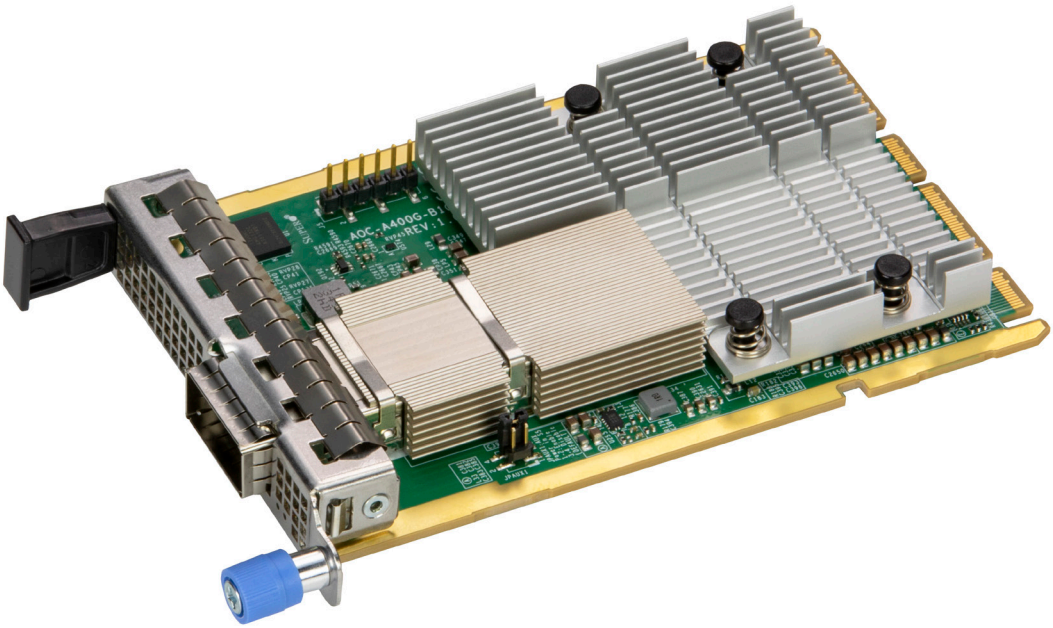
AOC-A400G-B1CM



USER'S MANUAL

Revision 1.0

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Manual Revision 1.0

Release Date: July 30, 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-A400G-B1CM 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 as well as other I/O technologies. The AOC-A400G-B1CM is based on the Broadcom® BCM57608 series Ethernet Controllers and is designed to lower data center total cost of ownership (TCO) by providing the industry's lowest power consumption for 400 G NICs. The AOC-A400G-B1CM offers a 1x 400G-capable network interface that delivers high-performance networking while maintaining low-power consumption and thermal efficiency. The BCM57608 series supports the fourth generation of RDMA over Converged Ethernet (RoCE) with hardware-based congestion control.

This technology ensures low latency and simplifies RoCE deployment at scale. Furthermore, the BCM57608 features the TruFlow engine, a hardware acceleration engine with enhanced programmability. This engine allows for rapid implementation of new flow types, increasing virtual machine density and improving application performance. The BCM57608 supports industry-leading security features, including Broadcom's HW Secure Boot (RoT) and Attestation support. These security measures enable the creation of secure server platforms. In summary, the BCM57608 series Ethernet Controllers are versatile and can be used in a wide range of hardware designs. This includes cloud and enterprise data center servers, AI and ML clusters, NVMe storage disaggregation, 5G Wireless RAN, Network Function Virtualization (NFV), mobile edge computing, and HPC 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.

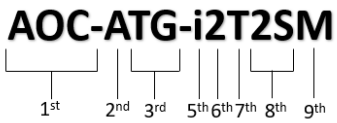
Important Links

For your system to work properly, please 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, please contact our support team at: support@supermicro.com

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

Naming Convention for Networking Adapters



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), 100G: 100GbE (100Gb/s), 200G: 200GbE (200Gb/s), 400G: 400GbE (400Gb/s)
4th	Chipset Model (Optional)	N: Niantic (82599), P: Powerville (i350), S: Sageville (X550), F: Fortville (XL710/X710), C: Columbiaville (E810) or Carlsville (X710-AT2/TM4), L: Linkville (E610), CN: Connersville (E830), 6: ConnectX-6, 7: ConnectX-7
5th	Chipset Manufacturer	i or I: Intel, b or B: Broadcom, m or M: Mellanox, N: NVIDIA
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/QSFP56/QSFP112/QSFP-DD
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 AIOM – None:** 1U height bracket for Edge systems only, **B:** 0.5U height bracket (internal lock) for Blade systems only, **G:** 0.5U height (Narrow) for Grand Twin Front IO systems only, **M:** 0.5U height bracket (Pull-Tab) 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, please 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:

