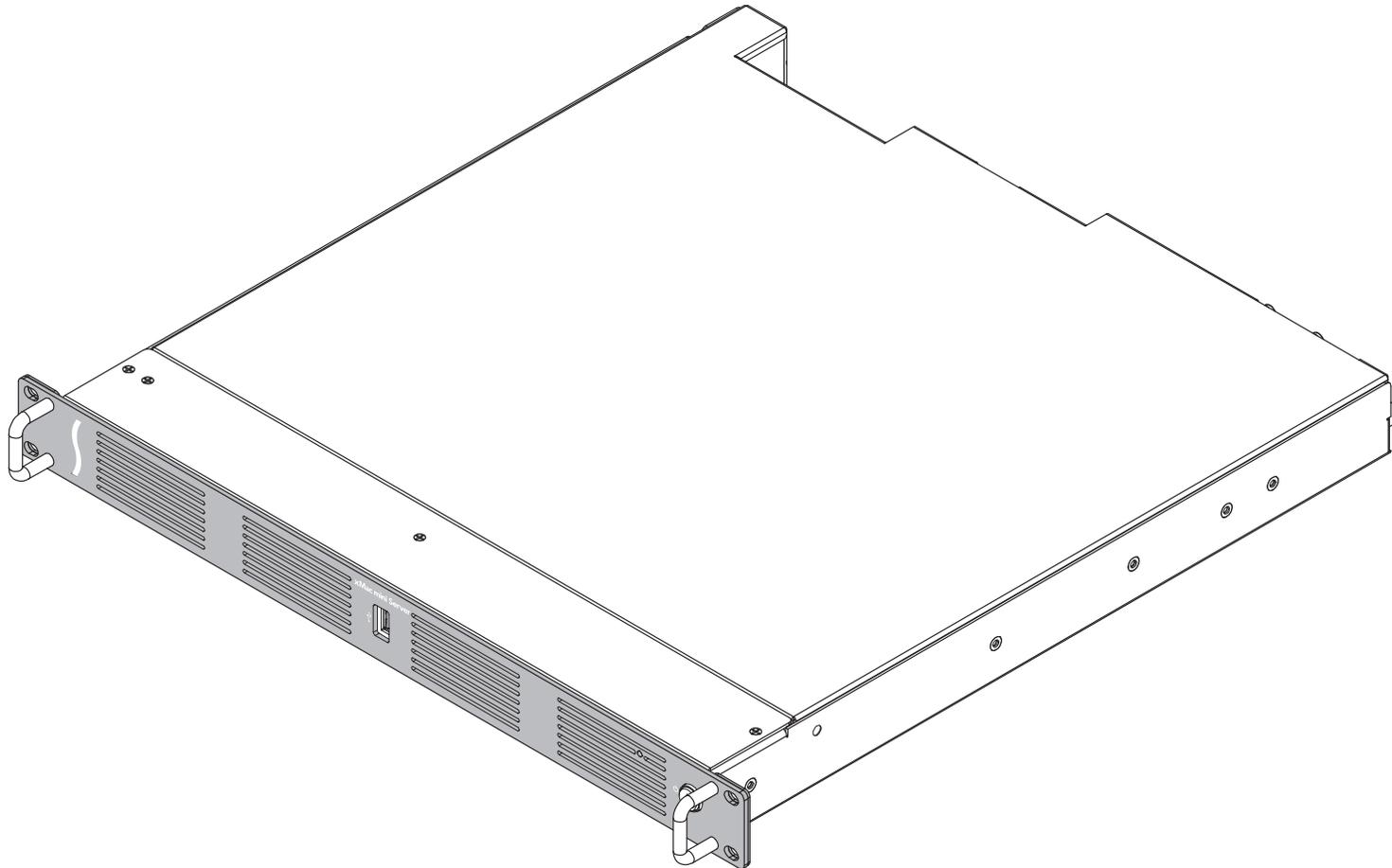


User's Guide

for xMac™ mini Server Thunderbolt 3 Edition



Contents

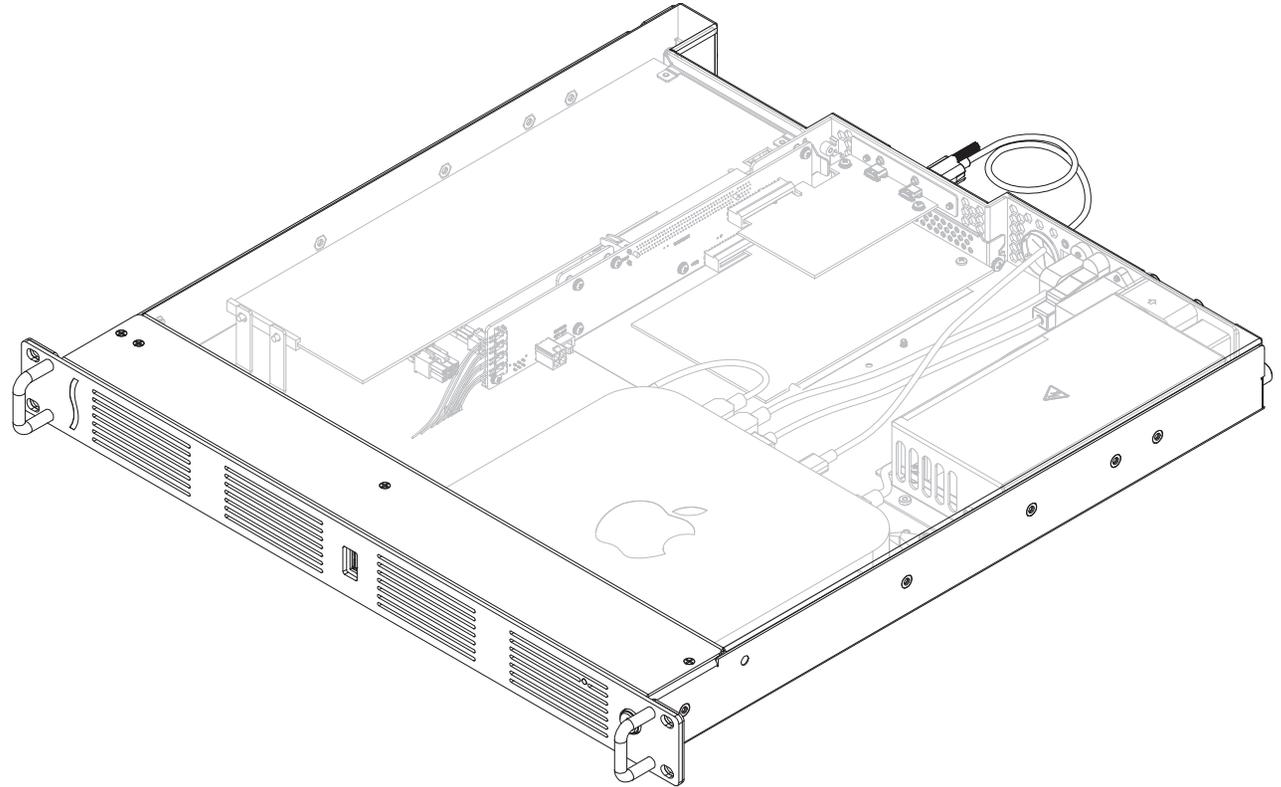
1	Introduction	1
2	xMac mini Server Thunderbolt 3 Edition (T3E) Description	2
3	PCIe Cards, Computer, and xMac mini Server T3E Installation Steps	5
	A – PCIe Cards Installation Steps	
	B – Mac mini Installation Steps	
	C – xMac mini Server T3E Rackmount Installation Information	
4	Verify System and Installed Cards are Recognized	11
	A – Confirm the xMac mini Server is Recognized	
	B – Confirm Installed Cards are Recognized	
	C – Install Card Drivers (If Necessary)	
5	Tips and Known Issues	12
	Tips	
	Known Issues	
6	Precautions, FCC Compliance, and Support Information	13
	Safety Precautions	
	FCC Compliance	
	Contacting Customer Service	
	Visit Our Website	
	Appendix	A
	A – Daughter Card Installation Steps	
	B – BNC Cable Installation	
	C – Fan Switch Setting Information	

