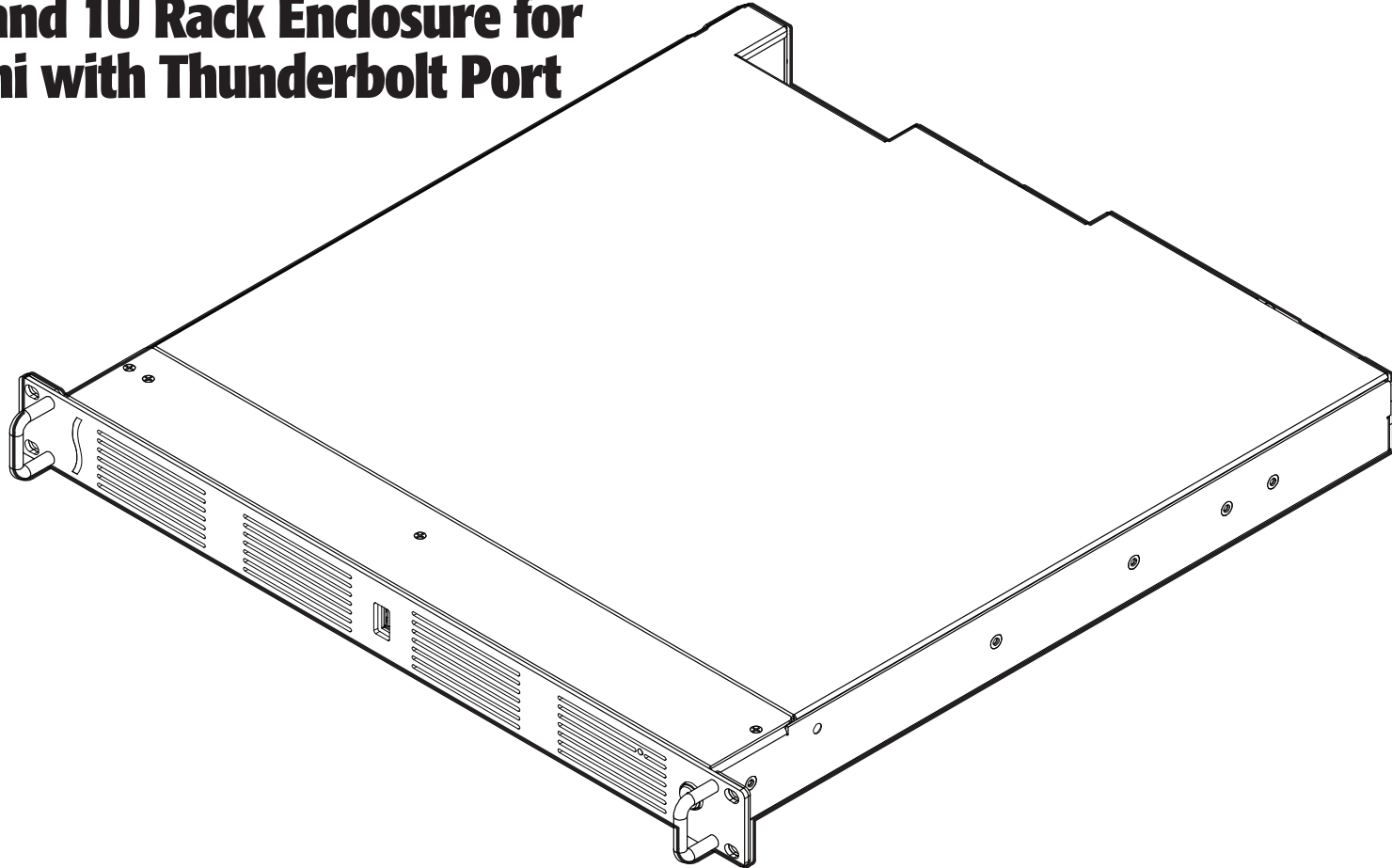


User's Guide

for xMac™ mini Server

Thunderbolt™ 2-to-PCI® Card Expansion
System and 1U Rack Enclosure for
Mac® mini with Thunderbolt Port



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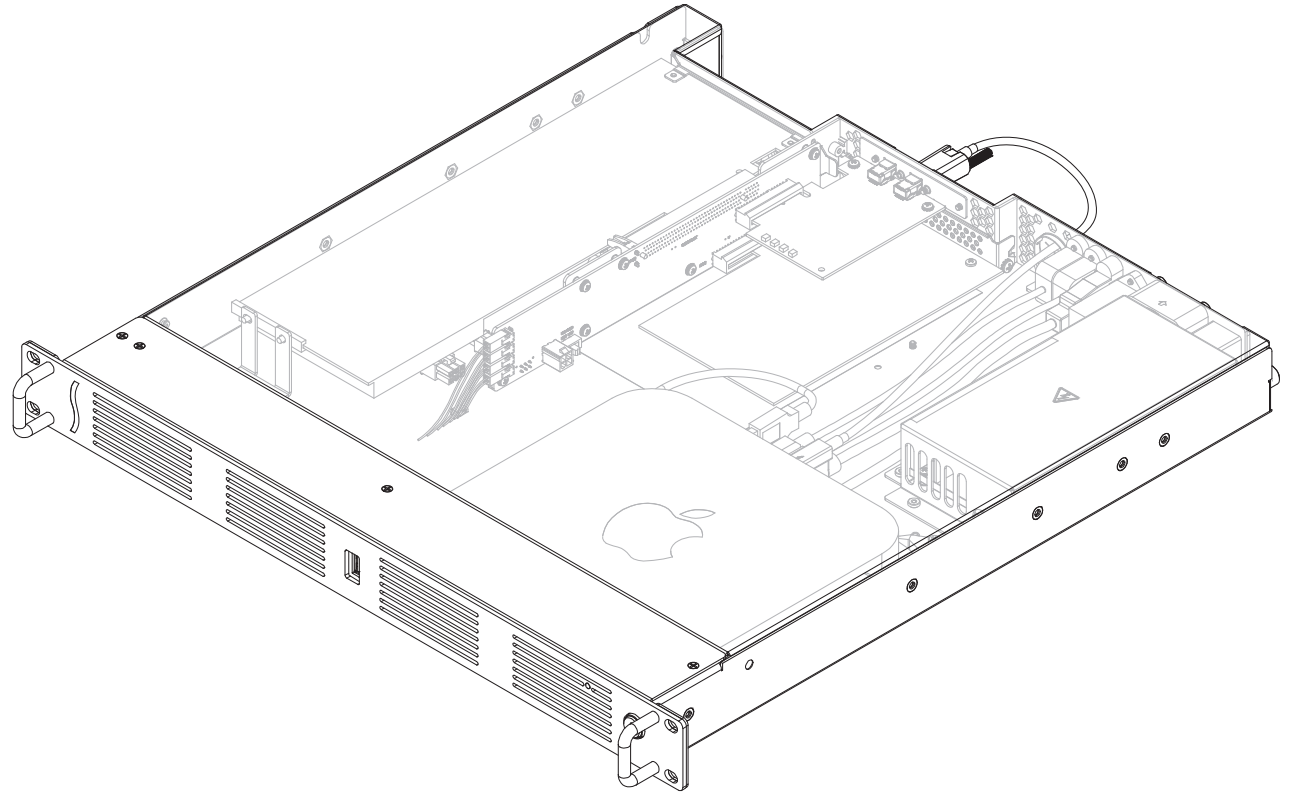
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Chapter 1 – Introduction

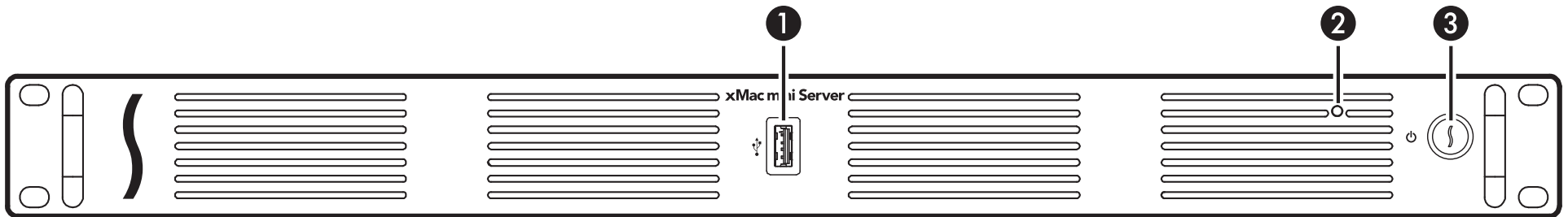
Congratulations on your purchase! xMac mini Server is a Thunderbolt 2-to-PCIe card expansion system and 1U rackmount enclosure for Mac mini with a Thunderbolt port. Through its two PCIe slots, you may connect two expansion cards to your Mac mini to expand its capabilities in ways never before possible!

xMac mini Server has numerous thoughtful design touches. The power supply and fans are user-replaceable. The front panel USB port connects to the back of the Mac mini, enabling you to connect a keyboard, mouse, or thumb drive to the computer without having to access its ports from the back. Other Mac mini interface ports are extended to the back of the chassis and mounted on the rear panel for convenient interfacing of Gigabit Ethernet, USB, and HDMI cables. The xMac mini Server's power switch turns the computer on and off, and the PCIe slots are powered on/off with the Mac mini for maximum energy savings. An opening in the front panel allows the Mac mini's power indicator to shine through. There's a central power hub for the computer and power supply for the PCIe slots, enabling you to power everything with one power cord. A Thunderbolt connector retainer clip and holes for cable ties enable you to secure all cables, keeping them tidy while avoiding accidental disconnects.