- Broadcom® BCM57608 one 400 GbE controller
- PCIe Gen 5.0 x16 low-profile standard form factor
- Single QSFP-DD connector
- Support for 400/200/100/50/25/10 GbE
- RDMA over Converged Ethernet (RoCEv2)
- VXLAN, NVGRE, and Geneve
- NIC Partitioning (NPAR)
- Broadcom® TruFlow™ flow processing engine
- Asset Management Features with thermal sensor
- NC-SI for Remote Management (Not supported in Standby by default)
- RoHS compliant 6/6

1.3 Specifications

Networking Features

- 8 SerDes capable of 100/50 G PAM4 and 25 G NRZ
- QSFP-DD
- 1x 400 GbE, 1x 200/100/50/25 GbE
- Auto-negotiation with auto-detect
- IEEE-1588v2
- IEEE 802.3x flow control
- IEEE 802.3ad Link Aggregation
- Virtual LANs- 802.1q VLAN tagging
- Configurable Flow Acceleration
- UEFI and iSCSI boot

Platform Security Features

- HW Secure Boot (RoT)
- Attestation (SPDM)

Manageability Features

- Network Controller Sideband Interface NC-SI (Not supported in Standby by default)
- Platform Level Data Model (PLDM) for Monitoring and FW Update

Stateless Offload Features

- TCP, UDP, and IP checksum offloads
- IPv4 and IPv6 offloads

- Receive Segment Coalescing (RSC)
- TCP Segmentation Offload (TSO)
- Large Receive Offload (LRO)
- Large Send Offload (LSO)
- Receive Side Scaling (RSS)
- Transmit Side Scaling (TSS)

NIC Partitioning (NPAR)

- 16 Physical Functions
- QoS per partition
- Partitioning control via sideband communication
- Up to 64 MAC/VLAN filter per partition
- Per partition statistics support
- Stateless offloads configuration per partition
- VEB/VEPA support

Virtualization Features

- NetQueue, VMQueue, and Multi-queue
- SR-IOV with up to 128 Virtual Functions (VFs)
- VXLAN, NVGRE, GRE, Geneve, and IP-in-IP
- Edge Virtual Bridging (EVB)

RDMA over Converged Ethernet (RoCE)

- RoCEv1 and RoCEv2
- Data Center Bridging (DCB) with RoCE

TruFlow™ Flow Processing

- Exact/Wildcard Match Flow Lookup
- VLAN insertion/deletion
- NAT/NAPT/Mirroring

Data Center Bridging

- Priority-based flow control (PFC; IEEE 802.1Qbb)
- Enhanced transmission selection (ETS; IEEE 802.1Qau)
- Quantized Congestion Notification (QCN; IEEE 802.1Qau)
- Data Center Bridging Capability eXchange (DCBX; IEEE 802.1Qaz)
- Eight traffic classes per port; fully DCB compliant per 802.1Qbb

Power Savings

- ACPI-compliant power management
- Pass-through Energy Efficient Ethernet (IEEE 802.3az-2010)

Power Consumption

- Maximum power consumption: 19 W

Environmental 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: 76 mm (2.99 in) x 115 mm (4.52 in) (W x D)

