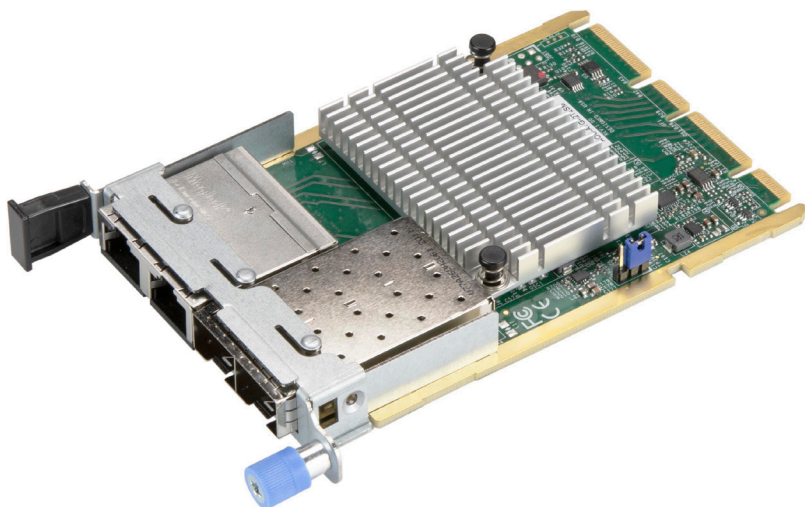




AOC-ATG-i2T2SM



User's Guide

Revision 1.0

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User's Guide Revision 1.0

Release Date: May 23, 2022

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Preface

About this User's Guide

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-i2T2SM add-on card.

About this Add-on Card

The Supermicro® AOC-ATG-i2T2SM is one of the most flexible and scalable 4-port 10Gb network solutions in the market. Based on Intel® X710-TM4 controller, it is designed to support a mixed network interface (two RJ45 and two SFP+ connectors) with performance-enhancing features and power management technologies. With the AIOM form factor, this controller fulfills the needs of flexible networking options in a small footprint and allows the capability to monitor the system remotely through a built-in NC-SI feature.

An Important Note to the User

All images and layouts shown in this user's 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'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 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 the User's Guide

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



Warning: Important information given to ensure proper system installation or to prevent damage to the components or injury to yourself.



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

Naming Convention

AOC-MHIBF-m2Q2G

1st 2nd 3rd 5th 6th 7th 8th

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
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), IBF: FDR IB (56Gb/s), IBQ: QDR IB (40Gb/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
7th	Connector Type (Optional)	S: SFP+/SFP28, T: 10GBase-T, Q: QSFP+, C: QSFP28
8th	2 nd Controller/Connector Type (Optional)	G: 1x GbE RJ45, 2G: GbE 2x RJ45, S: 1x 10G SFP+, T: 10GBase-T, 2T: 2x 10GBase-T