While xMac mini Server requires no drivers, the expansion cards you install do; Thunderbolt-compatible drivers to enable them to work properly through the Thunderbolt interface are required. More information on which cards are compatible with xMac mini Server is available at <http://sonnettech.com/support/charts/thunderbolt/index.html>



Chapter 2 – xMac mini Server Description



1 – USB 3.0 Port

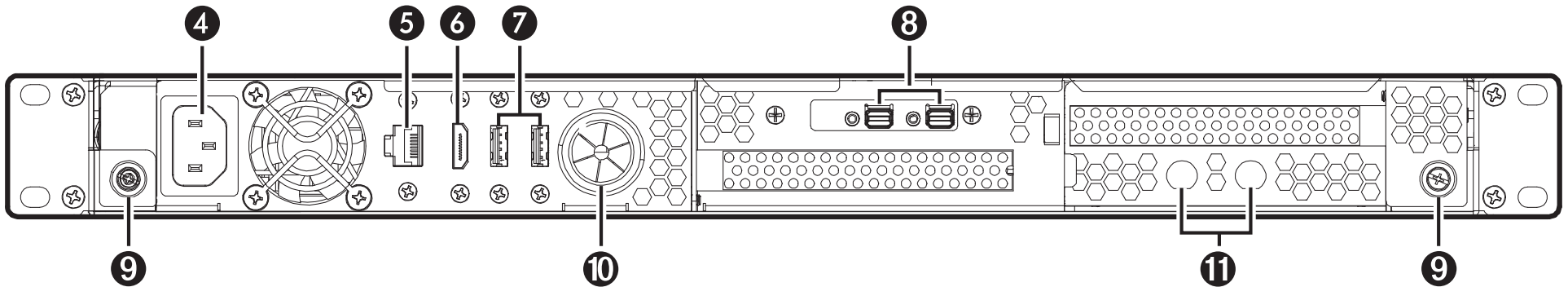
This port connects to the Mac mini through a cable attached to the front panel.

2 – Power Indicator Opening

This hole allows the Mac mini's power indicator to shine through.

3 – Power Switch

This button activates the Mac mini's power switch; the xMac mini Server's PCIe slots' power supply turns on and off along with the computer.



4 – Power Input Socket

Connect the included AC power cable here.

5 – Gigabit Ethernet Port

This RJ-45 port connects to the Mac mini through a cable attached to the back panel.

6 – HDMI Port

This port connects to the Mac mini through a cable attached to the back panel.

7 – USB 3.0 Ports

These ports connect to the Mac mini through cables attached to the back panel.

8 – Thunderbolt Ports

One port is connected to the Mac mini's Thunderbolt port with the included Thunderbolt cable, the other may be used to connect another Thunderbolt device.

9 – Top Panel Thumbscrews

Loosen these captive screws to enable the removal of the top cover, tighten the screws to secure the top cover.

10 – External Cable Passthrough

This opening allows the connection of the included Thunderbolt cable from the computer one of the Thunderbolt port on the xMac mini Server's back panel, and the connection of other cables to the Mac mini's ports or user-installed PCIe cards.

11 – BNC Connector Mounting Holes

These holes accommodate the installation of BNC connectors like those used for HD/SDI output for the RED ROCKET transcoding card.

Chapter 2 – xMac mini Server Description

1 – PCIe Slot 1 (Hidden)

This slot accepts an x8 mechanical, half-length, full-height PCIe card, and is also compatible with PCIe 3.0 and 1.1 cards.

2 – Thunderbolt Interface Card

This is installed into its own slot and may not be moved to another slot.

3 – Power Hub/Power Supply

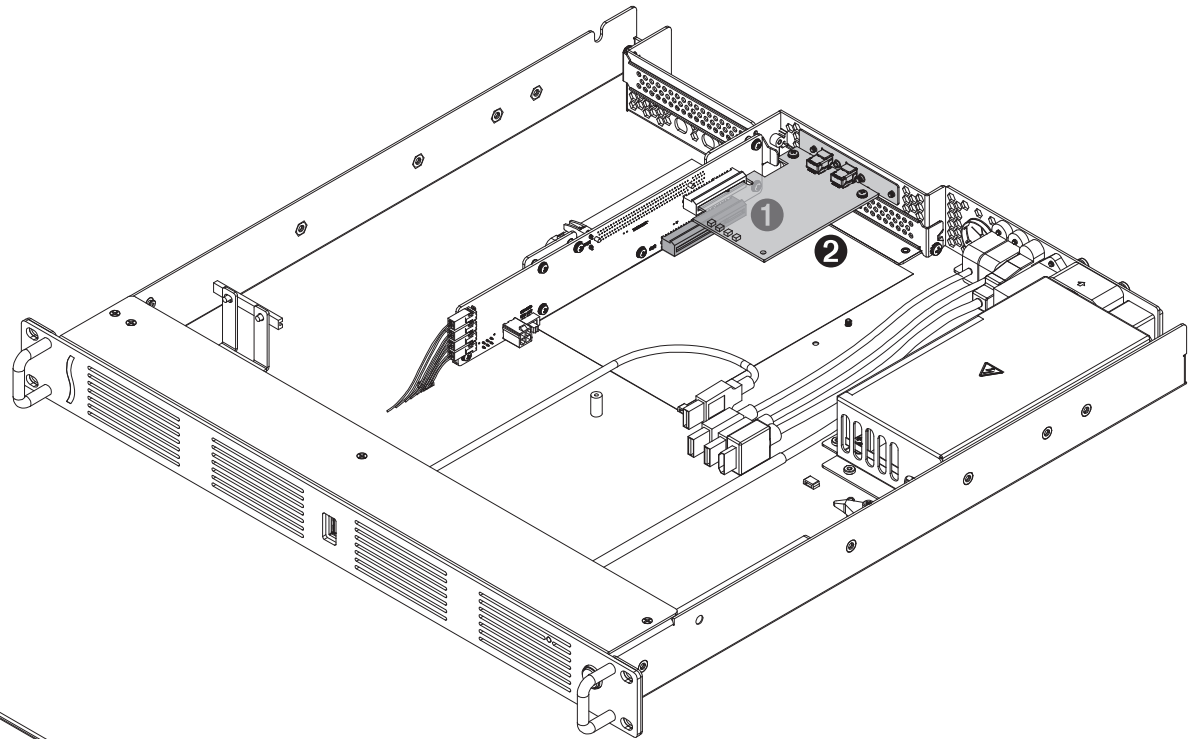
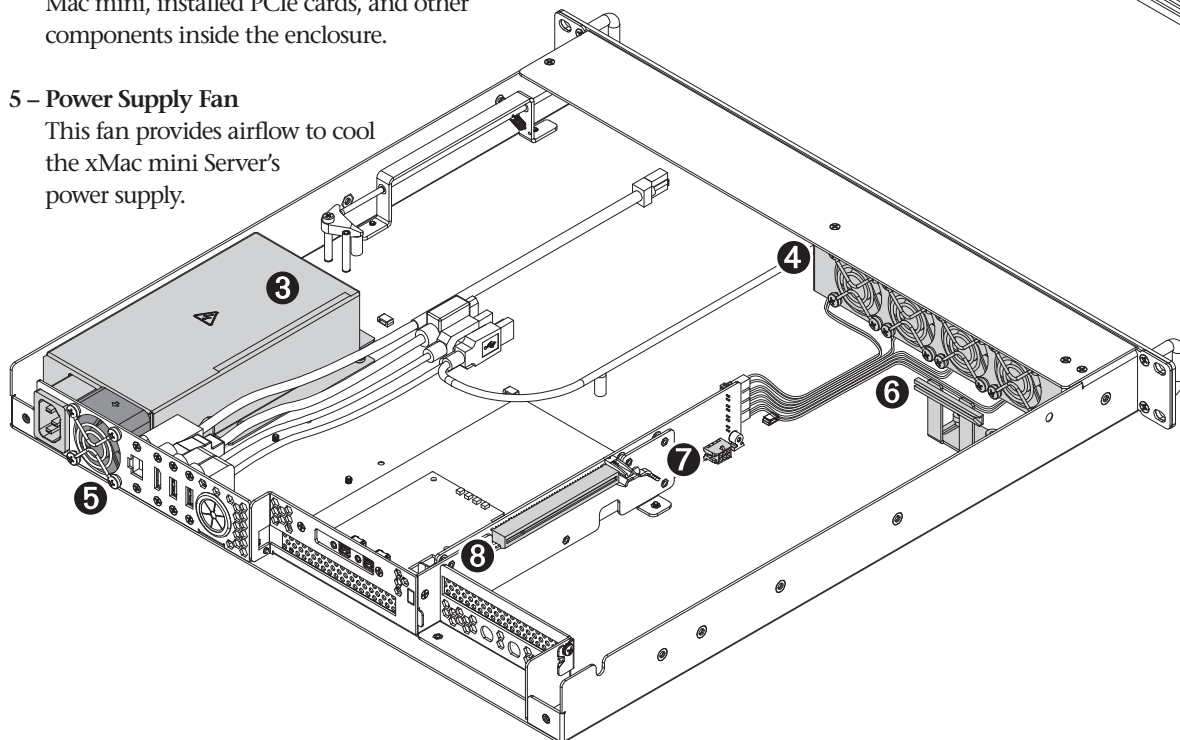
The hub routes power to the Mac mini and to the xMac mini Server's power supply, while this user-replaceable power supply provides power to the xMac mini Server's PCIe slots, fans, and assorted printed circuit boards.

