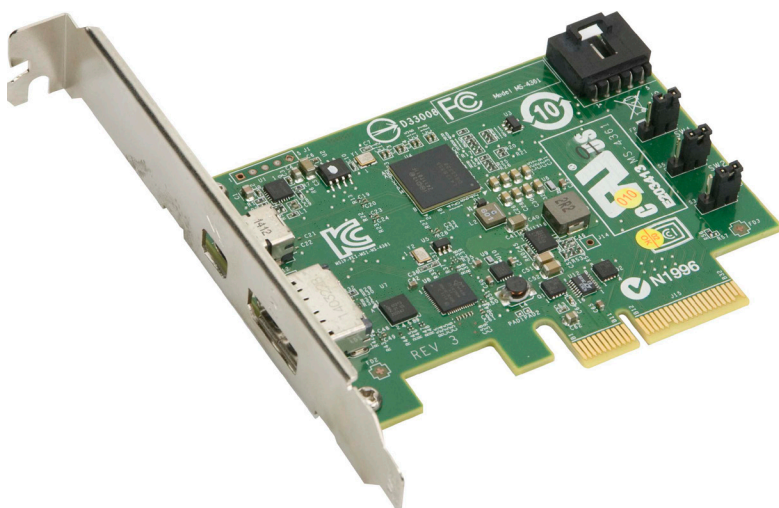




# AOC-TBT-DSL5320



## USER GUIDE

Revision 1.0a

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**WARNING:** Handling of lead solder materials used in this product may expose you to lead, a chemical known to the State of California to cause birth defects and other reproductive harm.

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User Guide: Revision 1.0a

Release Date: October 12, 2015

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## Preface

### About This User Guide

This user guide is written for system integrators, PC technicians and knowledgeable end users. It provides information for the installation and use of the AOC-TBT-DSL5320 add-on card with your Supermicro motherboard.

### An Important Note to the User

All images and layouts shown in this user guide are based upon the latest PCB revision available at the time of publishing. The card you have received may or may not look exactly the same as the graphics shown in this user guide.

### Returning Merchandise for Service

A receipt or copy of your invoice marked with the date of purchase is required before any warranty service will be rendered. You can obtain service by calling your vendor for a Returned Merchandise Authorization (RMA) number. When returning the motherboard to the manufacturer, the RMA number should be prominently displayed on the outside of the shipping carton, and the shipping package is mailed prepaid or hand-carried. Shipping and handling charges will be applied for all orders that must be mailed when service is complete. For faster service, You can also request a RMA authorization online (<http://www.supermicro.com/RmaForm/>).

This warranty only covers normal consumer use and does not cover damages incurred in shipping or from failure due to the alternation, misuse, abuse or improper maintenance of products.

During the warranty period, contact your distributor first for any product problems.

### Conventions Used in This User Guide

Pay special attention to the following symbols for proper system installation and to prevent damage to the system or injury to yourself:



**Note:** Additional information given to differentiate between various models or provides information for correct system setup.

## Contacting Supermicro

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# Chapter 1

## Overview

### 1-1 Overview

Congratulations on purchasing your add-on card from an acknowledged leader in the industry. Supermicro products are designed with the utmost attention to detail to provide you with the highest standards in quality and performance. For product support and updates, please refer to our website at: <http://www.supermicro.com/products/info/Thunderbolt.cfm>

In addition to the add-on card, several important parts that are included with the card are listed below. If anything listed is damaged or missing, please contact your retailer.

Main Parts List	
Description	Quantity
DSL5320 Thunderbolt Controller Card	1
DisplayPort Cable	1
GPIO Cable	1

### 1-2 Introduction to Intel® Thunderbolt™ Technology

Thunderbolt is Intel's breakthrough Input/Output (IO) technology, providing the fastest and most versatile connection to your computer.

A Thunderbolt connection is the amalgam of the PCI Express (PCIe) and DisplayPort I/Os into one super connection. This singular port offers increased data transfer speeds and ability for superior audio and video output.

Thunderbolt also allows for the hot-plugging of devices and the daisy chaining of various peripherals, without the loss of performance or speed.

Supermicro has created an add-on card (AOC-TBT-DSL5320) to enable the addition of Thunderbolt functionality to your existing Supermicro workstation motherboard.



**Note:** AOC is Supermicro's terminology for Add-On Card. TBT is short for Thunderbolt. This language may be used throughout this manual.

