

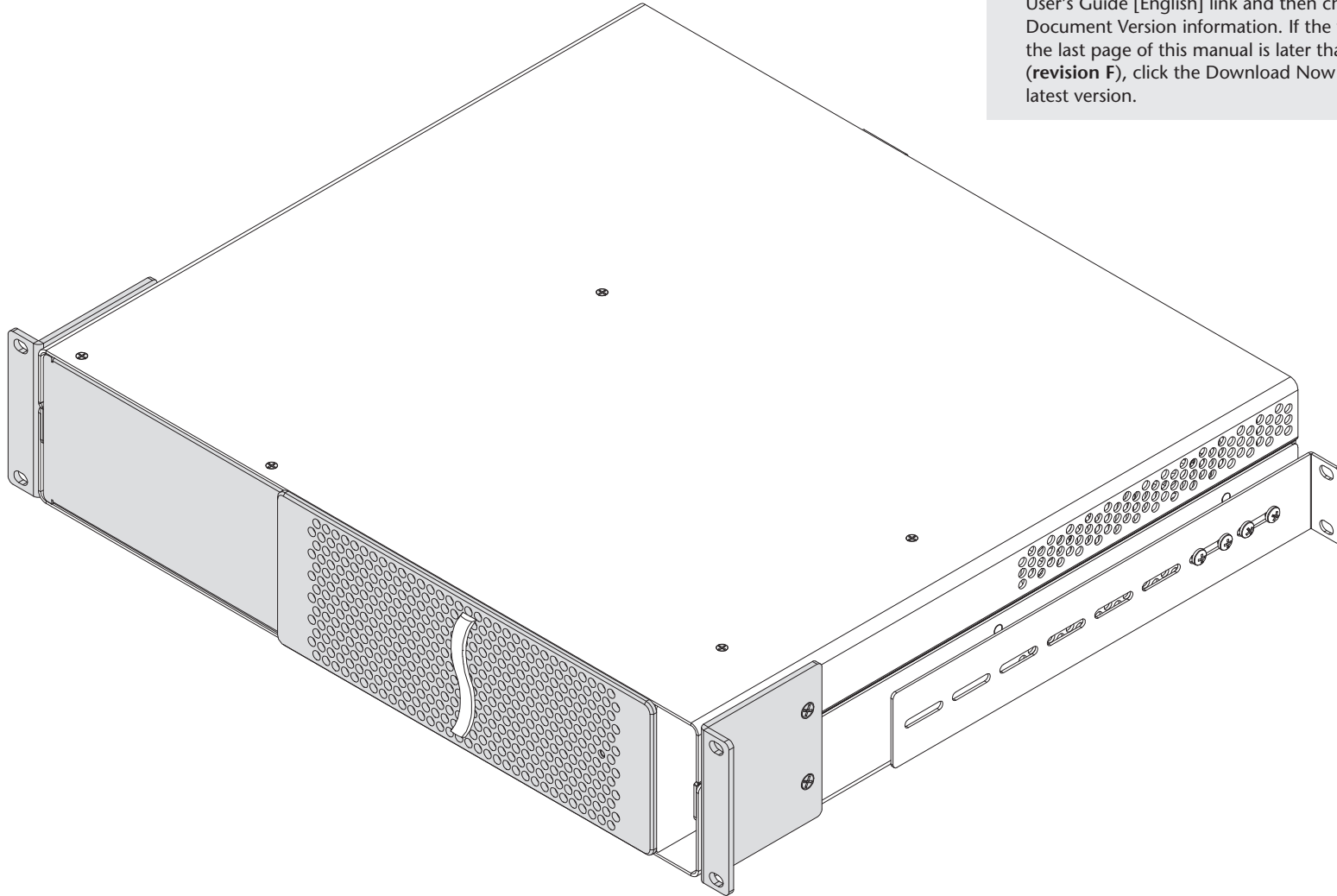
User's Guide

for Echo™ Express III-R – Thunderbolt™ 3 Edition Thunderbolt 3 to PCIe Card Expansion Chassis



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.

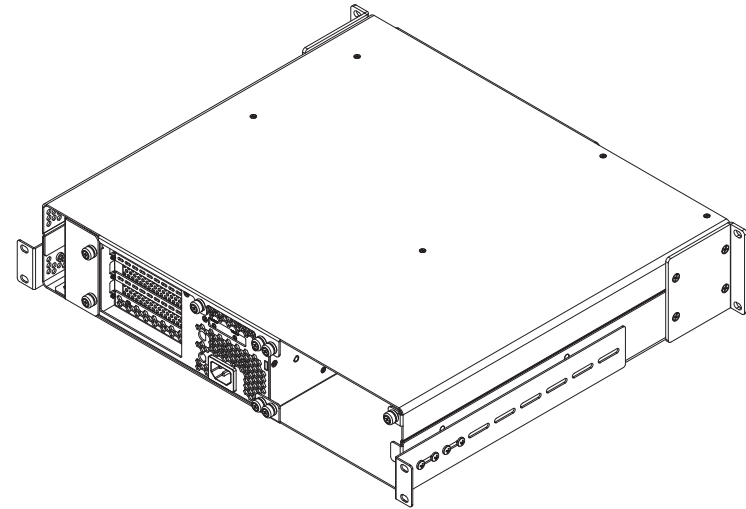
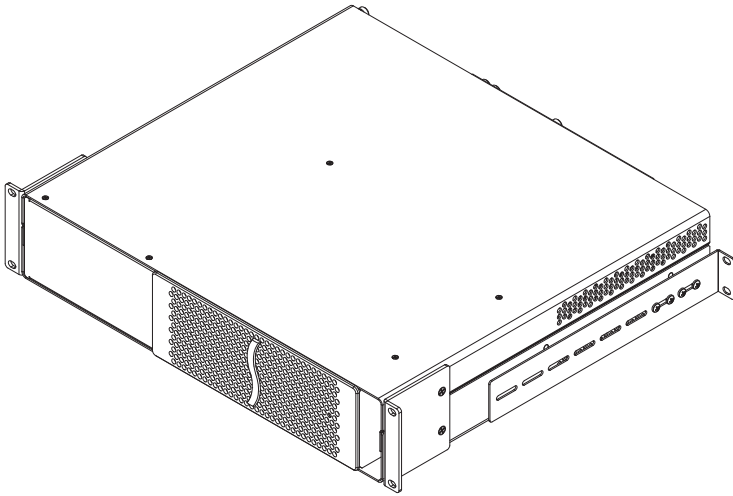
1. Go to www.sonnetech.com/support/kb/kb.php
2. Click the Thunderbolt Product link.
3. Click the Echo Express III-R - Thunderbolt 3 Edition link, and then click the Manual link.
4. Click the Echo Express III-R - Thunderbolt 3 Edition User's Guide [English] link and then check the Document Version information. If the version listed on the last page of this manual is later than this document (revision F), click the Download Now button for the latest version.



