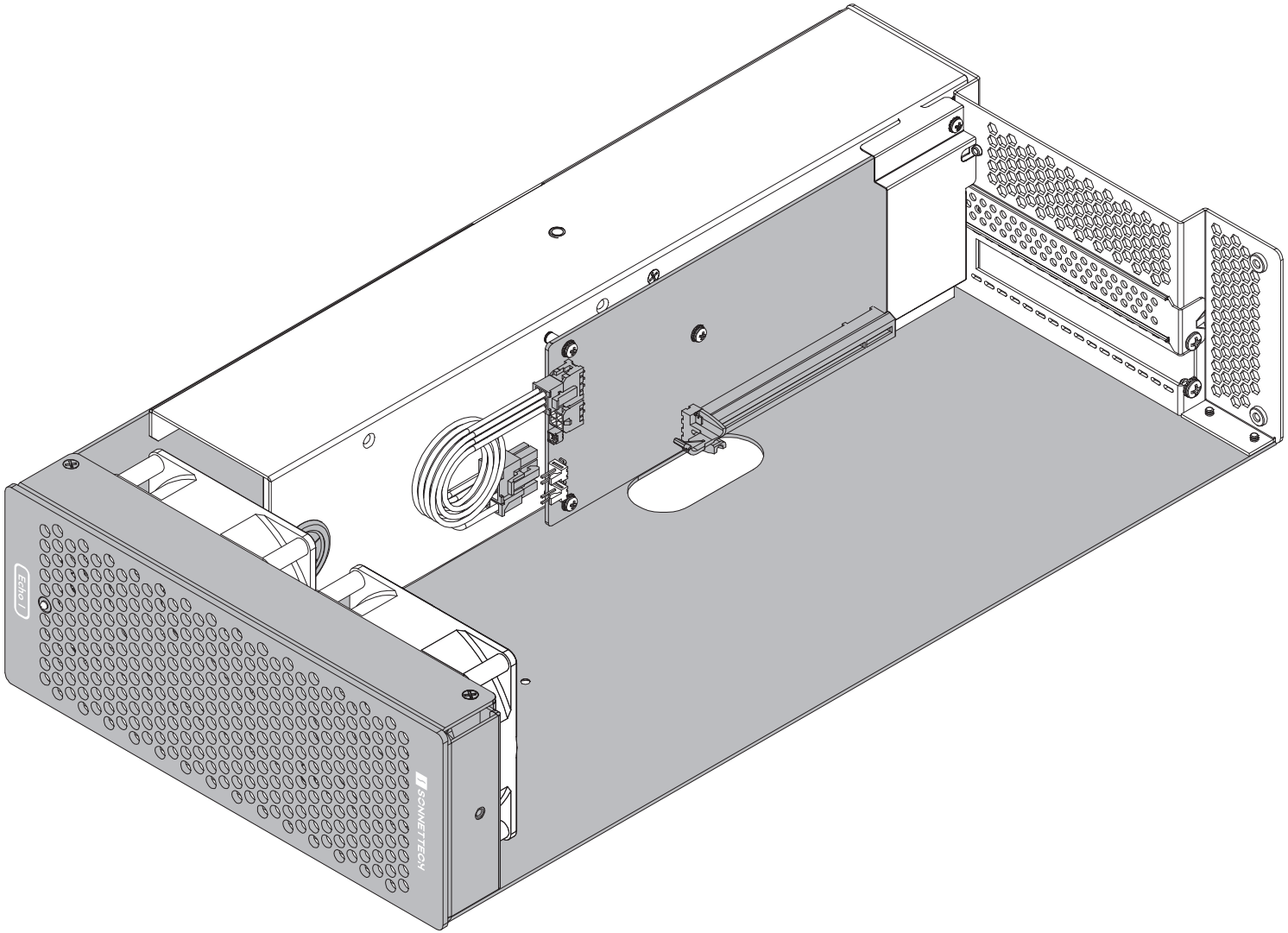
User's Guide

for DuoModo™ Echo I Module
Thunderbolt™ 3 to PCIe® Card Expansion System



THUNDERBOLT™ PCI EXPRESS®

Mac For Windows

CE FC UK CA RoHS COMPLIANT

Contents

Chapter 1 – Introduction, Compatibility Information, and PCIe Card Usage Requirements

Introduction

Congratulations on your purchase! The Echo I Module is a Thunderbolt 3 expansion system for PCIe cards. Through its PCIe slot, you may connect an adapter card to a computer with Thunderbolt ports to expand its capabilities and add connectivity beyond what's offered through its native ports.

