User's Guide
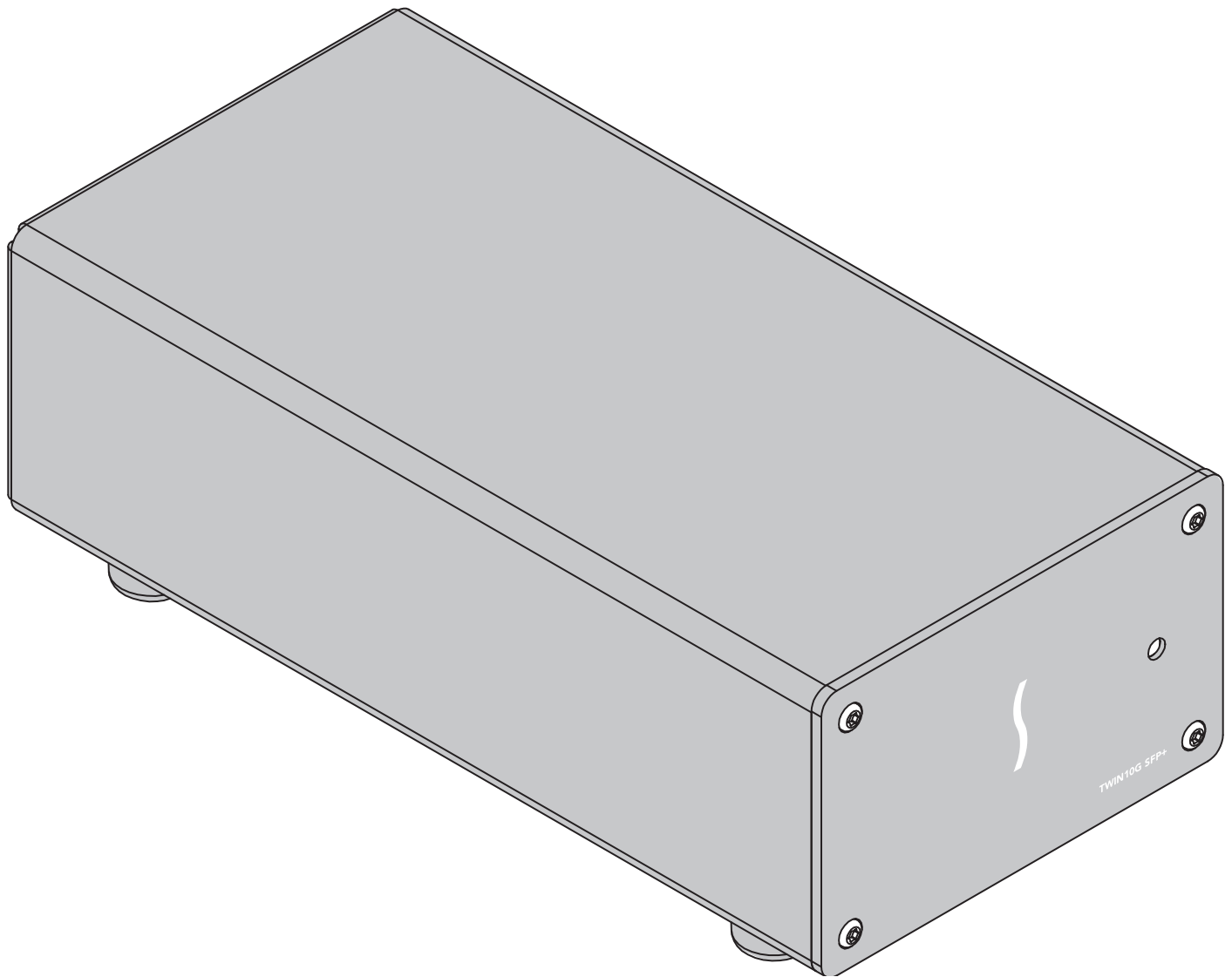
for Twin10G™ SFP+ Thunderbolt™ 2 Edition Dual-Port SFP+ 10 Gigabit Ethernet Thunderbolt 2 Adapter
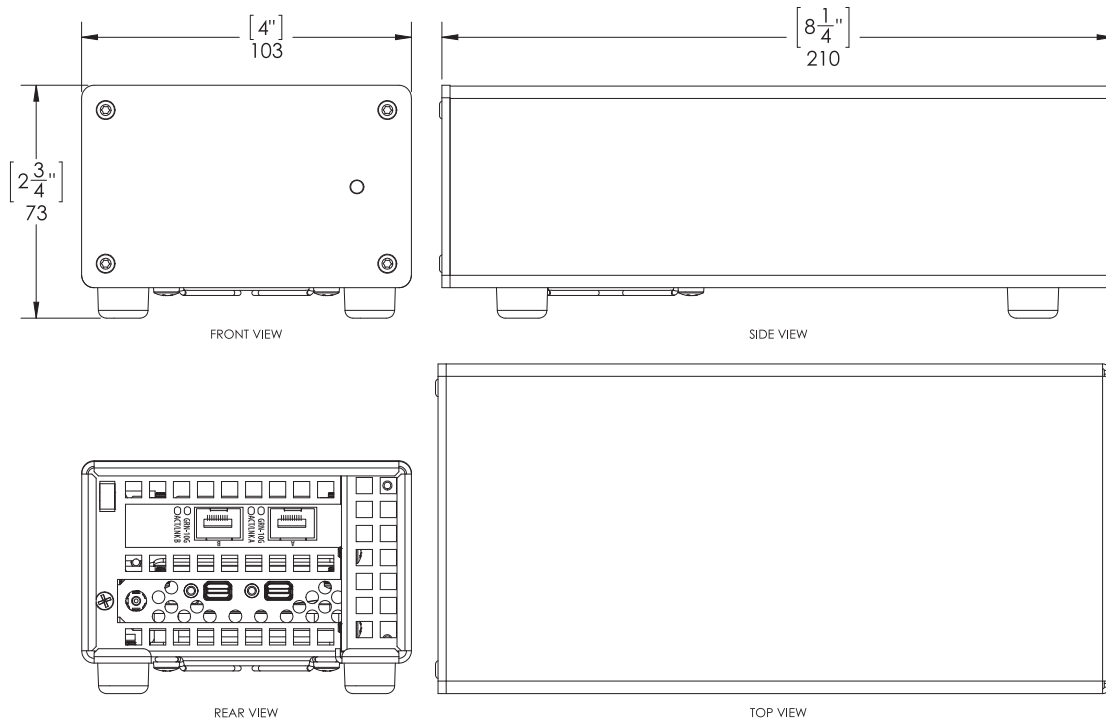
THUNDERBOLT™