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Chapter 1 – Introduction and System Requirements



Introduction

Congratulations on your purchase! The Echo Express III-R – Thunderbolt 3 Edition (T3E) is a Thunderbolt 3 expansion system for PCIe cards. Through its PCIe slots, you may connect three non-GPU adapter cards to any computer with Thunderbolt 3 ports to expand its capabilities and add connectivity beyond what's offered through its native ports.

Mac® Compatibility

- Macs with Thunderbolt 3 ports
- Macs with Thunderbolt 2 or Thunderbolt ports via an Apple Thunderbolt 3 (USB-C) to Thunderbolt 2 Adapter plus Thunderbolt cable (both sold separately)
- macOS® 10.12.6+
- macOS Mojave compatible

Windows® Compatibility

- PCs with Thunderbolt 3 ports
- Windows 10 (64-bit Edition Version 1809 or greater)

Important Note: Windows computers require the latest BIOS and Thunderbolt drivers to support this product. Check with your computer manufacturer for update information.

Linux® Compatibility

- Linux computer with Thunderbolt 3 ports
- Linux Kernel 5.0+

System Requirements

While the Echo Express III-R T3E requires no drivers, most 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 Echo Express III-R T3E is available at: <https://sonnettech.com/support>

Preparing to Use the Echo Express Chassis With a Mac Computer

The drivers required to support the Echo Express chassis are installed as part of macOS; there are no preparation steps beyond updating your computer to macOS 10.12.6 or newer.

Preparing to Use the Echo Express Chassis With a Windows Computer

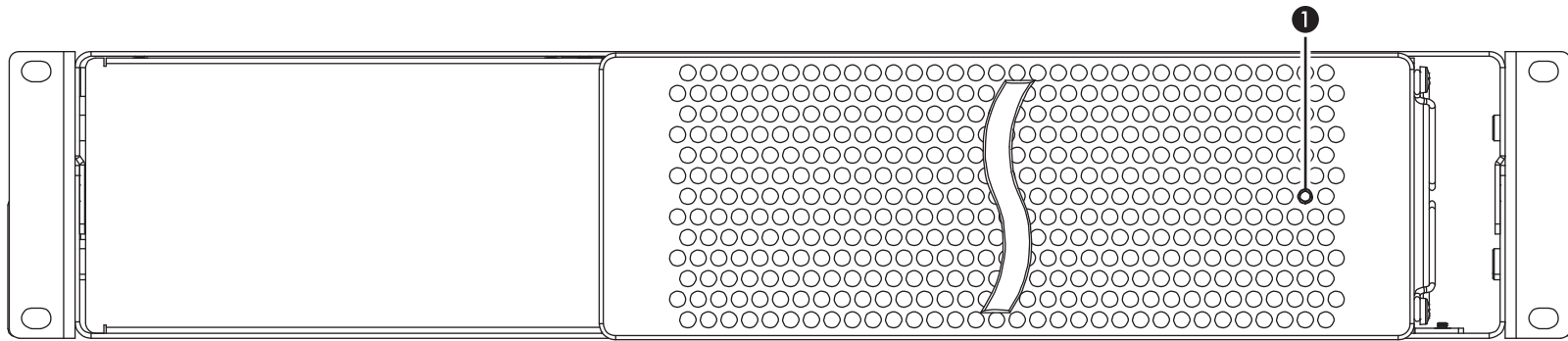
1. Update Windows. You must use Windows 10, 64-Bit **Version 1809** or newer. To check the version number, type *winver* in the search bar and click enter.
2. Update your computer's BIOS to the latest version. If you need help updating your BIOS, contact your computer manufacturer.

3. Update your Thunderbolt Bus Driver to the latest version; you will need version 16.3.61.275 or newer. To check your driver version, go to Settings:Apps:Thunderbolt(TM) Software and you will see the version number. If it is not 16.3.61.275 or newer, then you need to update it. Check with your computer manufacturer for an update.

Preparing to Use the Echo Express Chassis With a Linux Computer

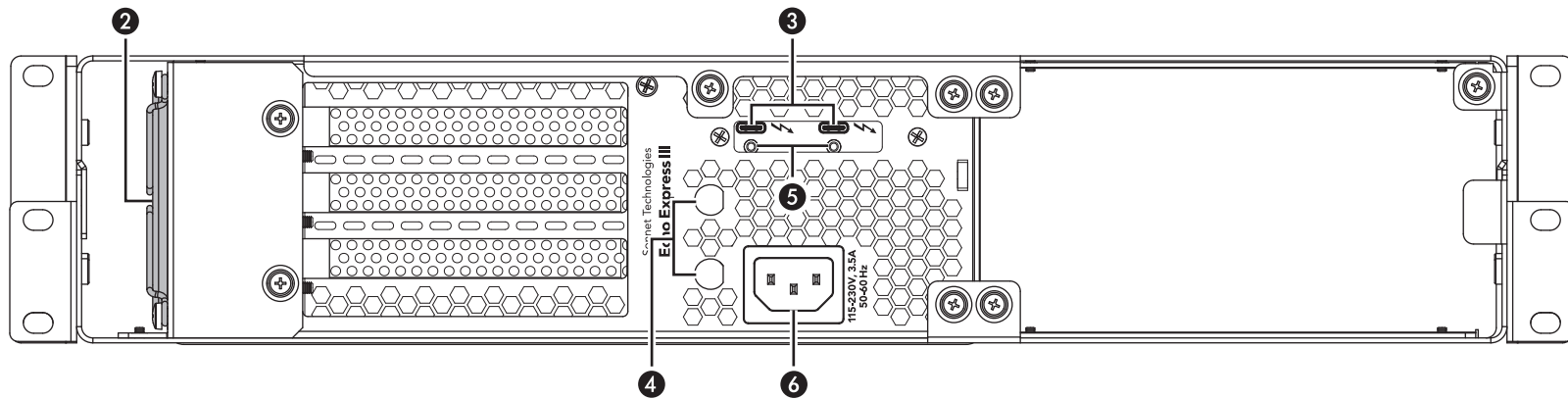
The drivers required to support the Echo Express chassis are installed as part of Linux Kernel 5.0 and later; there are no preparation steps beyond updating your computer to Linux Kernel 5.0 or later.

Chapter 2 – Echo Express III-R – Thunderbolt 3 Edition (T3E) Description



1 – Power Indicator LED

This lights when the Echo Express III-R T3E is powered, the Thunderbolt cable between the chassis and your computer is plugged in securely, and the computer powered on. Note that if the Echo chassis is connected to another Thunderbolt device instead of directly to the computer, any other Thunderbolt device connected between the computer and Echo chassis must also be powered on before the Echo chassis' power indicator will light up.