Mac® Compatibility

- Mac (M1, M2, M1 Pro, M1 Max, and M1 Ultra) computers with PCIe cards that have compatible drivers
- Mac (Intel®) computers with Thunderbolt 3 ports
- Mac computers 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+

Windows® Compatibility

- Windows computers with Thunderbolt 4 or Thunderbolt 3 ports
- Windows 11 and Windows 10

Linux® Compatibility

- Linux computers with Thunderbolt 4 or Thunderbolt 3 ports
- Linux Kernel 5.0+

PCIe Card Usage Requirements

While Echo expansion systems require no drivers beyond those pre-installed in your computer's OS, most PCIe 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 the Echo I Desktop is available at: https://sonnettech.com/support/

Preparing to Use the Echo I Module With a Mac Computer

The drivers required to support the Echo I Module 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 I Rackmount With a Windows 10 Computer

1. Update Windows. You must use Windows 10, 64-Bit **Version 2004** or newer. To check the version number, type *winver* in the search bar and click enter.

2. For computers with Thunderbolt 3 ports, update your computer's BIOS to the latest version. If you need help updating your BIOS, contact your computer manufacturer.

3. For computers with Thunderbolt 3 ports, 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 I Rackmount With a Linux Computer

The drivers required to support the Echo I Rackmount 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.

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. Navigate to and click the DuoModo Echo I Module link.
3. Click the Manual link.
4. Click the DuoModo Echo I Module 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 – DuoModo Echo I Module Description

Interior

1 – Auxilliary Power Connectors

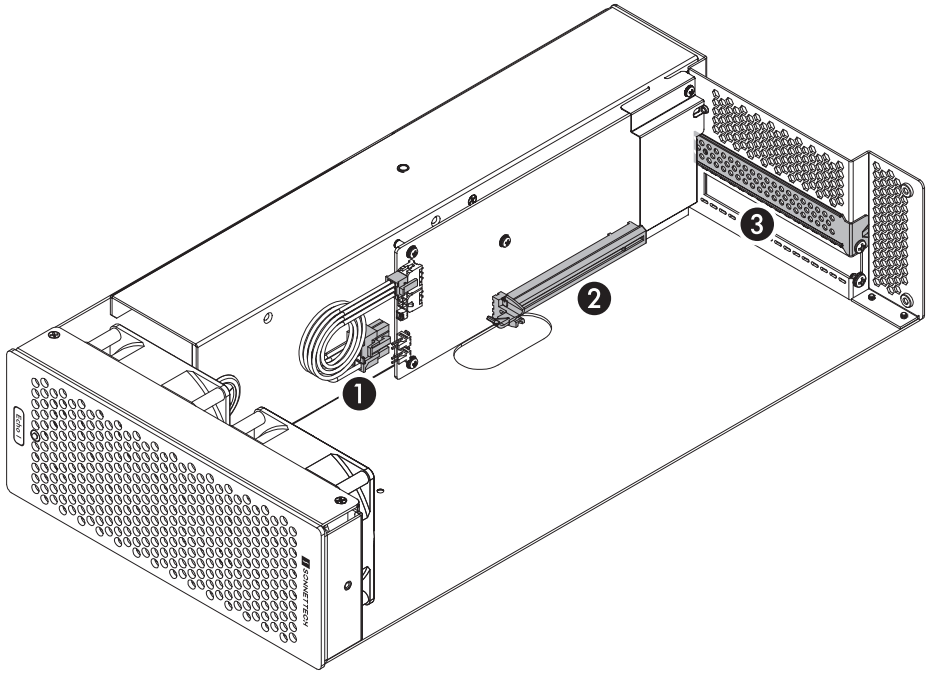
When auxiliary power is required, these connectors provide power to the installed card.

2 – PCIe Card Slot

This is an x16 mechanical (x4 electrical) PCIe 3.0 slot. It is also compatible with PCIe 4.0, 2.0, and 1.1 cards.