Chapter 1 – Introduction

Congratulations on your purchase! xMac mini Server Thunderbolt 3 Edition (T3E) is a Thunderbolt 3 to PCIe card expansion system and 1U rackmount enclosure for Mac mini with Thunderbolt 3 ports. Through its two PCIe slots, you may connect two expansion cards to your Mac mini to expand its connectivity and processing capabilities.

xMac mini Server T3E has numerous thoughtful design touches. The front panel USB-A port connects to 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 10 Gigabit (or Gigabit) Ethernet, USB-A, 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. The front panel USB-A port lights up when the computer is powered on. 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 3 connector retainer clip and holes for cable ties enable you to secure all cables, keeping them tidy while avoiding accidental disconnects.

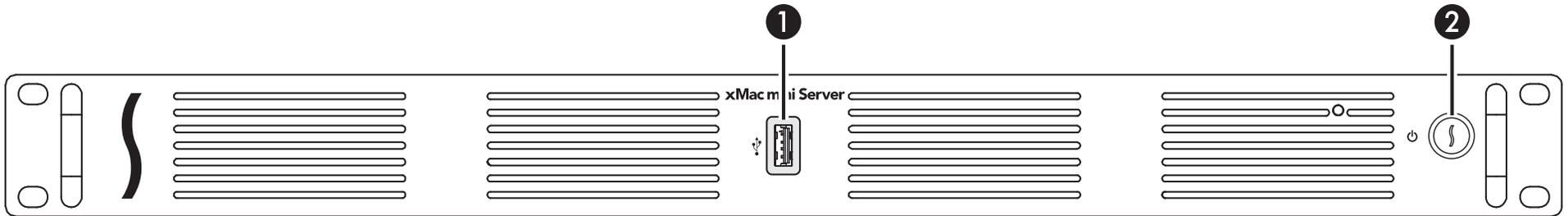
While xMac mini Server T3E requires no drivers, the expansion cards you install do; Thunderbolt-compatible drivers to enable them to work properly through the Thunderbolt interface are required. More information on which cards are compatible with xMac mini Server is available at <http://sonnettech.com/support/charts/thunderbolt/index.html>



Support Note: This document was up to date at the time of printing. However, changes to the hardware or software may have occurred since then. Please check the Sonnet website for the latest documentation.

1. Go to <https://www.sonnettech.com/support/kb/kb.php>
2. Click the Thunderbolt Product link.
3. Click the xMac mini Server Thunderbolt 3 Edition link, and then click the Documentation link.
5. Click the xMac mini Server Thunderbolt 3 Edition User's Guide [English] link and then check the Document Version information. If the version listed on the last page of this manual is later than this document (**revision C**), click the Download Now button for the latest version.

Chapter 2 – xMac mini Server Thunderbolt 3 Edition (T3E) Description

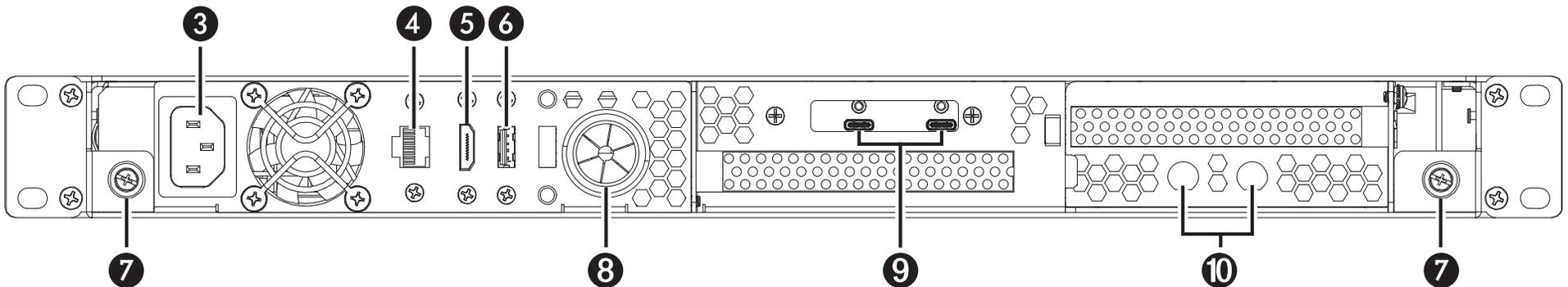


1 – USB-A Port/Power Indicator

This port connects to the Mac mini through a cable attached to the front panel, and lights when the computer is on.

2 – Power Switch

This button activates the Mac mini's power switch; the xMac mini Server T3E's PCIe slots' power supply turns on and off along with the computer.



3 – Power Input Socket

Connect the included AC power cable here.

4 – RJ45 Port (10 Gigabit or Gigabit Ethernet)

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

5 – HDMI Port

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

6 – USB-A Port

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

7 – Top Panel Thumbscrews

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

8 – 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.

9 – Thunderbolt 3 Ports

Connect the included Thunderbolt 3 cable, or comparable Thunderbolt 3 (40Gbps) cable, between either port and one of your computer's Thunderbolt ports.

The second port may be used to connect to another Thunderbolt peripheral device, display(s), or USB device (when connected with the proper cable or adapter).

10 – 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 T3E Description

1 – PCIe Slot 1 (Beneath Thunderbolt Interface Card)

