Service and Returned Merchandise Authorizations (RMAs)"—contains information about the warranty and obtaining a return merchandise authorization (RMA).

Contact information

Patton Electronics offers a wide array of free technical services. If you have questions about any of our other products we recommend you begin your search for answers by using our technical knowledge base. Here, we have gathered together many of the more commonly asked questions and compiled them into a searchable database to help you quickly solve your problems.

Contacting Patton Technical Services for Free Support

REGION	North America	Western Europe	Central & Eastern Europe
Location	**Maryland, USA**	**Bern, Switzerland**	**Budapest, Hungary**
Time Zone	EST/EDT UTC/GMT - 4/5 hours	CET/CEDT UTC/GMT + 1/2 hours	CET/CEDT UTC/GMT + 1/2 hours
Business Hours	Monday-Friday 8:00am to 5:00pm	Monday-Friday 09:00 to 12:00 13:30 to 17:30	Monday-Friday 8:30 to 17:00
Email	support@patton.com	support@patton.com	support@patton.com
Phone	+ 1 301 975 1007	+41 31 985 25 55	+36 439 3835
Fax	+1 301 869 9293	+41 31 985 2526	

Warranty Service and Returned Merchandise Authorizations (RMAs)

Patton Electronics is an ISO-9001 certified manufacturer and our products are carefully tested before shipment. All of our products are backed by a comprehensive warranty program.

Note If you purchased your equipment from a Patton Electronics reseller, ask your reseller how you should proceed with warranty service. It is often more convenient for you to work with your local reseller to obtain a replacement. Patton services our products no matter how you acquired them.

Warranty coverage

Our products are under warranty to be free from defects, and we will, at our option, repair or replace the product should it fail within one year from the first date of shipment. Our warranty is limited to defects in workmanship or materials, and does not cover customer damage, lightning or power surge damage, abuse, or unauthorized modification.

Out-of-warranty service

Patton services what we sell, no matter how you acquired it, including malfunctioning products that are no longer under warranty. Our products have a flat fee for repairs. Units damaged by lightning or other catastrophes may require replacement.

Returns for credit

Customer satisfaction is important to us, therefore any product may be returned with authorization within 30 days from the shipment date for a full credit of the purchase price. If you have ordered the wrong equipment or you are dissatisfied in any way, please contact us to request an RMA number to accept your return. Patton is not responsible for equipment returned without a Return Authorization.

Return for credit policy

- Less than 30 days: No Charge. Your credit will be issued upon receipt and inspection of the equipment.
- 30 to 60 days: We will add a 20% restocking charge (crediting your account with 80% of the purchase price).
- Over 60 days: Products will be accepted for repairs only.

RMA numbers

RMA numbers are required for all product returns. You can obtain an RMA by doing one of the following:

- Completing a request on the RMA Request page in the *Support* section at **www.patton.com**
- By calling **+1 (301) 975-1007** and speaking to a Technical Support Engineer
- By sending an e-mail to **returns@patton.com**

All returned units must have the RMA number clearly visible on the outside of the shipping container. Please use the original packing material that the device came in or pack the unit securely to avoid damage during shipping.

Shipping instructions

The RMA number should be clearly visible on the address label. Our shipping address is as follows:

Patton Electronics Company
RMA#: xxxx
7622 Rickenbacker Dr.
Gaithersburg, MD 20879-4773 USA

Patton will ship the equipment back to you in the same manner you ship it to us. Patton will pay the return shipping costs.

Appendix A **Compliance Information**

Chapter contents

Regulatory Information

EMC Directive:

- EMC: CE, FCC, EN 55032/24
- EMI: CISPR 32, FCC Part 15B Class A
- EMS: IEC 61000-4-2 ESD: Contact: 6KV; Air: 8KV
- IEC 61000-4-4 EFT: Power: 2KV; Signal: 2KV
- IEC 61000-4-5 Surge: Power: 2KV; Signal: 2KV

Low Voltage Directive:

- Safety: LVD (EN60950-1)
- Vibration: EN 60068-2-6

Environmental:

- Shock: EN 60068-2-27
- Free Fall: EN 60068-2-32

Radio and TV Interference (FCC Part 15)

This equipment has been tested and found to comply with the limits for a Class-A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received; including interference that may cause undesired operation:

CE Declaration of Conformity

This device is in compliance with the essential requirements and other relevant provisions of Directive 2004/30/EC relating to electromagnetic compatibility. Council Directive 2014/35/EU on the approximation of the laws of the member states relating to electrical equipment designed for use within certain voltage limits. The Declaration of Conformity may be obtained from Patton Electronics, Inc at www.patton.com/certifications.

The safety advice in the documentation accompanying this device shall be obeyed. The conformity to the above directive is indicated by CE mark on the device.

Authorized European Representative

Martin Green
Eurolink Europe Compliance Limited
25 Herbert Place
Dublin D02 AY86
Republic of Ireland

Service

All warranty and non-warranty repairs must be returned freight prepaid and insured to Patton Electronics. All returns must have a Return Materials Authorization number on the outside of the shipping container. This number may be obtained from Patton Electronics Technical Services at:

- Tel: +1 (301) 975-1007
- Email: **support@patton.com**
- URL: **http://www.patton.com**

Packages received without an RMA number will not be accepted.