## 1-3 Why Use Thunderbolt Technology?

Thunderbolt technology simplifies the attachment of peripheral devices to your system. Now multiple storage, audio, and video devices can be connected to your system through one high quality connector. Additionally, data transfer speeds both to and from the computer are increased due to the utilization of both the PCIe and DisplayPort avenues.

Thunderbolt 2 has taken this advanced technology even a step further. While the first iteration of Thunderbolt offered download and upload speeds of 10 Gbps, Thunderbolt 2 offers 20 Gbps.

The increased data transfer speed and hot-plugging capability saves Systems Administrators, graphics/video enthusiasts, and savvy end users time, as well as decreasing the number of connectors that they need. Furthermore, users can enjoy the latest technology in high definition video output without concerning themselves about loss of quality.

Supermicro's add-on card will give you access to all of these great features.

## 1-4 Key Features

- PCIe 2.0 x 4 connection
- Thunderbolt SPI ROM chip
- DisplayPort chip
- Display Converter chip
- One (1) Thunderbolt connector
- One (1) DisplayPort connector
- One (1) General Purpose Input/Output header (GPIO)



## 1-5 Specifications

### Mechanical Specifications

- Dimensions: 3.71" length x 2.99" height
- Must be inserted into the PCIe slot that is connected to the PCH. Refer to your Supermicro motherboard manual to determine which PCIe slot is connected to the PCH chipset.



**Note:** Some motherboard models may denote this slot with the Thunderbolt symbol.



### Supported Platforms

- Must be used with a compatible Supermicro motherboard model.



**Note:** At the time of this manual's publication, the supported models are: X10DAX, X10DAC, X10DAi, X10DRG-Q, and X10DAL-i.

- Computers must be running Windows 7 32-bit, Windows 7 64-bit, or Windows 8.1 64-bit.
- Supports DisplayPort 1.2

### Power

- Low power consumption of 4.1W max.

### Speed

- Thunderbolt bandwidth of 20 Gbps

### Compliance/Operating Environment

The add-on card is compliant with the following environmental regulations:

- RoHS Compliant 6/6, Pb Free

## 1-6 Product Use

To connect a device to a Thunderbolt port, use a Thunderbolt cable. Thunderbolt cable ends are the same as Mini DisplayPort ends.

For displays that do not have Thunderbolt connections built into them, adapters can be used. Storage devices must be Thunderbolt capable to work.

Up to six (6) devices may be daisy-chained via one Thunderbolt connector.

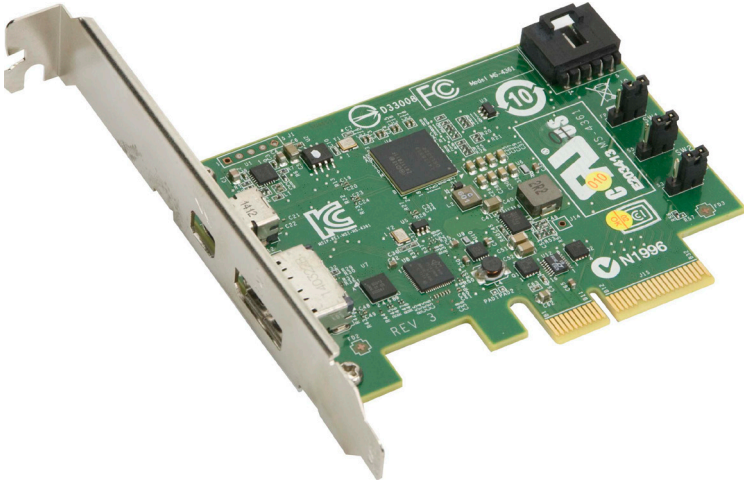


**Note:** It is important to note that non-Thunderbolt capable devices or cables that are connected via an adapter will not be able to utilize Thunderbolt speeds. Non-Thunderbolt capable devices should be connected as the last devices on any daisy chains to ensure that the Thunderbolt capable devices in the chain can maintain optimal performance.