SMC Networking Add-on Cards

Model	Type	Form Factor	Interface	Controller	Connection	Dimension (w/o Brackets) (L x H)	Power (W)
AOC-SGP-i2	GbE	Standard LP	PCI-E x4	Intel® i350 AM2	2 RJ45 (1Gb/port)	3.9" (99mm) x 2.73" (69mm)	3.5
AOC-SGP-i4	GbE	Standard LP	PCI-E x4	Intel® i350 AM4	4 RJ45 (1Gb/port)	3.9" (99mm) x 2.73" (69mm)	5
AOC-STG-i2T	10GbE	Standard LP	PCI-E x8	Intel® X540-AT2	2 RJ45 (10GBase-T)	5.9" (150mm) x 2.73" (69mm)	13
AOC-STGS-i1T	10GbE	Standard LP	PCI-E x4	Intel® X550-AT	1 RJ45 (10GBase-T)	5.9" (150mm) x 2.73" (69mm)	9
AOC-STGS-i2T	10GbE	Standard LP	PCI-E x4	Intel® X550-AT2	2 RJ45 (10GBase-T)	5.9" (150mm) x 2.73" (69mm)	11
AOC-STG-i2T	10GbE	Standard LP	PCI-E x8	Broadcom® BCM57416	2 RJ45 (10GBase-T)	5.6" (142mm) x 2.73" (69mm)	13.1
AOC-STG-i4T	10GbE	Standard LP	PCI-E x8	Intel® XL710-BM1	4 RJ45 (10GBase-T)	5.9" (149mm) x 2.73" (69mm)	15.5
AOC-STGN-i1S	10GbE	Standard LP	PCI-E x8	Intel® 82598EN	1 SFP+ (10Gb/port)	4.0" (102mm) x 2.73" (69mm)	10
AOC-STGN-i2S	10GbE	Standard LP	PCI-E x8	Intel® 82598ES	2 SFP+ (10Gb/port)	4.0" (102mm) x 2.73" (69mm)	11.2
AOC-STGF-i2S	10GbE	Standard LP	PCI-E x8	Intel® X710-BM2	2 SFP+ (10Gb/port)	5.19" (132mm) x 2.73" (69mm)	5.6
AOC-STG-i4S	10GbE	Standard LP	PCI-E x8	Broadcom® BCM57840S	4 SFP+ (10Gb/port)	5.4" (137mm) x 2.73" (69mm)	14
AOC-STG-i4S	10GbE	Standard LP	PCI-E x8	Intel® XL710-BM1	4 SFP+ (10Gb/port)	5.9" (150mm) x 2.73" (69mm)	8
AOC-S2SG-m2S	25GbE	Standard LP	PCI-E x8	Mellanox® CX-4 LX	2 SFP28 (25Gb/port)	5.6" (142mm) x 2.713" (69mm)	8.7
AOC-S2SG-i2S	25GbE	Standard LP	PCI-E x8	Broadcom® BCM57414	2 SFP28 (25Gb/port)	5.6" (142mm) x 2.713" (69mm)	5.2
AOC-S2SG-i2S	25GbE	Standard LP	PCI-E x8	Intel® XCV710	2 SFP28 (25Gb/port)	6.1" (156mm) x 2.713" (69mm)	7.2
AOC-S40G-i1Q	40GbE	Standard LP	PCI-E x8	Intel® XL710-BM1	1 QSFP+ (40Gb/port)	5.9" (150mm) x 2.73" (69mm)	6.5
AOC-S40G-i2Q	40GbE	Standard LP	PCI-E x8	Intel® XL710-BM2	2 QSFP+ (40Gb/port)	5.9" (150mm) x 2.73" (69mm)	7
AOC-S100G-m2C	100GbE	Standard LP	PCI-E x16	Mellanox® CX-4 EN	2 QSFP28 (100Gb/port)	6.6" (168mm) x 2.73" (69mm)	16.3
AOC-CGP-i2	GbE	MicroLP	PCI-E x4	Intel® i350 AM2	2 RJ45 (1Gb/port)	4.45" (113mm) x 1.54" (39mm)	4
AOC-CTG-i1S	10GbE	MicroLP	PCI-E x8	Intel® 82598EN	1 SFP+ (10Gb/port)	4.89" (123mm) x 1.54" (39mm)	10
AOC-CTG-i2S	10GbE	MicroLP	PCI-E x8	Intel® 82598ES	2 SFP+ (10Gb/port)	4.89" (123mm) x 1.54" (39mm)	11
AOC-CTG-i2T	10GbE	MicroLP	PCI-E x8	Intel® X540-AT2	2 RJ45 (10GBase-T)	4.8" (123mm) x 2.76" (77mm)	13
AOC-CTGS-i2T	10GbE	MicroLP	PCI-E x4	Intel® X550-AT2	2 RJ45 (10GBase-T)	4.45" (113mm) x 1.54" (39mm)	12
AOC-C2SG-m1S	25GbE	MicroLP	PCI-E x8	Mellanox® CX-4 LX EN	1 SFP28 (25Gb/port)	4.45" (113mm) x 1.54" (39mm)	8.5