2 – Temperature-Controlled Fans

These provide cooling for the installed PCIe cards and the chassis' supporting Thunderbolt circuitry. They operate at a whisper when the cards are running cool, and automatically speed up in steps as the temperature rises. Do not block the vent holes to prevent overheating.

3 – Thunderbolt Ports

Connect the included Thunderbolt cable, or comparable Thunderbolt 3 (40Gbps) cable, between either port and your computer's Thunderbolt port (or other Thunderbolt device in the chain connected to the computer).

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).

4 – BNC Connector Mounting Holes

These accommodate the installation of BNC connectors like those used for HD/SDI output for the RED ROCKET-X transcoding card, or for MADI and word clock input and output from cards like RME's HDSPe MADI FX.

5 – Threaded Nuts for ThunderLok 3

Attach the included Thunderbolt connector retainer clip here. Also compatible with ThunderLok 3L.

6 – Power Input Socket

Connect the included AC power cable here.

Chapter 2 – Echo Express III-R Description

1 – PCIe Card Bracket Locking Plate

This secures installed PCIe cards and port access covers in place.

2 – Port Access Covers

These cover openings in the chassis when PCIe slots are unoccupied.

3 – Slot 1

This is an x8 electrical (x8 mechanical) PCIe 3.0 slot. It is also compatible with PCIe 2.0 and 1.1 cards.

4 – Slot 2

This is an x8 electrical (x16 mechanical) PCIe 3.0 slot. It is also compatible with PCIe 2.0 and 1.1 cards.

5 – Slot 3

This is an x4 electrical (x8 mechanical) PCIe 3.0 slot. It is also compatible with PCIe 2.0 and 1.1 cards.

6 – Thunderbolt Interface Card

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

7 – 6-Pin Auxilliary Power Connector

Plugged into this connector is the auxiliary power cable for cards requiring extra power.

8 – PCIe Card Guides

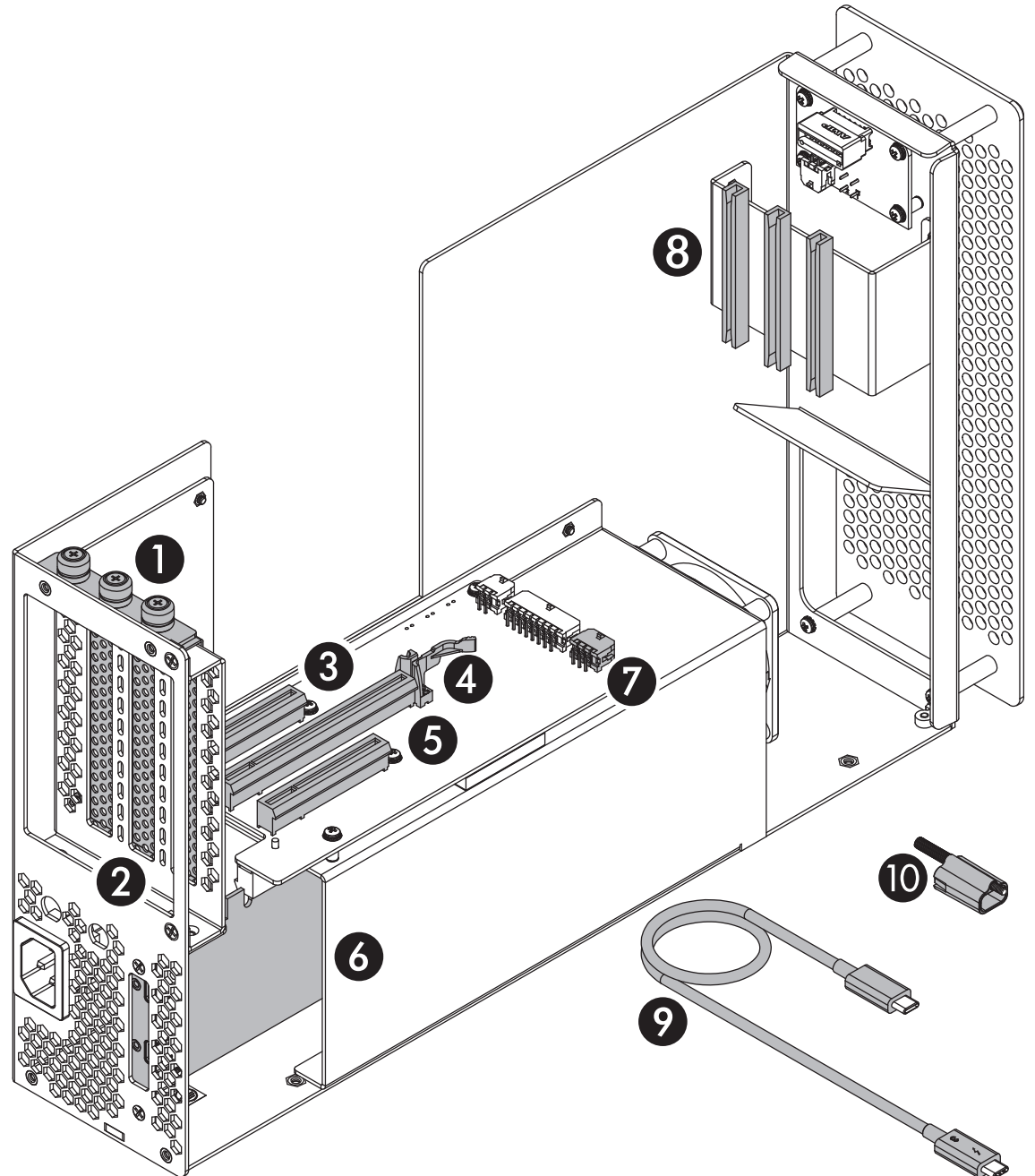
When installing full-length cards, use these to support and secure the cards.

9 – Thunderbolt 3 (40Gbps) Cable

Connect this cable between the Echo chassis and your computer (or other Thunderbolt device in the chain connected to the computer). Connecting the Echo chassis to a computer port marked with the USB icon (🔌) is NOT supported.

10 – Thunderbolt Connector Retainer Clip

This clip secures the Thunderbolt 3 connector plugged into one of the Echo chassis' Thunderbolt 3 ports to prevent accidental cable disconnection. This clip is compatible with Sonnet 0.5- and 0.7-meter Thunderbolt 3 cables, but not with Sonnet 1- or 2-meter Thunderbolt 3 cables.



Chapter 3 – PCIe Card Installation and Chassis Setup Steps

1. Remove the Echo Express III-R – Thunderbolt 3 Edition (T3E) from its packaging, and then set it on a flat, level surface.
2. Using a Phillips screwdriver, adjust or remove the rackmount extension rails, if necessary, by removing the four screws securing each one to the side of the enclosure. As necessary, set the rails in place and secure them to the enclosure with no fewer than two screws on each rail (**Figure 1**).