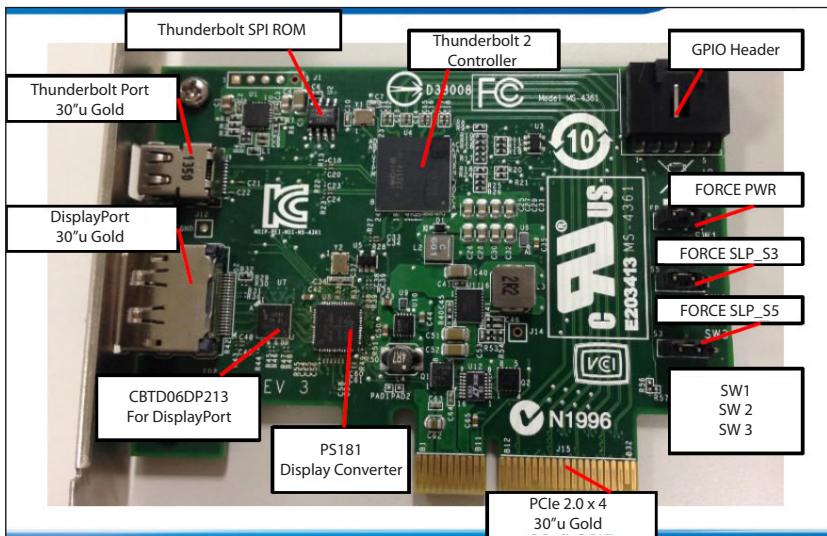
## Chapter 2

### Installation Instructions and Procedures

#### 2-1 Add-On Card Image and Layout



**AOC-TBT-DSL5320**



AOC-TBT-DSL5320 Features	
GPIO Connector	GPIO header
PCIe Connection	PCIe 2.0 x 4
DisplayPort Connector	1
Thunderbolt Connector	1

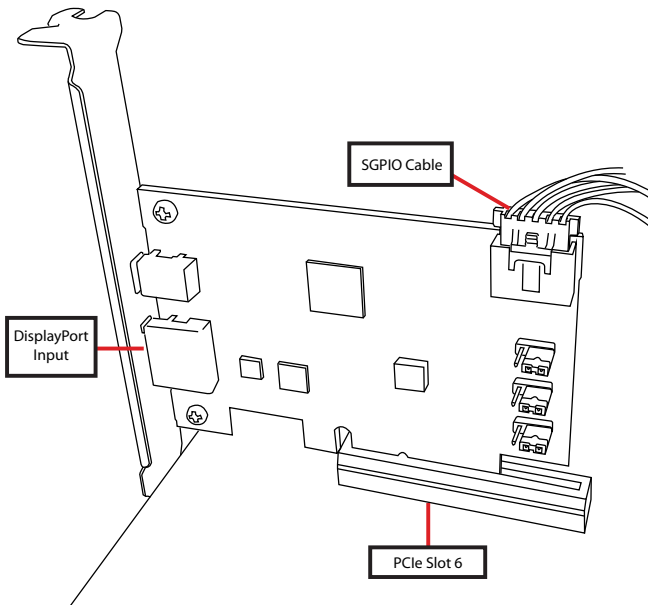
## 2-2 Thunderbolt AOC Installation

1. Identify which PCIe slot is connected to the PCH on your motherboard. Using both hands, carefully insert the AOC into the appropriate PCIe slot.
2. Connect one end of an **SGPIO** cable to the **GPIO header** on the AOC. Connect the other end to the **GPIO header JBT1** on the motherboard.

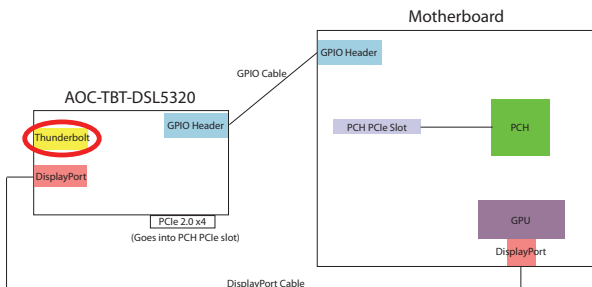


**Note:** Some motherboard models may have the Thunderbolt symbol next to JBT1.

3. Connect one end of a DisplayPort cable to the **DisplayPort input connector** on the AOC (on the back of the metal bracket). Connect the other end to the **DisplayPort output connector** on the graphics card (GPU) attached to the motherboard.




