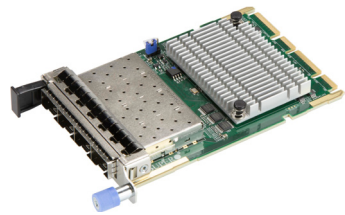
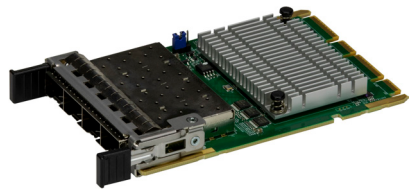
AOC-ATG-i4S

AOC-ATG-i4SM



AOC-ATG-i4SG



User's Guide

Revision 1.0a

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User's Guide Revision 1.0a

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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-i4S(M)(G) add-on card.

About this Add-on Card

The Supermicro® Advanced I/O Module (AIOM) is the latest form factor designed to provide a wide range of networking options as well as other I/O technologies. The 10GbE adapter AOC-ATG-i4S(M)(G) is a flexible and scalable 10GbE solution that supports four SFP+ ports. Based on the Intel® XL710-BM1 network controller, which offers performance-enhancing features and power management technologies, the AOC-ATG-i4S(M)(G) presents an excellent networking choice for data centers while reducing CPU utilization and power consumption. With the added NC-SI feature, this adapter also can function as a secure networking port for server remote management.

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 add-on card 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.

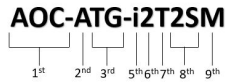
Conventions Used in the User's Guide

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

Warning: Important information is given to ensure proper system installation or to prevent damaging the components or injuring yourself.

Note: Additional information is given for proper system setup.

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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Table of Contents

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/nfo/networking.cfm#adapter.

1-2 Product Highlights

- Advanced I/O Module (AIOM) form factor
- Four 10Gbps ports with SFP+ connectors
- Intel® XL710-BM1 Ethernet Controller
- Network Virtualization Offloads: VXLAN and NVGRE
- Intel® Ethernet Flow Director
- Data Plane Developer Kit for efficient packet processing (DPDK)
- Asset Management features with thermal sensor
- NC-SI for Remote Management
- Supports both Direct Attach Copper (DAC) and Fiber Cables
- RoHS compliant 6/6 

1-3 Technical Specifications

General

- Advanced I/O Module (AIOM) form factor
- Intel® XL710-BM1 controller
- Four 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

- Virtual Machine Devices queues (VMDq)
- Single-Root I/O Virtualization (SR-IOV)
- VLAN
- VXLAN and NVGRE
- GENEVE

Management Features

- Asset Management support with thermal sensor
- NC-SI for remote management
- PXE remote boot
- 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)

Power Consumption (Max)

- AOC-ATG-i4S: 7W

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

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

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

1-4 Available SKUs

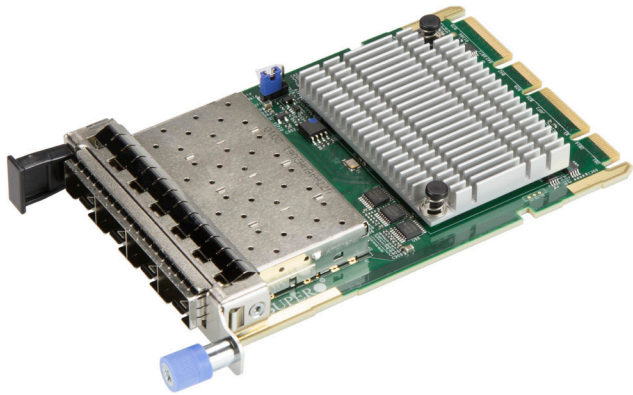
SKUs	Bracket Included	Description
AOC-ATG-i4S	BKT-0158L	4-port 10 Gigabit Ethernet Adapter with a 1U height bracket
AOC-ATG-i4SM	BKT-0159L	4-port 10 Gigabit Ethernet Adapter with a 0.5U height bracket
AOC-ATG-i4SG	BKT-0206L	4-port 10 Gigabit Ethernet Adapter with a 0.5U height Narrow bracket for Grand Twin Front IO systems