4 – Main Fan Assembly

This user-replaceable part provides airflow to cool the Mac mini, installed PCIe cards, and other components inside the enclosure.

5 – Power Supply Fan

This fan provides airflow to cool the xMac mini Server's power supply.



6 – PCIe Card Guide

When installing a full-length card, use this to support and secure the card.

7 – Auxiliary Power Connector

A few PCIe cards require extra power in order to operate. When installing such a card, connect the supplied auxiliary power cable between this connector and the card's power connector.

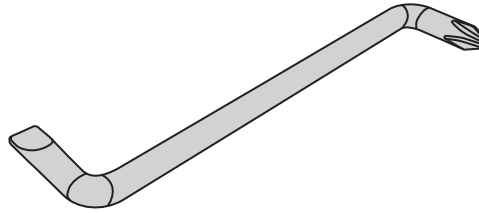
8 – PCIe Slot 2

This slot accepts an x8 mechanical, full-length, full-height PCIe 2.0 card, and is also compatible with PCIe 3.0 and 1.1 cards.

Chapter 2 – xMac mini Server Description

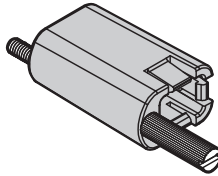
1 – Offset Screwdriver

Use this tool to remove the screw securing the port access cover for slot 1, and to install the screw securing the PCIe card you install into it.



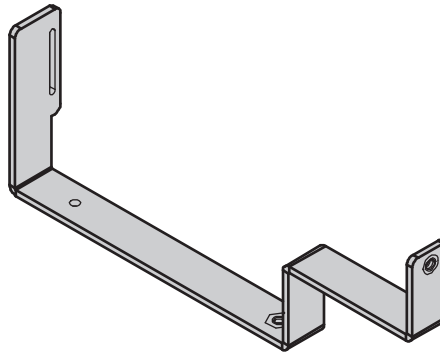
2 – Thunderbolt Connector Retainer Clip

This secures a Thunderbolt connector plugged into the xMac mini Server's Thunderbolt port to prevent accidental cable disconnection. This clip is not compatible with optical Thunderbolt cables.



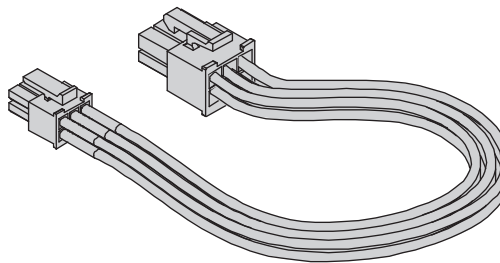
3 – Daughter Card Mounting Bracket

This bracket supports the installation of a daughter card that is in turn connected to the card installed into PCIe slot 1.



4 – Auxiliary Power Cable

This cable passes power between the xMac's auxiliary power connector and the PCIe power connector found on some PCIe cards.



Chapter 3 – PCIe Cards, Computer, and xMac mini Server Installation Steps

A – PCIe Cards Installation Steps

1. Remove the xMac mini Server from its packaging, and then set it on a flat, level surface.
2. Loosen the two captive thumbscrews securing the top cover to the rest of the enclosure (**Figure 1**).
3. Slide the top cover back and up to remove it (**Figure 1**).

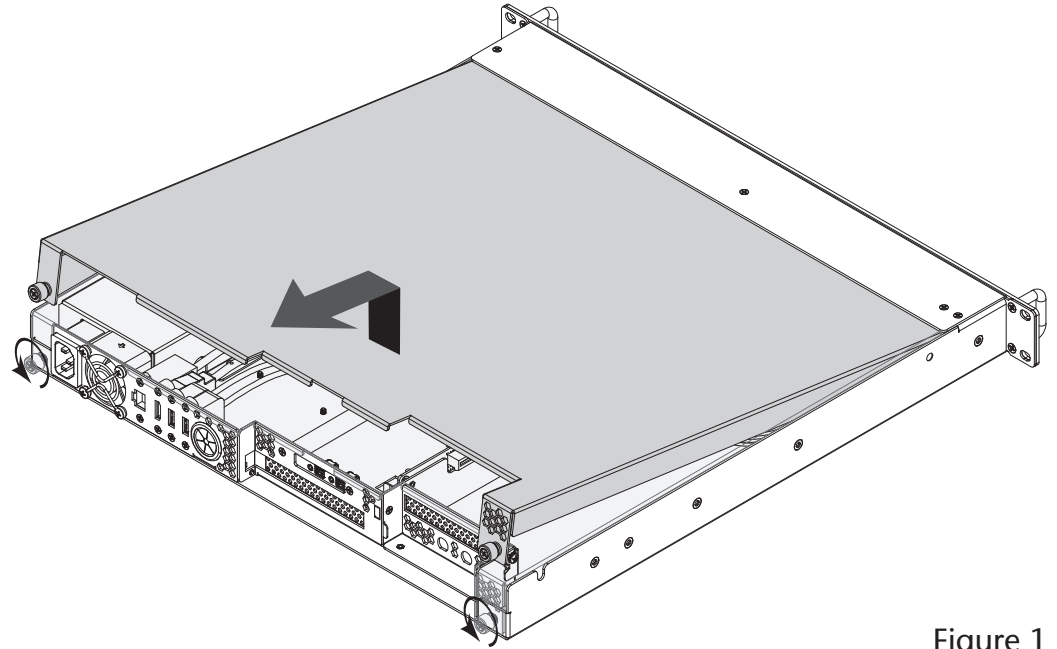




Figure 1

 **Support Note:** To avoid damaging components due to static electricity discharge, wear an antistatic wrist strap while working inside xMac mini Server.

4. Remove the strap securing the cables to the floor of xMac mini Server, remove the loose Thunderbolt cable and set it aside, and then move the rest of the cables aside (**Figure 2**).

 **WARNING:** When handling computer products, take care to prevent components from being damaged by static electricity; avoid working in carpeted areas. Handle expansion cards only by their edges and avoid touching connector traces and component pins. Also, avoid touching the xMac mini Server's circuit boards and any of its components.