## AOC-TBT-DSL5320 / Motherboard Layout

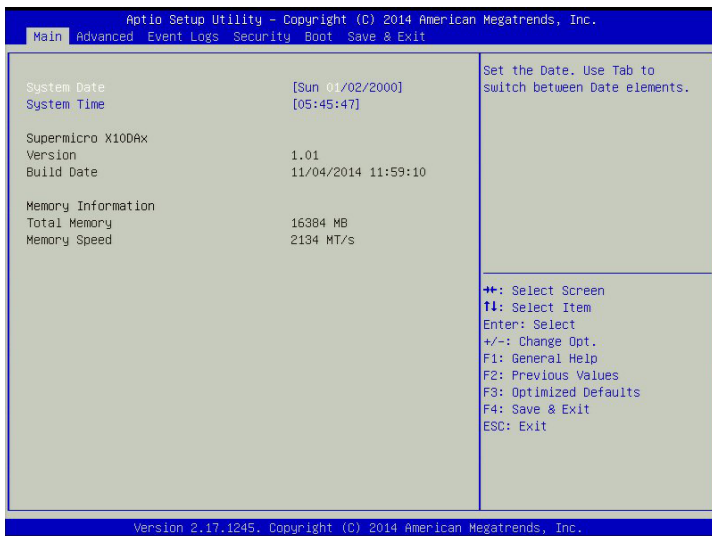


## 2-3 Thunderbolt AOC in BIOS

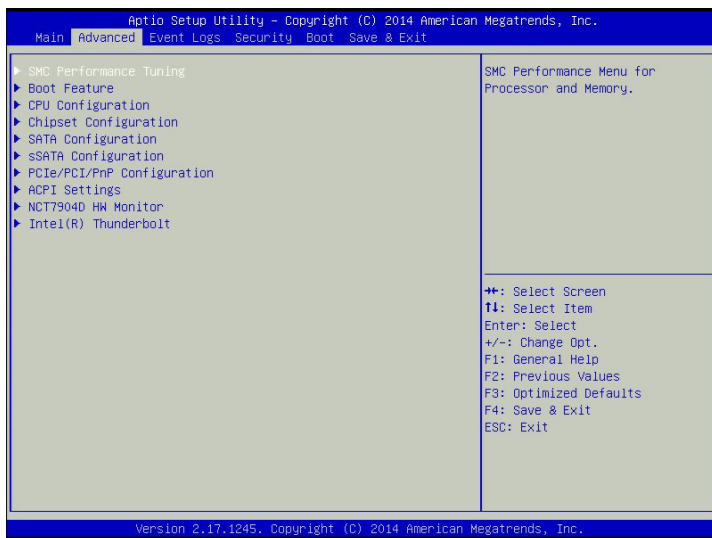
After you have physically installed the AOC, you should verify that Thunderbolt is enabled in the BIOS.

 **Note:** The default settings for the AOC should enable immediate functionality. This process is just to perform a verification check.

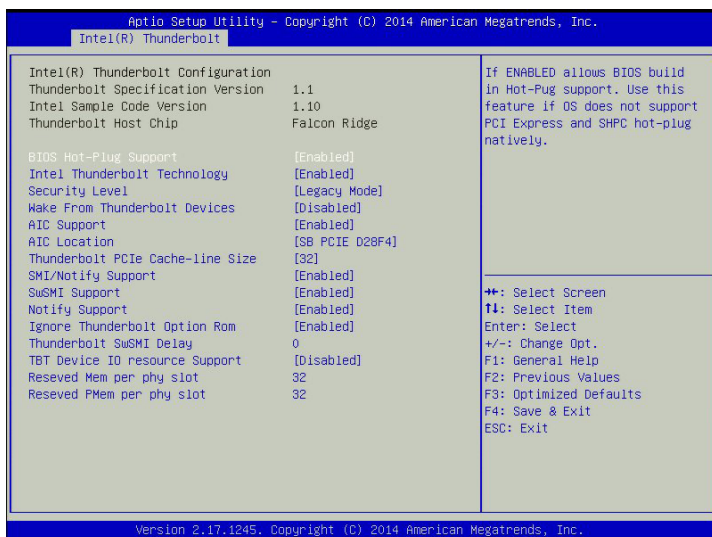
1. On system boot-up, press the **Delete** key to enter the BIOS.
2. The **Main** tab of the BIOS opens.