Mac

For Windows

SONNET™

Contents

Chapter 1 – Introduction, System Requirements, Driver Information

FRONT VIEW

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REAR VIEW

TOP VIEW

Introduction

Congratulations on your purchase! The Twin10G SFP+ Thunderbolt 2 Edition (T2E) is a Thunderbolt 2 to 10 Gigabit Ethernet (10GbE) adapter that enables you to connect your computer with Thunderbolt 2 or Thunderbolt ports to 10GbE infrastructure.

Connection of the Twin10G SFP+ T2E adapter to your computer requires a single Thunderbolt cable (included), while connection to 10GbE infrastructure requires the use of one or two SFP+ transceivers plus LC/LC fiber optic cables (or CAT 6A cables when used with 10GBASE-T SFP+ transceivers), or, one or two SFP+ terminated Twinax copper cables.

> **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.sonnettech.com/support/kb/kb.php
> 2. Click the Thunderbolt Product link.
> 3. Click the Twin10G SFP+ Thunderbolt 2 Edition link, and then click the Manual link.
> 4. Click the Twin10G SFP+ Thunderbolt 2 Edition User's Guide [English] link and then check the Document Version info. If the version listed is later than this document (**revision F**), click the Download Now button for the latest version.

Mac® Compatibility
• Mac with a Thunderbolt or Thunderbolt 2 port

• Mac with a Thunderbolt 3 port when used with an Apple Thunderbolt 3 (USB-C) to Thunderbolt 2 Adapter

• OS X® 10.8.5+

• macOS® Mojave compatible

Windows® Compatibility
• PC with a Thunderbolt 2 port

• 64-bit editions of Windows 10, 8, 7

Linux® Compatibility
• PC with a Thunderbolt 2 port

• Linux Kernel 5.0 and later

System Requirements

The Twin10G SFP+ T2E adapter requires the following to operate:

• Thunderbolt cable (included)

• One or two short-range or long-range SFP+ transceivers plus LC/LC fiber optic cables, or, one or two 10GBASE-T transceivers plus CAT 6A cables, or, one or two SFP+ terminated Twinax copper cables

> **Support Note:** For link aggregation (teaming) support, the switch or router to which the Twin10G SFP+ T2E is connected must also support link aggregation, and ports must be configured for link aggregation. Windows 10 teaming requires Creator's update, version 1703 or greater.

Driver Information—Mac and Windows

The drivers that enable the Twin10G adapter to work with Mac and Windows computers must be downloaded from Sonnet's Website; instructions follow.

Driver and Configuration Information—Linux

The drivers that enable the Twin10G adapter to work with Linux are installed as part of the Linux Kernel 5.0 and later.

The steps necessary to configure the Sonnet adapter with your computer may vary based on the version of Linux running. Sonnet recommends using whatever method or tools you would normally use for configuring any onboard ports.

Chapter 1 – Introduction, System Requirements, and System Preparation

Preparing to Use the Adapter With a Mac Computer

To enable the Twin10G SFP+ T2E to work with your system, you will do the following:

1. Download and install the Twin10G SFP+ T2E drivers (instructions follow).

2. Install SFP+ transceiver(s) into the Twin10G SFP+ T2E as necessary, and then connect the Sonnet adapter to a switch or storage system (instructions follow).

3. Connect the Twin10G SFP+ T2E adapter to your computer, and then power on the computer (instructions follow).

4. Confirm the Twin10G SFP+ T2E adapter and its Ethernet controllers are recognized by your computer (instructions follow).

5. Configure the adapter through the System Preferences' Network control panel (instructions follow).

Preparing to Use the Adapter With a Windows Computer

To enable the Twin10G SFP+ T2E to work with your system, you will do the following:

1. Download and install the Twin10G SFP+ T2E drivers (instructions follow).

2. Install SFP+ transceiver(s) into the Twin10G SFP+ T2E as necessary, and then connect the Sonnet adapter to a switch or storage system (instructions follow).

3. Connect the Twin10G SFP+ T2E adapter to your computer, and then approve the device (always connect); instructions follow.