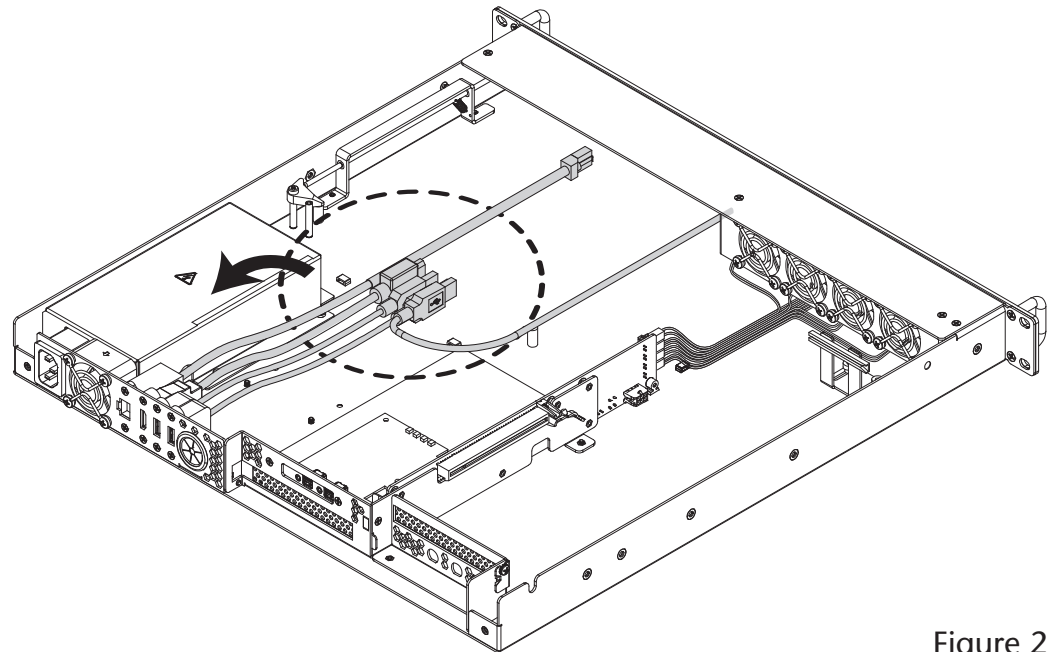


Figure 2

Chapter 3 – PCIe Cards, Computer, and xMac mini Server Installation Steps

A – PCIe Cards Installation Steps (continued)

5. If you are installing a card into PCIe Slot 1, remove and set aside the screw securing its port access cover using the supplied offset screwdriver, and then remove the cover (**Figure 3**).

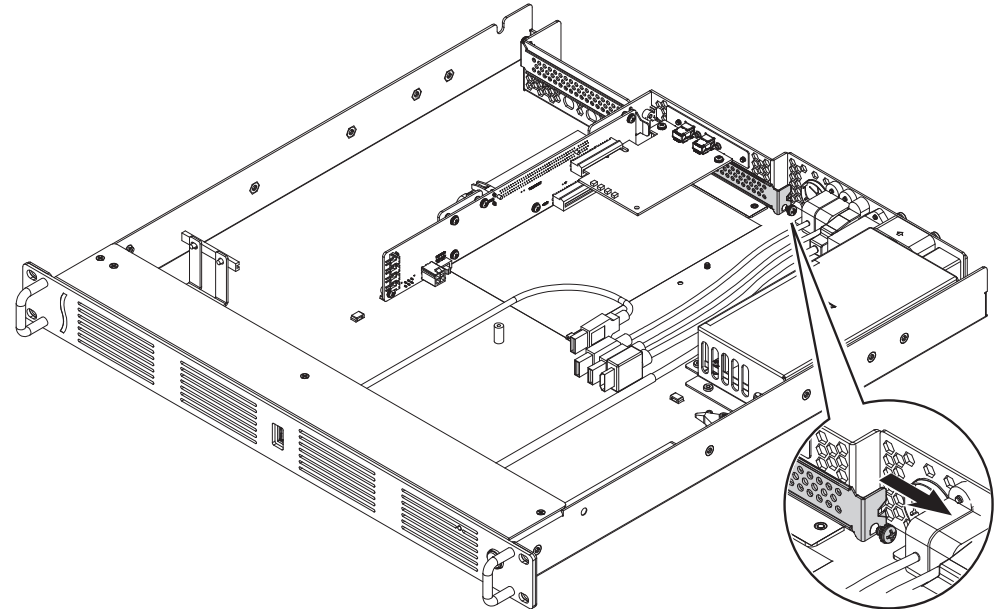


Figure 3

6. If you are installing a card into PCIe Slot 2, remove and set aside the screw securing its port access cover, and then remove the cover (**Figure 4**).
7. If you are installing a full-length card into PCIe Slot 2, loosen the thumbscrews securing the PCIe card guide, and then slide the guide toward the main fans (**Figure 4**).

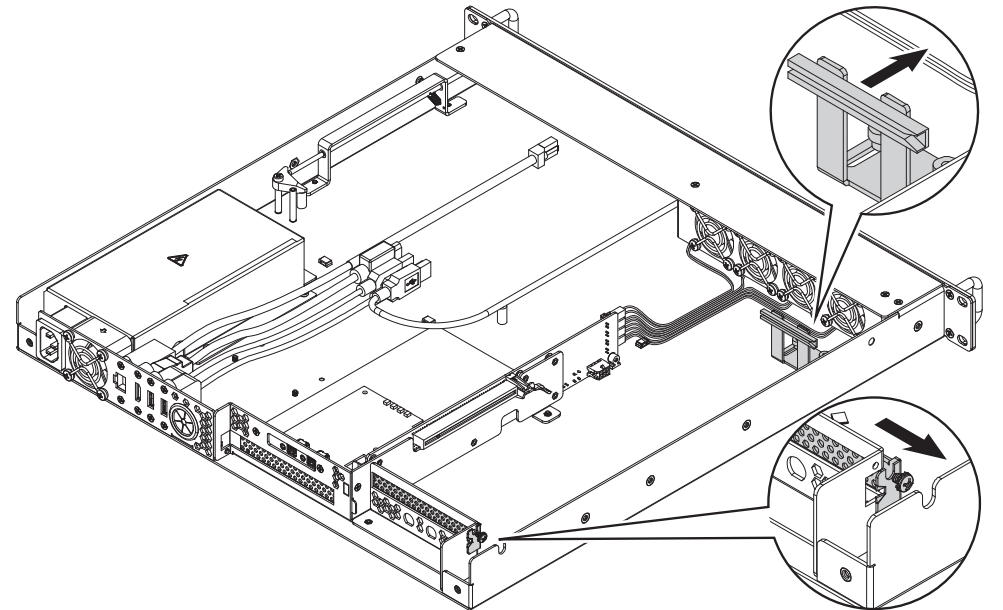


Figure 4

Chapter 3 – PCIe Cards, Computer, and xMac mini Server Installation Steps

A – PCIe Cards Installation Steps (continued)

8. If you are installing a card into PCIe Slot 1, remove the card from its packaging, handling the card by its edges and without touching any components or gold connector pins. Otherwise, skip to step 12.
9. Line up the card's connector with the slot, and then gently but firmly press the card into the slot; **do not rock the card or force the card into the slot**. If you encounter excessive resistance, check the card's connector and the slot for damage, and then try inserting the card again (Figure 5).
10. Secure the card using the screw you removed previously using the supplied offset screwdriver (Figure 5).
11. If you installed a card that includes a daughter card, skip to the appendix, page A, at the end of this document for instructions on installing the included daughter card mounting bracket and the daughter card. Otherwise, go to the next step.

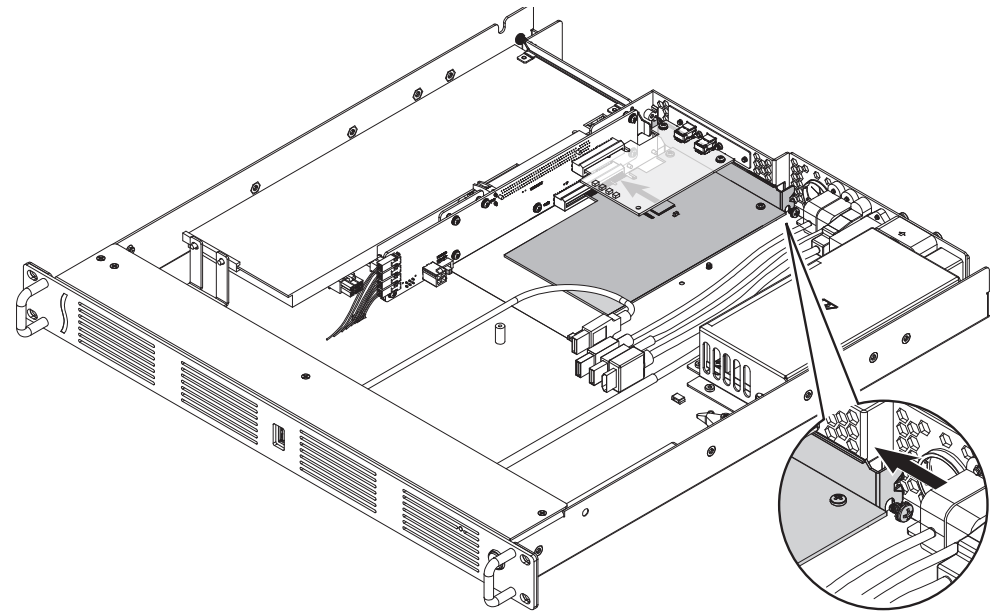


Figure 5

12. If you are installing a card into PCIe Slot 2 that includes BNC connectors, skip to the appendix, page B, at the end of this document for instructions on installing the connectors. Otherwise, go to the next step.
13. If you are installing a card into PCIe Slot 2, remove the card from its packaging, handling the card by its edges and without touching any components or gold connector pins.
14. Turn the card components side down, line up the card's connector with the slot, and then gently but firmly press the card into the slot; **do not rock the card or force the card into the slot**. If you encounter excessive resistance, check the card's connector and the slot for damage, and then try inserting the card again (Figure 6).
15. Secure the card using the screw you removed previously (Figure 6).
16. If you installed a full-length card, slide the PCIe card guide onto the card, and then tighten the guide's thumbscrews (Figure 6).

