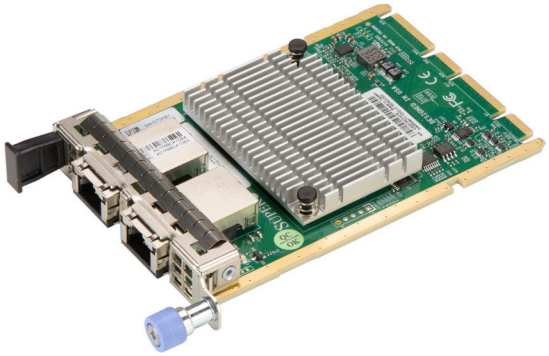
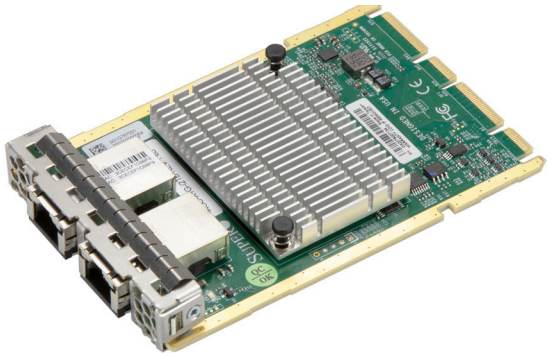
AOC-ATG-i2TM



AOC-ATG-i2TB



USER'S MANUAL

Revision 1.0a

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Manual Revision 1.0a

Release Date: November 25, 2024

Preface

About This Manual

This user's guide is written for system integrators, IT technicians, and knowledgeable end users. It provides information for the installation and use of the AOC-ATG-i2TM and AOC-ATG-i2TB add-on card.

About This Add-On Card

Supermicro® Advanced I/O Modules (AIOM) are the latest form factor designed to provide a wide range of networking options and other I/O technologies. The AOC-ATG-i2TM and AOC-ATG-i2TB is one of the most feature-rich low-power 10GBase-T controllers in the market today. Based on the Intel® X550 chipset with virtualization features such as VXLAN and NVGRE, they offer flexible connectivity selection for all networking requirements. The integration of 10 GbE MAC+PHY with Intel X550 helps drive down cost and power, enabling the most cost-effective solution in the data center. They are among the most innovative 10 GbE controllers in the market and an excellent choice to expand network connectivity in data centers and enterprise environments.

An Important Note to the User

All graphic images and layout drawings shown in this user's guide are based upon the latest PCB revision available at the time of publishing this user's guide. The add-on card you have received may or may not look exactly the same as the graphics shown in this user's 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 to the manufacturer, the RMA number should be prominently displayed on the outside of the shipping carton and 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, RMA authorizations may be requested online (http://www.supermicro.com/support/rma/).

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

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

Conventions Used in the Manual

Special attention should be given to the following symbols for proper installation and to prevent damage done to the components or injury.

Warning! Indicates important information given to prevent equipment/property damage or personal injury.

Warning! Indicates high voltage may be encountered while performing a procedure.

Important: Important information given to ensure proper system installation or to relay safety precautions.

Note: Additional information given to differentiate various models or to provide information for proper system setup.

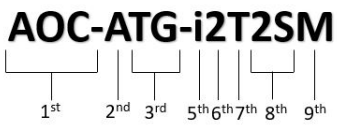
Important Links

For your system to work properly, follow the links below to download all necessary drivers/utilities and the user's manual for your server.

- Supermicro product manuals: http://www.supermicro.com/support/manuals/
- Product drivers and utilities: https://www.supermicro.com/wdl/driver
- Product safety info: http://www.supermicro.com/about/policies/safety_information.cfm
- A secure data deletion tool designed to fully erase all data from storage devices can be found at our website: https://www.supermicro.com/about/policies/disclaimer.cfm?url=/wdl/utility/Lot9_Secure_Data_Deletion_Utility/
- If you have any questions, contact our support team at: support@supermicro.com
- Frequently Asked Questions: https://www.supermicro.com/FAQ/index.php
- If you have any feedback on Supermicro product manuals, contact our writing team at: Techwriterteam@supermicro.com

This manual may be periodically updated without notice. Check the Supermicro website for possible updates to the manual revision level.

Naming Convention



Character	Representation	Options
1st	Product Family	AOC: Add On Card
2nd	Form Factor	S: Standard, P: Proprietary, C: MicroLP, M: Super IO Module (SIOM), MH: SIOM Hybrid A: Advanced IO Module (AIOM), AH: AIOM Hybrid
3rd	Product Type/Speed	G: GbE (1Gb/s), TG: 10GbE (10Gb/s), 25G: 25GbE (25Gb/s), 40G: 40GbE (40Gb/s), 50G: 50GbE (50Gb/s), 100G: 100GbE (100Gb/s), IBE: EDR IB (100Gb/s), HFI: Host Fabric Interface
4th	Chipset Model (Optional)	N: Niantec (82599), P: Powerville (i350), S: Sageville (X550), F: Fortville (XL710/X710), L: Lewisburg (PCH)
5th	Chipset Manufacturer	i: Intel, m: Mellanox, b: Broadcom
6th	Number of Ports	1: 1 port, 2: 2 ports, 4: 4 ports, 8: 8 ports
7th	Connector Type (Optional)	S: SFP/SFP+/SFP28, T: 10GBase-T, Q: QSFP+, C: QSFP28
8th	2nd Controller/Connector Type (Optional)	G: 1x GbE RJ45, 2G: GbE 2x RJ45, S: 1x 10G SFP+, T: 10GBase-T, 2T: 2x 10GBase-T, 2S: 2x SFP+
9th	Bracket	For SIOM – Non-M: swappable bracket for Storage systems, M: Internal bracket for Twin systems. For AIOM – Non-M: 1U height bracket for Edge systems, M: 0.5U height bracket for all other systems.

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Website:	www.supermicro.com.tw

Table of Contents

Chapter 1

Introduction

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 of quality and performance. For product support and updates, refer to our website at https://www.supermicro.com/en/products/networking/adapters.

1.2 Key Features

The key features of this add-on card include the following.

- Advanced I/O Module (AIOM) form factor
- Intel X550 10 GbE controller
- Dual RJ45 connectors
- Network Virtualization Offloads: VXLAN and NVGRE
- VMDq and SR-IOV for virtualized environment
- Jumbo Frames support up to 15.5 KB
- Asset Management features with thermal sensor
- NC-SI for Remote Management
- Supports RJ-45 Category-6 and 6A cables
- RoHS compliant 6/6

1.3 Specifications

General

- Advanced I/O Module (AIOM) form factor
- Intel X550 dual-port 10 GbE controller with integrated MAC and PHY
- Dual RJ45 ports

I/O Features

- Intel® Flow Director
- MSI/MSI-X support
- Tx/Rx IP, SCTP, TCP, and UDP Checksum Offloading (IPv4, IPv6) capabilities
- Tx TCP Segmentation Offload (IPv4, IPv6)
- RSS for Windows Environment Scalable I/O for Linux environments

Virtualization Features

- Network Virtualization Stateless Offload: VXLAN, NVGRE
- Support for Virtual Machine Device Queues (VMDq)
- 64 Transmit (Tx) and Receive (Rx) Queue Pairs per port
- FFP – 64 VFs per port
- PCI-SIG SR-IOV support
- 802.1q VLAN support

Manageability Features

- Preboot eXecution Environment (PXE) support
- Remote Boot iSCSI and FCoE
- IEEE 1588
- Network Controller Sideband Interface (NC-SI) (Not supported in Standby by default)

Cable Support

- RJ-45 Category-6 up to 55 m; Category-6A up to 100 m

Power Consumption

- Maximum power consumption: 13 W

Operating Conditions

- Storage temperature: -40°C to 70°C (-40°F to 158°F)
- Storage humidity: 90% non-condensing relative humidity at 35°C

Physical Dimensions

- Card PCB dimensions: 19 mm x 76 mm x 115 mm (H x W x D)

Note: This product is only sold as part of an integrated solution with Supermicro server systems.