4. Confirm the Twin10G SFP+ T2E adapter and its Ethernet controllers are recognized by your computer (instructions follow).

5. Configure the adapter through the Network and Sharing Center control panel (instructions follow).

Preparing to Use the Adapter With a Linux Computer

To enable the Twin10G SFP+ T2E to work with your system, you will do the following:

1. If necessary, download and install the Linux Kernel 5.0 or later.

2. Install SFP+ transceiver(s) into the Twin10G SFP+ T2E as necessary, and then connect the Sonnet adapter to a switch or storage system.

3. Connect the Twin10G SFP+ T2E adapter to your computer, and then power on the computer.

4. Configure the adapter using the methods or tools you would normally use for configuring onboard ports.

Chapter 2 – Twin10G SFP+ Thunderbolt 2 Edition (T2E) Description

Support Note: Sonnet has sold two versions of the Twin10G SFP+ Thunderbolt 2 Edition adapter. The first version was manufactured through approximately November 2018, with the second edition manufactured December 2018 and after. The ports are the same on both versions; only the activity and link indicators differ as designated.

Twin10G SFP+ T2E Indicators, Sockets, and Ports

1 – Power Indicator

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

2 – ACT/LINK Indicators (Adapter Version 1)

These LEDs flash green upon activity between adapter and switch, and remain off when there is no link.

3 – GRN-10G Indicators (Adapter Version 1)

These LEDs light green when a link is established between the adapter and the switch or storage system, and remain off when there is no link.

4, 5 – SFP+ Sockets

When connecting to a switch or storage system via LC optical cables, insert a short-range or long-range SFP+ optical transceiver (sold separately) into the socket, making sure it is firmly seated and secured. Alternatively, you can install a 10GBASE-T SFP+ copper transceiver (sold separately) and connect via a CAT 6A cable; you may also use a direct-attached SFP+ terminated copper cable (sold separately) to connect to a switch or storage system.
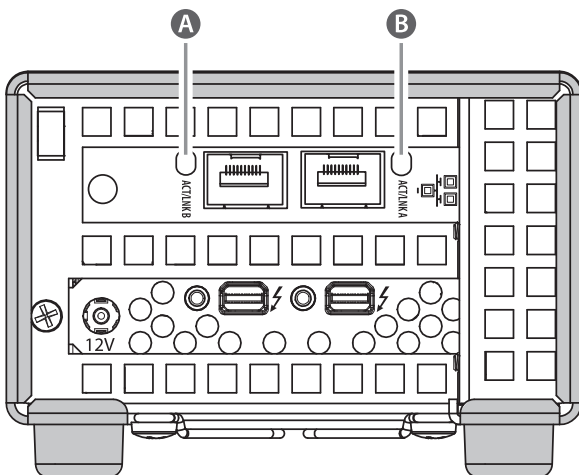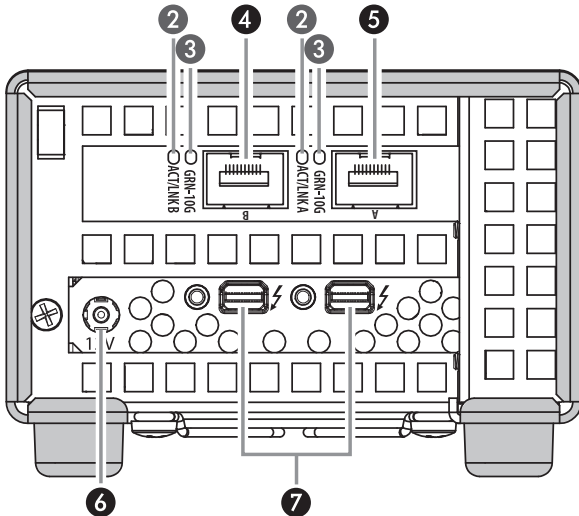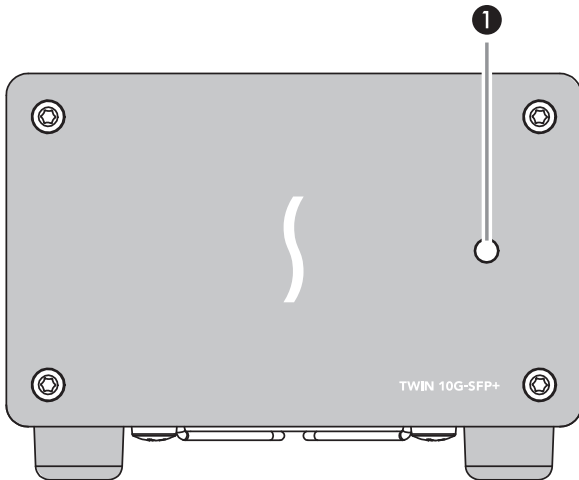
6 – 12VDC Socket

Connect the included DC power adapter between this socket and the included power cord.

7 – Thunderbolt Ports

Connect the included Thunderbolt cable between either of these ports and your computer's (or intermediate peripheral device's) Thunderbolt port; the open port may be used to connect another Thunderbolt peripheral device. *You may not connect two computers to this adapter's Thunderbolt ports, nor to a daisy chain of Thunderbolt peripheral devices.*

A, B – ACT/LINK Indicators (Adapter Version 2)

There are two LEDs visible through each opening in the bracket. When a link is established between the adapter and the switch, the right LEDs light yellow to indicate the link to the switch is active. When there is activity between the adapter and the switch or device, the left LEDs flash green.