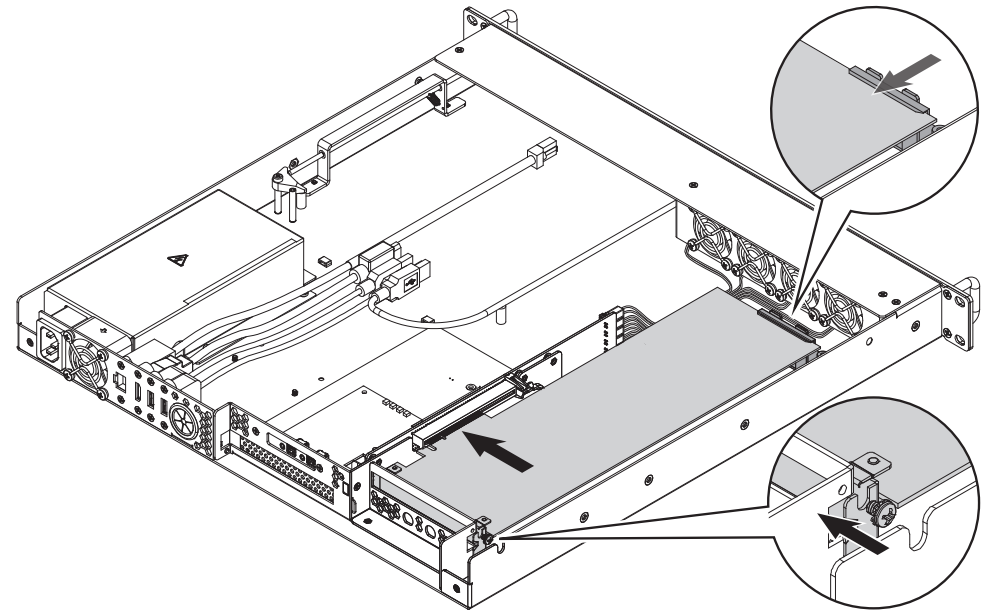


Figure 6

Chapter 3 – PCIe Cards, Computer, and xMac mini Server Installation Steps

A – PCIe Cards Installation Steps (continued)



Support Note: Sonnet's ThunderLok™ Thunderbolt connector retainer clip secures the included Thunderbolt cable to the xMac mini Server to prevent accidental disconnects. Although it is compatible with other copper Thunderbolt cables like Apple's, it is not compatible with optical Thunderbolt cables.

To attach the clip to the cable, remove both from their packaging. Turn one of the cable's connectors so the Thunderbolt icon is facing down, and then insert the connector into the connector clip as shown (Figure 7). Note that the connector will pass all the way through the clip; when you connect the cable to the xMac mini Server, the clip will secure the cable.

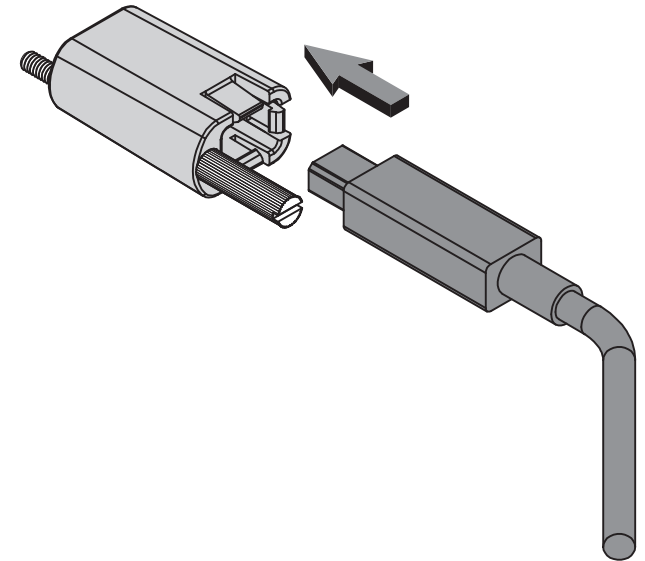


Figure 7

17. Connect one end of the supplied Thunderbolt cable to either one of the xMac mini Server's Thunderbolt ports, and then route the other end of the cable through the external cable passthrough (Figure 8). Secure the retainer clip to the xMac mini Server if you attached it. If you are daisy chaining additional Thunderbolt devices, connect another Thunderbolt cable to the open Thunderbolt port on the xMac mini Server.
18. Route any external cables that need to be connected to the computer (or PCIe cards) through the cable passthrough opening.
19. If desired, secure the cables to the bottom of the xMac mini Server with cable ties.

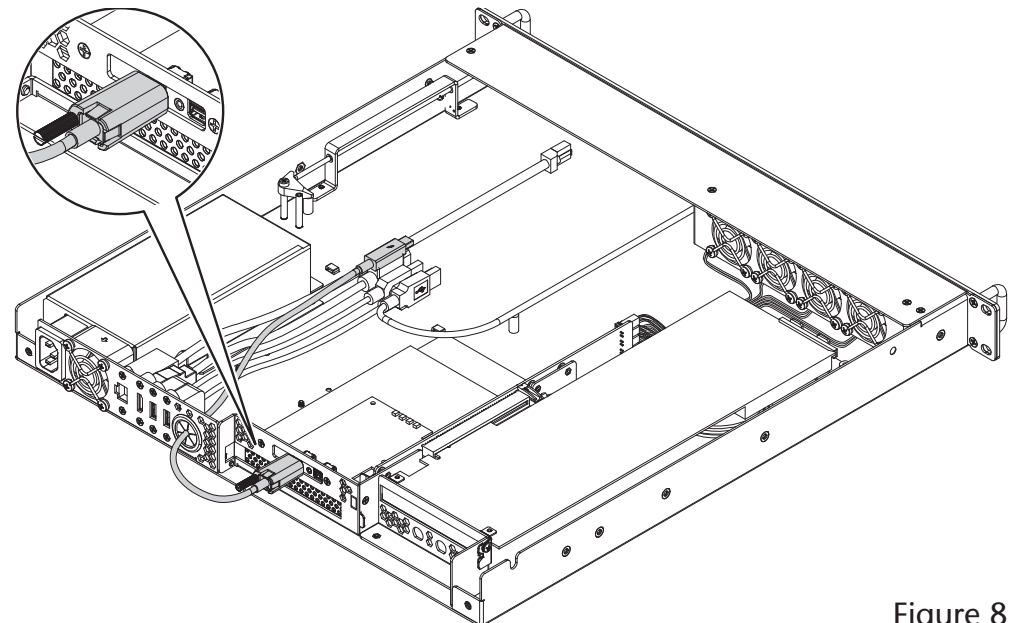


Figure 8

Chapter 3 – PCIe Cards, Computer, and xMac mini Server Installation Steps

B – Mac mini Installation Steps

1. Remove the Mac mini from its packaging.
2. Carefully insert the Mac mini under the top edge of the enclosure, push it against the gasket behind the enclosure's face plate, and then lower the computer onto the floor behind the small plastic posts (**Figure 9**).
3. Plug all the xMac mini Server's cables into the back of the Mac mini, and other cables into PCIe cards as necessary; **verify the cables are plugged in securely** (**Figure 9**).

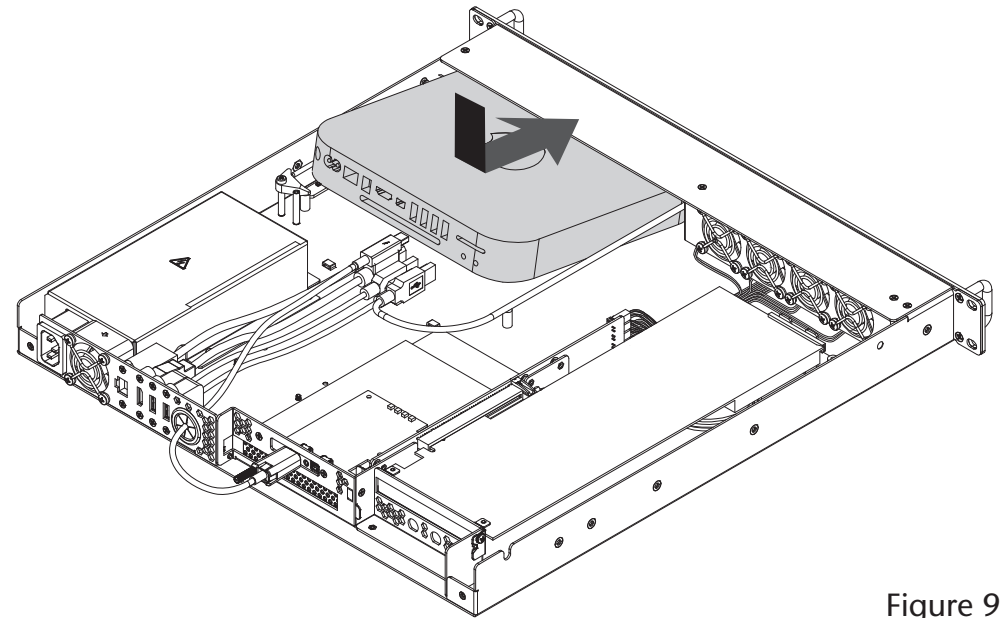


Figure 9

4. Insert the top cover under the top edge of the enclosure, lower the lid, and then secure it with the captive thumbscrews (**Figure 10**).