Model	Type	Form Factor	Controller	Connection	Dimension (w/o Brackets) (L x H)	Power (W)
AOC-MGP-i2	GbE	SIOM	Intel® i350 AM2	2 RJ45 (1Gb/port)	3.622" (92mm) x 3.428" (87.08mm)	3.7
AOC-MGP-i4	GbE	SIOM	Intel® i350 AM4	4 RJ45 (1Gb/port)	3.622" (92mm) x 3.428" (87.08mm)	4.4
AOC-MTGN-i2S	10GbE	SIOM	Intel® 82599ES	2 SFP+ (10Gb/port)	3.622" (92mm) x 3.428" (87.08mm)	7.2
AOC-MTG-i4S	10GbE	SIOM	Intel® XL710-BM1	4 SFP+ (10Gb/port)	3.622" (92mm) x 3.428" (87.08mm)	7
AOC-MTG-i2T	10GbE	SIOM	Broadcom® BCM57416	2 RJ45 (10GBase-T)	3.622" (92mm) x 3.428" (87.08mm)	11
AOC-MTG-i2T	10GbE	SIOM	Intel® X550-AT2	2 RJ45 (10GBase-T)	3.622" (92mm) x 3.428" (87.08mm)	13
AOC-MTG-i4T	10GbE	SIOM	2x Intel® X550-AT2	4 RJ45 (10GBase-T)	3.622" (92mm) x 3.428" (87.08mm)	26
AOC-MHIBF-m1Q2G	FDR IB GbE	SIOM	Mellanox® ConnectX-3 Pro Intel® i350	1 QSFP (56Gb/port) 2 RJ45 (1Gb/port)	3.622" (92mm) x 3.428" (87.08mm)	9
AOC-MHIBF-m2Q2G	FDR IB GbE	SIOM	Mellanox® ConnectX-3 Pro Intel® i350	2 QSFP (56Gb/port) 2 RJ45 (1Gb/port)	3.622" (92mm) x 3.428" (87.08mm)	11
AOC-MHIBE-m1CG	EDR IB GbE	SIOM	Mellanox® ConnectX-4 VPI Intel® i210	1 QSFP28 (100Gb/port) 1 RJ45 (1Gb/port)	3.622" (92mm) x 3.428" (87.08mm)	19
AOC-MH25G-i2S2G	25GbE	SIOM	Broadcom® BCM57414 Intel® i350	2 SFP28 (25Gb/port) 2 RJ45 (1Gb/port)	3.622" (92mm) x 3.428" (87.08mm)	9
AOC-MH25G-m2S2T	25GbE	SIOM	Mellanox® ConnectX-4 Lx EN Intel® X550-AT2	2 SFP28 (25Gb/port) 2 RJ45 (10GBase-T)	3.622" (92mm) x 3.428" (87.08mm)	25
AOC-M25G-m4S	25GbE	SIOM	Mellanox® ConnectX-4 Lx EN	4 SFP28 (25Gb/port)	3.622" (92mm) x 3.428" (87.08mm)	20
AOC-M25G-i2S	25GbE	SIOM	Intel® XXV710	2 SFP28 (25Gb/port)	3.622" (92mm) x 3.428" (87.08mm)	11.8
AOC-MHF-i1C	Omni- Path	SIOM	Intel® OP HFI A SiC (Wolf River WFR-B)	1 QSFP28 (100Gb/port)	3.622" (92mm) x 3.428" (87.08mm)	15

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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/networking.cfm#adapter>.

1-2 Key Features

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

- Advanced I/O Module (AIOM) Form Factor
- Intel® X710-TM4 Ethernet controller
- Quad 10Gbps ports: two RJ45 and two SFP+ connectors
- Network Virtualization Offloads: VXLAN and NVGRE
- Energy Efficient Ethernet (EEE)
- Intel® Ethernet Flow Director
- Data Plane Developer Kit for efficient packet processing (DPDK)
- Asset Management support on Supermicro® platforms
- NC-SI for Remote Management
- Supports RJ45 Category-6 and 6A cables
- Supports both Direct Attach Copper and fiber cables
- RoHS compliant 6/6 

1-3 Specifications

General

- Advanced I/O Module (AIOM) Form Factor
- Intel® X710-TM4 Ethernet controller
- Two RJ45 and two SFP+ connectors with speeds up to 10Gbps per port

Networking Features

- IEEE 802.3ad, 802.1AX Link Aggregation
- IEEE 802.1Q VLAN
- MSI and MSI-X support
- Intel® Flow Director
- Jumbo Frames (up to 9.5KB)
- IEEE 802.3x Flow Control
- Teaming support
- Checksum Offload (IPv4/IPv6, SCTP, TCP, UDP, Tx/Rx)

Virtualization Features

- Support for Virtual Machine Device Queues (VMDq)
- Single-Root I/O Virtualization (SR-IOV)
- VLAN
- Network Virtualization Stateless Offload: VXLAN, NVGRE
- GENEVE

Management Features

- Asset Management Features with thermal sensor
- NC-SI for remote management
- Preboot eXecution Environment (PXE)
- iSCSI remote boot