Appendix B Specifications

Chapter contents

Audio

- Up to eight channels at 44.1, 48, 88.2 or 96 kHz. HDCP sourced audio channels limited to 48 kHz
- High-quality, low jitter with on-board clock generator for audio
- Up to 8192 samples (170ms @ 48kHz) audio buffering per channel (receiver only)
- Built-in 8-channel asynchronous sample rate converter (receiver only)
- Audio transport formats:
  - Dante Audio over IP
  - AES67 RTP
- Bit depths: 24, 16, and 32 bits per audio sample
- Sample rate pull-up/down (+4.1667, +0.1, -0.1, and -4.0%)

Network

- 2 x 10/100/1000BaseTX:
  - Dante Network Port
  - Switch or daisy-chain
- PoE (PD-powered device)
- Hardware time-stamping, supporting sample-accurate playback
- Audio Flows In/Out: Up to 8x8 (unicast or multicast)
- Video Flows In/Out: 1x1 (unicast or multicast)

Video

- 1 HDMI 2.0/1.4b input (T model) or output (R model)
- Latency: 8-ms delay from HDMI input to HDMI output for a 60-Hz video
- Built-in HDCP encryption/decryption for video
- HDCP 2.2 input/output, HDCP 2.3 over network
- 800 Mbps recommended maximum bit rate
- Accepts any bit stream from external codec
- Video transport format: Dante Video over IP
- Up to 4K60 input/output
- HDR support
- HDMI monitor output loop-through (T model)
- JPEG2000

Control interfaces (peripherals)

- 2 x USB 2.0 Type A for keyboard and mouse
- USB On The Go (OTG) for keyboard and mouse
- RS422/VISCA for PTZ camera input control (RJ45)
- IR 3mm infrared control over IP

Front panel status LEDs

- Power
- CODEC
- Dante software/system
- Clock synchronization (master, slave, progress)
- Error
- HDCP status

Software

- Full Dante API support
- Support for HDMI management
- Support for fully validated HDCP management
- EDID management
- Serial/IR/USB HID/CEC over IP support

Power

- 48 VDC (0.75A) input
- 802.3bt (60–90W)

Physical

- Dimensions: 9.15L x 5.72D x 1.75H inch (23.34L x 14.53D x 4.45 H cm)
- Weight: 2.85 lbs (1.29 kg)
- Operational Temperature: 32–104°F (0–40°C)

Figure 12 on page 38 shows the physical dimensions of Patton's FPX6000.

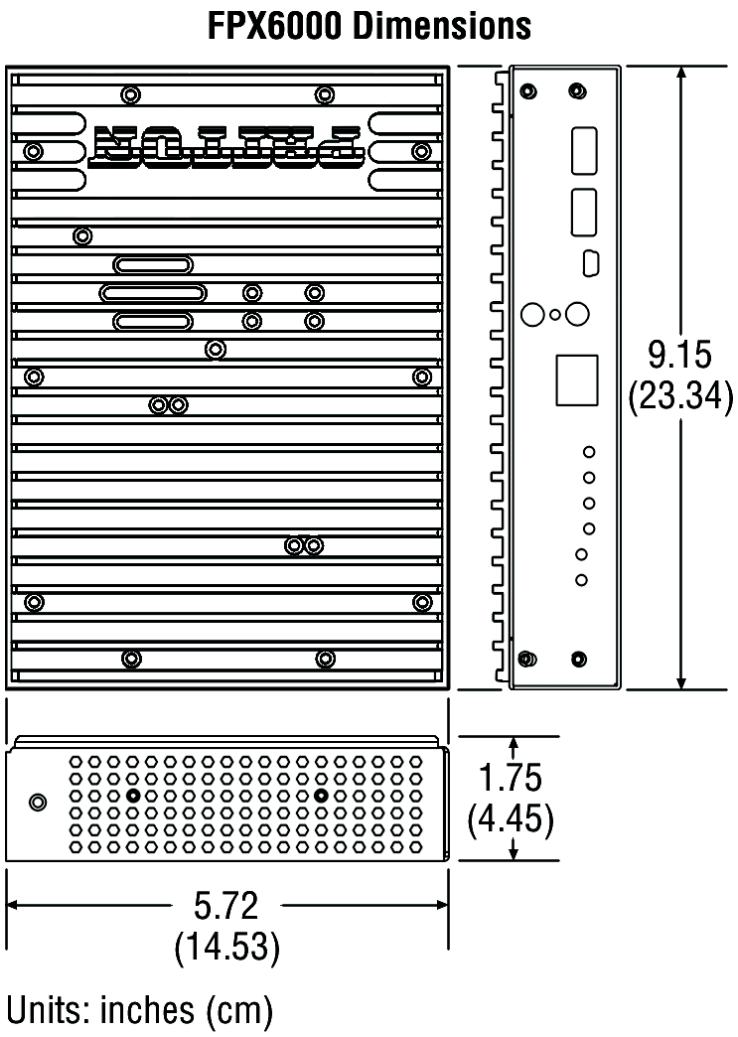

Figure 12. FPX6000 Physical Dimensions