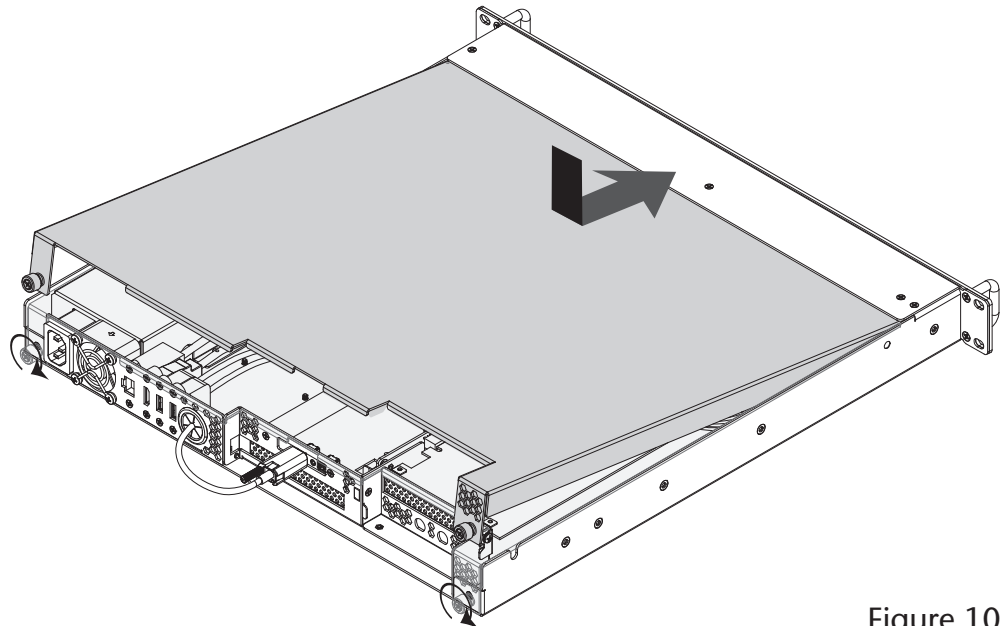


Figure 10

Chapter 3 – PCIe Cards, Computer, and xMac mini Server Installation Steps

C – xMac mini Server Rackmount Installation Information

You may mount xMac mini Server into any standard 19-inch EIA compliant equipment rack at least 19 inches deep. It is recommended that you mount xMac mini Server using rack slides or a rack shelf. Sonnet offers rack slide sets for purchase separately; please visit the site at www.sonnettech.com/product/xmacminiserver.html and click on the Accessory tab for more information.

1. Install and secure the xMac mini Server in the equipment rack.
2. Connect any necessary interface cables to the back of xMac mini Server; **verify the cables are plugged in securely.**
3. Connect the supplied power cable between xMac mini Server and a grounded wall outlet or power strip; **verify the cables are plugged in securely.**




Support Note: If you haven't set up your Mac mini, you will need to connect a monitor, keyboard, and mouse to complete those steps.

Chapter 4 – Verify Connections Using System Information


A – Verify the xMac mini Server is Recognized

1. Press the power button on the front panel of the xMac mini server to turn on the Mac mini. If you haven't yet set up the computer, follow the onscreen directions to complete the setup process.
2. From the Apple menu, select About This Mac; the System Information application will launch.
3. When the *About This Mac* window opens, click More Info; a summary of specifications will appear.
4. Click System Report; a full report window will appear.
5. In the *System Information* window, click Thunderbolt under the Hardware header in the left column (Figure 11).
6. In the top right column under the Thunderbolt Device Tree header, you should see Mac mini, followed “xMac mini Server” (Figure 11).

 **Support Note:** If you do not see “xMac mini Server” listed, disconnect and reconnect the Thunderbolt cable between the computer and xMac mini Server. Note that it is not necessary to shut down the computer before disconnecting and reconnecting the cable.

B – Verify Installed Cards are Recognized

1. When a card is installed into one of xMac mini Server's PCIe slots, the PCIe slot (listed as a port), the Status should appear as connected (Figure 12).
2. Click PCI Cards under the Hardware header in the left column (Figure 12).
3. At the top of the right column, installed cards are listed. By selecting a card at the top, detailed information is listed. You should see “Yes” next to Driver Installed and Tunnel Compatible, otherwise the card or driver may not be Thunderbolt compatible (Figure 12).

 **Support Note:** While xMac mini Server requires no drivers, installed cards require Thunderbolt-compatible drivers to enable their use with xMac mini Server.

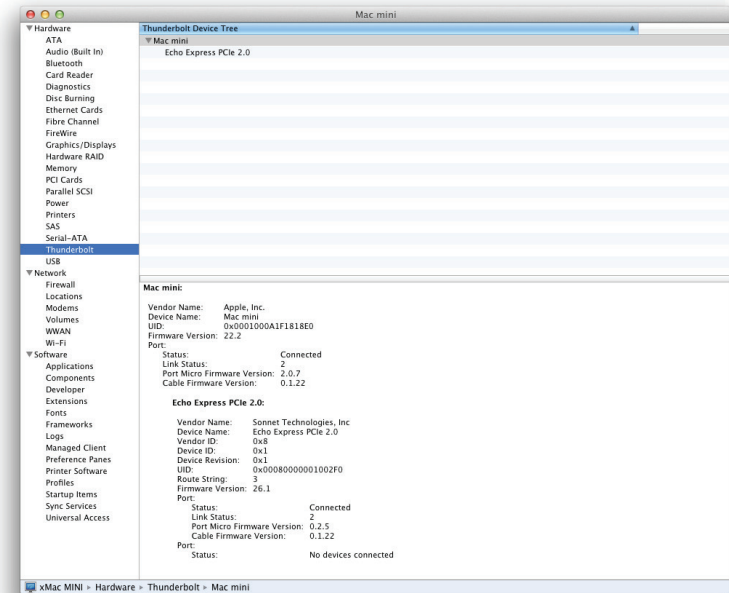


Figure 11

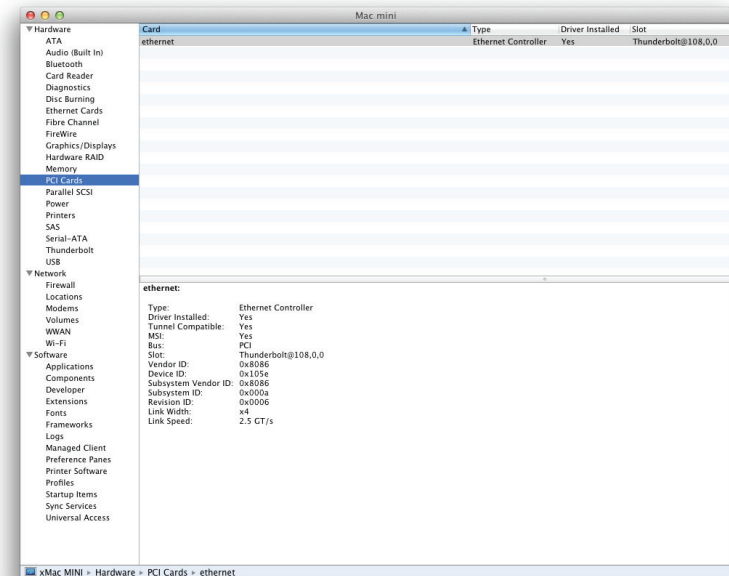


Figure 12

Chapter 5 – Tips and Known Issues

TIPS

Cooling xMac mini Server and Everything Inside It

With its optimized airflow design and temperature-controlled fans providing adequate cooling at all times, xMac mini server may be installed anywhere in a rack. *Do not block any of the vents!* Otherwise, the Mac mini, installed cards, and xMac mini Server's components may overheat.