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

2 – Thunderbolt Interface Card

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

3 – Fan Speed Switch for Main Fan Assembly

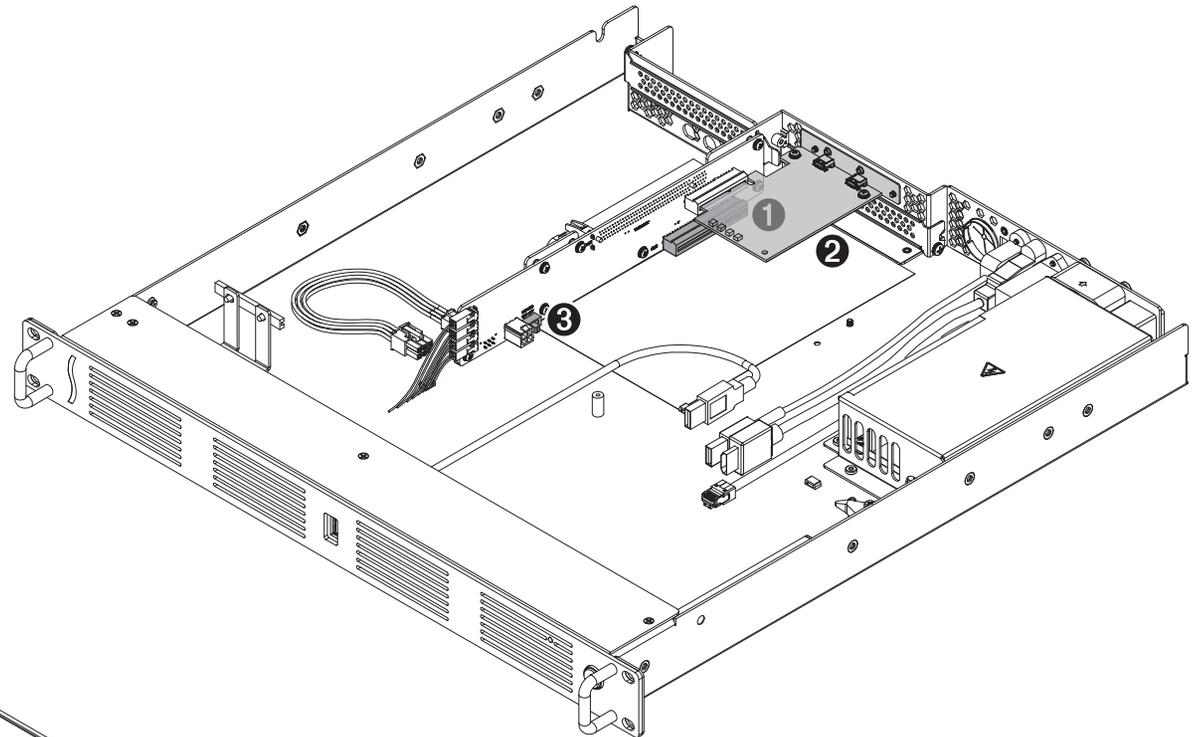
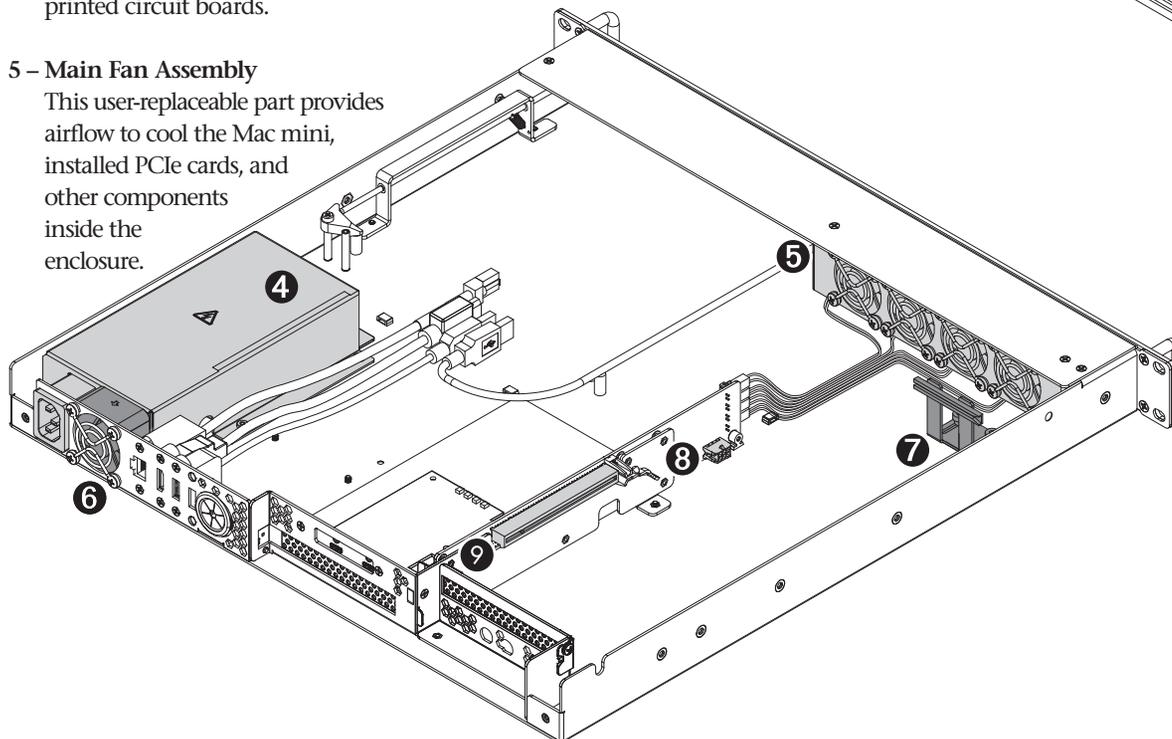
This enables you to change when the main fans' speed increases relative to the temperature inside the enclosure. See Appendix section C at the end of this manual for detailed information.

4 – Power Hub/Power Supply

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

5 – Main Fan Assembly

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



6 – Power Supply Fan

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

7 – PCIe Card Guide

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

8 – Auxiliary Power Connector

Some 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.

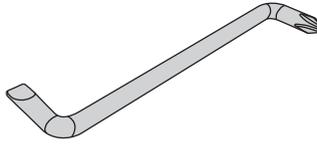
9 – PCIe Slot 2

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

Chapter 2 – xMac mini Server T3E Description

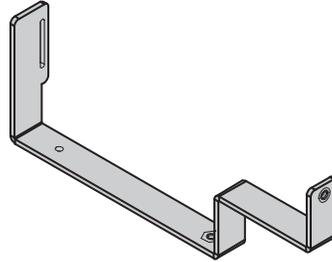
Offset Screwdriver

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.



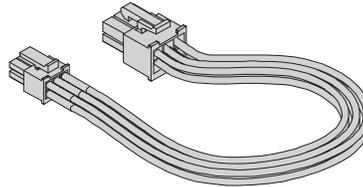
Daughter Card Mounting Bracket

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



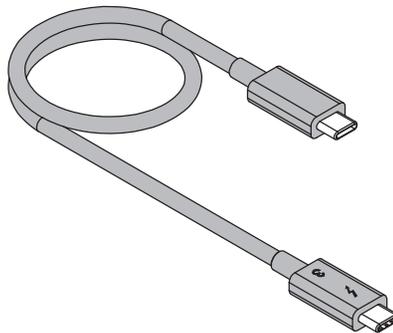
Auxiliary Power Cable

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



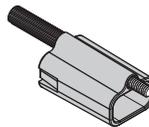
Thunderbolt 3 (40Gbps) Cable

Connect this cable between the xMac mini Server's Thunderbolt 3 port and your computer (or other Thunderbolt device in the chain connected to the computer).



ThunderLok 3 Thunderbolt Connector Retainer Clip

This secures a Thunderbolt 3 connector plugged into the xMac mini Server's Thunderbolt 3 port to prevent accidental cable disconnection. This clip is compatible with the included Sonnet 0.5-meter Thunderbolt 3 cable and Sonnet 0.7-meter Thunderbolt 3 cables, but not with Sonnet 1- or 2-meter Thunderbolt 3 cables.



Chapter 3 – PCIe Cards, Computer, and xMac mini Server T3E 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. Lift the top cover up and slide it back to remove it (**Figure 1**).