Chapter 2

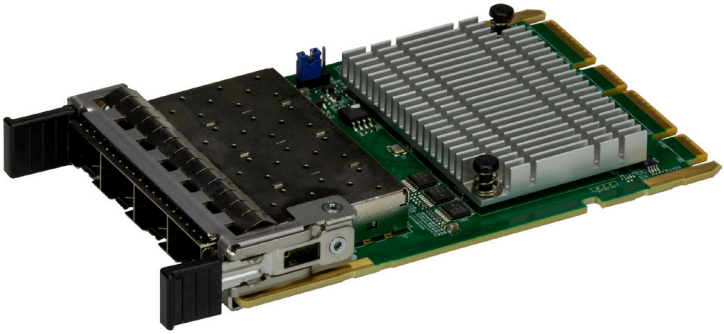
Hardware Components

2-1 Add-On Card Image and Layout

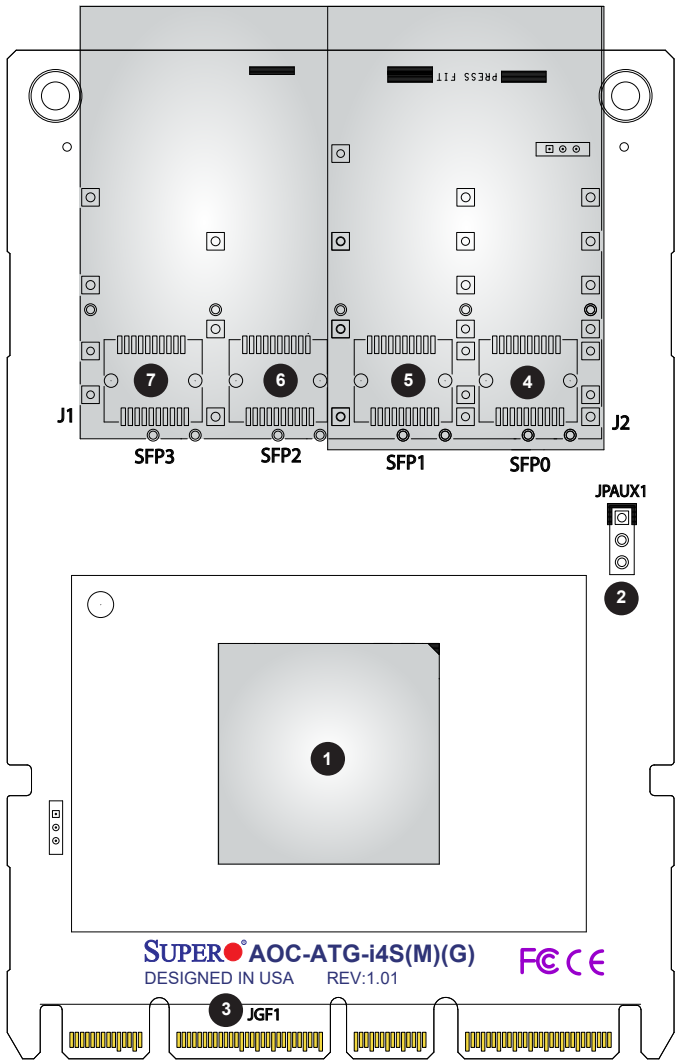
View of the AOC-ATG-i4S



View of the AOC-ATG-i4SM



View of the AOC-ATG-i4SG



Combined view of the AOC-ATG-i4S(M)(G)

2-2 Major Components

The following components are on the AOC-ATG-i4S(M)(G).

AOC-ATG-i4S(M)(G) Major Components		
No	**Component Name**	**Definition**
1	Intel® XL710-BM1	Ethernet LAN Controller
2	JPAUX1	1-2: Enable AUX Power in S5 (Default)
		2-3: Disable AUX Power in S5
3	JGF1	PCI-E 3.0 x8 Slot
4	SFP0	SFP+ Port 1
5	SFP1	SFP+ Port 2
6	SFP2	SFP+ Port 3
7	SFP3	SFP+ Port 4

2-3 LED Indicators and Connectors

LAN Ports

The AOC-ATG-i4S(M)(G) has four network LAN (SFP+) ports. These LAN ports support connection speeds up to 10Gbps per port. Plug the Direct Attached Copper (DAC) cable into the SFP+ port for network connections.

Note 1: To make sure that the LAN port functions properly, be sure to use the following cables specified by the manufacturer:

- Direct Attached Twin-Axial Copper cable, or
- Short-range or long-range fiber optic cable used in conjunction with the optional optical transceiver.