Connecting Additional Thunderbolt Devices

You may connect up to six Thunderbolt devices total in a daisy chain, including the Apple Thunderbolt Display.

Using Expansion Cards Without Drivers

Some Thunderbolt-compatible expansion cards, like Sonnet's Allegro™ FW800 PCIe FireWire® adapter, Tango™ 3.0 PCIe USB/FireWire adapter, and Tempo™ SATA Pro 6Gb eSATA cards, use drivers built into the OS. Cards listed as Thunderbolt-compatible, but stating "no drivers required" fall into this category.

Replacing Cards or Adding Cards After Initial Installation

If you decide to replace or add a card to xMac mini server after the initial setup installation, shut down the system and disconnect power to it before installing a card.

KNOWN ISSUES

Not all PCIe Cards Will Perform at 100%

Thunderbolt 2's PCIe bandwidth is limited to 20Gbps. While many cards will operate at full performance, some may not due to the fact they require more bandwidth than Thunderbolt 2 is capable of delivering.

OS X Updates May Break Compatibility

Specific device drivers that work under one version of OS X may not work under a later version. It is even possible that an OS X update may break compatibility. *Before updating to the latest drivers or OS version,* we recommend that you contact your PCIe cards' manufacturers to verify that the existing drivers work, and check online forums for reports of issues with the latest OS update.

Some Devices' Performance May be Affected by Where They Are Connected in a Thunderbolt Chain

However small, Thunderbolt introduces latency to a device chain. If you expand with additional Thunderbolt expansion chassis, you may need to experiment with which cards work better in chassis closer or farther to the Mac mini in the chain.

Chapter 6 – Specifications, Precautions, FCC Compliance, and Support Information

Specifications

External Connectors	<ul style="list-style-type: none"> • Two Thunderbolt 2 (one open, one used) • One RJ-45 Gigabit Ethernet port extension • Three USB 3.0 port extensions (one front-mount and 2 rear-mount) • One HDMI port extension
Internal Connectors	<ul style="list-style-type: none"> • 6-pin Mini-Fit Jr (provides auxiliary power for PCIe cards that require it) • One C-8 power
Expansion Slots	<ul style="list-style-type: none"> • One x8 (x4 electrical) PCIe 2.0 • One x16 (x4 electrical) PCIe 2.0
PCIe Cards Supported	<ul style="list-style-type: none"> • One full-length, full-height, x16 PCIe card • One half-length, full-height, x8 PCIe card
Compatible PCIe Cards	See Sonnet Website (www.sonnettech.com)
Power Supply	Universal 150W, 90-260V AC, 50-60 Hz
Operating Temperatures	0° C to 35° C (32° F to 95° F)
Dimensions WxDxH:	19 x 17.75 x 1.72 in. (48.3 x 45.1 x 4.4 cm)
Weight	16.0 lb. (7.26 kg)
RoHS Compliant	Yes
Package Contents	<ul style="list-style-type: none"> • xMac mini Server • 0.5-meter Thunderbolt cable • Offset screwdriver • Daughter card mounting bracket • ThunderLok • Power cord • Documentation

Safety Precautions

Please read this section carefully before proceeding. These precautions explain the correct and safe use of this device, thereby helping to prevent injury to you or others, and also help you to minimize the risk of damaging the device.

Warnings

Always follow the basic warnings listed here to avoid the risk of serious injury or death from electrical shock, short-circuiting, fire, and other hazards. These warnings include, but are not limited to:

- Aside from replacing user-replaceable parts, do not attempt to disassemble the enclosure. If this device appears to be malfunctioning, contact your reseller or local distributor.
- Do not drop or mishandle the product; dropping or mishandling the product may result in a malfunction leaving the product inoperable.
- Do not expose the device to rain, use it near water or containers that contain liquids which might spill into any openings, or in damp or wet conditions.
- If unusual smells, sounds, or smoke come from the device, or if liquids enter it, switch it off immediately and unplug it from the electrical outlet.
- Follow the instructions in this manual carefully; contact your reseller or local distributor for additional advice not covered in this User's Guide.

FCC Compliance

xMac mini Server complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: This device may not cause harmful interference, AND this device must accept any interference received, including interference that may cause undesired operation.

Contacting Customer Service

The Sonnet Web site located at www.sonnettech.com has the most current support information and technical updates. Before you call Customer Service, please check our Web site for the latest updates and online support files, and check this User's Guide for helpful information.

When you call Customer Service, have the following information available so the customer service staff can better assist you:

- Product name
- Date and place of purchase
- Computer model
- PCIe card models
- Operating system version
- Software/firmware versions

USA Customers

If further assistance is needed, please contact **Sonnet Customer Service** at:
Tel: 1-949-472-2772
 (Monday–Friday, 7 a.m.–4 p.m. Pacific Time)
E-mail: support@sonnettech.com

For Customers Outside the USA

For support on this product, contact your reseller or local distributor.

Visit Our Web Site

For the most current product information and online support files, visit the Sonnet Web site at www.sonnettech.com/support/. Register your product online at <http://registration.sonnettech.com> to be informed of future upgrades and product releases.

Appendix

A – Daughter Card Installation Steps

1. Insert the included daughter card mounting bracket into the xMac mini Server as shown, securing the bracket with the provided screws through the bottom of the chassis (Figure A1).
2. Remove the screw from the top of the bracket and set it aside (Figure A1).

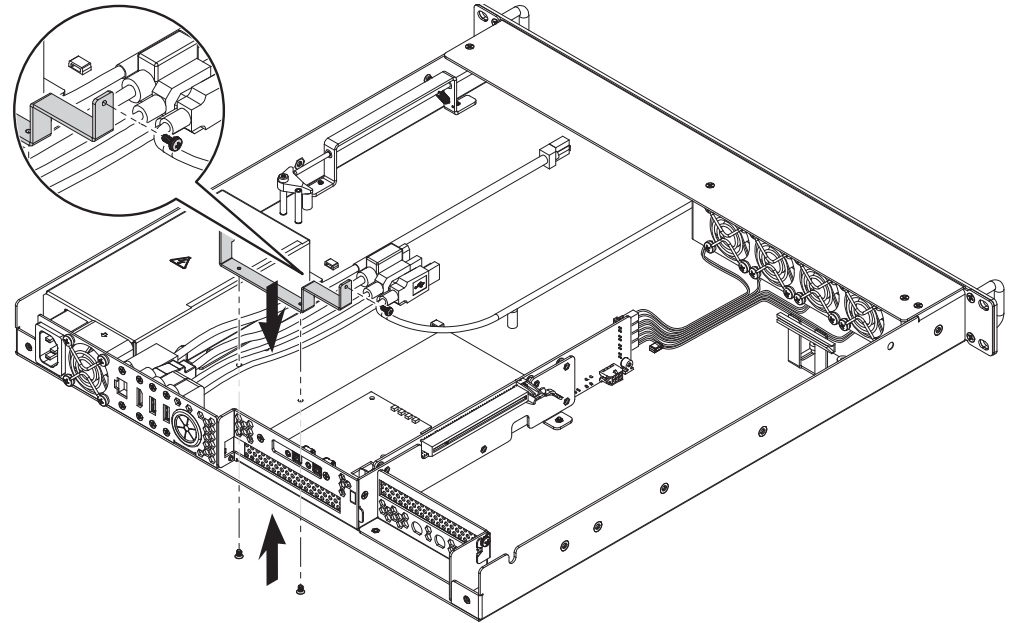


Figure A1

3. Remove the daughter card from its packaging, handling the card by its edges and without touching any components.
4. Turn the daughter card components (or connectors) face up, and then insert the bottom tip of the PCIe bracket into the slot near the power supply, with the top of the PCIe bracket wrapped around the daughter card bracket as shown (Figure A2).
5. Secure the card to the daughter card bracket using the screw included with it (Figure A2).
6. If you are installing BNC cables in the xMac's BNC connector mounting holes, go to the next page. Otherwise, return to step 13 on page 7, and complete the setup procedure.