Power Savings

- ACPI compliant power management
- PCI Express Active State Power Management (ASPM)
- Energy Efficient Ethernet (IEEE 802.3az)

OS Support

- Windows® Server
- Linux RHEL
- Linux SLES
- Linux Ubuntu
- Linux CentOS
- FreeBSD
- VMware

Cable Support

- SFP+ direct attach twin-axial copper cables up to 5m
- Fiber-optic cables (with required optional SFP+ transceivers)
- RJ-45 Category-6 up to 55m; Category-6A up to 100m

Power Consumption

- Maximum power consumption: 10W

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: 76mm x 115mm (W x D)

Supported Platforms

- Supermicro® motherboards with AIOM slot
- Supermicro® server systems with AIOM slot (See AIOM Compatibility Matrix online)

http://www.supermicro.com/support/resources/AOC/AOC_Compatibility_AIOM.cfm

Please note that this product is sold only as part of an integrated solution with Supermicro® server systems.

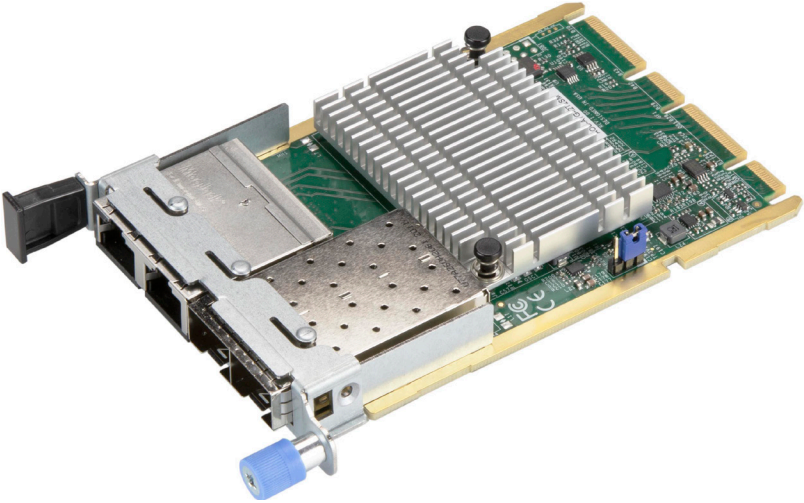
Available SKUs

Product Part Number	Bracket Included	Description
AOC-ATG-i2T2SM	BKT-0176L	4-port 10Gigabit Ethernet Adapter with a 0.5U height bracket