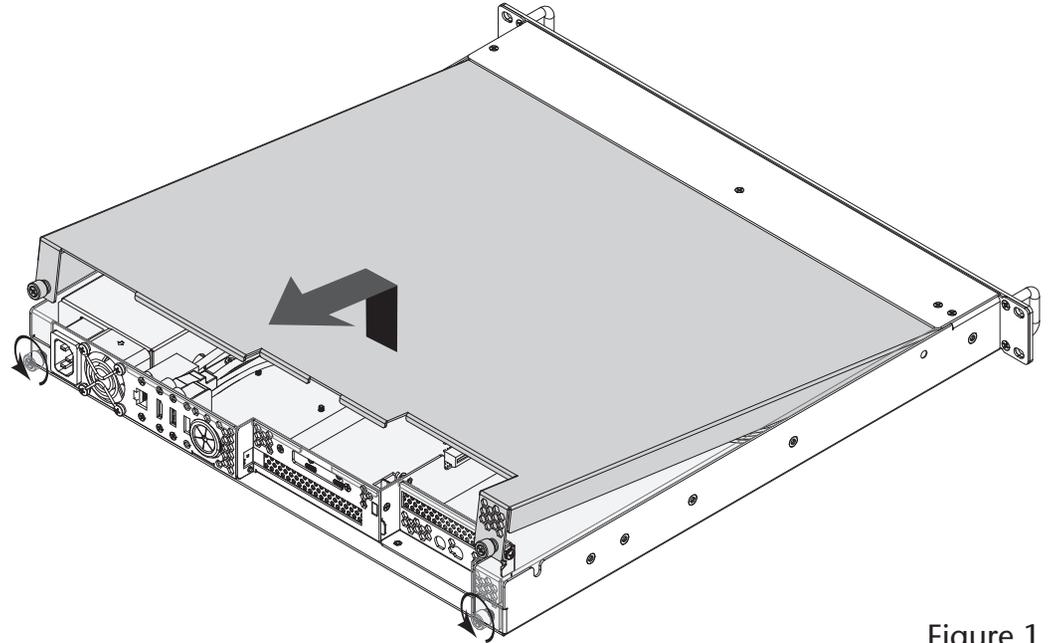


Figure 1



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.

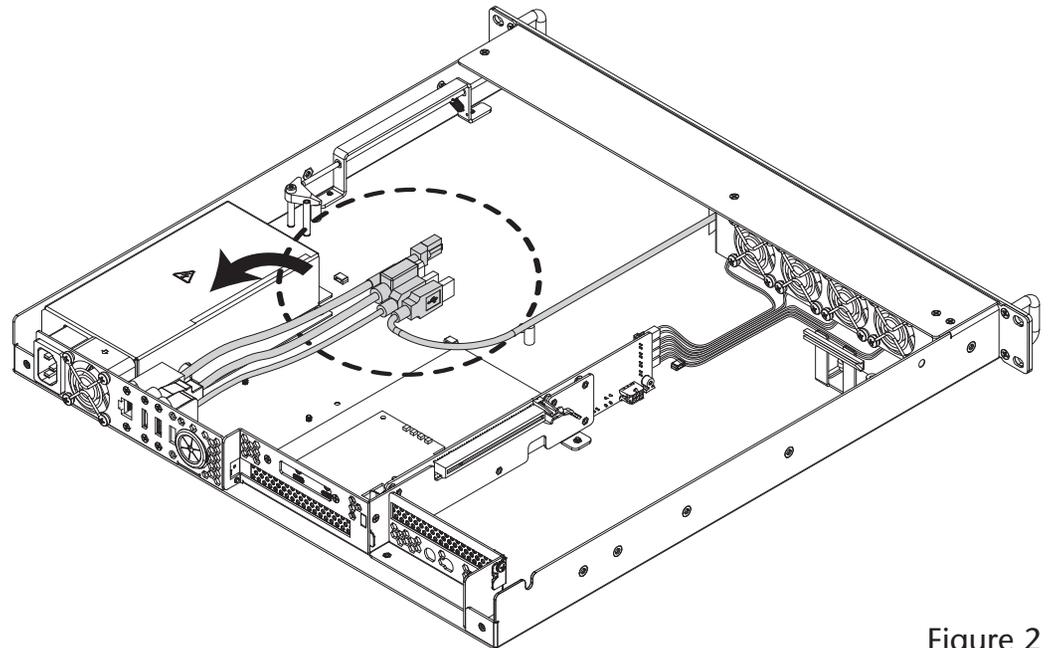


Figure 2

Chapter 3 – PCIe Cards, Computer, and xMac mini Server T3E 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**).

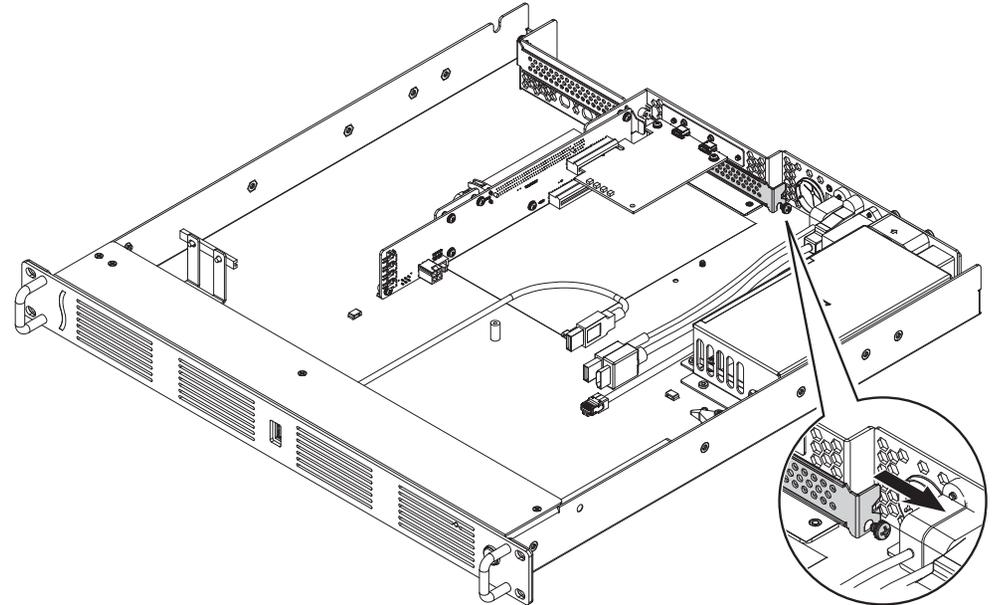


Figure 3

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**).

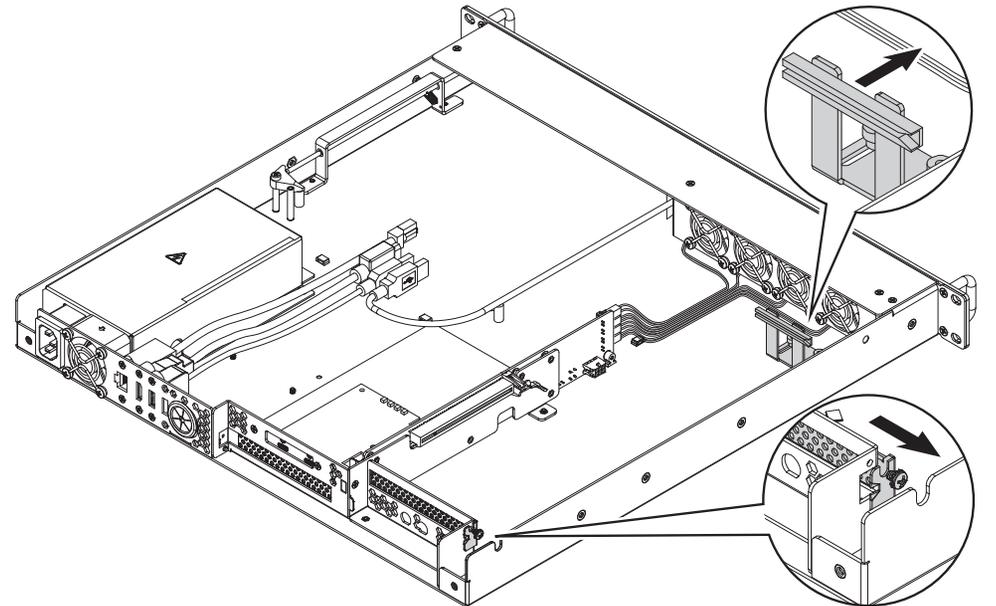


Figure 4

Chapter 3 – PCIe Cards, Computer, and xMac mini Server T3E Installation Steps

A – PCIe Cards Installation Steps (continued)