Chapter 2 – Twin10G SFP+ Thunderbolt 2 Edition (T2E) Description

Power Adapter
1 – Power Adapter
 Connect this to the Twin10G SFP+ T2E adapter's 12VDC socket. Note that the power indicator on top lights when the adapter is connected to AC power.

2 – Power Cord
 Connect this between a power outlet and the power adapter. Note that the power cord included with your product may appear different than the one pictured here, depending on where the product was purchased.

Thunderbolt Cable
Connect this cable between the Twin10G SFP+ T2E adapter and your computer or other Thunderbolt peripheral device.

ThunderLok™ Thunderbolt Connector Retainer Clip
This secures a Thunderbolt connector plugged into the Twin10G SFP+ T2E adapter's Thunderbolt port to prevent accidental cable disconnection. This clip is not compatible with optical Thunderbolt cables.

Chapter 3 – Software Installation

Driver Download and Installation Steps—Mac Users

This section describes the download and installation of the drivers required to support the Twin10G SFP+ T2E adapter connected to your Mac computer.

1. For users running macOS 10.13 (High Sierra) or later, open System Preferences, and then click Security and Privacy. Otherwise, skip to step 3.

2. In the Security and Privacy panel click the General tab. Under "Allow apps downloaded from" select "App Store and identified developers".

3. Launch a Web browser and go to www.sonnettech.com/support, and then click the Downloads, Manuals, & Knowledgebase link.

4. On the Support Categories page, click the Thunderbolt link, and then click the Twin10G SFP+ Thunderbolt 2 Edition link.

5. On the Twin10G SFP+ Thunderbolt 2 Edition page, click the Driver link, and then click the Download Now button next to driver software for macOS; the software will be downloaded.

6. Double-click the .dmg you downloaded; the file will expand and a new window will open.

7. Double-click the Sonnet Twin-10G.pkg file to launch the driver installer. Follow the on-screen instructions to install the software.

8. When the window appears indicating the software installation is complete, click Restart to restart your system and finish the driver installation.

9. For users running macOS 10.13 (High Sierra) or later, if the driver doesn't load after a restart, you may need to go back into System Preferences, manually authorize the Sonnet driver, and then restart your system again.

Driver Download And Installation Steps—Windows Users

Windows Support Note: For users with custom-built PCs, or systems that have been extensively modified, it may be necessary for you to install the PC or motherboard manufacturer's Thunderbolt drivers to enable the Thunderbolt port(s) to operate. Visit the manufacturer's website to locate and download the appropriate drivers.

This section describes the download and installation of the drivers required to support the Twin10G SFP+ T2E adapter connected to your Windows PC.

1. Launch a Web browser and go to www.sonnettech.com/support, and then click the Downloads, Manuals, & Knowledgebase link.

2. On the Support Categories page, click the Thunderbolt link, and then click the Twin10G SFP+ Thunderbolt 2 Edition link.

3. On the Twin10G SFP+ Thunderbolt 2 Edition page, click the Driver link, and then click the Download Now button next to next to driver software for Windows link; a new window or tab will open.

4. Locate the Intel® Network Adapter Driver for Windows… link matching the version of Windows installed on your computer, and then click it; a new page opens.

5. On the *Intel® Network Adapter Driver for Windows…* page, locate and click the PROWin64.exe button; an *Intel Software License Agreement* window will open.

6. Read the license agreement, and then click the "I accept the terms in this license agreement" button; the *Opening PROWin64.exe* window will open.

7. In the *Opening PROWin64.exe* window, click Save File; the file will be saved.

8. Locate and double-click the PROWin64 application file to launch the installer. If you haven't disabled User Access Control (UAC) on your computer, another window will appear asking you to allow the program to run; click Allow; the installer will launch.

9. Follow the on-screen instructions to complete the driver installation.

Chapter 4 – Twin10G SFP+ T2E Adapter Connection Steps

Support Note: Sonnet's ThunderLok™ Thunderbolt connector retainer clip secures the included Thunderbolt cable to the Twin10G SFP+ T2E adapter 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 1)**. 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 cable.
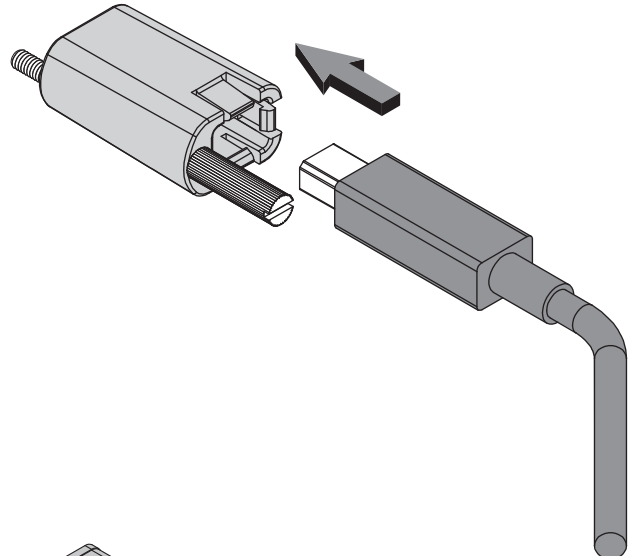