1.4 Available SKUs

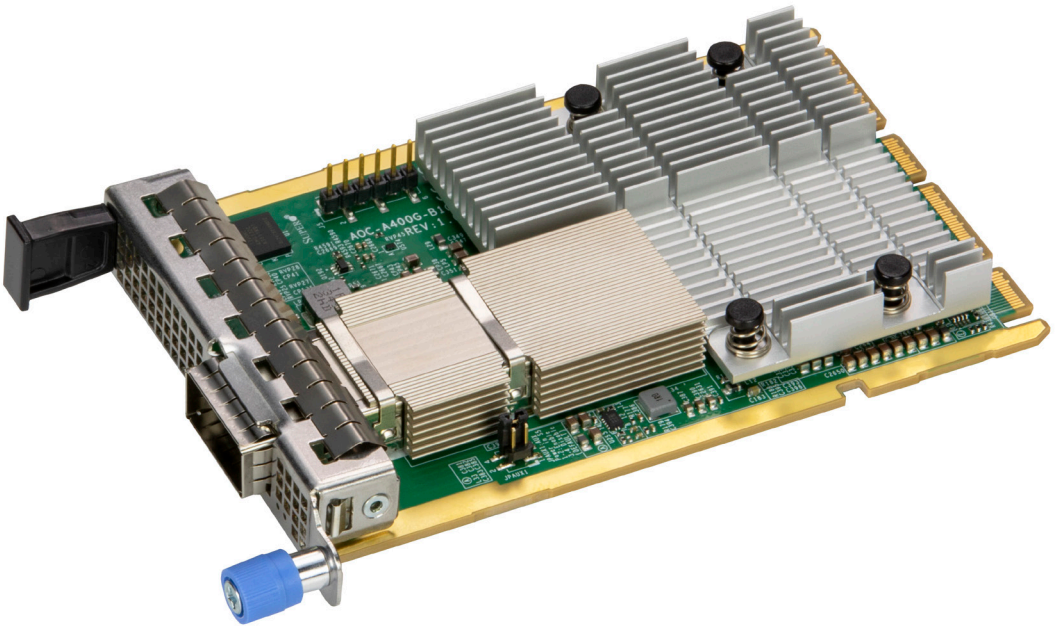
Note: Please note that this product is sold only as part of an integrated solution with Supermicro server systems.

Product Part Number	Bracket Included	Description
AOC-A400G-B1CM	BKT-0220L	1-port 400 Gigabit Ethernet Adapter with a 0.5 U height bracket