8. If desired, you may change the main fan speed switch setting (Figure 5). Refer to appendix section C at the end of this manual for more information on when the low speed setting may be used.
9. 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 13.
10. 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).
11. Using the supplied offset screwdriver, secure the card using the screw you removed previously (Figure 5).
12. 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.
13. 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.
14. 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.
15. 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).
16. Secure the card using the screw you removed previously (Figure 6).
17. If you installed a full-length card, slide the PCIe card guide onto the card, and then tighten the guide's thumbscrews (Figure 6).

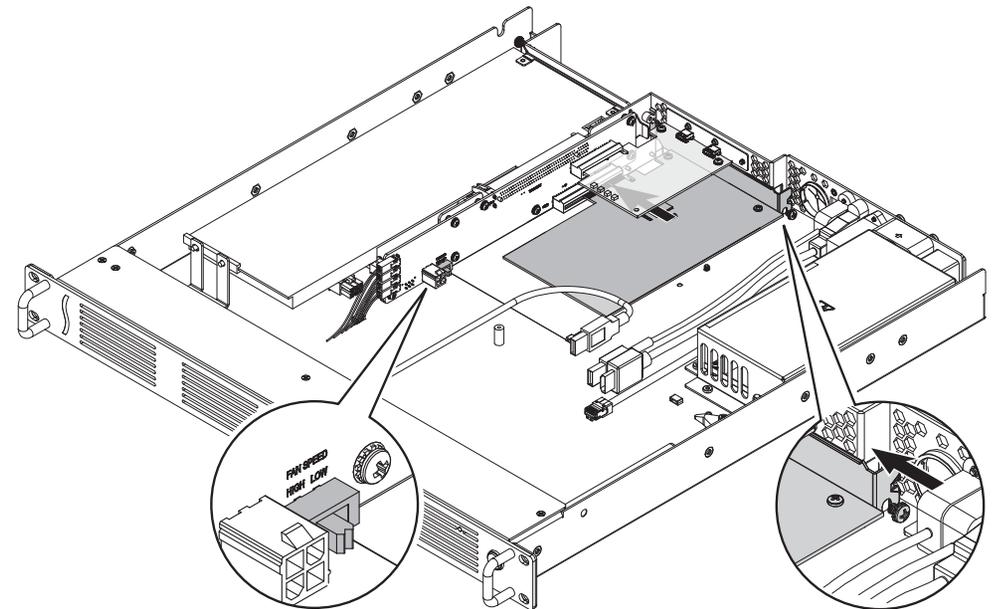


Figure 5

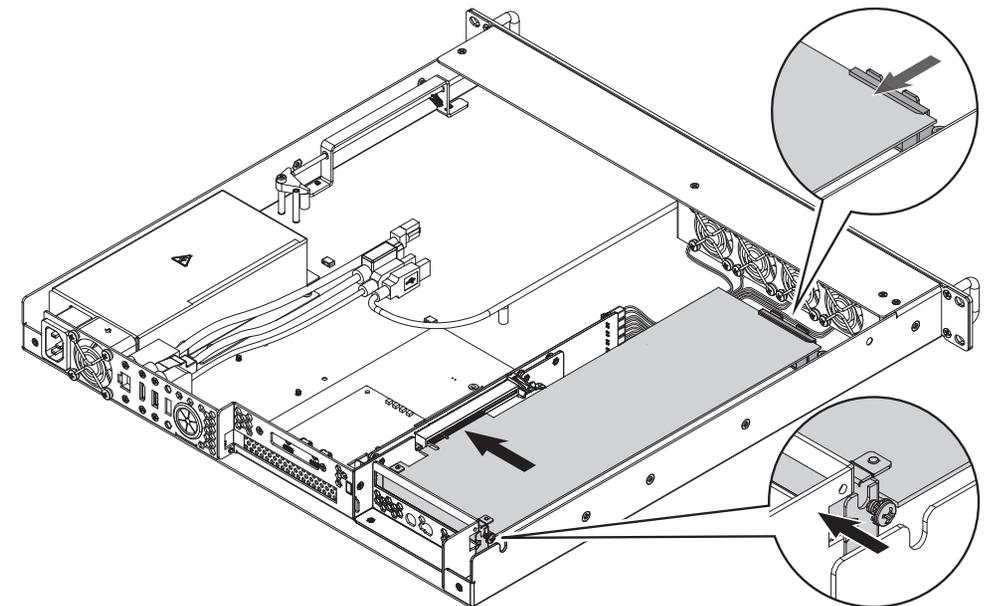


Figure 6

Chapter 3 – PCIe Cards, Computer, and xMac mini Server T3E Installation Steps

B – Mac mini Installation Steps



Support Note: Sonnet's ThunderLok™ 3 Thunderbolt connector retainer clip secures the included Thunderbolt 3 (40Gbps) cable to the xMac mini Server T3E to prevent accidental disconnects. It is compatible with Sonnet 0.5-meter and 0.7 Thunderbolt 3 (40Gbps) cables, but not compatible with Sonnet 1-meter Thunderbolt 3 (40Gbps) cables.

To attach the clip to the cable, remove both from their packaging, and then slide the connector clip completely over the connector as shown (**Figure 7**). Note that when you connect the cable to the chassis, the clip will secure the connector.

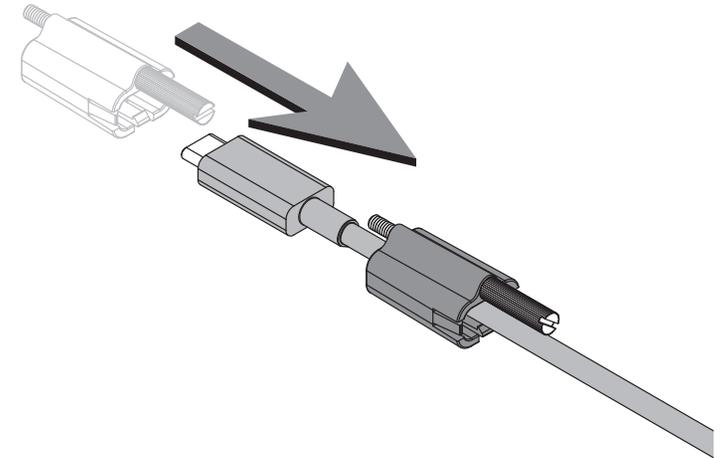


Figure 7

1. Connect one end of the supplied Thunderbolt 3 cable to either one of the xMac mini Server T3E's Thunderbolt 3 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.
2. Route any external cables that need to be connected to the computer (or PCIe cards) through the cable passthrough opening.
3. If desired, secure the cables to the bottom of the xMac mini Server with cable ties.