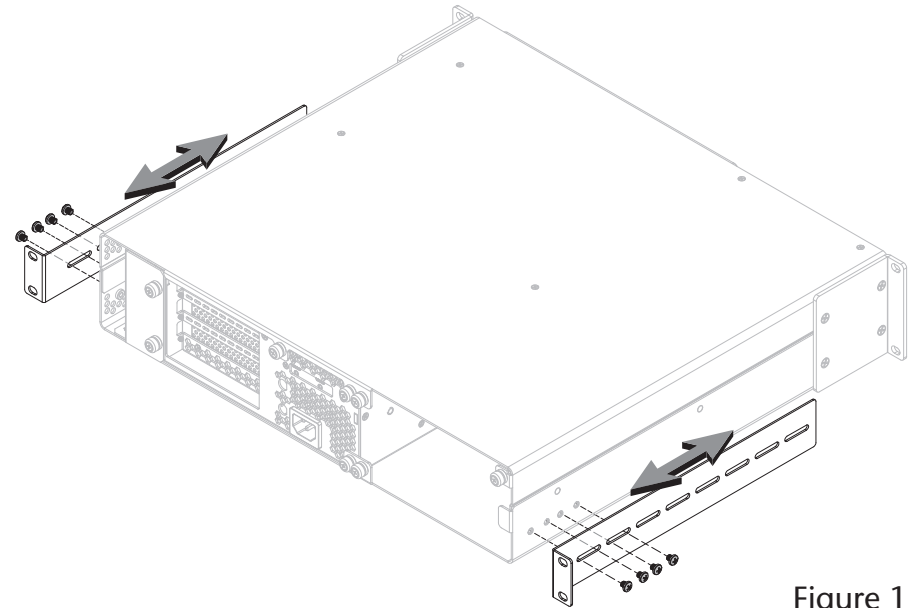


Figure 1

3. Loosen the five thumbscrews securing the inner assembly to the rackmount enclosure (**Figure 2**).
4. Push the back of the inner assembly into the enclosure, and then gently pull out the inner assembly through the front of the enclosure (**Figure 2**).

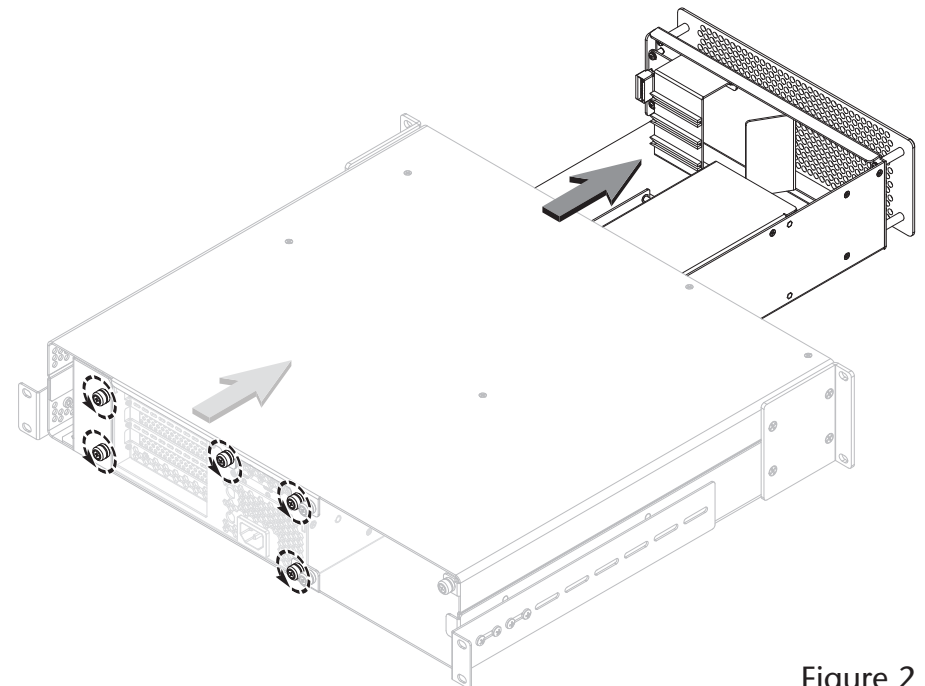


Figure 2

Chapter 3 – PCIe Card Installation and Chassis Setup Steps

5. OPTIONAL STEP: If you are going to install an optional Sonnet mobile rack device mounting kit into the III-R T3E, remove and set aside the six screws securing the blank plate inside the enclosure, and then remove and set aside the cover plate (Figure 3).
6. OPTIONAL STEP: Due to its size and weight, we recommend that you install the empty rackmount enclosure now. If you don't have full access to the back of the rack into which you'll install the III-R T3E, or you are installing an optional mobile rack device mounting kit into a III-R T3E that will reside in a mobile cart or rack, wait to install the assembled III-R T3E until instructed to do so.

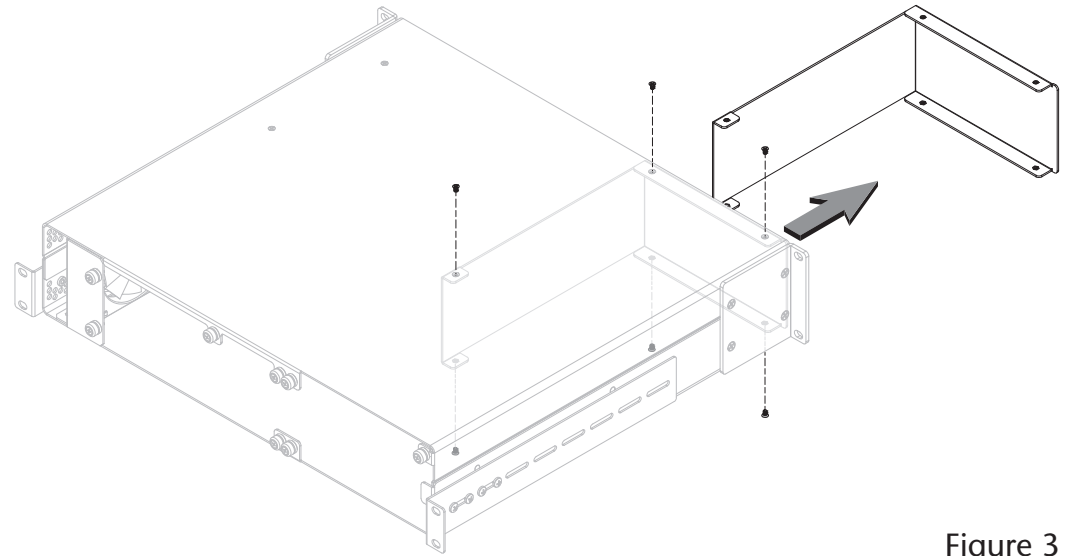




Figure 3

 **Support Note:** To avoid damaging components due to static electricity discharge, wear an antistatic wrist strap while working inside the Echo Express chassis.