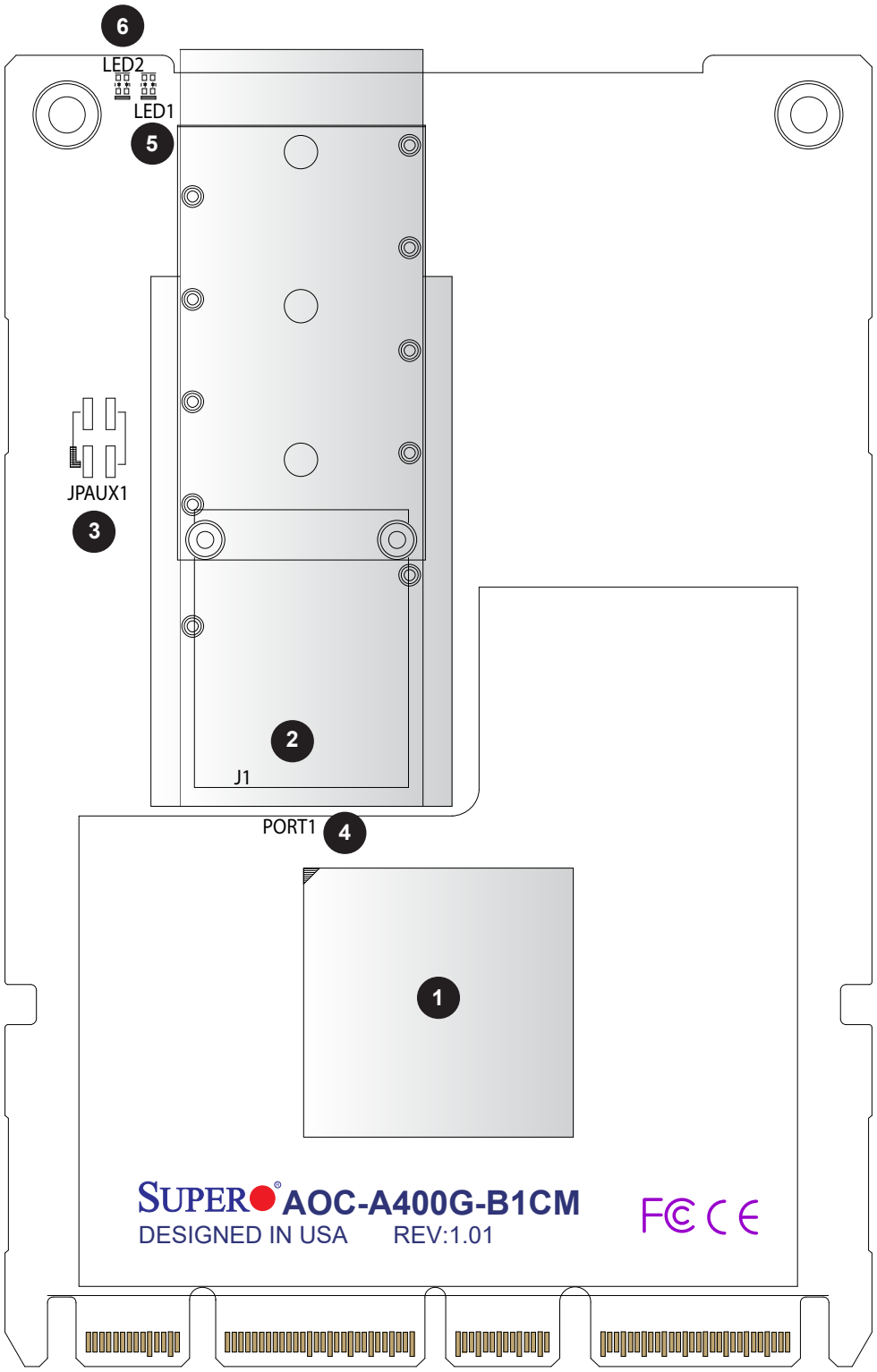
Chapter 2

Hardware Components

2.1 Add-On Card Image and Layout



AOC-A400G-B1CM Image



AOC-A400G-B1CM Layout

2.2 Major Components

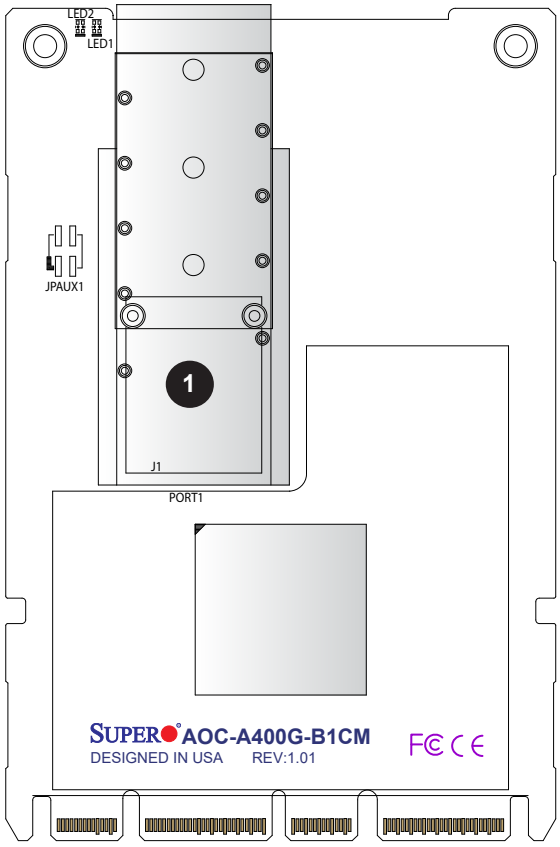
The following major components are installed on the AOC-A400G-B1CM:

AOC-A400G-B1CM Major Components		
No	**Component Name**	**Definition**
1	Broadcom® BCM57608	400 GbE Ethernet LAN controller
2	J1	QSFP-DD 112 connector
3	JPAUX1	1–2: Enable AUX Power in S5
		3–4: Disable AUX Power in S5 (default)
4	Port 1	Quad Small Form Factor Pluggable Double Density (QSFP-DD)
5	LED1	QSFP-DD Port Link LED
6	LED2	QSFP-DD Port Active LED

2.3 QSFP-DD Ethernet Connection

QSFP-DD Connector

AOC-A400G-B1CM has one Quad Small Form Factor Pluggable Double Density (QSFP-DD) 112 connector located on the add-on card. The QSFP-DD port operates at up to 400 GbE. Plug the Direct Attached Copper (DAC) cable into the QSFP-DD port for network connections. See the layout below for the location.



1. QSFP-DD

2.4 Port and Port LED

QSFP-DD Port

The QSFP-DD adapter port is located on the AIOM form factor card. Connect a Direct Attach Copper cable or an LC Fiber-Optic cable to the port to provide 400 Gigabit Ethernet communication. Refer to the AIOM Form factor card layout on page 14 for the location of the QSFP-DD port.

QSFP-DD Port LED

There is one LED located below the single QSFP-DD port to indicate the link speed and activity status of the port. See the table below for more information.