Figure 1

1. Connect the included Thunderbolt cable between either Thunderbolt port on the Twin10G SFP+ T2E adapter and a Thunderbolt port on your computer, or other Thunderbolt peripheral device in the chain connected to the computer **(Figure 2)**. Secure the retainer clip to the adapter if you attached it to the cable. If you are daisy chaining additional Thunderbolt peripheral devices, connect another Thunderbolt cable between the downstream device and the open Thunderbolt port on the Sonnet adapter. Note that **you may not connect two computers to the Sonnet adapter's Thunderbolt ports, nor to a daisy chain of Thunderbolt devices.**

Support Note: To ensure the best performance possible when connecting multiple Thunderbolt devices in a daisy chain, be sure to connect 20Gbps Thunderbolt 2 devices such as this Sonnet adapter closest to the computer, with 10Gbps Thunderbolt devices at the end.

2. If you are connecting the Twin10G SFP+ T2E adapter via SFP+ terminated Twinax copper cable(s) to the switch or storage device, do so now, and then go to step 4. Otherwise, read the documentation included with the SFP+ transceiver(s) you purchased, and then install them into the Sonnet adapter's SFP+ sockets.

Support Note: Unless your setup requires connection redundancy or link aggregation (and your switch or storage system supports those features), connecting the Twin10G SFP+ T2E adapter to a switch or storage system requires only a single SFP+ transceiver plus appropriate cable (or single Twinax copper cable).
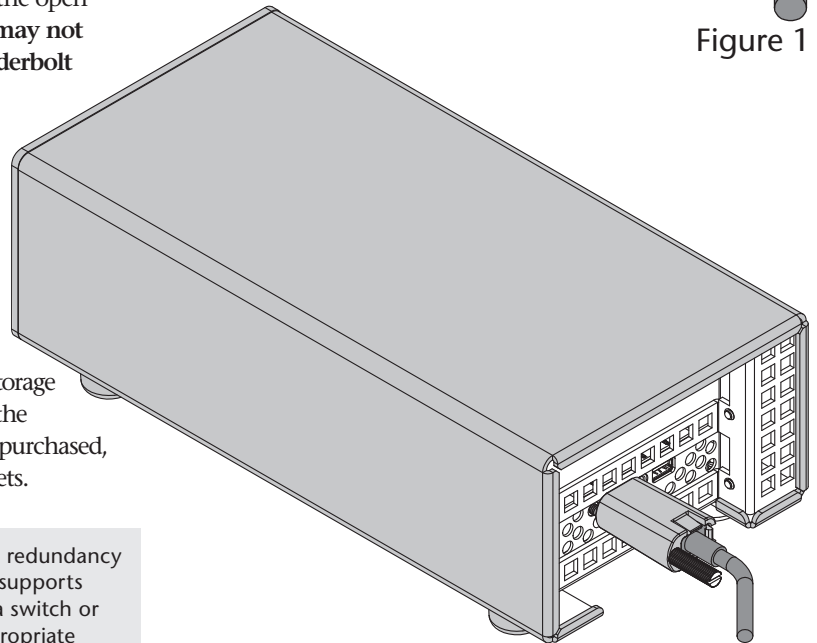

Figure 2

3. Connect cable(s) between the transceiver(s) and the port(s) on the switch or storage device.

4. Connect the included power cord between a wall outlet or power strip and the power adapter; verify the connector is plugged in securely. Note that the power adapter's power indicator will light at this time.

5. Connect the power adapter cable to the Twin10G SFP+ T2E adapter's 12V power socket. Note that the Sonnet adapter's power indicator will not light until the computer, and any other Thunderbolt devices connected between it and the adapter, is powered on.

6. Go to the next section, Verification and Configuration Steps.

Chapter 5 – Verification and Configuration Steps

Confirm the Twin10G SFP+ T2E and Its Ethernet Controllers Are Recognized—Mac Users

This page instructs Mac users how to verify the Twin10G adapter is recognized by the computer; Windows users should skip to the next page.

1. With the Twin10G adapter powered and connected to the computer, turn on the computer. Note that if there are any other Thunderbolt devices connected between the Sonnet adapter and your computer, they must also be powered for you to perform the following steps.

2. From the Apple menu, select About This Mac; the *About This Mac* window will open.

3. In the *About This Mac* window click System Report; a full report window will open.

4. In the *System Information* window, click Thunderbolt under the Hardware header in the left column **(Figure 3)**.

5. In the top right column under the Thunderbolt Device Tree header, you will see the computer, followed by Thunderbolt Bus, and then "Echo Express SEL" **(Figure 3)**.
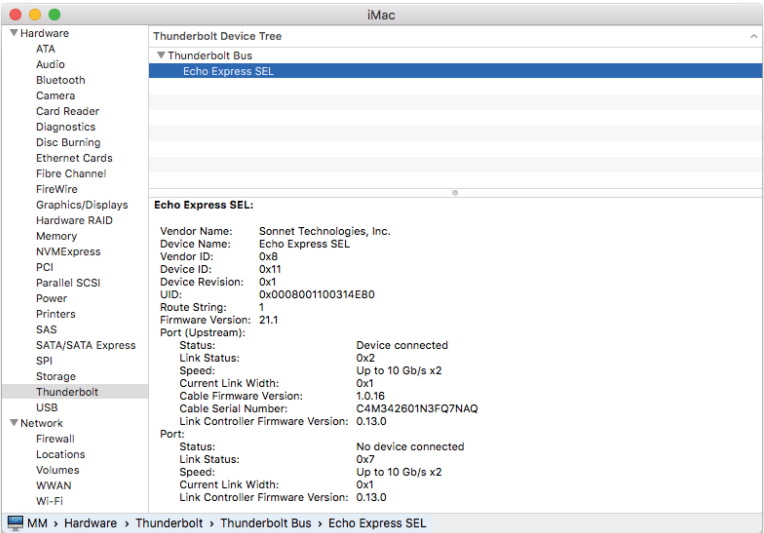
> **Support Note:** If you do not see "Echo Express SEL" listed, disconnect and reconnect the Thunderbolt cable between the computer and Twin10G SFP+. Note that it is not necessary to shut down the computer before disconnecting and reconnecting the cable.