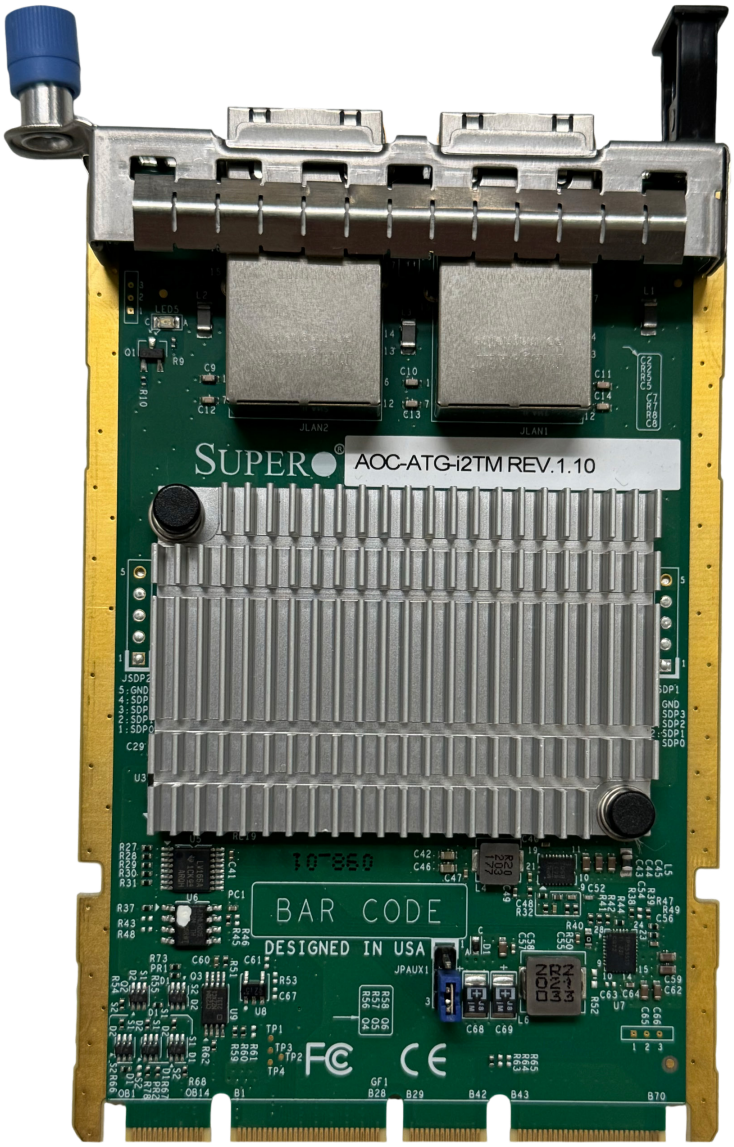
1.4 Available SKUs

SKUs	Bracket Included	Description
AOC-ATG-i2TM	BKT-0168L	2-port 10 Gigabit Ethernet Adapter with a 0.5U height bracket
AOC-ATG-i2TB	BKT-0181L	2-port 10 Gigabit Ethernet Adapter with a 0.5U height internal lock bracket (for Blade system only)