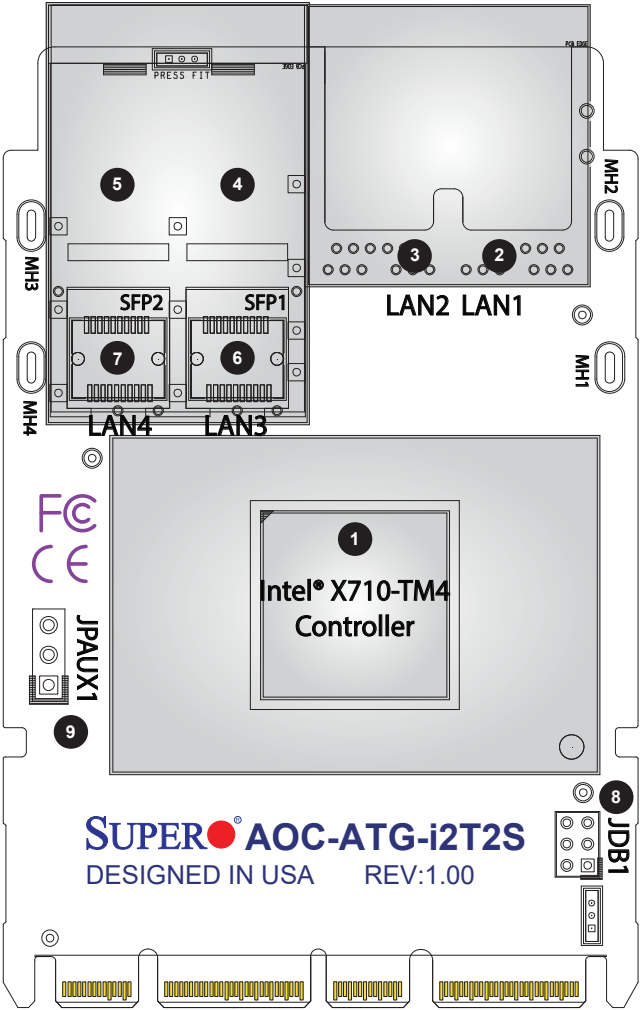
Chapter 2

Hardware Components

2-1 Add-On Card Image and Layout



AOC-ATG-i2T2SM Side View



AOC-ATG-i2T2SM Layout

2-2 Major Components

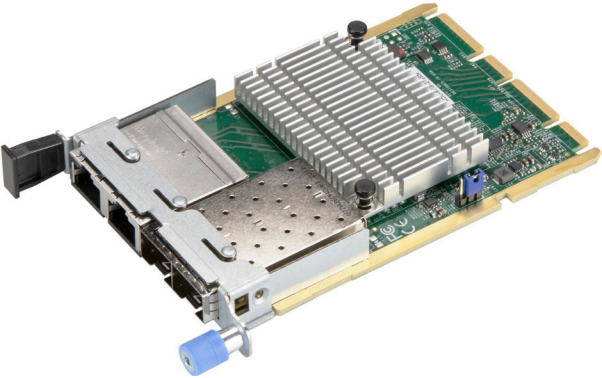
The following components are on the AOC-ATG-i2T2SM.

AOC-ATG-i2T2SM Major Components		
No	Component Name	Definition
1	Intel® X710-TM4	Ethernet 25GbE Controller
2	LAN1	LAN Port 1
3	LAN2	LAN Port 2
4	LAN3	LAN Port 3
5	LAN4	LAN Port 4
6	SFP1	SFP+ Port 1
7	SFP2	SFP+ Port 2
8	JDB1	Debug Header
9	JPAUX1	1-2: Enable AUX Power
		2-3: Disable AUX Power

2-3 LAN Ports and LAN LED Indicators

LAN Ports

There are four LAN ports on the AOC-ATG-i2T2SM. These LAN ports support connection speeds of 10Gbps. Use a direct-attach RJ45 type LAN cable.



AOC-ATG-i2T2SM Image

Each LAN has one bi-colored LED per port (RJ45 or SFP+) at the bottom of PCB. Please refer to the table below for LED color definition.

Port Link LED State	
LED Color	Definition
Green	10 Gbps
Amber	1 Gbps
Off	100 Mbps

SFP+ Ports

Two SFP+ 10Gb adapter ports are located on the add-on card. Connect a DAC Twin Axial cable or an LC Fiber-Optic cable to the ports to provide Gigabit Ethernet communication. Refer to the add-on card layout on Page 2-2 for the location of the SFP+ port.

2-4 Jumpers and Connectors

Explanation of Jumpers

To modify the operation of the add-on card, a jumper can be used to choose between optional settings. A jumper creates 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. See the add-on card layout on page 2-2 for the jumper locations.



Note: On two-pin jumpers, "Closed" means the jumper is on and "Open" means the jumper is off the pins.

AOC JPAUX1 set to Disabled	When system/MB goes into a standby mode		
	IPMI Support	FailOver Support	WoL Support
	No	No	No
	When system/MB is NOT in the standby mode		
	IPMI Support	FailOver Support	WoL Support
	Yes	Yes	N/A
AOC JPAUX1 set to Enabled	When system/MB goes into a standby mode		
	IPMI Support	FailOver Support	WoL Support
	Yes	Yes	Yes
	When system/MB is NOT in the 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	WoL is supported on all four ports but limited to platforms with sufficient airflow when it is in standby mode (S5 state). Please consult Supermicro before enabling it.

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.
- 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

Before you install the add-on card, follow the instructions below.