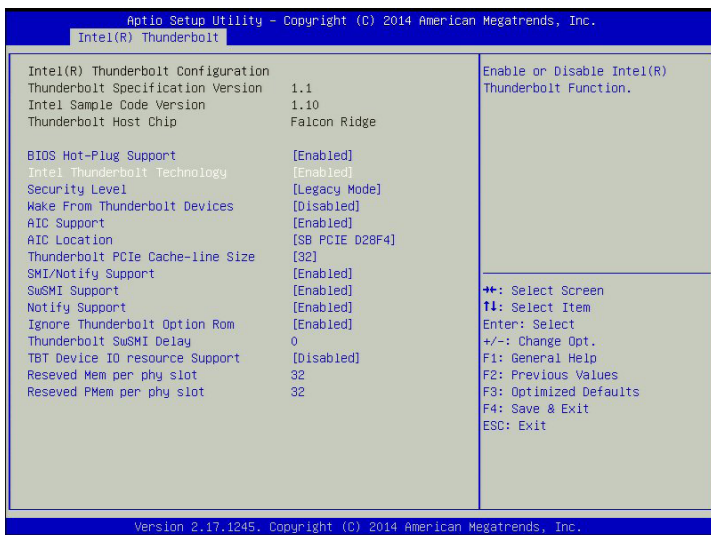
- Press the **right arrow** key to navigate to the **Advanced** tab.



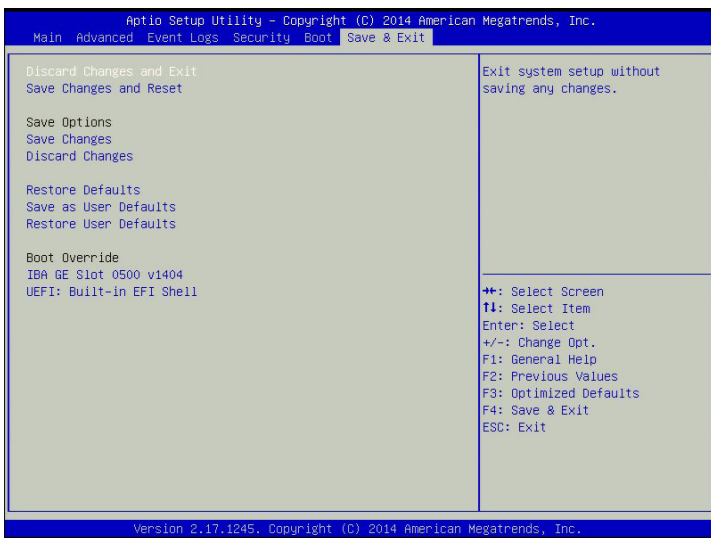
- Press the **down arrow** key to navigate to the **Intel(R) Thunderbolt** option. Press the **Enter** key.



5. Verify that Intel Thunderbolt Technology is set to **[Enabled]**.




6. When you are finished, press the **Esc** key. If you made changes, use the **right arrow** key to navigate to the **Save & Exit** tab and down to the **Save Changes** option. Press the **Enter** key to save any configuration changes that you made.



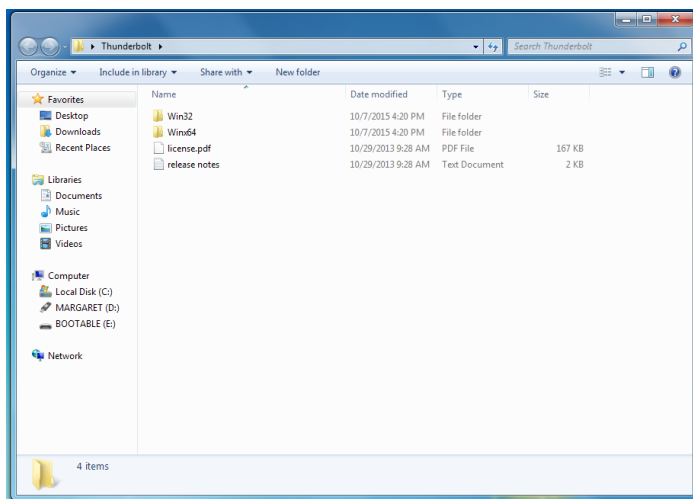
## 2-4 Installing the Thunderbolt Drivers

Now that you have verified that Thunderbolt is set up in the BIOS, you will need to download and install the drivers from the Intel web site.

 **Note:** A Windows 7 computer was used to capture the following screenshots. If you are running a different OS, your screens may look different.