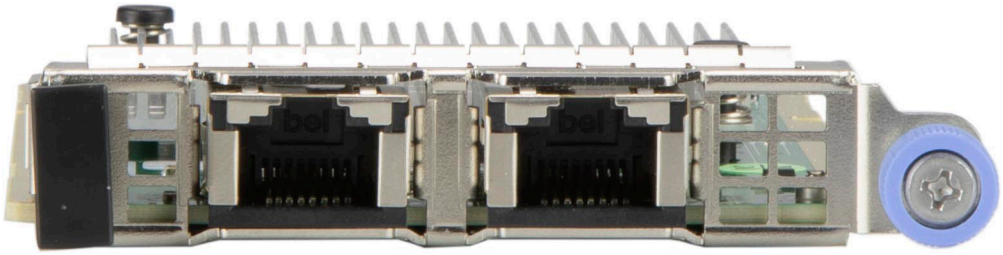
Chapter 2

Hardware Components

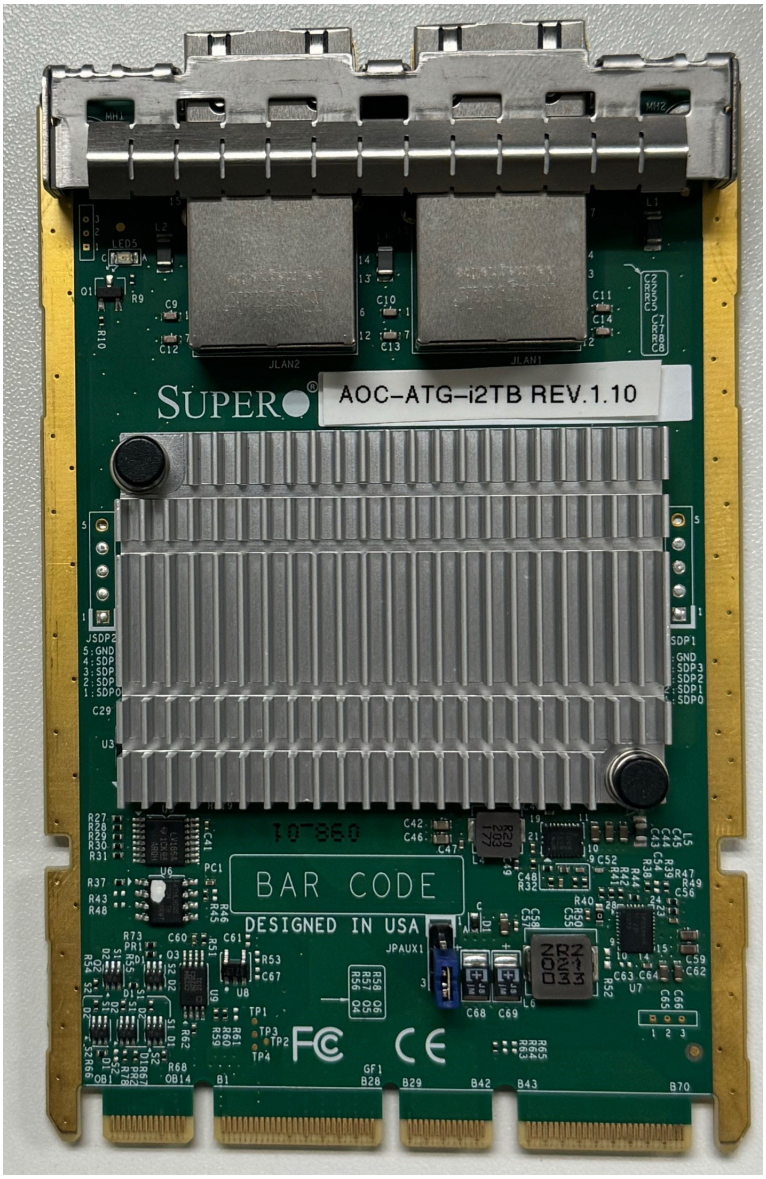
2.1 Add-On Card Image and Layout



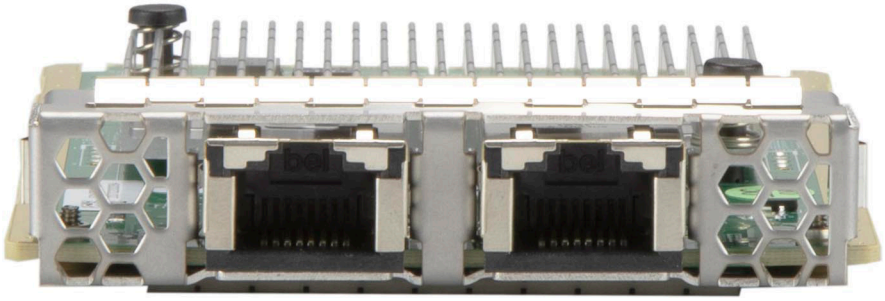
AOC-ATG-i2TM Top View



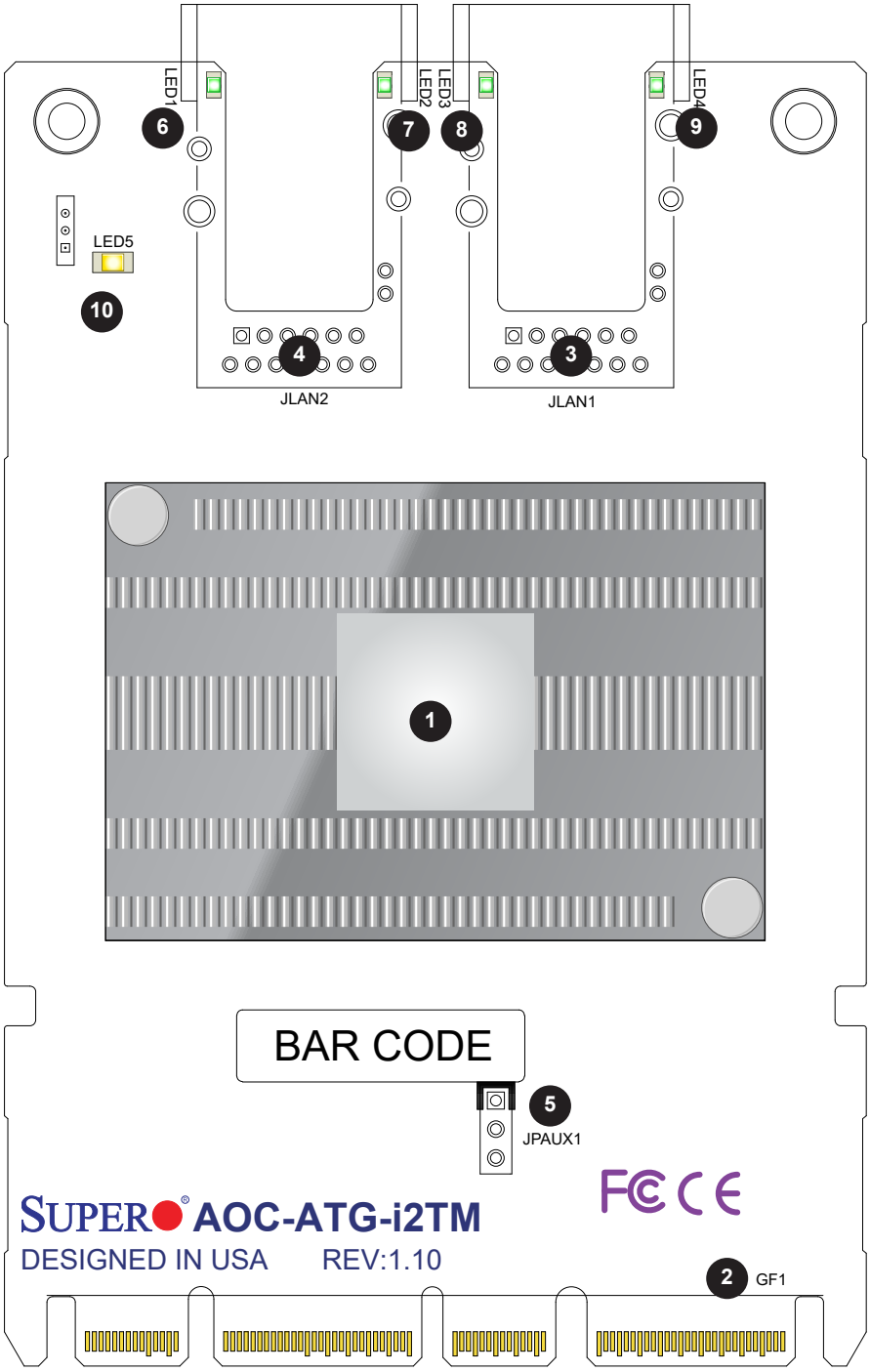
AOC-ATG-i2TM Front View



AOC-ATG-i2TB Top View



AOC-ATG-i2TB Front View



AOC-ATG-i2TM Layout

2.2 Major Components

The following major components are installed on the AOC-ATG-i2TM and AOC-ATG-i2TB:

AOC-ATG-i2TM/-i2TB Major Components		
No	**Component Name**	**Definition**
1	Intel X550	10 GbE Ethernet LAN controller
2	GF1	PCIe connector
3	JLAN1	RJ45 Port 1
4	JLAN2	RJ45 Port 2
5	JPAUX1	1–2: Enable AUX Power
		3–4: Disable AUX Power (default)
6	LED1	RJ45 Port 2 Link LED
7	LED2	RJ45 Port 2 Activity LED
8	LED3	RJ45 Port 1 Link LED
9	LED4	RJ45 Port 1 LActivity LED
10	LED5	Power Good LED

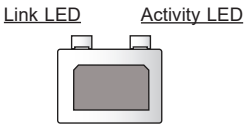
2.3 LED Ports and LED Indicators

LAN Ports

The AOC-ATG-i2TM/-i2TB add-on card has two network LAN RJ45 ports. These LAN ports support connection speeds up to 10 Gbps. Be sure to use RJ45 type LAN cables.for network connections.