6. In the *System Information* window click PCI under the Hardware header in the left column **(Figure 4)**.

7. At the top of the right column, the Twin10G SFP+ T2E's 10 Gigabit Ethernet Controllers are listed; detailed information appears below. You should see "Yes" next to Driver Installed and Tunnel Compatible **(Figure 4)**.

8. Skip to the next section, Basic Configuration Steps—Mac Users.
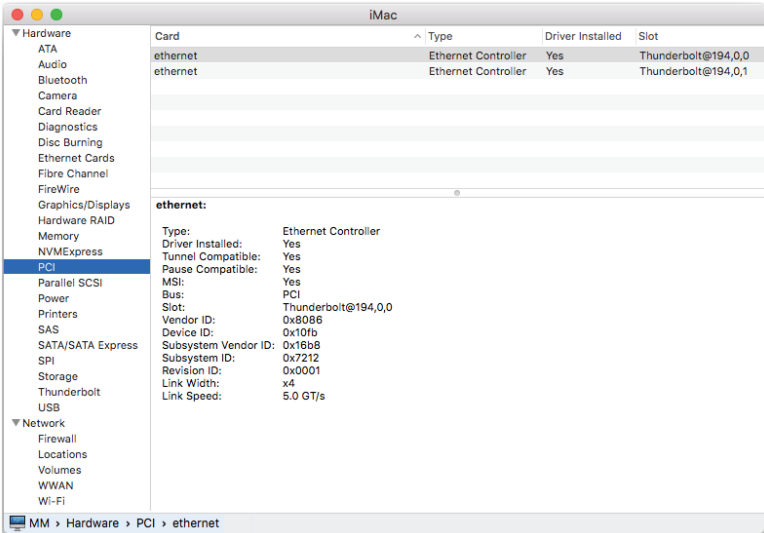

Figure 3

Figure 4

Chapter 5 – Verification and Configuration Steps

Confirm the Twin10G SFP+ T2E and Its Ethernet Controllers Are Recognized—Windows Users

This section describes how to confirm the Twin10G SFP+ T2E adapter is recognized by your Windows computer.

1. With the Twin10G SFP+ T2E adapter 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 Twin10G SFP+ T2E adapter 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 connecting the Twin10G SFP+ T2E, a *New Thunderbolt™ Devices Attached…* window appears **(Figure 5)**. Select Always Connect from the drop-down menu; another alert appears.

> **Windows Support Note:** If a *New Thunderbolt Devices Attached* window does not appear when you power your system, it is likely necessary for you to install (or reinstall) the PC or motherboard manufacturer's Thunderbolt drivers to enable the computer's Thunderbolt port(s) to operate. Visit the manufacturer's website to locate and download the appropriate drivers before proceeding.

3. When the alert stating the device is not certified for PC use appears click Yes **(Figure 6)**. Back in the *New Thunderbolt™ Devices Attached…* window click OK.

4. From the Windows Start menu, select the Windows Settings (gear) icon; the *Windows Settings* window will appear.

5. In the *Windows Settings* window, click on the Network & Internet Link; the *Network Status* window will appear. Click the Ethernet link on the left; the *Ethernet* window will appear.

6. In the *Ethernet* window, the various Ethernet ports recognized by the system are listed to the right. For most users, the Twin10G SFP+ T2E adapter's will be the only other Ethernet ports listed, with the computer's onboard Ethernet port listed as "Network". Click on one of the other ports; an Ethernet port *Properties* window will appear. Each of the Sonnet adapter's ports will have the description "Intel(R) 82599 10 Gigabit Dual Port Network Connection" with either #1 or #2 listed next to it **(Figure 7)**.