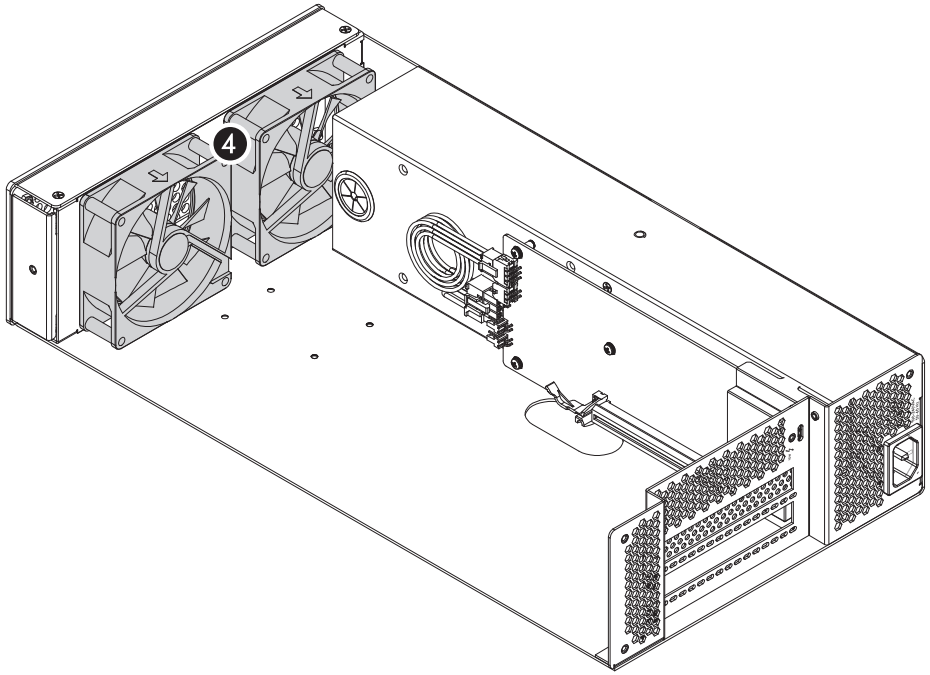
3 – PCIe Slot Access Cover

Remove this cover when installing a double-width card. If a single-width card is installed, leave this in place.

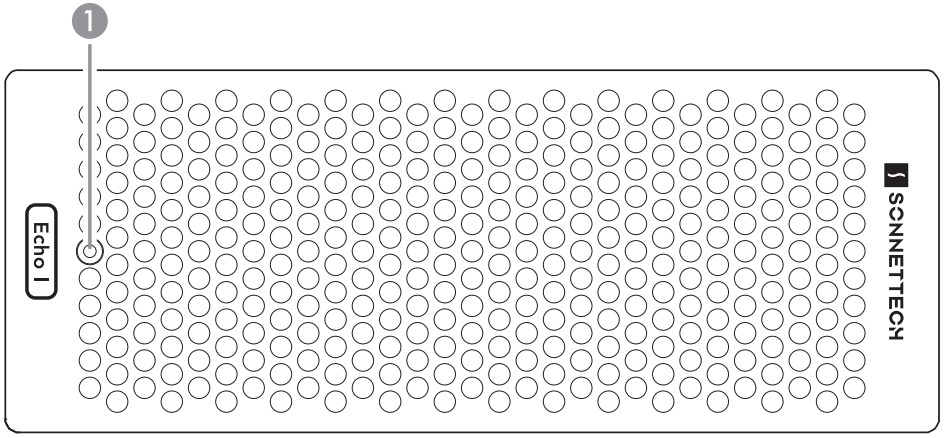


4 – Temperature-Controlled Fans

These provide cooling for the installed card and the module's supporting Thunderbolt and power circuitry. They operate at a whisper when the cards are running cool, and automatically speed up in steps as the temperature rises. To prevent overheating, do not block the fans or the vent holes on the module.