QSFP-DD Port LEDs

LED	Color	Definition
Activity	Blinking Green	Activity
Link	Amber	< 400 Gbps Link Speed
	Green	400 Gbps Link Speed

2.5 Jumper Settings

Explanation of Jumpers

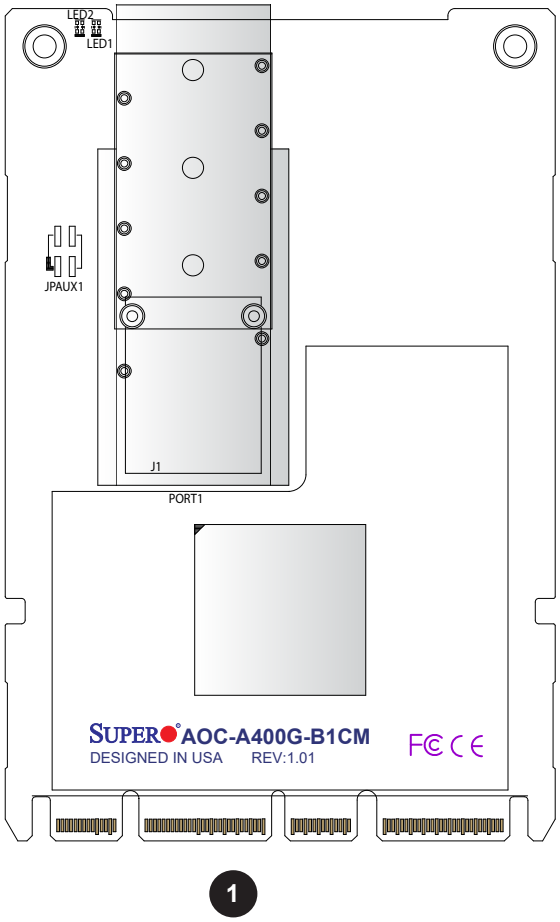
To modify the operation of the motherboard, jumpers can be used to choose between optional settings. Jumpers create shorts between two pins to change the function of the connector. Pin 1 is identified with a square solder pad on the printed circuit board.

AOC JPAUX1 set to Disabled	**When system/MB goes into standby mode**		
	IPMI Support	**FailOver Support**	**WoL Support**
	No	No	No
	When system/MB is NOT in standby mode		
	IPMI Support	**FailOver Support**	**WoL Support**
	Yes	Yes	N/A
AOC JPAUX1 set to Enabled	**When system/MB goes into standby mode**		
	IPMI Support	**FailOver Support**	**WoL Support**
	Yes	Yes	Yes
	When system/MB 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	WoL is supported on port 1 ONLY but limited to platforms with sufficient airflow when it is in standby mode (S5 state). Please consult Supermicro before enabling it.

2.6 PCIe 5.0 x16 Form Factor Golden Finger

Insert the PCIe 5.0 x16 low-profile standard form factor golden finger into the form factor slot on a motherboard to use this card. See the layout below for the location.



1. PCIe 5.0 x16 form factor

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.