LAN Port LED Indicators

Each RJ45 LAN port has two LEDs to indicate speed and data activity. The LAN port LEDs (LED1, LED2, LED3, and LED4) will be lit in different colors to indicate different statuses. The LED on the top indicates link speed, and the LED on the bottom indicates the status of activity of the connector.

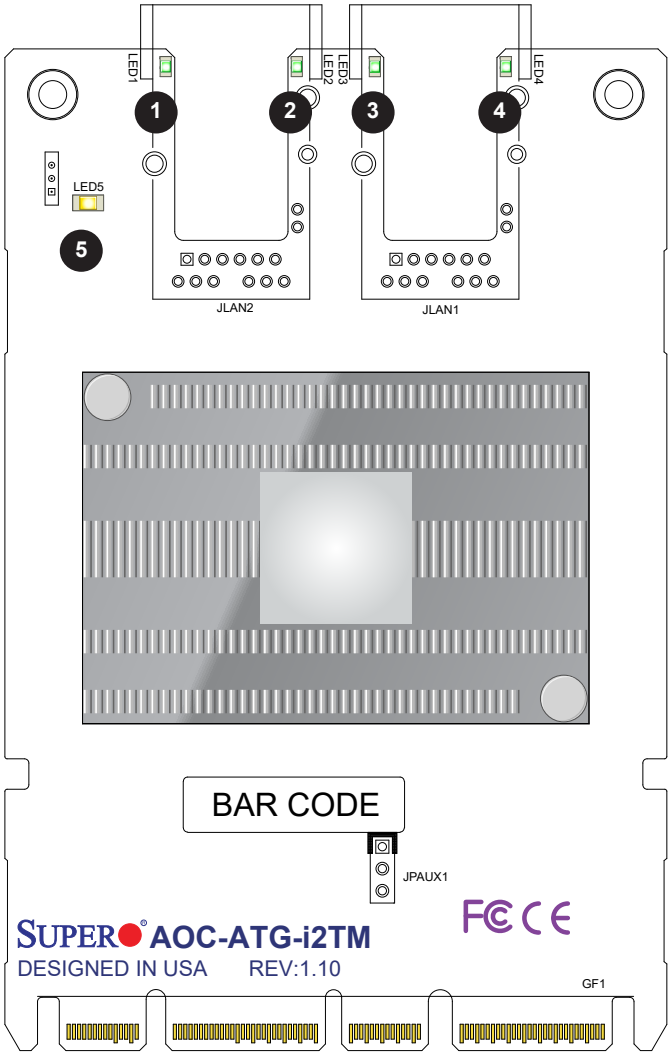


RJ45 LAN Port Link LED (Left) LED State	
LED Color	**Definition**
Green	10 Gbps Speed
Amber	1 Gbps Speed
Amber	100 Mbps Speed

RJ45 LAN Port Activity LED (Right) LED State		
LED Color	**Status**	**Definition**
Off/None	Off	No connection
Green	Solid	Link
Green	Flashing	Active

LAN Power Rail LED

The AOC-ATG-i2TM/-i2TB add-on card has one Power Good LED, referred to as LED5. This LED will be lit to indicate when the LAN power rails are up and running. Refer to page 18 for its location.



1. RJ45 Port 2 Link LED
2. RJ45 Port 2 Activity LED
3. RJ45 Port 1 Link LED
4. RJ45 Port 1 Activity LED
5. Power Good LED

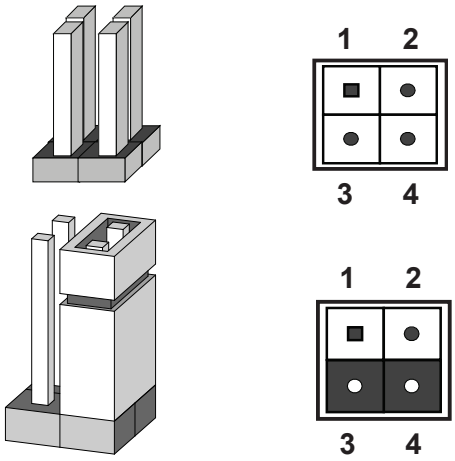
2.4 Major Components of AIOM Module

The major components of the Supermicro Advanced I/O Modules (AIOM) are the card and bracket. Before a computer system can operate, all slots are required to be populated. If an AIOM module is used, be sure that the bracket is firmly installed into the chassis. This will ensure that the card that is installed to the bracket is seated securely in the motherboard connector. For instructions on how to install and uninstall an AIOM module, refer to chapter 3.

2.5 Jumper Settings

Explanation of Jumpers

To modify the operation of the motherboard, jumpers can be used to choose between optional settings. Jumpers create shorts between two pins to change the function of the connector. Pin 1 is identified with a square solder pad on the printed circuit board.



AOC JPAUX1 set to Disabled	**When system/motherboard goes into standby mode**		
	IPMI Support	**Failover Support**	**WoL Support**
	No	No	No
	When system/motherboard is NOT in standby mode		
	IPMI Support	**Failover Support**	**WoL Support**
	Yes	Yes	N/A
AOC JPAUX1 set to Enabled	**When system/motherboard goes into standby mode**		
	IPMI Support	**Failover Support**	**WoL Support**
	Yes	Yes	No
	When system/motherboard is NOT in standby mode		
	IPMI Support	**Failover Support**	**WoL Support**
	Yes	Yes	N/A

JPAUX1 for Standby Power	Function	Notes
Disable *No standby power to AOC NIC*	Disable jumper to disconnect the standby power	Default
Enable *Standby power to AOC NIC*	Enable jumper to connect standby power to AOC NIC	Standby Power can be enabled to provide support for NC-SI (IPMI/Failover Support). Consult Supermicro before enabling it.

Note: Due to the limitations of the X550 with the standby power jumper, it is necessary to change the BMC setting from failover to dedicated when performing the on/off test.

Chapter 3

Installation

3.1 Static-Sensitive Devices

Electrostatic Discharge (ESD) can damage electronic components. To avoid damaging your add-on card, it is important to handle it very carefully. The following measures are generally sufficient to protect your equipment from ESD.

Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing the add-on card from the antistatic bag.
- Handle the add-on card by its edges only; do not touch its components or peripheral chips.
- Put the add-on card back into the antistatic bags when not in use.
- For grounding purposes, make sure that your system chassis provides excellent conductivity between the power supply, the case, the mounting fasteners, and the add-on card.

Unpacking

The add-on card is shipped in antistatic packaging to avoid static damage. When unpacking your component or system, make sure you are static protected.

Note: To avoid damaging your components and to ensure proper installation, always connect the power cord last, and always unplug it before adding, removing, or changing any hardware components.

3.2 Before Installation

To install the add-on card properly, be sure to follow the instructions below.