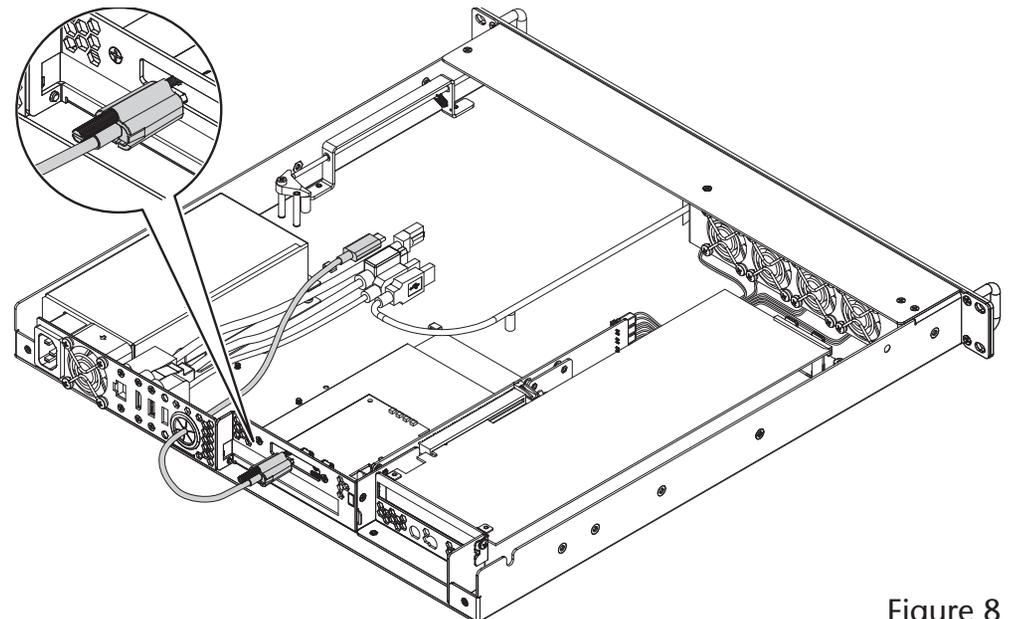


Figure 8

Chapter 3 – PCIe Cards, Computer, and xMac mini Server T3E Installation Steps

B – Mac mini Installation Steps (continued)

4. Remove the Mac mini from its packaging.
5. 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).
6. 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).

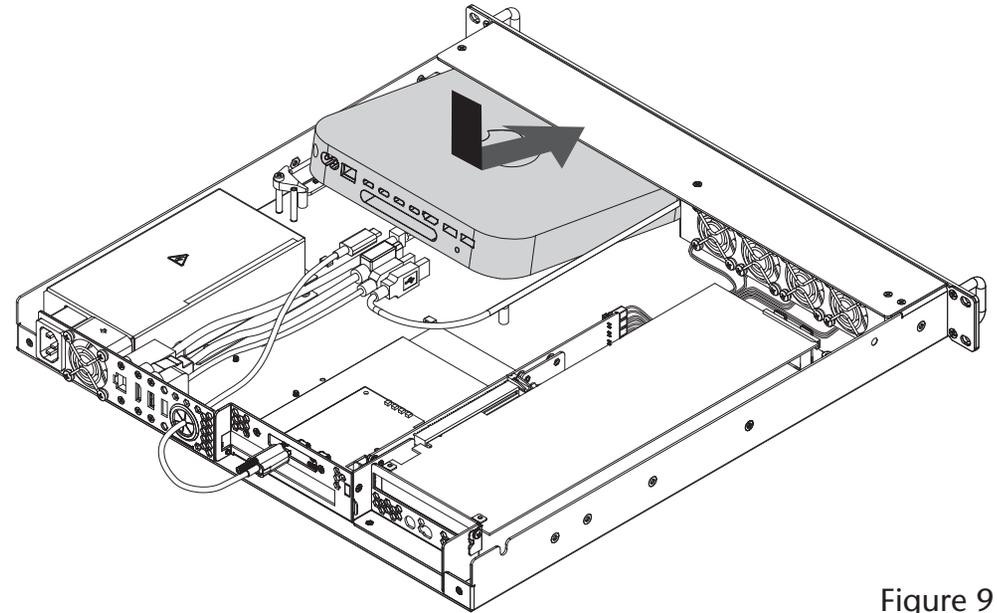


Figure 9

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

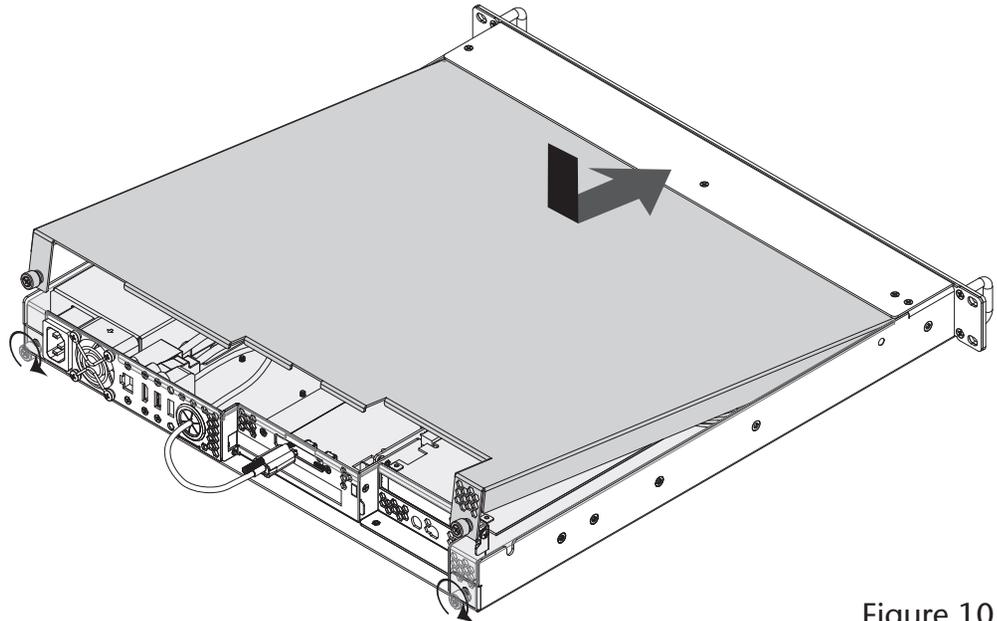


Figure 10

Chapter 3 – PCIe Cards, Computer, and xMac mini Server T3E Installation Steps

C – xMac mini Server T3E Rackmount Installation Information

You may mount xMac mini Server Thunderbolt 3 Edition into any standard 19-inch EIA compliant equipment rack at least 19 inches deep. Additional support such as rack slides or a rack shelf may be needed in mobile environments.

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 System and Installed Cards are Recognized

A – Confirm the xMac mini Server is Recognized

1. Press the power button on the front panel of the xMac mini Server T3E 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. On the connected keyboard, press and hold down the Option key, and then from the Apple menu, select System Information; a *System Information* window will open.
3. In the *System Information* window, click Thunderbolt under the Hardware header in the left column (**Figure 11**).
4. In the top right column under the Thunderbolt Device Tree header, you should see Mac mini, followed “xMac mini Server TB3 Upgrade” (**Figure 11**).

 **Support Note:** If you do not see “xMac mini Server TB3 Upgrade” 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 – Confirm the Installed Cards are Recognized

1. In the *System Information* window click PCI under the Hardware header in the left column (**Figure 12**).
2. At the top of the right column, the installed cards are listed. You should see “Yes” next to Driver Installed and Tunnel Compatible, otherwise the cards or drivers may not be Thunderbolt-compatible (**Figure 12**).