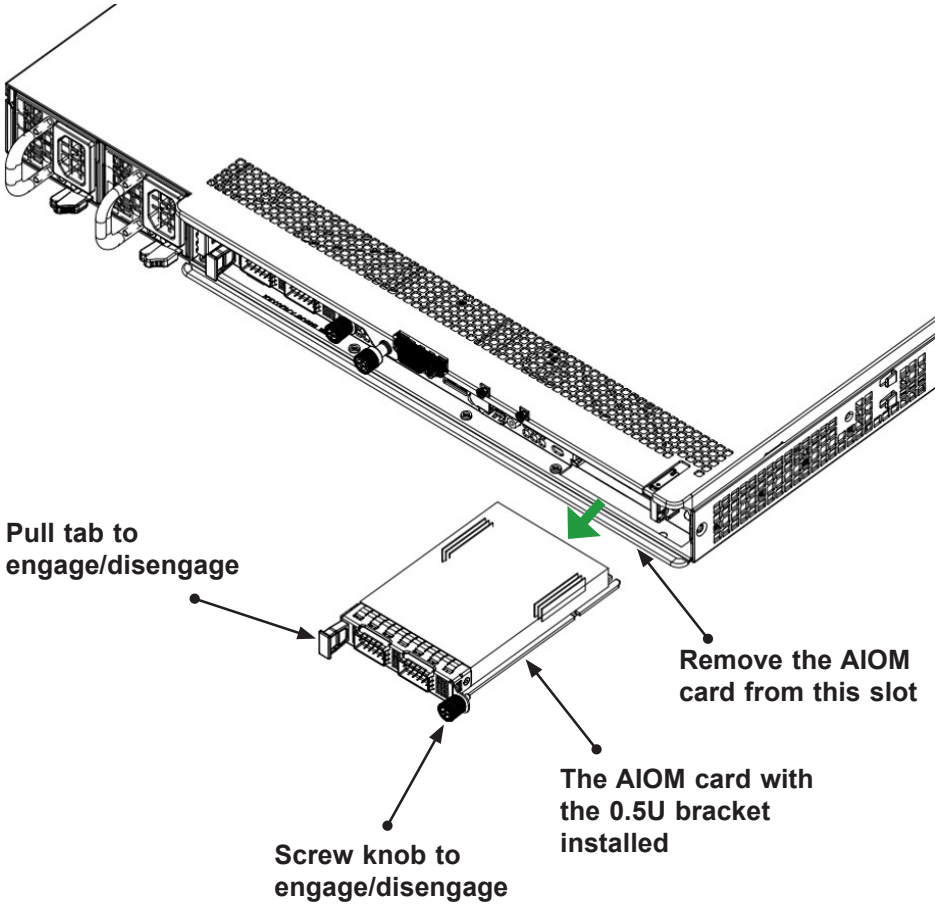
1. Power down the system.
2. Remove the power cord from the wall socket.
3. Use industry-standard anti-static equipment (such as gloves or wrist strap) and follow the instructions listed on page 20 to avoid damage caused by ESD.
4. Familiarize yourself with the server, motherboard, and/or chassis documentation.
5. Confirm that your operating system includes the latest updates and hot fixes.

3.3 Installing the Add-on Card (with 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.)

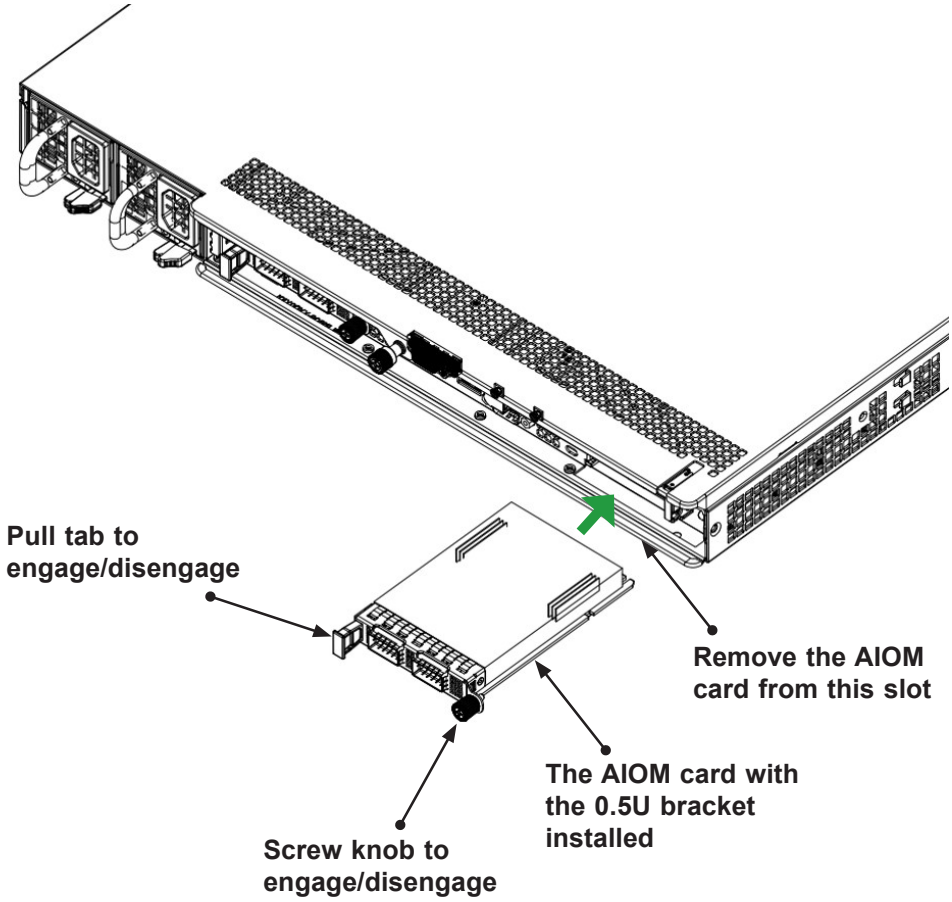
Uninstalling an AIOM module

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.