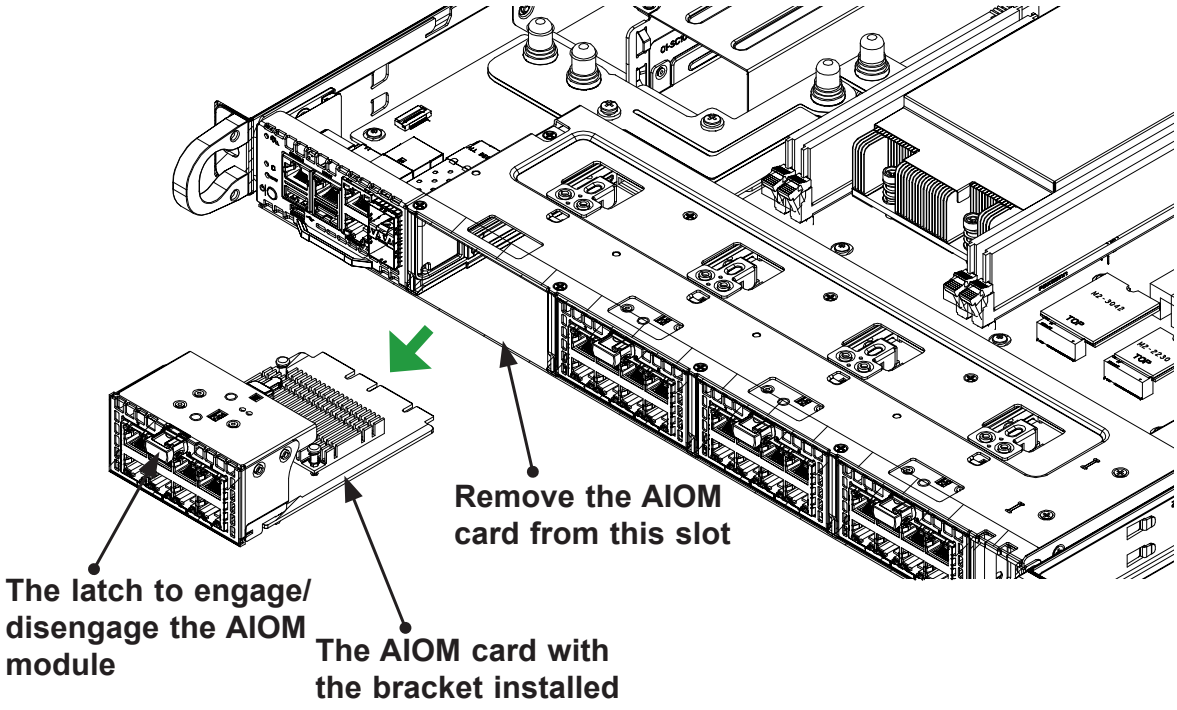
1. Power down the system.
2. Remove the power cord from the wall socket.
3. Use industry-standard antistatic equipment (such as gloves or wrist strap) and follow the instructions listed on page 24 to avoid damage caused by ESD.
4. Familiarize yourself with the server, motherboard, and/or chassis documentation.
5. Confirm that your operating system includes the latest updates and hot fixes.

3.3 Installing the Add-on Card (with 1U bracket)

Follow the steps below to install an add-on card into your system. If the system is fixed onto a rack, the removal of server top cover is not required. If the system is *not* anchored to a fixed structure, it is recommended to remove the system top cover for ease of installation.

Uninstalling an AIOM module

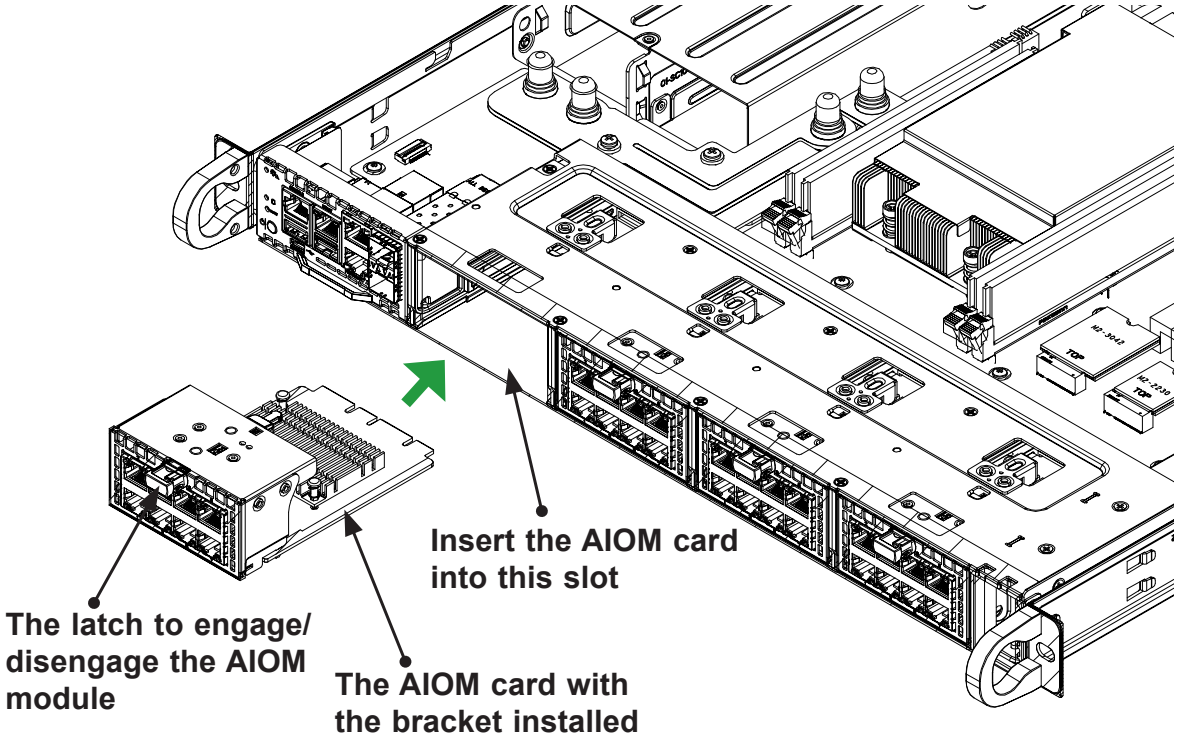
1. Slide the black latch to the left to "unlock" position, then disengage the AIOM module from the chassis structure by pushing the blue latch once to extend it outward.
2. Pull the blue latch to disengage the AIOM module from the motherboard connector.
3. Gently slide the AIOM module out.



Installing and Reinstalling an AIOM module (with an empty slot)

1. Position the AIOM module in front of the empty slot.
2. Gently push onto the metal bracket (do not use the blue latch). The AIOM module should slide into the chassis until the card securely is seated in the connector.
3. Press the blue latch to properly secure it onto the chassis and move the black latch to the right to "lock" position.