Google Chrome was the web browser used for the purposes of this section. If you are running a different browser, you may be presented with different options.

1. In your Internet browser, go to [https://downloadcenter.intel.com/Detail\\_Desc.aspx?DwnldID=23742](https://downloadcenter.intel.com/Detail_Desc.aspx?DwnldID=23742) to access the Intel Thunderbolt driver.
2. Double-click the File name link **TBT\_Win7\_32\_64\_Win8.1\_64\_2.0.4.250.zip**. The Intel Software License Agreement dialog box appears. Review the agreement and if you accept, click the **I accept the terms in the license agreement** button. If you do not accept, you will not be able to continue.
3. After you have accepted the license agreement, download and save the drivers to a folder of your choice.

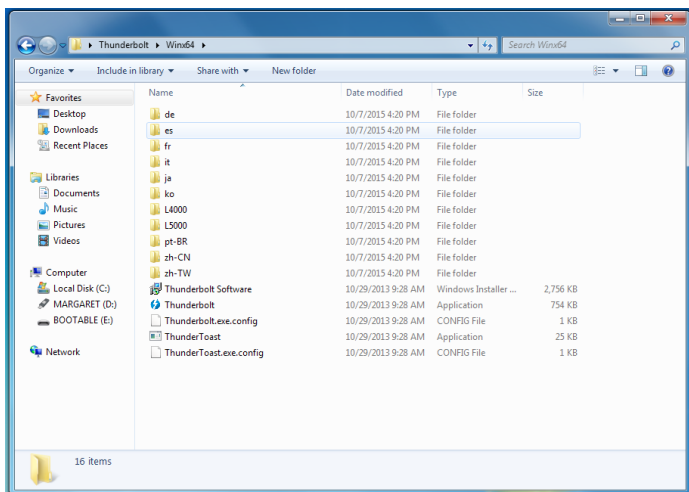




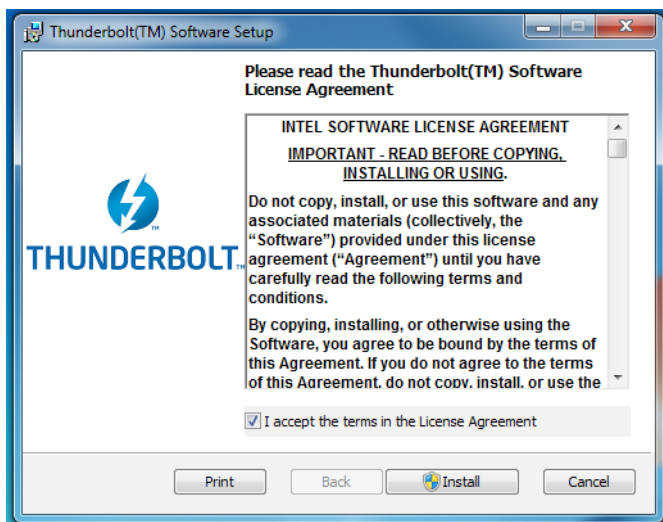
4. Open the zip file, then open either the Win32 or Win64 folder depending on if your operating system (OS) is 32-bit or 64-bit. Click **Thunderbolt Software** to start the installation process.



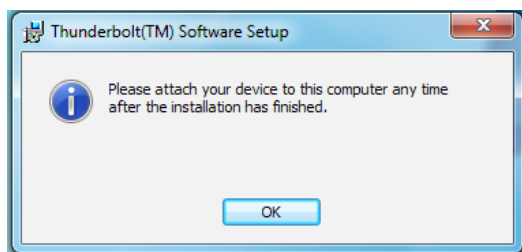
**Note:** If you do not know if your OS is 32 or 64-bit, you can find this information by navigating to Start > Computer > System Properties > System type.



5. The Thunderbolt(TM) Software Setup dialog box and license agreement opens. Review the agreement and if you agree to it, check the **I accept the terms in the License Agreement** box and click the **Install** button. If you do not accept the terms, you will not be able to continue.



6. When the installation is finished a dialog box will appear to notify you that you may connect Thunderbolt devices to your system. Click the **OK** button.