 **Support Note:** While xMac mini Server T3E requires no drivers, installed cards require Thunderbolt-compatible drivers to enable their use with xMac mini Server.

C – Install Card Drivers (If Necessary)

1. Launch a web browser, and then go to your card manufacturer's website. Download and install the latest drivers according to the manufacturer's directions.
2. Restart your computer; your xMac mini Server is ready to use!

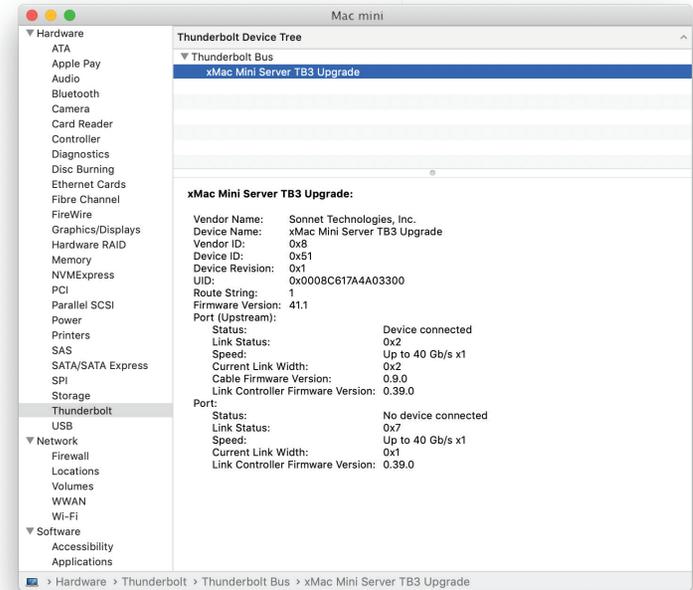


Figure 11

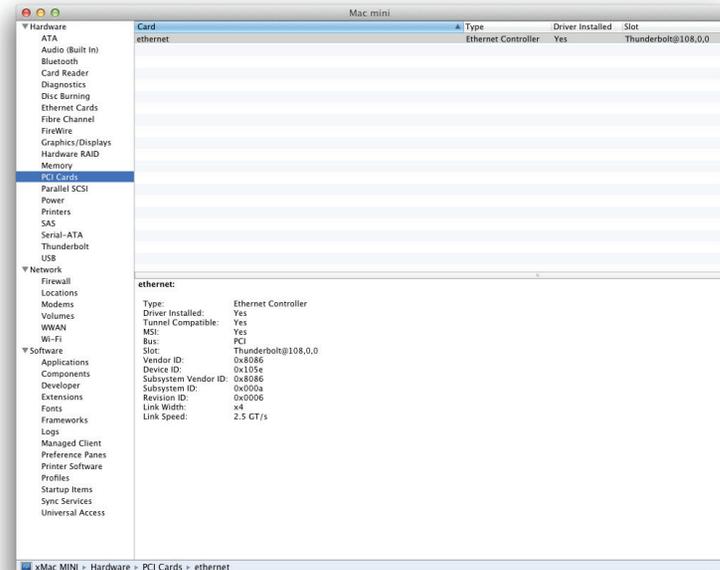


Figure 12

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 3 Peripheral Devices

The xMac mini Server T3E includes two Thunderbolt 3 ports; the first is reserved for connection to your computer, while the second supports daisy-chaining of up to five additional Thunderbolt peripheral devices.

Using Expansion Cards Without Drivers

Some Thunderbolt-compatible expansion cards, like Sonnet's Allegro™ Pro USB 3.1 PCIe and Solo10G™ PCIe card, use drivers built into the OS, and are ready to use out of the box. 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.

xMac mini Server T3E Provides Upstream Power

For connected peripheral devices requiring extra power, the xMac mini Server T3E provides up to 15 watts of power to bus-powered devices through its secondary Thunderbolt 3 port.

How to Identify Thunderbolt 3 (40Gbps) Cables

Look for the Thunderbolt icon (⚡) AND the number 3 on the connector housings to identify these cables. Cables with USB-C connectors that only have the Thunderbolt icon without the number 3 support 20Gbps speeds, and are not recommended for PCIe cards with high bandwidth requirements. Cables marked with the USB icon (🔌) are NOT compatible for use connecting your computer to the xMac mini Server T3E.

KNOWN ISSUES

Not all PCIe Cards Will Perform at 100%

xMac mini Server's bandwidth is limited to PCIe 2.0 x4. While many cards will operate at full performance, some may not due to the fact they require more bandwidth than PCIe 2.0 x4 is capable of delivering.

OS Updates May Break Compatibility

Specific device drivers that work under one operating system version may not work under a later version. It is even possible that an OS 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 – Precautions, FCC Compliance, and Support Information

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 Thunderbolt 3 Edition 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

Sonnet's Web site located at <https://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.

Email support requests generally receive the fastest responses, and are usually processed within a 24-hour period during normal business hours, excluding holidays. When you contact 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
- A macOS System Report

If further assistance is needed, please contact us at:

USA Customers

If further assistance is needed, please contact **Sonnet Customer Service** at:

Tel: 1-949-472-2772

(Monday–Friday, 9 a.m.–5 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 <https://www.sonnettech.com/support/>. Register your product online at <https://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, using the provided screws to secure the bracket through the bottom of the chassis (Figure A1).
2. Remove the screw from the top of the bracket and set it aside (Figure A1).

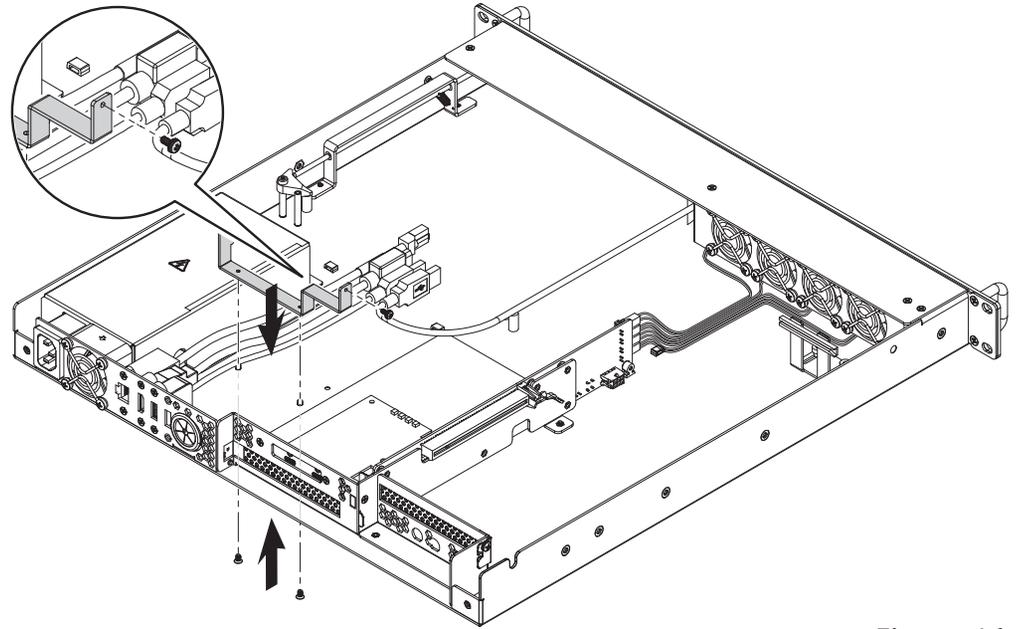


Figure A1

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 14 on page 7, and complete the setup procedure.