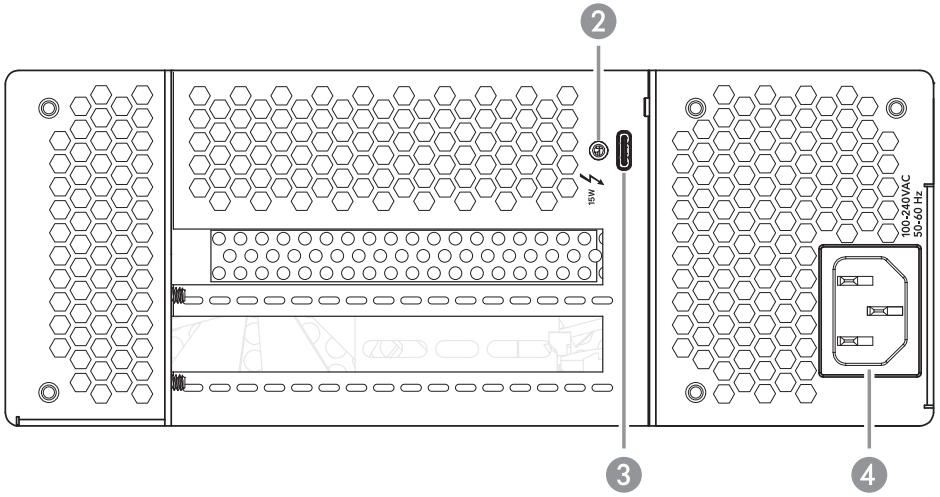
Chapter 2 – DuoModo Echo I Module Description



Front Panel

1 – Power Indicator LED

This lights when the DuoModo Echo I Module is powered, the Thunderbolt cable between the module and your computer is plugged in securely, and the computer powered on.



Back Panel

2 – Threaded Nut for ThunderLok 3

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

3 – Thunderbolt Port

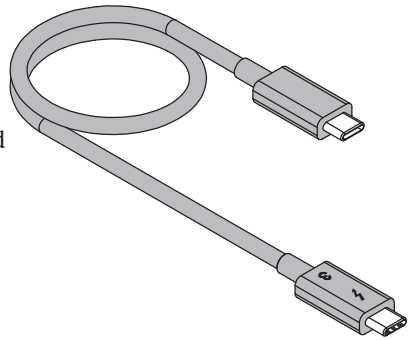
Connect the included (or comparable) Thunderbolt 3 (40Gbps) cable, or any Thunderbolt 4 cable, between this port and your computer's Thunderbolt port.

4 – Power Input Socket

Connect the included AC power cable here.

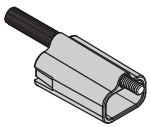
Thunderbolt 3 (40Gbps) Cable

Connect this cable between the module and your computer. Connecting the DuoModo Echo I Module to a computer port marked with the USB icon (•<) is NOT supported.



Thunderbolt 3 Connector Retainer Clip (ThunderLok)

This clip secures the Thunderbolt 3 cable connector plugged into the module's Thunderbolt port 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 Steps

1. Remove the DuoModo Echo I Module from its packaging, and then set it on a flat, level surface.

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

2. Remove and set aside the screw next to the PCIe slot access cover **(Figure 1)**.

3. If you are installing a double-width card, or an additional daughter card, remove and set aside the screw securing the PCIe slot access cover, and then remove and set aside the cover **(Figure 1)**.

4. OPTIONAL STEP: If you are *not* installing a PCIe card which requires auxiliary power, go to step 5. Otherwise, locate the auxiliary power cable **(Figure 2)**.

   - When installing an Avid Pro Tools | HDX PCIe card, disconnect the power cable from the module and set it aside, replace it with the custom power cable included with the Avid card, and then move the loose connectors aside for later connection.

   - When installing a card other than the Pro Tools | HDX, remove the cable twist tie securing the power cable, and then move the loose connector aside for later connection.

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 I Module's circuit boards and any of its components.

5. Remove the PCIe card from its packaging, handling the card by its edges and without touching any components or gold connector pins.

6. 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 2)**.