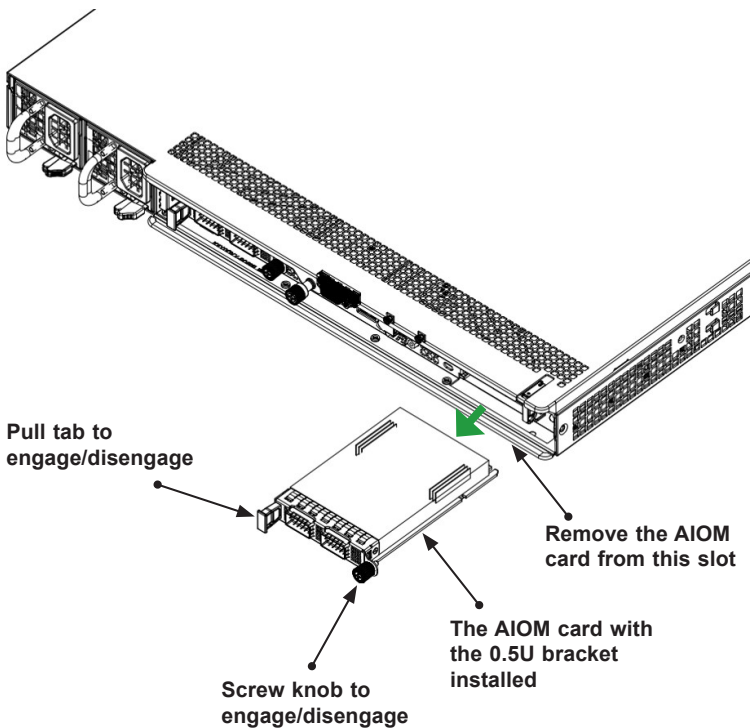
1. Power down the system.
2. Unplug the power cord.
3. Use industry-standard anti-static equipment such as gloves or a wrist strap and follow the precautions on page 3-1 to avoid damage caused by ESD.
4. Familiarize yourself with the server, motherboard, and/or chassis documentation.
5. Confirm that your operating system includes the latest updates and hotfixes.

3-3 Installing the Add-on Card AOC-ATG-i2TM (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)

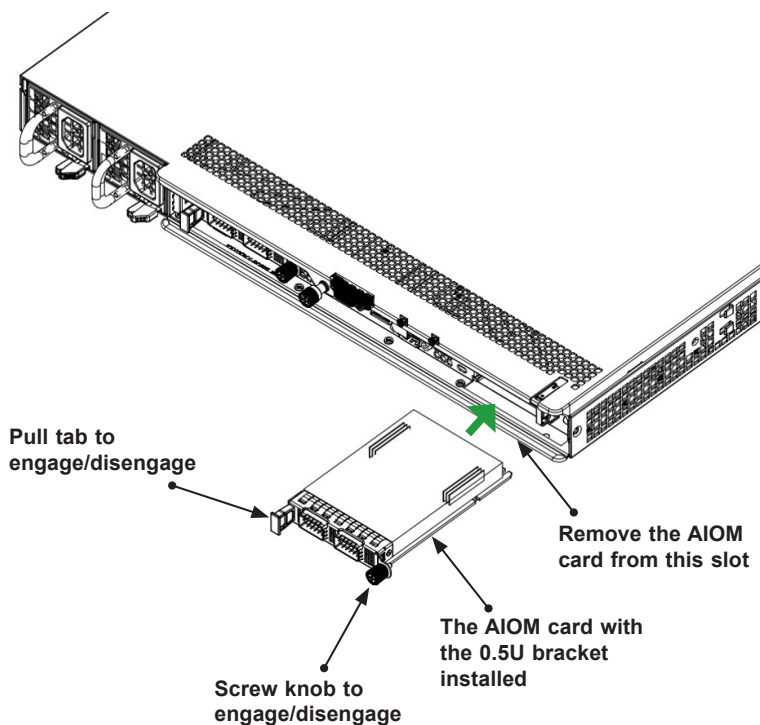
A. Uninstalling an AIOM module

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.