7. Turn the inner assembly so the PCIe slots are facing up (Figure 4).
8. Loosen all three thumbscrews of the PCIe card bracket locking plate, and then remove and set it aside (Figure 4).
9. Remove and set aside the port access covers (Figure 4).

 **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 Echo chassis' circuit boards and any of its components.

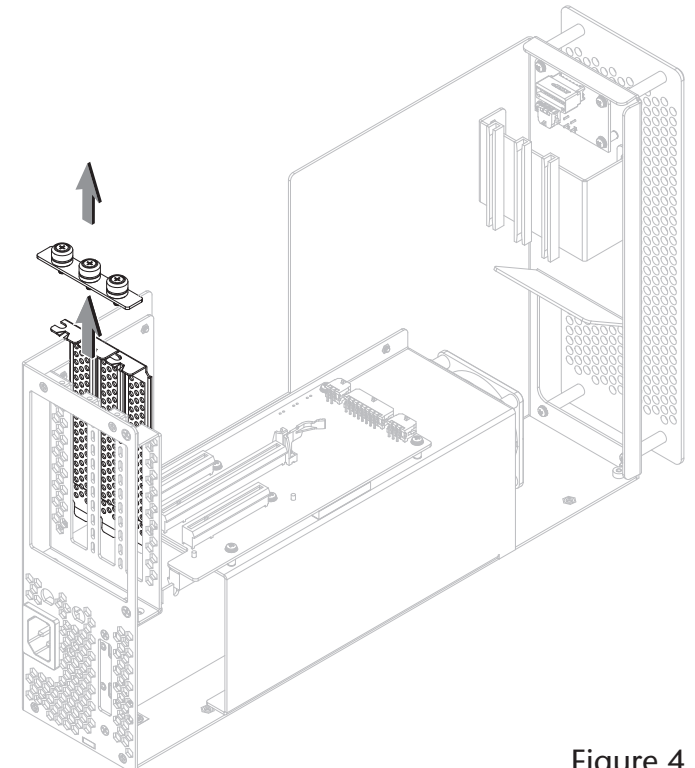


Figure 4

Chapter 3 – PCIe Card Installation and Chassis Setup Steps

10. **OPTIONAL STEP:** If you are installing a PCIe card which requires additional power and must be connected to auxiliary power, locate the wire harness connected the 6-pin connector indicated in the graphic to the right (**Figure 5**). Remove the cable twist tie securing the wire harness, and move the loose connector aside for later connection. Otherwise, go to the next step.



Support Note: If you are installing an Avid Pro Tools|HDX PCIe card, you will need to disconnect the Echo chassis' auxiliary power wire harness plugged into the 6-pin connector indicated in **Figure 5**, and replace it with the one included with the Avid card.

11. **OPTIONAL STEP:** If you are installing BNC connectors into the chassis' mounting holes, skip to the appendix at the end of the document for instructions. Otherwise, go to the next step.
12. Remove a PCIe card from its packaging, handling the card by its edges and without touching any components or gold connector pins.



Support Note: If you are installing a x8 PCIe 1.1 card like the original RED ROCKET (not RED ROCKET-X) or certain 10 Gigabit Ethernet cards, installing it into slot 3 may result in reduced performance. We recommend you install it into either slot 1 or 2 for best performance.

13. Line up the card's connector with the slot, and then gently but firmly press the card straight 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**).
14. Repeat steps 12 and 13 as necessary with any remaining cards.
15. If you installed a card which requires auxiliary power, connect the auxiliary power connector to it now. If you installed cables with BNC connectors into the chassis, connect them to the card you installed.
16. If there are any unoccupied slots, install the port access covers you removed previously (**Figure 6**).
17. Secure the cards and port access covers using the previously-removed PCIe card bracket locking plate (**Figure 6**).

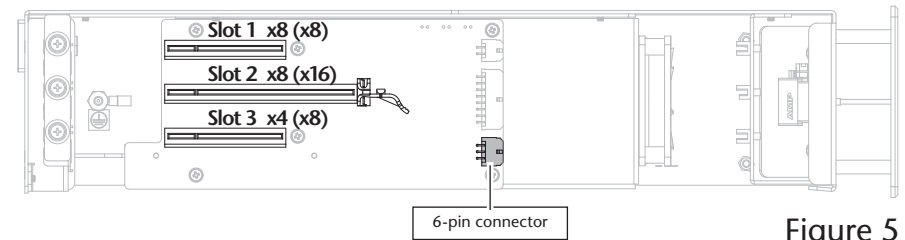


Figure 5

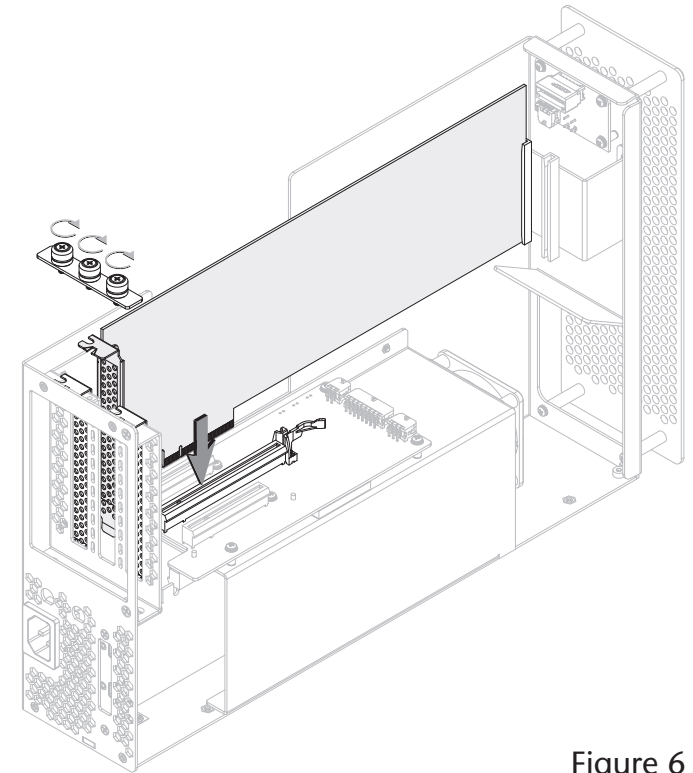


Figure 6

Chapter 3 – PCIe Card Installation and Chassis Setup Steps

18. OPTIONAL STEP: If you are also installing a Sonnet mobile rack device mounting kit, refer to its user's guide now for instructions about installing it and the inner assembly. Otherwise, go to the next step.
19. Gently push the inner assembly back inside the rackmount enclosure (Figure 7).
20. Secure the inner assembly to the rackmount enclosure by tightening the five thumbscrews clockwise (Figure 7).
21. If you haven't already installed the Echo Express III-R T3E into its rack, do so now.