7. Secure the card using the screw(s) you removed previously; do not overtighten the screw(s) **(Figure 2)**.

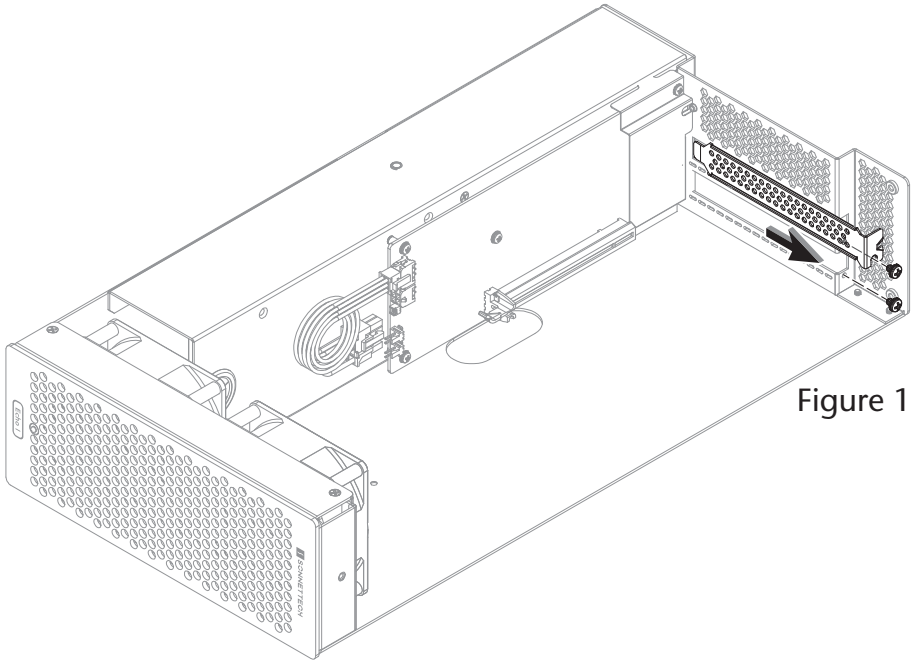


Figure 1

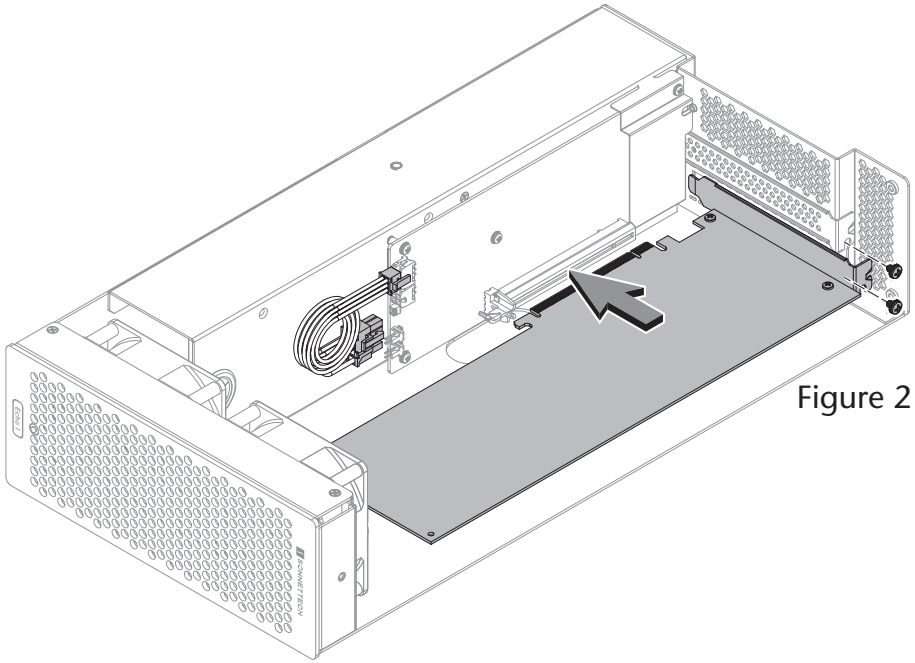


Figure 2

Chapter 3 – PCIe Card Installation Steps

Support Note: The DuoModo Echo I Module includes an "8-pin" auxiliary power connector comprised of a 6-pin plus 2-pin connector pair. To create an 8-pin connector, slide the 6-pin and 2-pin connectors together as shown; note the little nubs on the 2-pin connector that align the connectors to each other **(Figure 3)**.

8. If required, connect the auxiliary power connector(s) to the installed card; make sure the connectors are plugged in securely.

9. Following the instructions included with the enclosure you purchased, install the DuoModo Echo I Module into the enclosure now.

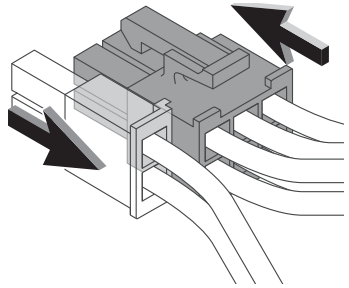


Figure 3

Support Note: Sonnet's ThunderLok™ 3 Thunderbolt connector retainer clip secures the included Thunderbolt 3 cable to the module 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 4)**. Note that the connector will pass all the way through the clip; when you connect the cable to the module, the clip will secure the connector.