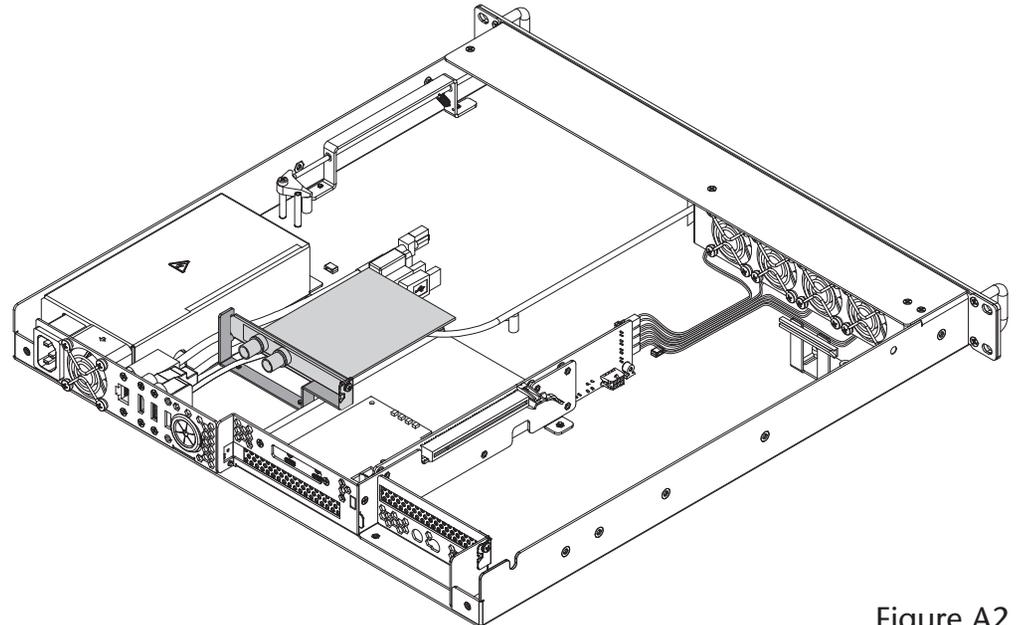


Figure A2

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 14 on page 7, and complete the setup procedure.

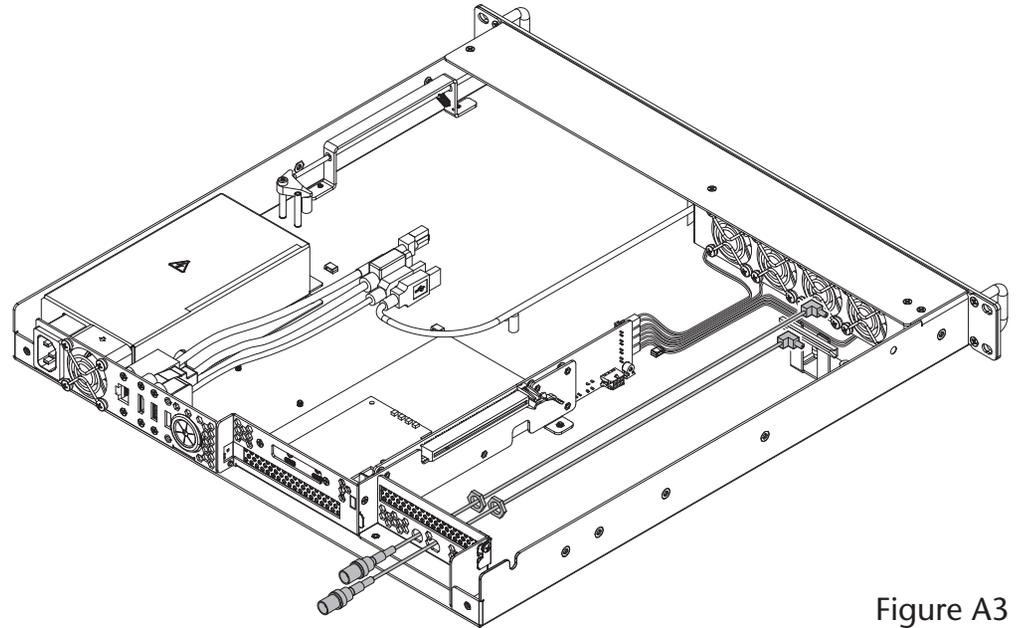


Figure A3

C – Fan Speed Setting Information

The xMac mini Server includes a fan speed switch (Figure A4) 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 PCIe 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). If you are using PCIe cards that each require less than 15W of power, then you may use this setting.

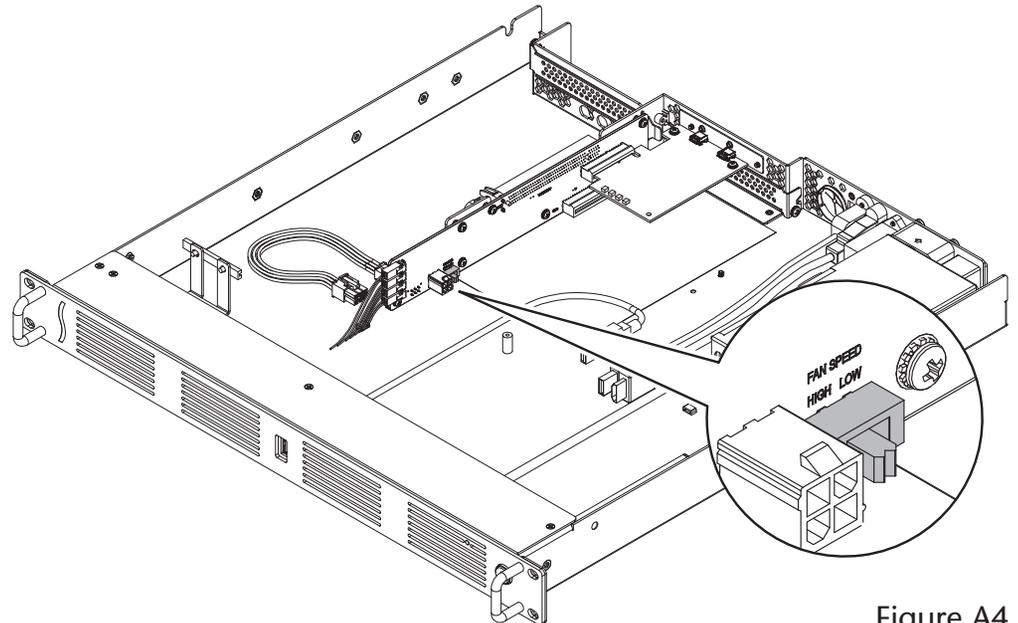


Figure A4



©2020 Sonnet Technologies, Inc. All rights reserved. Sonnet, the Sonnet logotype, Allegro, Solo10G, and xMac are trademarks of Sonnet Technologies, Inc. Mac, macOS and Mac mini are trademarks of Apple Inc., registered in the United States and other countries. Thunderbolt and the Thunderbolt logo are trademarks of Intel Corporation in the U.S. and/or other countries. Other product names are trademarks of their respective owners. Product specifications subject to change without notice. UG-XMAC-MS-A-TB3-E-C-060520