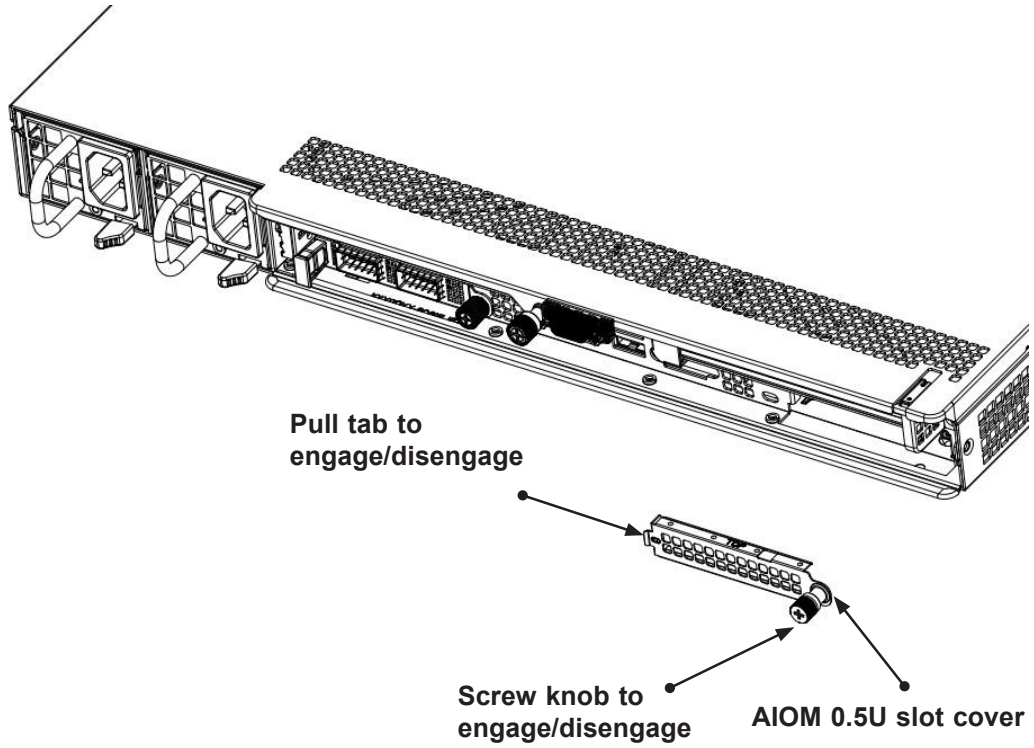
Installing an AIOM module

1. Position the AIOM module in front of the empty slot 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.



Installing an AIOM module (an AIOM slot with its 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.