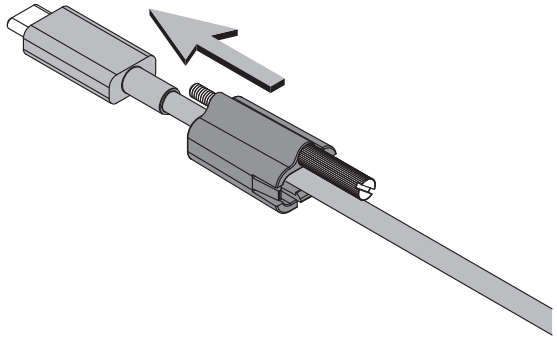


Figure 4

10. Connect the included (or comparable) Thunderbolt 3 (40Gbps) cable, or any Thunderbolt 4 cable, between the Thunderbolt port on the Echo module and a Thunderbolt port on your computer (recommended), or other Thunderbolt device in the chain connected to the computer **(Figure 5)**. Note that cables or computer ports marked with a generic USB icon (⇢) or USB + Charging Port icon (ϟ) are NOT compatible. Secure the retainer clip to the module if you attached it.

11. Connect interface cables between devices, PCIe card, and computer as necessary.

12. Connect the included power cord between a wall outlet or power strip and the Echo I Module's power socket. Note that the module's power indicator will not light until the computer is powered on.

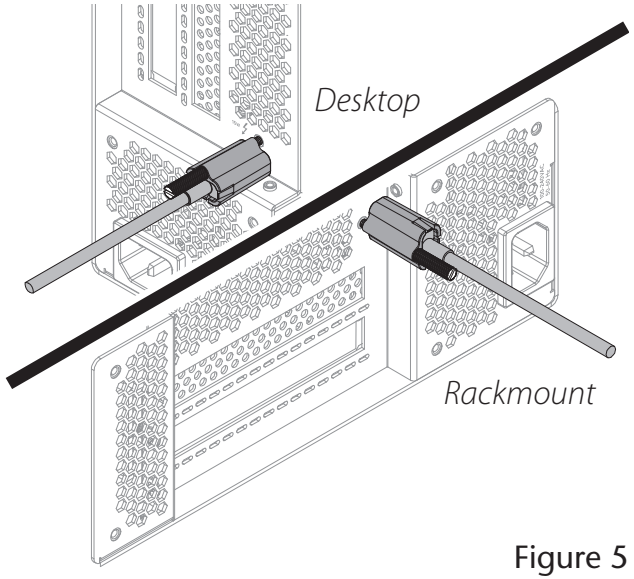


Figure 5

Chapter 4 – Complete Setup and Configuration

SETUP AND CONFIGURATION STEPS—MAC USERS

This page instructs Mac users how to verify the Echo module and installed card is recognized by the computer; Windows users should skip to the next page.

A – Confirm the Echo I Module is Recognized

1. With the Echo module powered and connected to the computer, turn on the computer. Note that if there are any other Thunderbolt devices connected between the module and your computer, they must also be powered for you to perform the following steps.

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 (or Thunderbolt/USB4 under the Hardware header in the left column **(Figure 6)**.

4. In the top right column under the Thunderbolt (or Thunderbolt/USB4) Device Tree header, you will see Thunderbolt Bus, and then "DuoModo eGPU Module" **(Figure 6)**.

Support Note: If "DuoModo eGPU Module" is not listed, disconnect and reconnect the Thunderbolt cable between the computer and module. Note that it is not necessary to shut down the computer before disconnecting and reconnecting the cable, so long as the installed card is Thunderbolt-compatible.

B – Confirm the Installed Card is Recognized

1. In the *System Information* window click PCI under the Hardware header in the left column **(Figure 7)**.

2. At the top of the right column, the installed card is listed (if not, you may to install drivers before the card is recognized). Click the card; you should see "Yes" next to Driver Installed and Tunnel Compatible, otherwise the card or driver may not be Thunderbolt-compatible **(Figure 7)**.