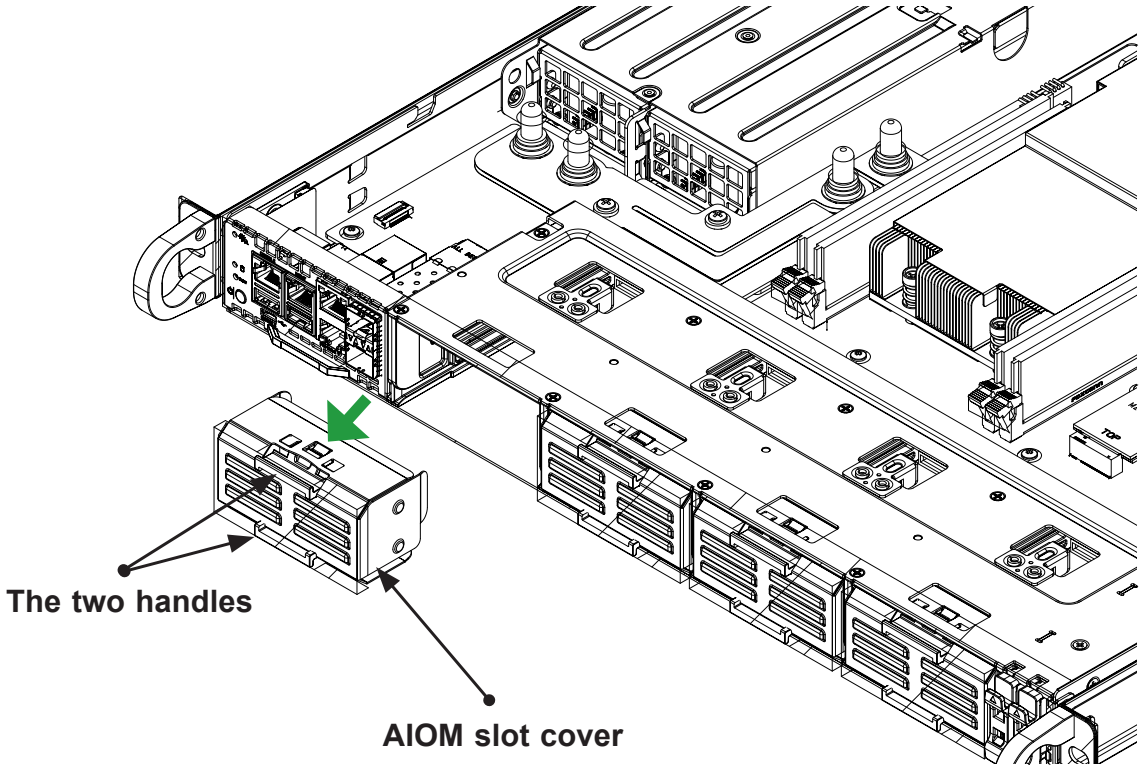
Black Latch



Note: A computer system should not be operating with an empty AIOM slot. All slots should be populated with AIOM modules, AIOM slot covers, or combinations of both.

Installing an AIOM module (with an AIOM slot cover)

1. Remove the AIOM slot cover by pulling it with two handles.
2. Position the AIOM module in front of the empty slot.
3. Gently push onto the metal bracket (do not use the blue latch). The AIOM module should slide into the chassis until the card is fully seated inside the connector.
4. Press the blue latch to secure it onto the chassis structure.



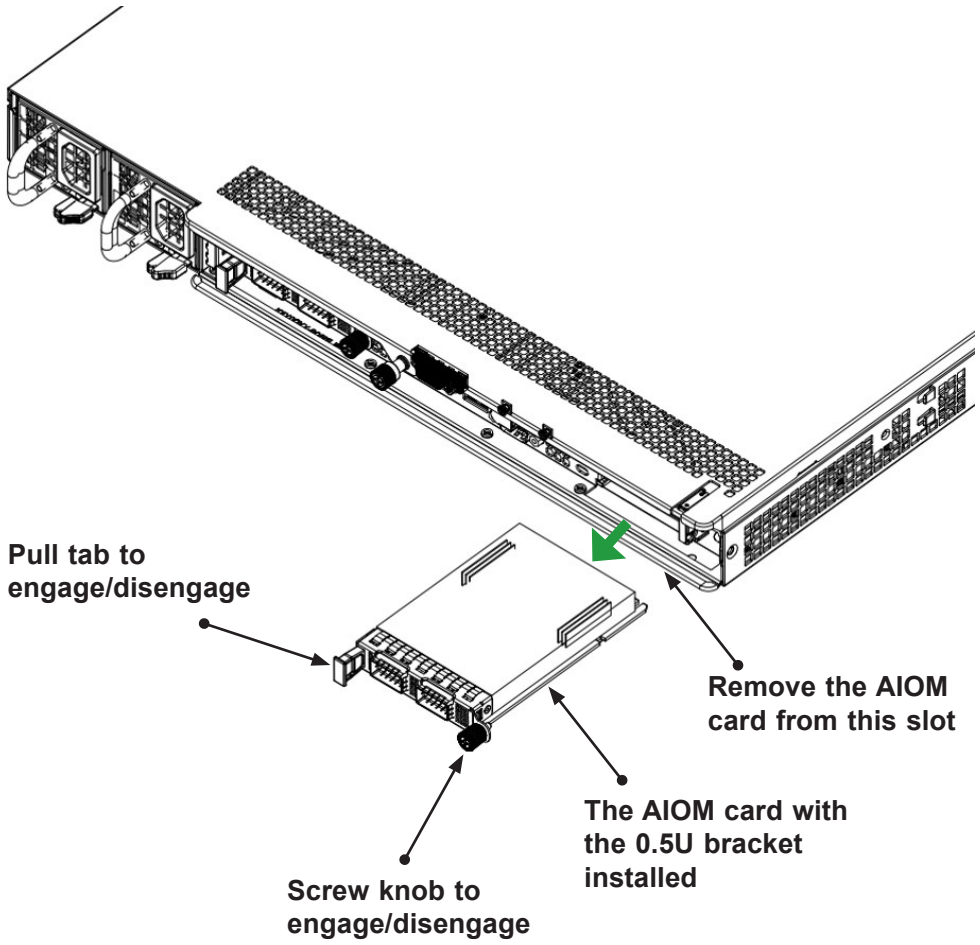
Note: This AIOM module does not support hot plug. Turn off the AC power and remove the power cord from the wall socket before installing or removing an AIOM module.

3.4 Installing the Add-on Card (with 0.5U bracket)

Follow the steps below to install an add-on card into your system. (If the system is fixed onto a rack, the removal of server top cover is not required. If the system is not anchored to a fixed structure, it is recommended to remove the system top cover for ease of installation.)