7. Skip to the next section, Basic Configuration Steps—Windows Users.
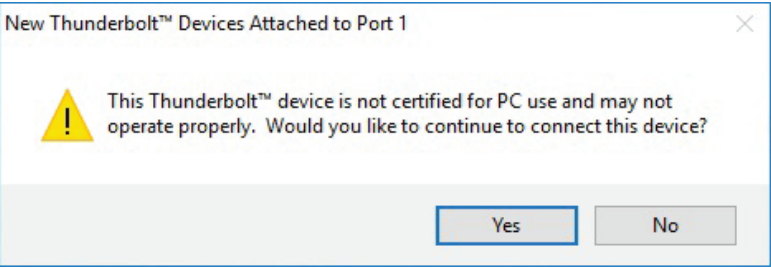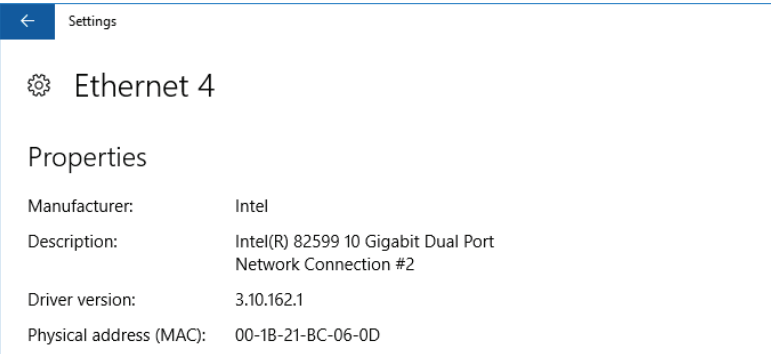

Figure 5

Figure 6

Figure 7

Chapter 5 – Verification and Configuration Steps

Basic Configuration Steps—Mac Users

Listed below are the basic steps necessary to configure the Twin10G adapter for use with your computer.

1. With the Twin10G adapter connected to your computer and 10GbE infrastructure, open System Preferences, and then click Network.

2. In the Network system preferences panel, click one of the Twin10G adapter's ports (identified as Thunderbolt Ethernet Slot x, Port 1 and Thunderbolt Ethernet Slot x, Port 2) in the left panel, and then configure the settings; repeat for the other port if necessary **(Figure 8)**.

3. When you've completed reviewing or changing the settings, click Apply.

Performance Tuning Steps—Mac Users

Listed below are steps required to configure the Twin10G adapter for maximum performance.

> **Support Note:** In order to realize any performance increases, the network switches and server to which the Sonnet adapter is connected must all be configured to have jumbo frames enabled.

1. With the Twin10G adapter connected to your computer and 10GbE infrastructure, open System Preferences, and then click Network.

2. In the Network System Preferences panel, click one of the Twin10G SFP+ T2E's ports (identified as Thunderbolt Ethernet Slot x, Port 1 and Thunderbolt Ethernet Slot x, Port 2) in the left panel, and then click Advanced; a new panel appears.

3. In the Advanced panel, click Hardware. From the Configure drop-down menu, select "Manually". In the Speed drop-down menu, leave the setting at 10G… In the Duplex drop-down menu, select "full-duplex" (*not* "full duplex, flow-control"). In the MTU drop-down menu, select "Custom," and then enter "9000" in the box below **(Figure 9)**.

4. When you've completed changing the settings for the port, click OK.

5. Repeat steps 2–4 for the other port, if necessary.

6. Back in the main Network window, click Apply after you've completed changing the settings.

7. If you used existing settings and do not need to combine Ethernet ports (link aggregation), your installation is complete. For additional information on combining Ethernet ports, open a browser and go to support.apple.com; type "network, Ethernet" and "Manage Virtual interfaces" to display various articles.
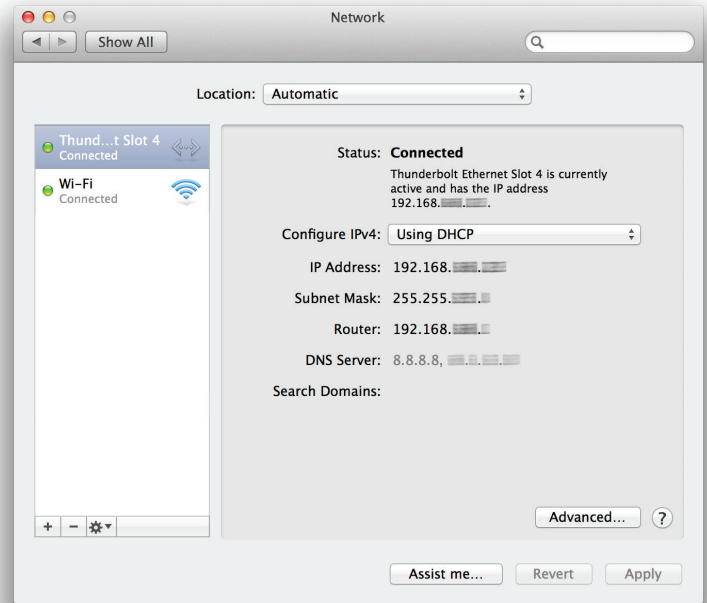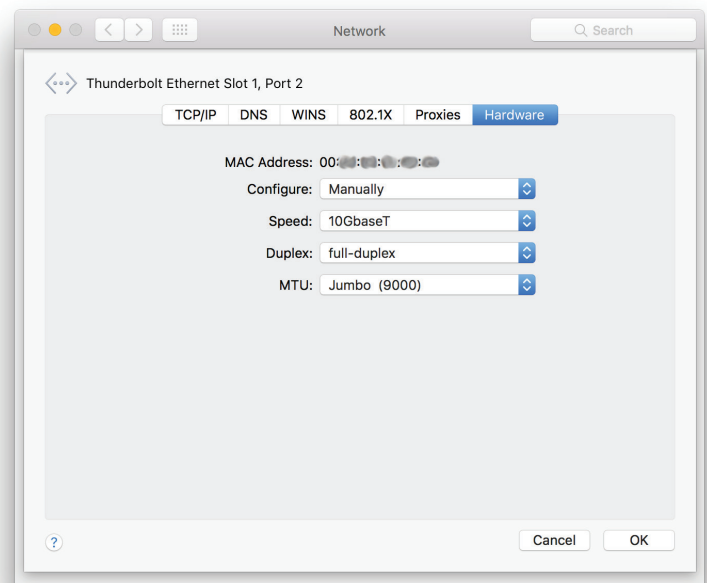
Figure 8

Figure 9

Chapter 5 – Verification and Configuration Steps

Basic Configuration Steps—Windows Users

Listed below are the basic steps necessary to configure the Twin10G SFP+ T2E adapter for use with your computer.