Support Note: While the Echo module doesn't require drivers beyond those pre-installed in your computer's OS, 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 the card manufacturer's website. Download and install the drivers according to the manufacturer's directions.

2. Restart your computer; your Echo module is ready to use!

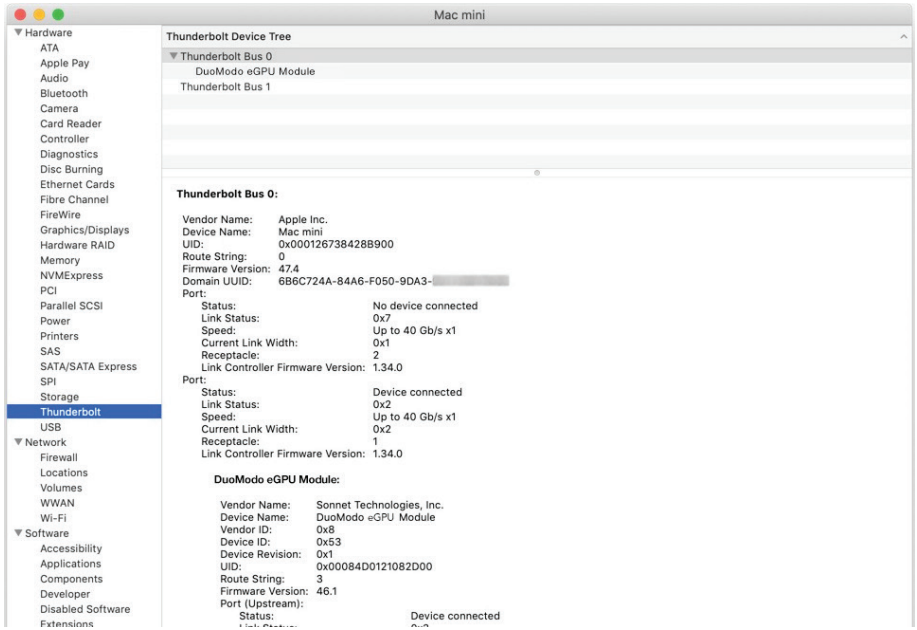


Figure 6

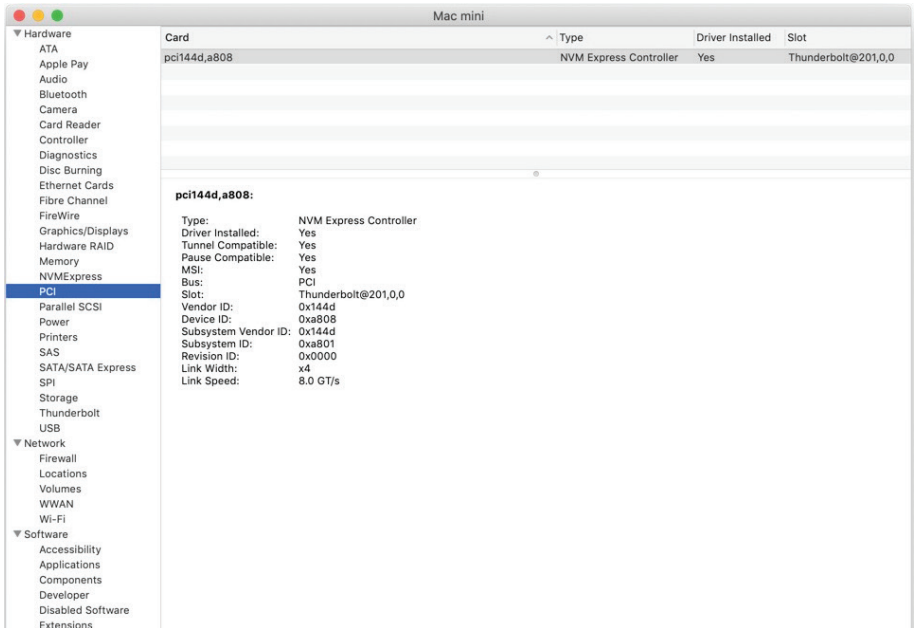


Figure 7

Chapter 4 – Complete Setup and Configuration

SETUP AND CONFIGURATION STEPS—WINDOWS USERS

A – Confirm the Echo I Desktop and Installed Card is Recognized

1. With the Echo module 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 module 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 module, 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 the card type you installed to expand the listing; a generic adapter listing will appear. After its drivers are installed, the listing will change to display the names of the installed card.