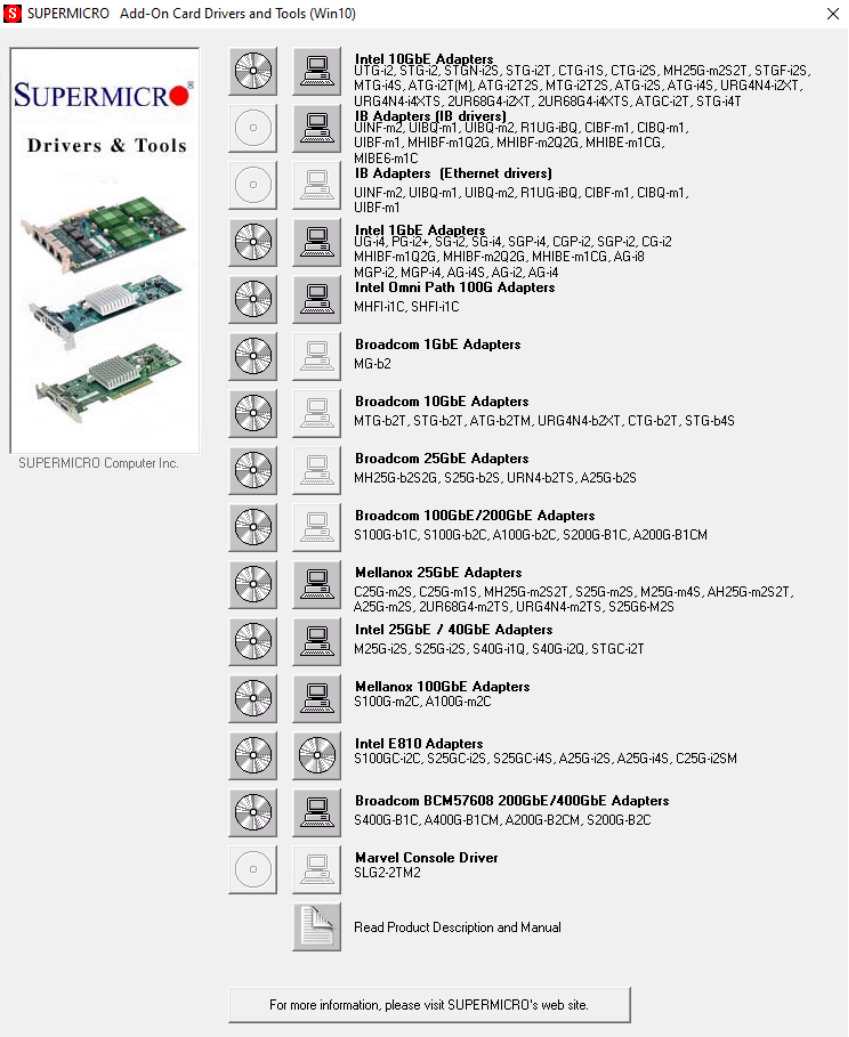


Note 1: This AIOM module does not support the hot plug. Please turn off the AC power and remove the power cord from the wall socket before installing or removing an AIOM module.

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

3.4 Installing Drivers (for Broadcom® BCM57608)

To install drivers for the AOC-A400G-B1CM add-on card for either Linux or Windows, please follow the instructions below.



Before Installing the Drivers for the Linux Operating System

Infiniband-diags is a set of utilities designed to help configure, debug, and maintain infiniband fabrics. Installing them from the Linux library is necessary prior to driver installation. To do so, please first download the following libraries:

```
yum -y install libibverbs* infiniband-diags perftest qperf librd-macm-utils

yum -y install groupinstall "InfiniBand Support"
```

Installing 400G Drivers for the Linux Operating System

Follow the steps below to install the drivers on the Linux operating system:

1. Download the Linux driver package file: netxtreme-bnxt_en-<ver>.tar.gz.

   Note: This driver can be found on either the Supermicro website, or by going to the Linux_Driver directory from the FTP site (https://www.supermicro.com/wdl/Networking_Drivers/CDR-NIC_1.70_for_Add-on_NIC_Cards/) or CDR-NIC LAN driver CD by going to the following directory: Broadcom > 400G > Linux > Linux_Driver.

2. Install the driver by entering the following commands

```
tar xvzf netextreme-bnxt_en-<ver>.tar.gz
cd netextreme-bnxt_en-<ver>
make
make install
```

RDMA over Converged Ethernet (RoCE) is a network protocol that allows remote direct memory access (RDMA) over an Ethernet network. This feature is optional, but if you would like to install it with RoCE, please follow the additional steps below:

1. Download the Linux driver package file: libbnxt_re-<ver>.tar.gz.

   Note: This driver can be found on either the Supermicro website, or by going to the RoCE_Lib directory from the FTP site (https://www.supermicro.com/wdl/Networking_Drivers/CDR-NIC_1.70_for_Add-on_NIC_Cards/) or CDR-NIC LAN driver CD by going to the following directory: Broadcom > 400G > Linux > RoCE_Lib.

2. Install the library by entering the following commands:

```
tar xvzf libbnxt_re-<ver>.tar.gz
cd libbnxt_re-<ver>
./configure
make
make install
cp bnxt_re.driver/etc/libibverbs.d
```

```
echo "/usr/local/lib">>/etc/ld.so.conf
ldconfig -v
```

Installing 400G Drivers for the Windows Operating System

Follow the steps below to install the drivers on the Windows operating system:

1. From the FTP site or CDR-NIC LAN driver CD, go to the following directory: Broadcom > 400G > Windows.
2. Choose the desired Windows driver package folder.
3. As the drivers are in .inf format, you can install the driver from the Device Manager.

(Disclaimer Continued)

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