Note 2: For detailed information on manufacturer-recommended cables and transceivers, please visit https://www.supermicro.com/en/support/resources/aoc/cables-transceivers.

LED	Color	Definition
Link (Left)	Amber	1G Link Speed
	Green	10G Link Speed
Activity (Right)	Green Flashing	Activity

Link/Activity LED Indicators

Each SFP+ connector has two LEDs per port at the bottom of the PCB. Please refer to the table above for LED color definition.

2-4 Jumper Settings

Explanation of Jumpers

To modify the operation of the card, 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. See the motherboard layout pages for jumper locations. The Standby Power default state is **Enable** (Pins 1-2).

JPAUX1 for Standby Power	IPMI Support	FailOver Support	WoL Support
Disable = No standby power to AOC NIC	Yes, but no function in S5	Yes, but no function in S5	No
Enable = Standby power to AOC NIC	Yes	Yes	Yes

JPAUX1 for Standby Power	Function	Notes
Disable = No standby power to AOC NIC	Disable jumper to disconnect the standby power	No standby power in standby mode (S5 state).
Enable = Standby power to AOC NIC	Enable jumper to connect standby power to AOC NIC	WoL (Wake on LAN) is supported but limited to platforms with sufficient airflow when it is in standby mode (S5 state). Please consult Supermicro before enabling it.

2-5 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 installed on the bracket is seated securely in the motherboard connector. For instructions on how to install and uninstall an AIOM module, please refer to chapter 3.

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 that 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.

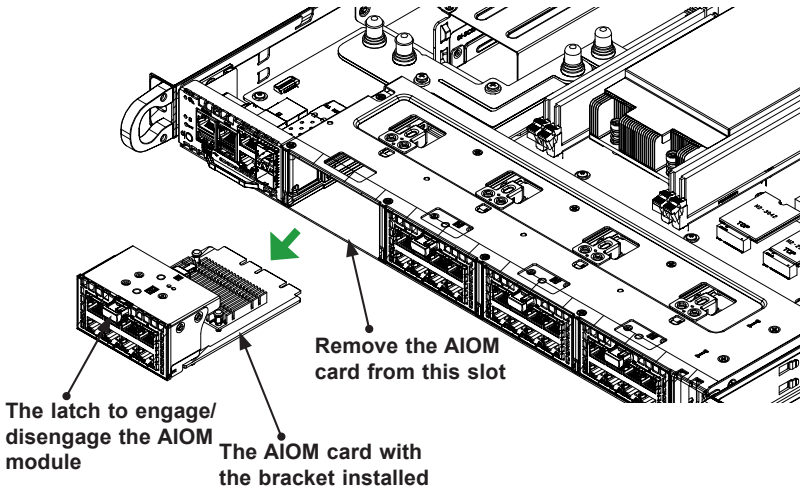
3-3 Installing the Add-on Card AOC-ATG-i4S (with 1U bracket)

Follow the steps below to install an add-on card into your system. (If the system is fixed onto a rack, the removal of the 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. Slide the black latch to the left to the "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, then gently slide the AIOM module out.

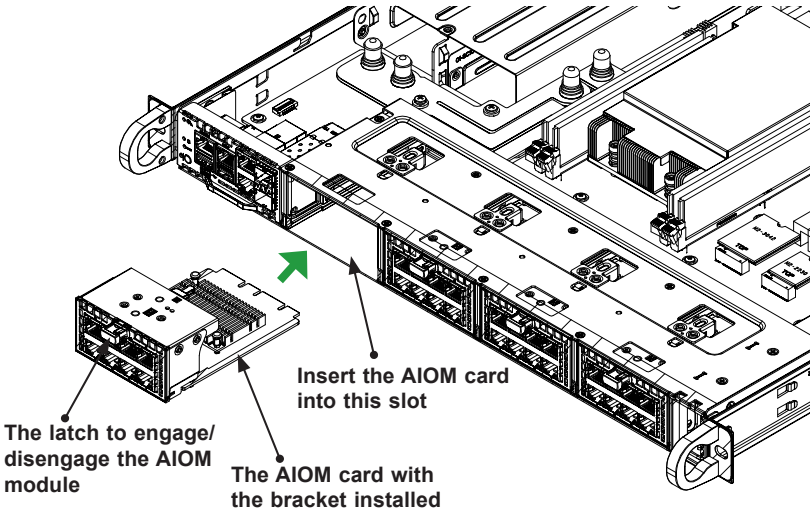


B. Installing an AIOM module (Reinstalling an AIOM module into an empty slot)

1. Position the AIOM module in front of the empty slot and gently push it onto the metal bracket (do not use the blue latch). The AIOM module should slide into the chassis until the card is securely seated in the connector.