Support Note: Sonnet's ThunderLok™ 3 Thunderbolt connector retainer clip secures the included Thunderbolt 3 (40Gbps) cable to the Echo chassis to prevent accidental disconnects. This clip is compatible with Sonnet 0.5- and 0.7-meter Thunderbolt 3 cables, but not with Sonnet 1- or 2-meter Thunderbolt 3 cables.

To attach the clip to the cable, remove both items from their packaging, and then insert the connector into the connector clip as shown (Figure 8). Note that the connector will pass all the way through the clip; when you connect the cable to the chassis, the clip will secure the connector.

22. Connect the included Thunderbolt cable (or a comparable Thunderbolt 3 [40Gbps] cable) between the Thunderbolt 3 port on the Echo chassis and a Thunderbolt 3 port on your computer, or other Thunderbolt device in the chain connected to the computer (Figure 8). Note that cables marked with the USB icon (🔌) are NOT compatible. Secure the retainer clip to the chassis if you attached it. If you are daisy chaining additional Thunderbolt devices, connect another Thunderbolt cable between the downstream device and the open Thunderbolt port on the Echo chassis.
23. Connect interface cables between devices, PCIe cards, and computer as necessary.
24. Connect the included power cord between a wall outlet or power strip and the Echo chassis' power socket. Note that the Echo Express III-R T3E's power indicator will not light until the computer and any other Thunderbolt device connected between it and the Echo chassis is powered on.

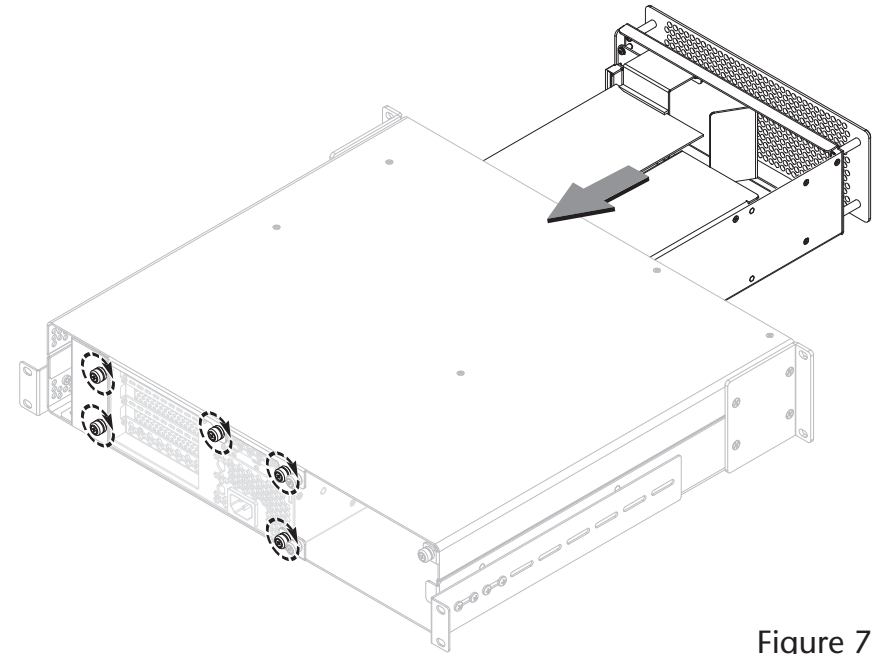


Figure 7

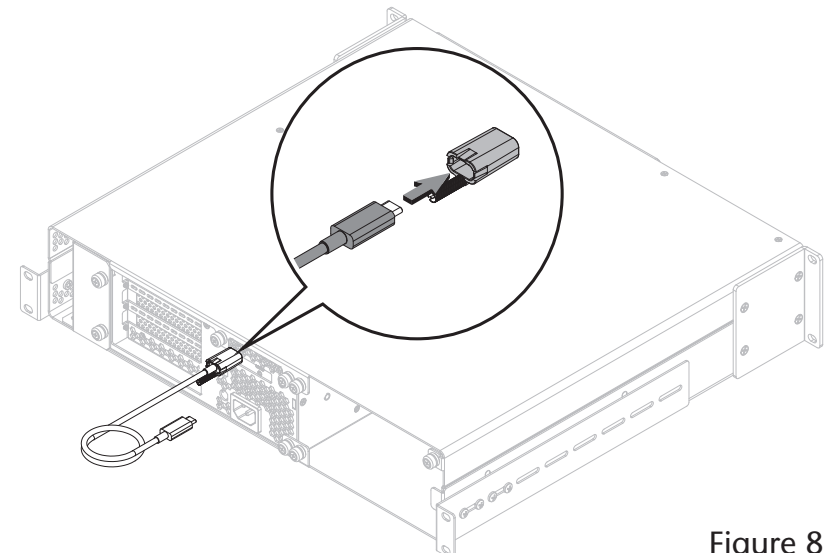


Figure 8

Chapter 4 – Complete Setup and Configuration

SETUP AND CONFIGURATION STEPS—MAC USERS

This page instructs Mac users how to verify the Echo chassis and installed cards are recognized by the computer; Windows users should skip to the next page.

A – Confirm the Echo Express III-R T3E Chassis is Recognized

1. With the Echo chassis powered and connected to the computer, turn on the computer.
2. 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 9).
4. In the top right column under the Thunderbolt Device Tree header, you will see Thunderbolt Bus, and then “Echo Express III TB3” (Figure 9).



Support Note: If “Echo Express III TB3” is not listed, disconnect and reconnect the Thunderbolt cable between the computer and Echo chassis. 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 10).
2. At the top of the right column, installed cards are listed (if not, you may to install drivers before the cards are recognized). Click one of the cards; you should see “Yes” next to Driver Installed and Tunnel Compatible, otherwise the card or driver may not be Thunderbolt-compatible (Figure 10).



Support Note: While the Echo Express III-R T3E expansion chassis requires no drivers, installed cards require Thunderbolt-compatible drivers to enable their use.

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 Echo chassis is ready to use!