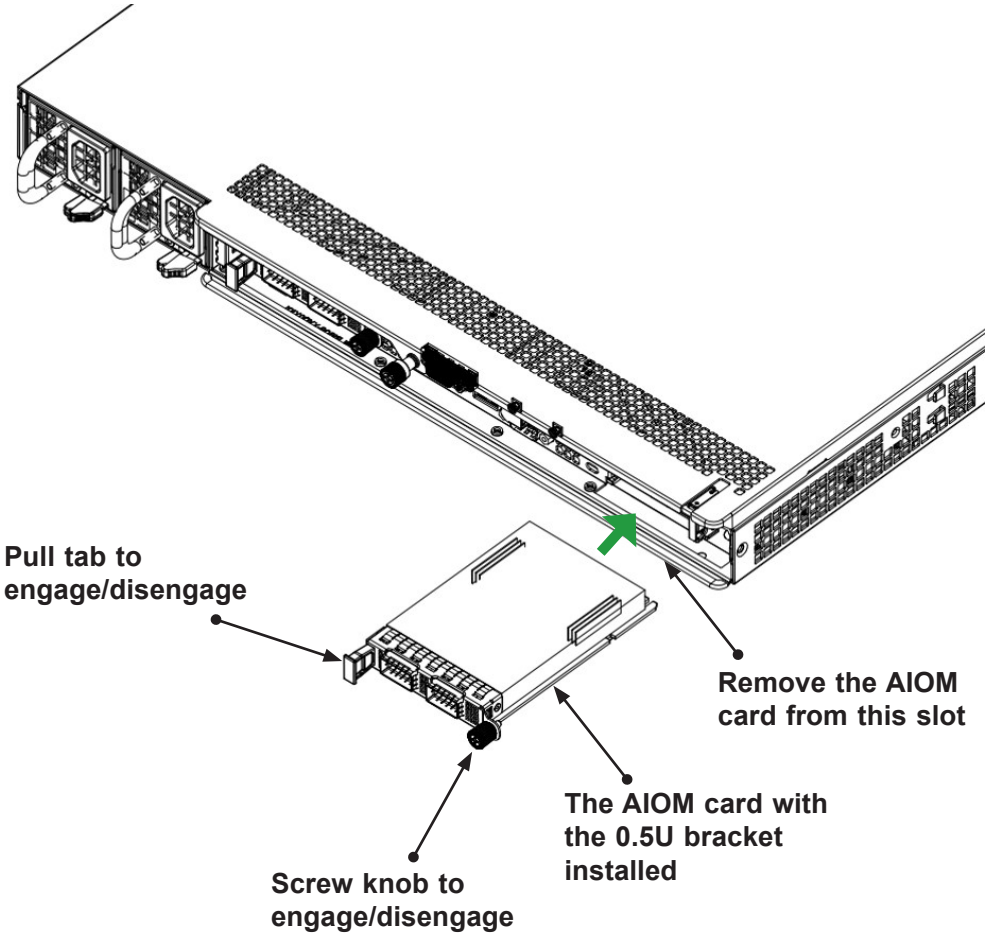
Uninstalling an AIOM module

1. Unscrew the blue knob from the system.
2. Pull on the tab and a knob evenly on both sides of the card to disengage the AIOM module from the motherboard connector.
3. Gently slide the AIOM module out.



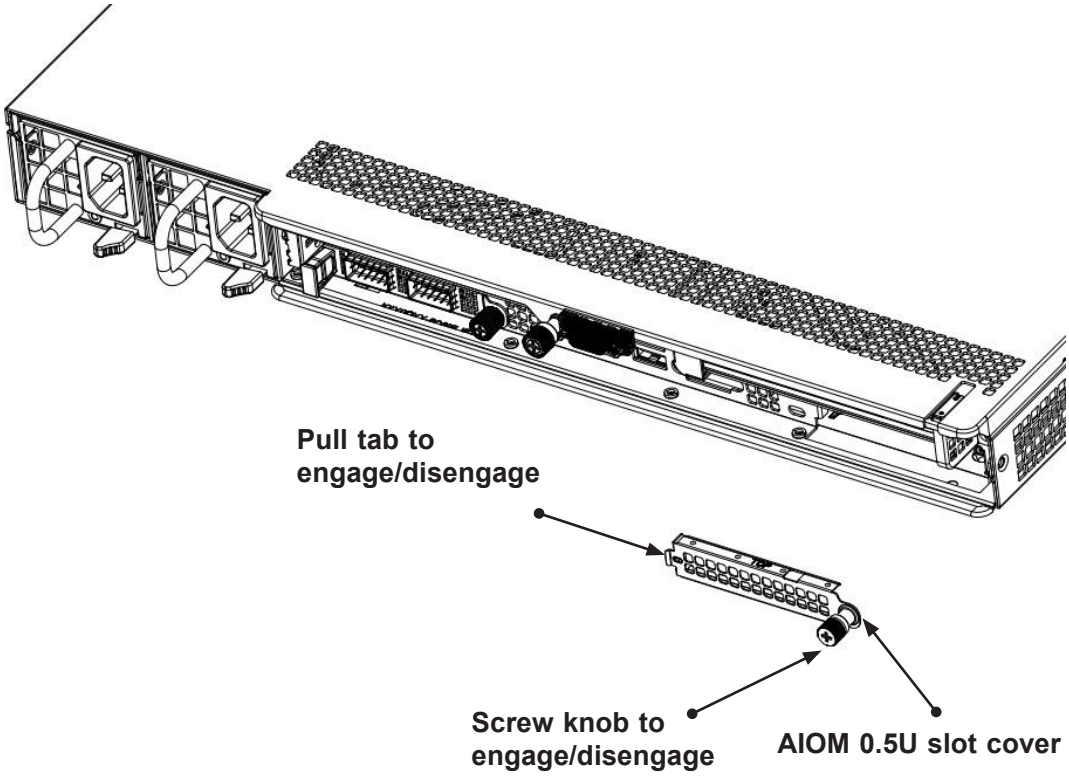
Installing an AIOM module

1. Position the AIOM module in front of the empty slot.
2. Gently push onto the metal bracket. The AIOM module should slide into the chassis until the card is securely seated in the connector.
3. Press the blue knob and secure it onto the chassis by turning the knob clockwise.



Installing an AIOM module (with an AIOM slot cover)

1. Remove the AIOM slot cover by unscrewing the knob and screw that attaches the bracket to the chassis. Pull the bracket away and set it aside.
2. Position the AIOM module in front of the empty slot.
3. Gently push onto the metal bracket. The AIOM module should slide into the chassis until the card is securely seated in the connector.
4. Press the blue knob and secure it onto the chassis by turning the knob clockwise.



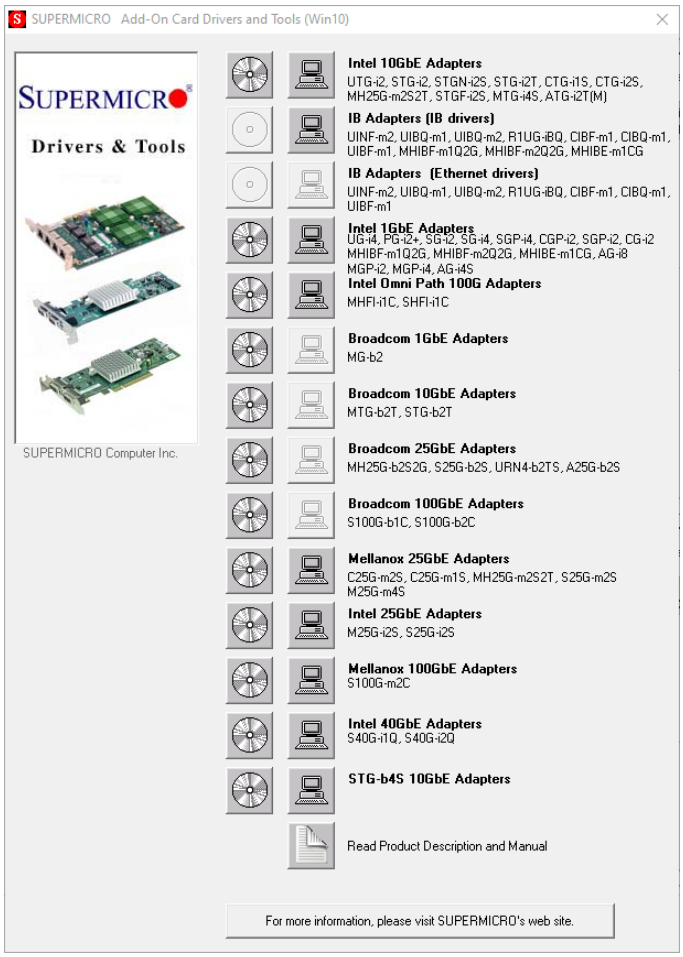
Note 1: This AIOM module does not support hot plug. Turn off the AC power and remove the power cord from the wall socket before installing or removing an AIOM module.