1. With the Twin10G SFP+ T2E adapter connected to your computer and 10GbE infrastructure, open the Network and Sharing Center control panel **(Figure 10)**.

2. Set up network connections by clicking "Set up a new connection or network".

You may also configure the Sonnet adapter's settings using Windows Device Manager. You may locate the device's ports in the Network adapters category, listed as Intel 82599 10 Gigabit dual port network connections.
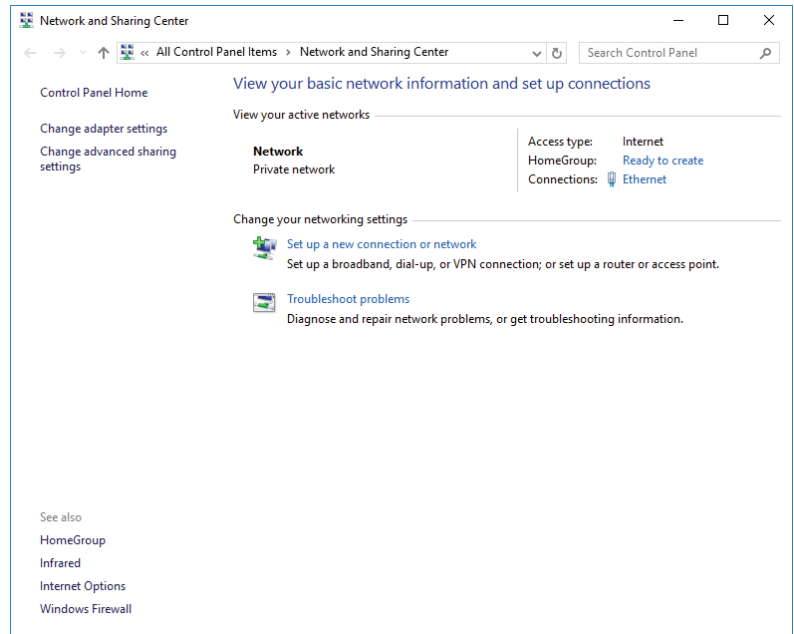

Figure 10

Chapter 6 – Tips, General Information, and Known Issues

TIPS, GENERAL INFORMATION

Keeping the Twin10G SFP+ T2E Adapter Cool
With its optimized airflow design and automatic, temperature-controlled fan providing cooling at all times, the Sonnet adapter provides adequate cooling for the components inside. *Do not block any of the vents while the adapter is operating*! Otherwise, the adapter may overheat.

Hot-Plugging the Twin10G SFP+ T2E Adapter
You may connect and disconnect the Thunderbolt cable between the Twin10G SFP+ adapter and your computer while your computer is on.

There's No Need to Unplug the Power Adapter
Because the Twin10G SFP+ T2E adapter 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. When your computer is sleeping, the Twin10G SFP+ enters a low-power state; this allows it to wake with your computer.

Power Indicator LED Operation
Because the Twin10G SFP+ T2E adapter automatically powers on and off with the computer to which it's connected, its power indicator lights only when the computer is on, and turns off when the computer is sleeping or powered off. Note that the power adapter's power indicator will remain lit as long as it is connected to a live power outlet.

Connecting Additional Thunderbolt Peripheral Devices
You may connect up to six Thunderbolt peripheral devices total in a daisy chain, including a Thunderbolt Display, to a single host computer. *You may not connect two computers to the Sonnet adapter, nor to a daisy chain of Thunderbolt devices.*

KNOWN ISSUES

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 to the latest OS, we recommend that you contact Sonnet to verify that the existing Twin10G SFP+ T2E 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, the Thunderbolt interface introduces latency to a device chain. If you add additional Thunderbolt devices to the chain, you may need to experiment with which device works better closer or farther to the computer in the chain.

Chapter 8 – Precautions, FCC Compliance, and Support Information

Precautions

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:

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

• 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.

• Do not drop the Twin10G SFP+ T2E; dropping or mishandling the Twin10G SFP+ T2E may result in a malfunction leaving the product inoperable.

• Follow the instructions in this manual carefully; contact your reseller or local distributor for additional advice not covered in this User's Guide.

• If unusual smells, sounds, or smoke come from the device, or if liquids enter it, disconnect it immediately and unplug it from the electrical outlet.

FCC Compliance

Twin10G SFP+ Thunderbolt 2 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

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.

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
• Operating system version
• Software/firmware versions
• A System Report (macOS) or a Microsoft System Information MSINFO32 (Windows) report (Windows)

USA Customers

If further assistance is needed, please contact **Sonnet Customer Service** at:
E-mail: support@sonnettech.com
Tel: 1-949-472-2772
(Monday–Friday, 8 a.m.–4 p.m. Pacific Time)

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.