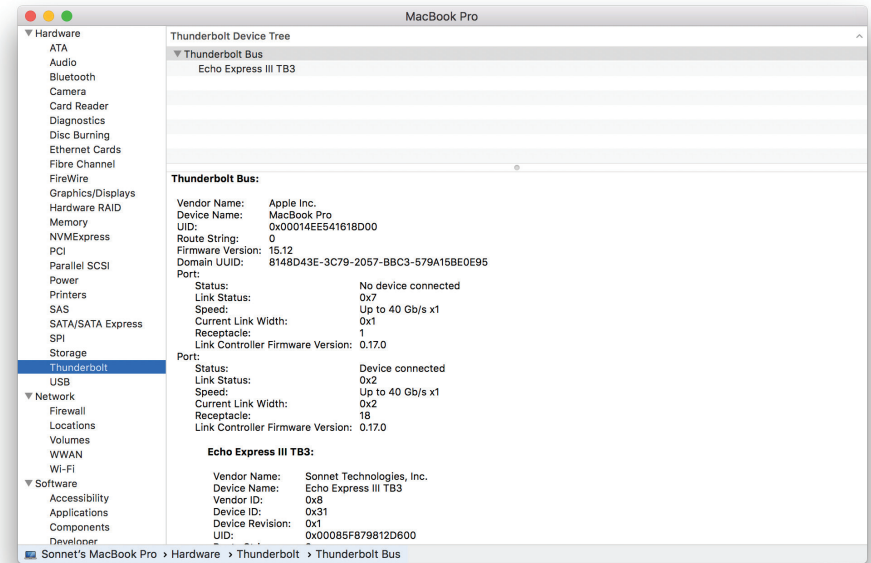


Figure 9

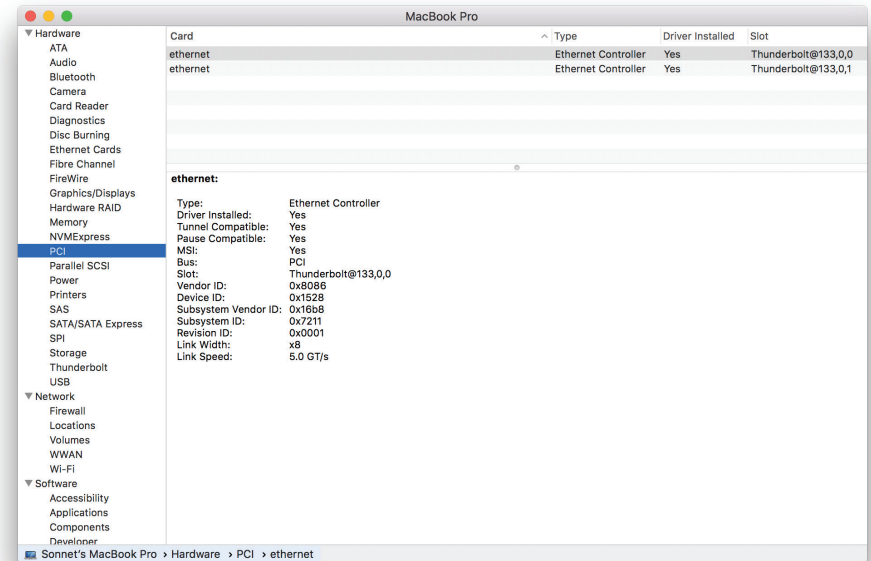


Figure 10

Chapter 4 – Complete Setup and Configuration

SETUP AND CONFIGURATION STEPS—WINDOWS USERS

A – Confirm the Echo Express III-R T3E Chassis and Installed Cards Are Recognized

1. With the Echo chassis connected to a power source and to the computer, turn on the computer. Note that if there are any other Thunderbolt devices connected between the Sonnet chassis and your computer, they must also be powered for you to perform the following steps.
2. When the computer boots for the first time after you connected the Echo chassis, an *Approve New Thunderbolt™ Devices* window appears. From the drop-down menu select Always Connect, and then click OK.
3. Right-click the Windows Start button, and then select Manage; the *Computer Management* window appears.
4. In the *Computer Management* window, click the category of each card type you installed to expand the listing; a generic adapter listing will appear. After their drivers are installed, the listings will change to display the names of the installed cards.

B – 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 Echo chassis is ready to use!

Chapter 5 – Tips, General Information, and Known Issues

TIPS, GENERAL INFORMATION

Keeping the Cards Cool

With its optimized airflow design and temperature-controlled fan providing cooling at all times, the Echo Express III-R T3E provides adequate cooling for the installed cards. *Do not operate the Echo chassis with its cover off, and do not block any of the vents!* Otherwise, the installed cards and Echo chassis' components may overheat.

Hot Plugging the Echo Express III-R T3E

When certified Thunderbolt-compatible cards (used with Thunderbolt-compatible drivers) are installed in the Echo Express III-R T3E, you may connect and disconnect the chassis while the computer is on. Of course, if you have anything connected to the cards, such as storage devices, cameras, etc., follow proper procedures for disconnecting those devices before unplugging the Echo chassis.

There's No Need to Unplug the Power Cable

Because Echo Express III-R T3E automatically powers on and off with the computer to which it's connected, there's no power switch, nor is there any need to disconnect the power cable under normal use.

Power Indicator LED Operation

The chassis automatically powers on and off with the computer to which it's connected, and its power indicator only lights when the computer is on and turns off when the computer is sleeping or powered off.

Connecting Additional Thunderbolt 3 Peripherals

The Echo Express III-R 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 Installing Drivers

Some Thunderbolt-compatible expansion cards, like Sonnet's Allegro™ Pro USB 3.1 PCIe cards, use inbox (built into the operating system) drivers, and are ready to use out of the box.

Replacing a Card After Initial Installation

Shut down the computer, and then disconnect the power adapter and Thunderbolt cables from the Echo Express III-R T3E before opening the chassis and replacing the card.

PCIe CARDS ARE NOT HOT-PLUGGABLE!

Never install a PCIe card into Echo chassis while it is connected to a computer or power outlet! If you do, you risk injury, and damage to the card, chassis, and computer.

Echo Express III-R T3E Provides Upstream Power

The Echo Express III-D T3E can provide up to 15 watts to bus-powered Thunderbolt 3 peripheral devices, enabling them to operate without connecting an additional power adapter.

Using the Echo Chassis to Charge Your Notebook Computer or Laptop Computer With Thunderbolt 3

Apple® MacBook Air® and MacBook Pro®, and some PC laptop computers with Thunderbolt 3 may be charged *slowly* via the Echo chassis' Thunderbolt 3 port (via 15W Power Delivery). Computers with Thunderbolt 2 or Thunderbolt ports cannot be charged via Thunderbolt.

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 may only support 20Gbps speeds, and are not recommended for PCIe cards with high bandwidth requirements. Cables marked with the USB icon (🔌) are NOT compatible for connecting the Echo chassis to the computer.