## 2-5 Connecting Thunderbolt Devices

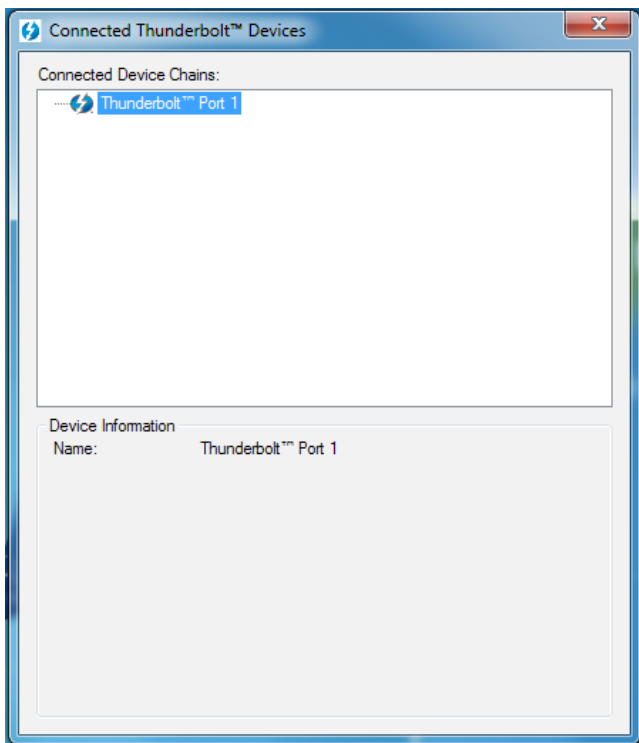
Now that your AOC has been installed, you can begin connecting Thunderbolt devices to your system. If your Thunderbolt device is not working you can check to see if the system recognizes it.

To do this:

1. Open the Start menu and open the All Programs directory. Navigate to the Thunderbolt (TM) Software folder, open it, and click **Thunderbolt (TM) Software**.
2. The Thunderbolt icon now appears in your System Tray. Click on it.



3. A list of your Thunderbolt connected devices appears.



## Chapter 3

### Frequently Asked Questions (FAQs)

Q: What do I need to do to get my AOC working?

A: You will need to do three things:

1. Physically install the AOC (see page 2-2 for instructions)
2. Verify that Thunderbolt is enabled in the BIOS (see pages 2-3 to 2-5)
3. Install and run the drivers (see pages 2-6 to 2-8)

Q: What do I do if the AOC is not being recognized by my system?

A: You will need to perform a series of checks on your hardware and software.

#### Hardware

- Verify it is the Supermicro add-on card model AOC-TBT-DSL5320. You cannot add Thunderbolt functionality to your Supermicro motherboard with any other brand or model of add-on card.
- Is your motherboard supported? It must be a Supermicro motherboard, and must be a supported model. At the time of this manual's publication the supported models are: X10DAX, X10DAC, X10DAi, X10DRG-Q, and X10DAL-i.
- Is your AOC installed in the appropriate PCIe slot? It must be installed in the PCIe slot that is connected to the PCH or your AOC will not work. Please refer to your Supermicro motherboard manual to determine which PCIe slot is connected to the PCH chipset.
- Are the appropriate cables connected? In other words, are the SGPIO cable and the DisplayPort cable connected to the AOC and the motherboard? (See pages 2-2 and 2-3 for more information).
- See also section 1-6 Product Use (page 1-4) and verify that the products you are using are supported and connected correctly.

#### Software

- Is your computer running one of the supported OS types? They are Windows 7 32-bit, Windows 7 64-bit, and Windows 8.1 64-bit. If your computer is not running one of these, the AOC will not work.

- Is the AOC properly set up in the BIOS? The default BIOS settings should have been sufficient to run your AOC (see pages 2-3 to 2-5 for more information).
- Have you installed the drivers properly? (See pages 2-6 to 2-9 for more information).

If you have checked all of these things and everything is in order, please contact Supermicro to receive technical support (see page iv in the Preface section).

Q: I see three sets of jumpers on the right side of my AOC (page 2-1). What do I do with those?

A: Nothing. Those are configuration straps and should not be adjusted unless advised by Supermicro technical support.

Q: My AOC is detected by my system and all set up. How do I begin using Thunderbolt devices?

A: You will need to plug in a Thunderbolt cable to the Thunderbolt port (see diagram on page 2-1 for location of Thunderbolt port).

From there, you can begin utilizing the Thunderbolt functionality. See section 1-6 Product Use on page 1-4 and verify that the products you are using are supported and connected correctly.

(Disclaimer Continued)

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