Note 2: Graphics shown above are for illustrative purposes only. Actual products may vary due to product enhacement.

3.5 Installing Drivers on Windows (for Intel X550)

Follow the steps below to install the drivers for the Windows operating systems. Download the drivers from Intel Download Center or the Supermicro site at https://www.supermicro.com/wftp/Networking_Drivers.

1. Run 'rpmbuild -tb <filename.tar.gz>'.
2. When the SUPERMICRO window appears, click on the computer icon next to the product model.



Note: If the FOUND NEW HARDWARE WIZARD screen displays on your system, click CANCEL.

3. Click on INSTALL DRIVERS AND SOFTWARE.
4. Follow the prompts to complete the installation.

3.6 Installing Drivers on Linux (for Intel X550)

Download the drivers from Intel Download Center or the Supermicro site at https://www.supermicro.com/wftp/Networking_Drivers. Follow the instructions below to build the driver manually.

Build a Binary RPM Package

1. Run 'rpmbuild -tb <filename.tar.gz>'.
2. Replace <filename.tar.gz> with the specific filename of the driver.

   Note: For the build to work properly, the current running kernel MUST match the version and configuration of the installed kernel sources. If you have just recompiled the kernel, reboot the system at this time.

   Move the base driver tar file to the directory of your choice. For example:

   ```
   /home/username/ixgbe
   ```

   or

   ```
   /usr/local/src/ixgbe
   ```

3. Untar/unzip archive, where <x.x.x> is the version number for the driver tar file:

   ```
   tar zxf ixgbe-x.x.x.tar.gz
   ```

4. Change to the driver src directory, where <x.x.x> is the version number for the driver tar:

   ```
   cd ixgbe-x.x.x/src/
   ```

5. Compile the driver module:

   ```
   make install
   ```

   The binary will be installed as:

   ```
   /lib/modules/[KERNEL_VERSION]/kernel/drivers/net/ixgbe/ixgbe.[k]
   o
   ```

The install locations listed above are the default locations. They may not be correct for certain Linux distributions. For more information, see the ldistrib.txt file included in the driver tar.

```
make CFLAGS_EXTRA=”-DIGB_NO_LRO” install
```

Note: IXGBE_NO_LRO is a compile time flag. The user can enable it at compile time to remove support for LRO from the driver. The flag is used by adding CFLAGS_EXTRA=-”DIGB_NO_LRO” to the make file when it’s being compiled.

6. Load the module:

   For kernel 2.6.x, use the modprobe command:

   ```
   modprobe ixgbe <parameter>=<value>
   ```

   For 2.6 kernels, the *insmod* command can be used if the full path to the driver module is specified. For example:

   ```
   insmod /lib/modules/<KERNEL VERSION>/kernel/drivers/net/ixgbe/
   ixgbe.ko
   ```

   In addition, when using 2.6-based kernels, make sure that older ixgbe drivers are removed from the kernel before loading the new module. To do this, input the following:

   ```
   rmmod ixgbe; modprobe ixgbe
   ```

7. Assign an IP address to the interface by entering the following, where x is the interface number:

   ```
   ifconfig ethx <IP_address> netmask <netmask>
   ```

8. Verify that the interface works. Enter the following, where <IP_address> is the IP address for another machine on the same subnet as the interface that is being tested:

   ```
   ping <IP_address>
   ```

3.7 Installing Drivers on FreeBSD (for Intel X550)

Follow the instructions below to install the drivers for FreeBSD kernel 4.8 or later. In the instructions below, x.x.x is the driver version as indicated in the name of the drive tar file.

Note: You must have kernel sources installed in order to compile the driver module.

1. Move the base driver tar file to the dirctory of your choice. For example, use:

   ```
   /home/username/ixgbe or /usr/local/src/ixgbe
   ```

2. Untar/unzip the archive:

   ```
   tar xfz ixgbe-x.x.x directory
   ```

3. To install main page:

   ```
   cd ixgbe-x.x.x

   gzip -c ixgbe.4 > /usr/share/man/man4/ixgbe.4.gz
   ```

4. To load the driver onto a running system, perform the following steps:

   ```
   cd ixgbe-x.x.x

   make
   ```

   or

   ```
   cd ixgbe-x.x.x/src

   make load
   ```

5. To assign an IP address to the interface, enter the following:

   ```
   ifconfig ixgbe<interface_num> <IP_address>
   ```

6. Verify that the interface works. Enter the following, where <IP_address> is the IP address for another machine on the same subnet as the interface that is being tested:

   ```
   ping <IP_address>
   ```

7. If you want the driver to load automatically when the system is booted, enter the following:

```
cd ixgbe-x.x.x/src

make load

cp if_ixgbe.ko /modules
```

Edit /boot/loader.conf, and add the following line:

```
if_ixgbe_load="YES"
```

or

compile the driver into the kernel (see item 8).

Edit /etc/rc.conf, and create the appropriate ifconfig_ixgbe<interface_num> entry:\

```
ifconfig_ixgbe<interface_num>="<ifconfig_settings>"
```

Example usage:

```
ifconfig_ixgbe0="inet 192.168.10.1 netmask 255.255.255.0"
```

8. If you want to compile the driver into the kernel, enter:

```
cd ixgbe-x.x.x/src

mkdir /usr/src/sys/dev/ixgbe

cp if_ixgbe* /usr/src/sys/dev/ixgbe

cp ixgbe* /usr/src/sys/dev/ixgbe

cp Makefile.kernel /usr/src/sys/modules/ixgbe/Makefile
```

Edit the /usr/src/sys/conf/files.i386 file, and add the following line:

```
dev/ixgbe/ixgbe_hw.c optional ixgbe

dev/ixgbe/ixgbe_ee.c optional ixgbe

dev/ixgbe/if_ixgbe.c optional ixgbe
```

Remove the following lines from the /usr/src/sys/conf/files.i386 file if they exist:

```
/dev/ixgbe/if_ixgbe_fx_hw.c optional ixgbe

/dev/ixgbe/if_ixgbe_phy.c optional ixgbe
```

Edit the kernel configuration file (i.e., GENERIC or MYKERNEL) in /usr/src/sys/i386/conf and ensure the following line is present:

```
device ixgbe
```

Compile and install the kernel. Reboot the system for the kernel updates to take affect.

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