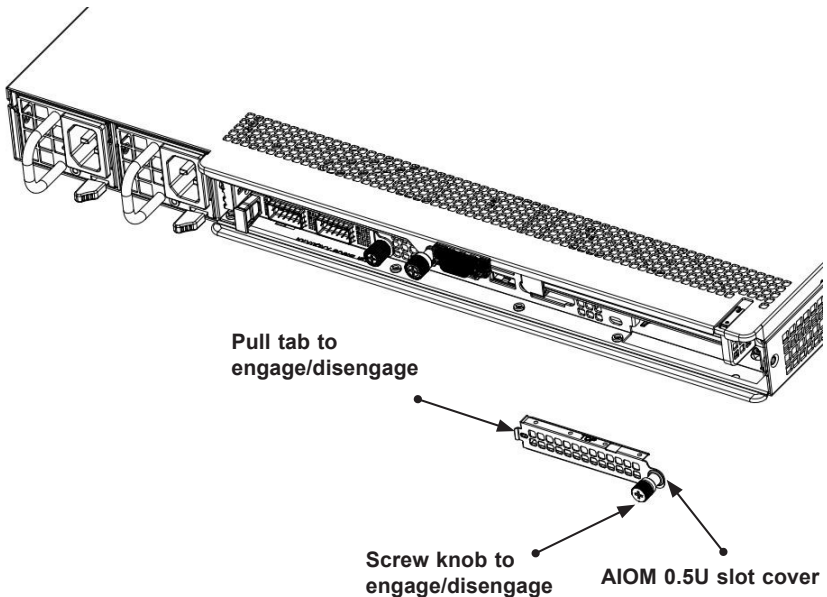
B. Installing an AIOM module

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



C. Installing an AIOM module (An AIOM slot 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 and 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.



Note 1: This AIOM module does not support hot plug. Please 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 illustration purposes only. Actual products may vary due to product enhancement.

3-4 Installing Drivers on Windows

Follow the steps below to install the drivers for Windows. Download the drivers from the Supermicro FTP site at ftp://ftp.supermicro.com/Networking_Drivers/.

1. Run CDR-NIC.
2. When the SUPERMICRO window appears, click on the computer icon next to the product model.
3. Click on INSTALL DRIVERS AND SOFTWARE.
4. Follow the prompts to complete the installation.



3-5 Installing Drivers on Linux

Follow the steps below to install the drivers for Linux.

1. Download the driver from the Supermicro CDR-NIC LAN driver CD or ftp://ftp.supermicro.com/Networking_Drivers/CDR-NIC_1.62_for_Add-on_NIC_Cards/Intel/LAN/PRO40GB/LINUX. Due to the continuous development of the Linux kernel, the drivers are updated more often than the bundled releases. The latest driver can be found on <http://downloadcenter.intel.com>.
2. Choose the Intel driver package from LAN/PRO40GB/LINUX.
3. Copy the driver to the directory of your choice. For example:

```
/home/username/i40e
```

or

```
/usr/local/src/i40e
```

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

```
tar xzf i40e-x.x.x.tar.gz
```

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

```
cd i40e-x.x.x/src/
```

```
make install
```

This will install the Linux driver to your system. For more driver installation information, please refer to the Intel Support Website.

3-6 Installing Drivers on FreeBSD

Follow the instructions below to install the drivers to a FreeBSD system, where <x.x.x> is the driver version as indicated in the name of the driver tar file.



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

1. Download the driver from the Supermicro CDR-NIC LAN driver CD or ftp://ftp.supermicro.com/Networking_Drivers/CDR-NIC_1.62_for_Add-on_NIC_Cards/Intel/LAN/PRO40GB/FreeBSD. Due to the continuous development of the Linux kernel, the drivers are updated more often than the bundled releases. The latest driver can be found on <http://downloadcenter.intel.com>.
2. Move the base driver tar file to the directory of your choice. For example, use home/username/ixl or usr/local/src/ixl.

3. Untar/unzip the archive:

```
tar xzf ixl-x.x.x.tar.gz
```

4. To install man page:

```
cd ixl-x.x.x
```

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

5. To load the driver onto running system:

```
cd ixl-x.x.x/src
```

```
make load
```

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

```
ifconfig ix<interface_num> <IP_address>
```

7. 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>
```


8. If you want the driver to load automatically when the system is booted:

```
cd ixl-x.x.x/src  
  
make  
  
make install
```

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

```
ixl_load="YES"
```

or

compile the driver into the kernel (see item 10)

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

```
ifconfig_ix<interface_num>
```

Example usage:

```
ifconfig_ix0="inet 192.168.10.1 netmask 255.255.255.0"
```



Note: For assistance, see the `ifconfig` main page.

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

FreeBSD 7 or later:

```
cd ixl-x.x.x/src  
  
cp *.ch /user/src/sys/dev/ixl  
  
cp Makefile.kernel /usr/src/sys/modules/ixl/Makefile
```

Edit the kernel configuration file (i.e., `GENERIC` or `MYKERNEL`) in `/usr/src/sys/i386/conf` (replace "i386" with the appropriate system architecture if necessary, and ensure the following line is present:

```
device ixl
```

Compile and install the kernel. The system must be reboot for the kernel updates to take effect. For additional information on compiling the kernel, consult the FreeBSD operating system documentation.

(Disclaimer Continued)

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