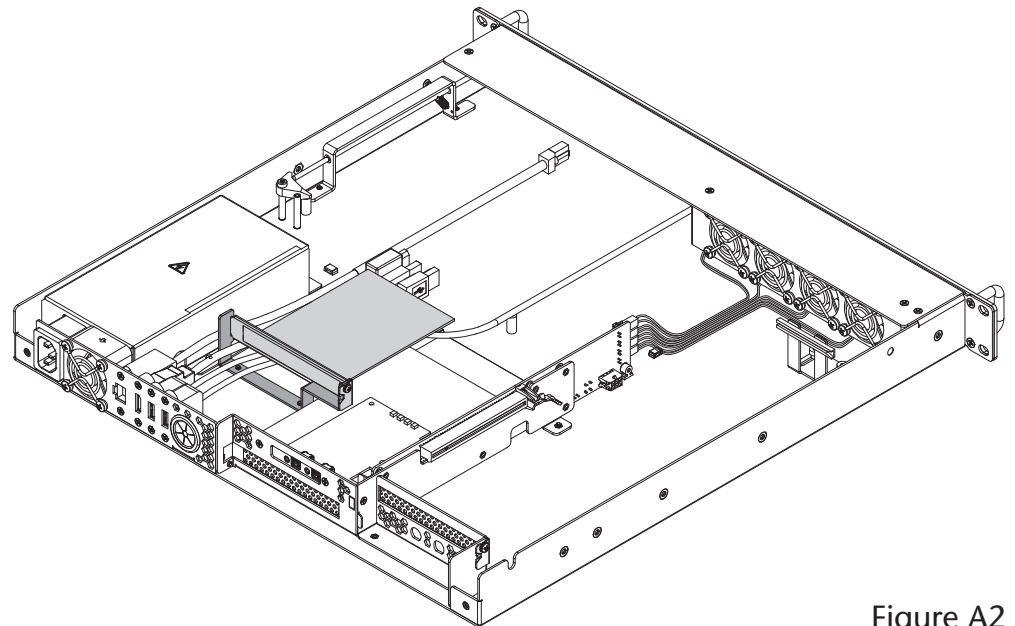


Figure A2

Appendix

B – BNC Cable Installation

1. Insert the BNC cables through the BNC connector mounting holes, and then secure them as shown. (Figure A3).
2. Return to step 13 on page 7, and complete the setup procedure.

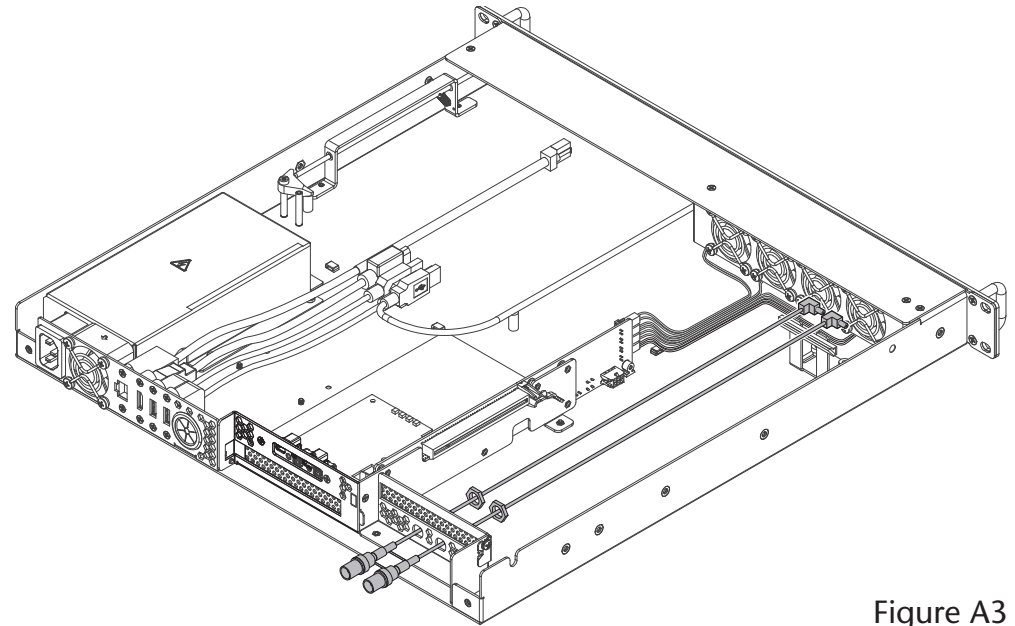


Figure A3

C – Fan Speed Setting Information

The xMac mini Server includes a fan speed switch which enables you to change when the main fans' speed increases relative to the temperature inside the enclosure. Regardless the switch setting, the fans' starting speed is the same. *Note that this switch does not affect the power supply's fan operation.*

- In High Speed Mode (factory setting), the fans' speed begins to increase when the temperature inside the enclosure exceeds 25° C (77° F), and reaches full speed at 40° C (104° F). This setting is appropriate for all compatible cards and is the default setting.
- In Low Speed Mode, the fans' speed begins to increase when the temperature inside the enclosure exceeds 35° C (95° F), and will speed up somewhat as the temperature climbs toward 40° C (104° F). This mode is appropriate for most PCIe cards except 10 Gigabit Ethernet controllers, Fibre Channel controllers, SAS and SATA RAID controllers.
- A quiet fan kit (Sonnet part number XMFAN-Q-A) is available for separate purchase for customers who want even quieter operation than possible with the standard fans. This kit is suitable for most PCIe cards except 10 Gigabit Ethernet controllers, Fibre Channel controllers, and SAS and SATA RAID controllers. The fan speed switch should be set only in the High Speed Mode setting with the quiet fan kit.

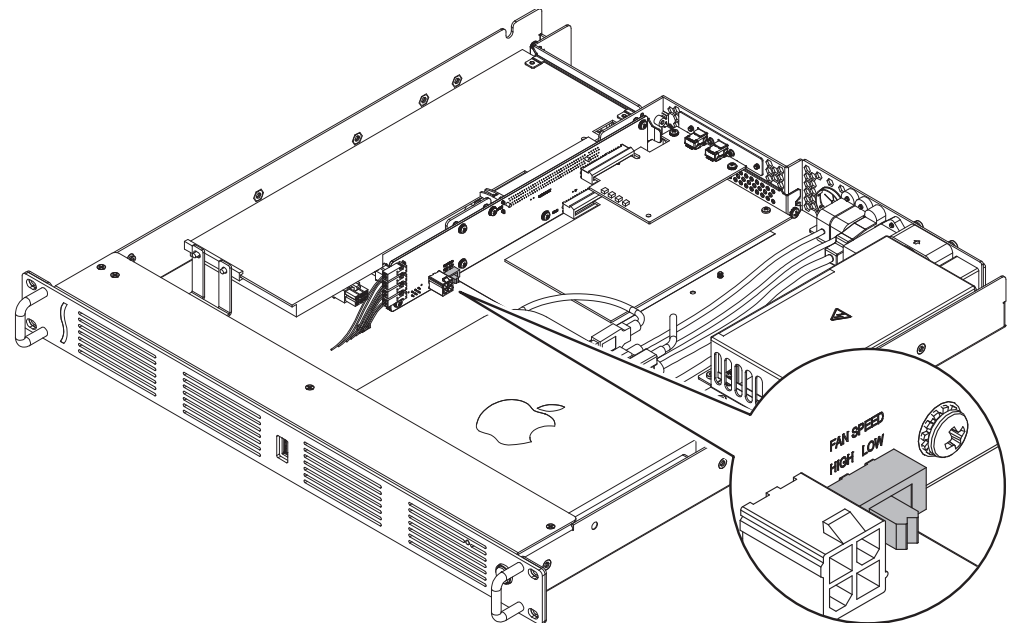


Figure A4



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Statement of Conformity

Sonnet Technologies, Inc.
8 Autry
Irvine, CA 92618
USA

Declare under our sole responsibility that the product(s):


Product Name: xMac mini Server
Product Number(s): XMAC-MS-A

To which this declaration relates is in conformity with the requirements of the following specifications:

ANSI C63.4-2009
FCC 47 CFR Part 15, Subpart B, Class B Digital Device.
ICES-003 Issue 5

Supplementary information:

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.

Signed by or for manufacturer:	
Name: Title: Place and Date:	George Smith Director of Hardware Development Sugar Hill, GA USA, March 7, 2015



EC Declaration of Conformity

In accordance with EN ISO 17050-1:2004

Manufacturer's Name: Sonnet Technologies, Inc.

Manufacturer's Address: 8 Autry
Irvine, CA 92618
USA

In accordance with Directive(s):
LVD (2006/95/EC).
EMC Directive (2004/108/EC)

hereby declare, that the product(s)

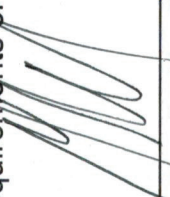
Product Name: xMac mini Server
Product Number(s): XMAC-MS-A

Conforms to the following Product Specifications:

Safety: IEC 60950-1:2005/A1:2009, EN 60950-1:2006/A11:2009/A1:2010/A12:2011/AC:2011

EMC: EN 55022:2010
EN 55024:2010
EN 61000-3- 2:2006 w/A1:2009 and A2:2009
EN 61000-3- 3:2008

I hereby declare that the equipment named above has been designed to comply with the relevant sections of the above referenced specifications. The unit complies with all applicable Essential Requirements of the Directives.


George Smith, Director of Hardware Development

Sugar Hill, GA USA
March 7, 2015