2. Press the blue latch to properly secure it onto the chassis and move the black latch to the right to the "lock" position.

Black Latch



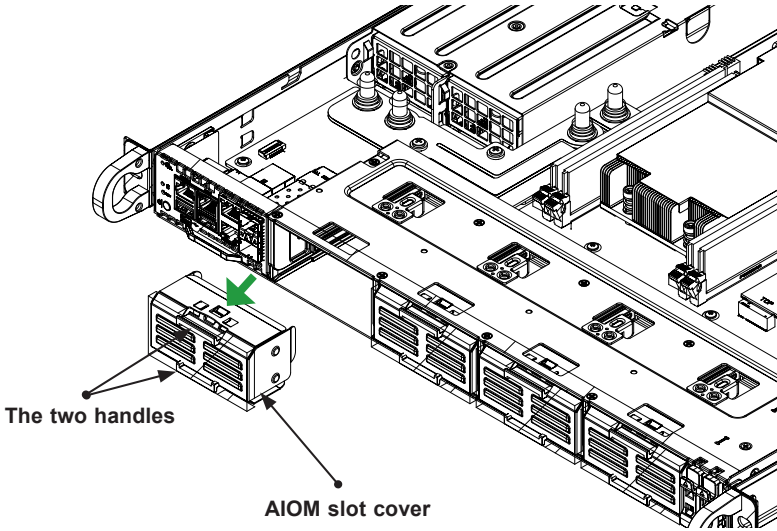
Note: A computer system should not be operating with an empty AIOM slot. All slots should be populated with AIOM modules, AIOM slot covers, or combinations of both.

C. Installing an AIOM module (An AIOM slot 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 and gently push it 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.

3. Press the blue latch to secure it onto the chassis structure.



Note: 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.

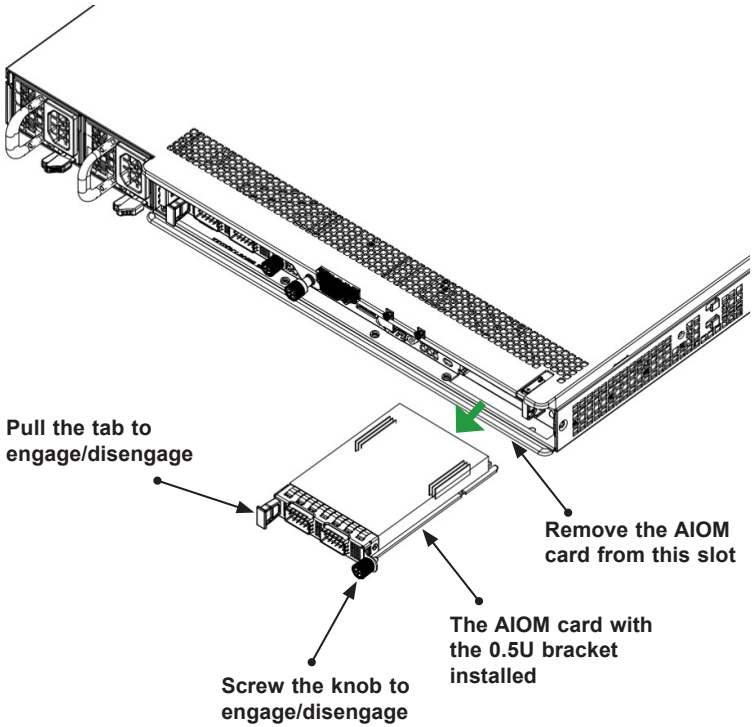
3-4 Installing the Add-on Card AOC-ATG-i4SM/i4SG (with 0.5U bracket)

Follow the steps below to install an add-on card into your system. (If the system is fixed onto a rack, the removal of the 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.