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 Installed Card Cool
With its optimized airflow design and temperature-controlled fans providing cooling at all times, the DuoModo Echo I Module provides adequate cooling for the installed card when the module is installed in an enclosure. *Do not block any of the vents*! Otherwise, the card and module's components may overheat.

Hot Plugging the Echo I Module
When a certified Thunderbolt-compatible card (used with Thunderbolt-compatible drivers) is installed, you may connect and disconnect the module 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 module.

There's No Need to Unplug the Power Cable
Because the Echo I Module 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 DuoModo Echo I Module power indicator LED only turns on when the computer to which the module is connected is on, and turns off when the computer is sleeping or powered off.

Using an Expansion Card Without Installing Drivers
Some Thunderbolt-compatible expansion cards, such as Sonnet's M.2 4x4 PCIe Card, use inbox (built into the operating system) drivers, and are ready to use out of the box.

Replacing a PCIe Card After Initial Installation
Shut down the computer, and then disconnect the power cable and Thunderbolt cable from the Echo I Module before opening the system and replacing the card; **PCIe cards are not hot-pluggable!**

Replacing a Card After Initial Installation
Shut down the computer, and then disconnect the power cable and Thunderbolt cables from the Echo I Module before opening the system and replacing the card; **PCIe cards are not hot-pluggable!**

Using the DuoModo Echo I Module to Charge Your Portable Computer
MacBook Air® and MacBook Pro® with Thunderbolt ports, some PC laptop computers with Thunderbolt 3 ports, and all PC laptops with Thunderbolt 4 ports may be charged *slowly* via the Echo I Module's 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 (ϟ) AND the number 3 on the connector housings to identify these cables. Aside from Thunderbolt cables from Apple, 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 use with the Echo I Module. Cables marked with a generic USB icon (⇄) are NOT compatible for connecting the Echo I Module to the computer.

KNOWN ISSUES

Not All Thunderbolt 3 Computers' Performance is Equal
When using the Echo III Desktop with the 2017 MacBook Pro 13-inch model with four Thunderbolt 3 ports, you should connect the dock to one of the ports on the left side of the computer. The right side ports use an x2 (2-lane) implementation of Thunderbolt 3 that limits PCIe bandwidth to 20Gbps (up to 1,400 MB/s). Some Windows computers equipped with Thunderbolt 3 ports also use the x2 PCIe lane implementation.

Not All Mac-Compatible Cards Work With M1 or M2 Macs
While this product is compatible with all M1 and M2 series Mac computers, not all PCIe cards that work with Intel-based Macs have M1/M2-compatible drivers. We recommend that you contact your PCIe card's manufacturer to verify that the existing drivers support M1 and M2 series Macs.

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 computer software updates may also break compatibility.

Not All Thunderbolt Cables Deliver Full Performance
Full performance from the Echo system requires the use of the included (or comparable) Thunderbolt 3 (40Gbps) cable, or any Thunderbolt 4 cable. When shopping for a Thunderbolt 3 cable, please be aware that some support only lower data transfer speeds (20Gbps).

Not all PCIe Cards Will Perform at 100%
Thunderbolt 3's PCIe bandwidth is limited to 2,800 MB/s when used with a Thunderbolt 3 host, and 3,000 MB/s when used with a Thunderbolt 4 host. While most cards will operate at full performance, some may not because they require more bandwidth than Thunderbolt 3 can provide.

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.

- When you have to ship the DuoModo Echo I Module, Sonnet recommends that you remove the installed card and ship it separately.

- Do not attempt to modify the enclosure. If this device appears to be malfunctioning, contact your reseller or local distributor.

- Do not drop the module; dropping or mishandling module may result in a malfunction leaving the product inoperable.

- Do not insert your fingers or foreign objects inside the PCIe slot.

- 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 here.

FCC Compliance

DuoModo Echo I Module 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 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
- Computer model
- PCIe card model
- Operating system version you're using
- 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 **Sonnet Customer Service** at:
E-mail: support@sonnettech.com
Tel: 1-949-472-2772
(Monday–Friday, 9 a.m.–5 p.m. Pacific Time, excluding holidays)

Japan Customers
Contact Sonnet Customer Service Japan at:
E-mail: jp.support@sonnettech.com

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