KNOWN ISSUES

Not All Computers' Thunderbolt 3 Performance is Equal

While this product features a 40Gbps Thunderbolt 3 interface, some computers equipped with Thunderbolt 3 use an implementation of Thunderbolt 3 that limits PCIe performance to 20Gbps. Mid-2017 and earlier 13-inch MacBook Pro computers with four Thunderbolt 3 ports have this limitation in the two right-hand Thunderbolt 3 ports, while offering full performance from the left-hand ports.

Not all PCIe Cards Will Perform at 100%

Thunderbolt 3's PCIe bandwidth is limited to 40Gbps. While most cards will operate at full performance, some may not due to the fact they require more bandwidth than Thunderbolt 3 is capable of supporting.

Not All Thunderbolt 3 Cables Deliver Full Performance

Full performance from the Echo chassis requires the use of the included Thunderbolt 3 (40Gbps) cable (which also supports up to 100W power delivery), or a comparable Thunderbolt 3 cable. When shopping for a Thunderbolt 3 cable, please be aware that some support only lower data transfer speeds (20Gbps).

Operating System (OS) Updates May Break Compatibility

Specific device drivers that work under one OS version may not work under a later version. Before updating your computer to the latest OS, we recommend that you contact your PCIe card's manufacturer to verify that the existing drivers work. Note that other software updates for the computer may also break compatibility.

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 to or farther from the computer 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.

- Do not attempt to modify the enclosure. If this device appears to be malfunctioning, contact your reseller or local distributor.
- Do not drop the chassis; dropping or mishandling chassis may result in a malfunction leaving the product inoperable.
- Do not insert your fingers or foreign objects inside the slot(s).
- 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, unplug it from the electrical outlet immediately.
- 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

Echo Express III 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 contacting 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 System Report (macOS) or a Microsoft System Information MSINFO32 (Windows) report (Windows), along with a description of the issue(s) you are encountering with your device

If further assistance is needed, please contact us at:

USA, Canada, or Mexico Customers

Please contact **Sonnet Customer Service** at:

E-mail: support@sonnettech.com

Tel: 1-949-472-2772

(Monday–Friday, 9 a.m.–5 p.m. Pacific Time)

For Customers Outside North America

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. Remember to register your product online at <https://registration.sonnettech.com> to be informed of future upgrades and product releases.

Appendix A – BNC Connector Installation Steps

1. Remove and set aside the two screws securing the Thunderbolt interface card to the inner assembly (Figure A-1).
2. Gently push down on the edge of the card to disengage the card from its slot (Figure A-1).
3. Grasping the card by its edges, rotate the card out of the inner assembly, and then pull it out (Figure A-2). Set aside the Thunderbolt interface card on flat surface, component side down.
4. Insert the BNC cables through the BNC connector mounting holes in the inner assembly (Figure A-3). Route the cables out over the top of the PCIe slot riser card.
5. Slide the connector nuts over the BNC cables, and then secure the connectors to the inner assembly (Figure A-3).
6. Grasping the Thunderbolt interface card by its edges, insert the card back into the inner assembly (Figure A-4).
7. Line up the card's connector with the slot, and then gently but firmly press the card straight 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 A-5).
8. Using the two screws you removed previously, secure the Thunderbolt interface card to the inner assembly; **do not overtighten the screws** (Figure A-5).
9. Return to step 12 on page 6 to complete the PCIe card and chassis setup steps.

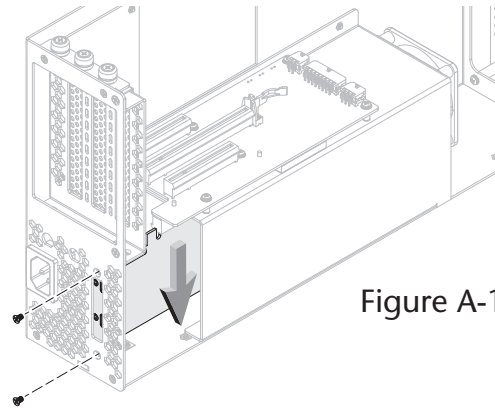


Figure A-1

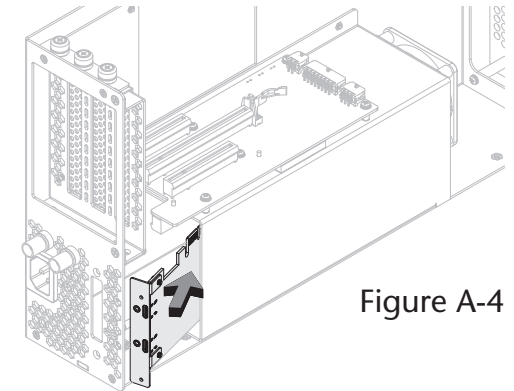


Figure A-4

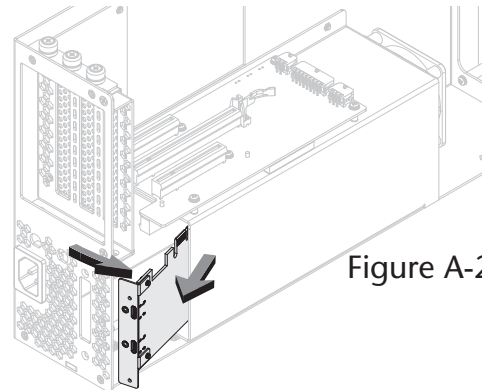


Figure A-2

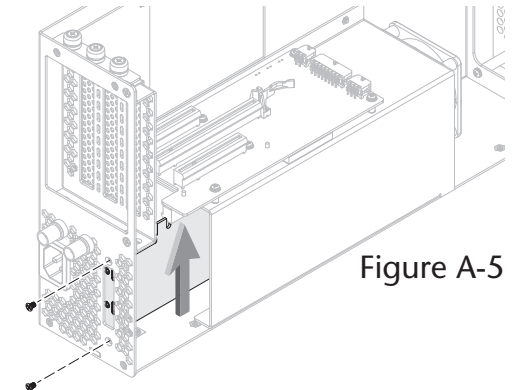


Figure A-5

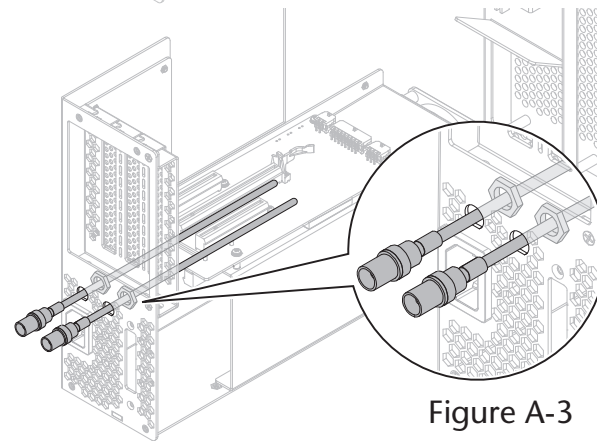


Figure A-3