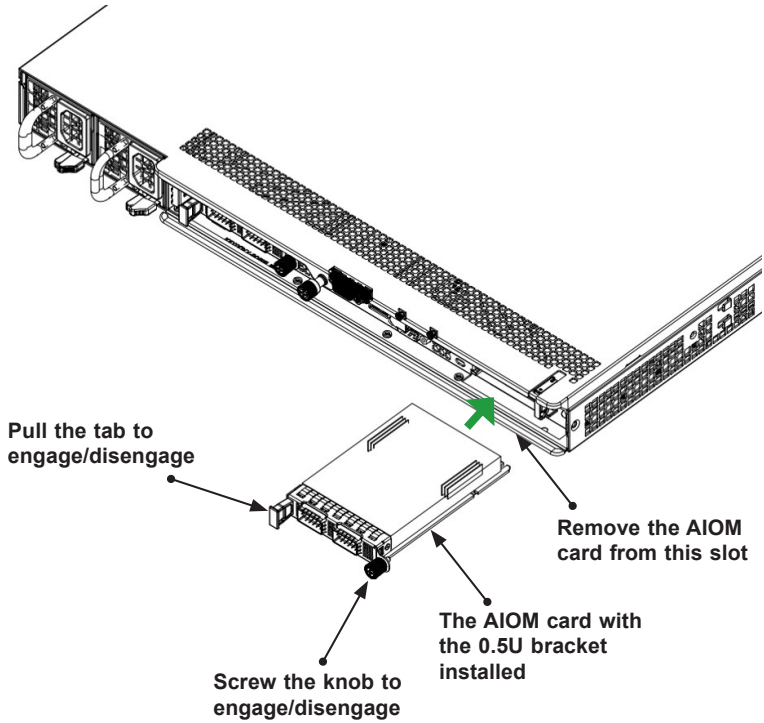
2. Pull on the tab and a knob evenly on both sides of the card to disengage the AIOM module from the motherboard connector, then gently slide the AIOM module out.



B. Installing an AIOM module

1. Position the AIOM module in front of the empty slot and gently push it 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.

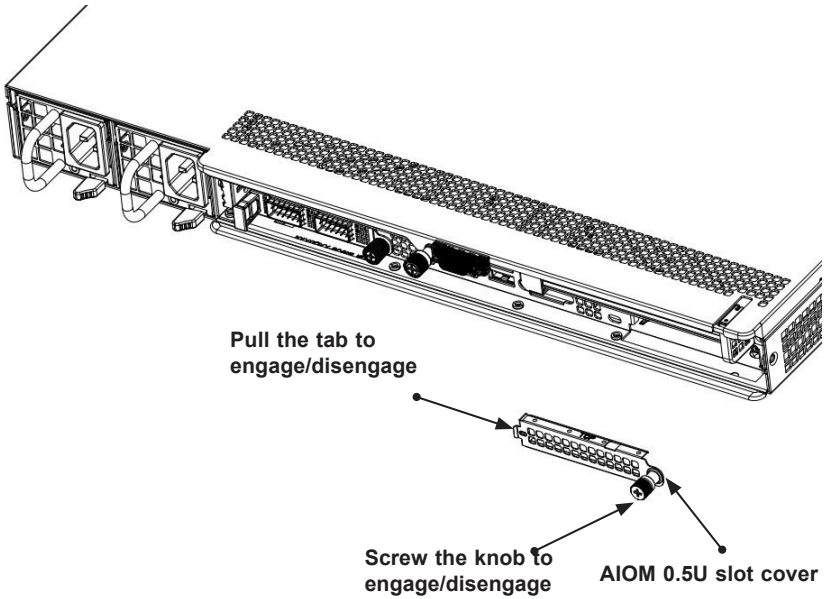


C. Installing an AIOM module (An AIOM slot with an AIOM slot cover)

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 it 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.

3-5 Installing Drivers on Windows (for Intel® XL710-BM1)

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 CDR-NIC.

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.

3-6 Installing Drivers on Linux (for Intel® XL710-BM1)

Download the drivers from Intel Download Center or the Supermicro site at https://www.supermicro.com/wftp/Networking_Drivers.

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.

Follow the instructions below to build the driver manually.

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 the 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.

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.

make CFLAGS_EXTRA="-DIGB_NO_LRO" install

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, use:

   ```
   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® XL710-BM1)

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 at 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 xfz ixl-x.x.xtar.gz
```

4. To install the main page:

```
cd ixl-x.x.x

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

5. To load the driver onto the 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 rebooted 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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