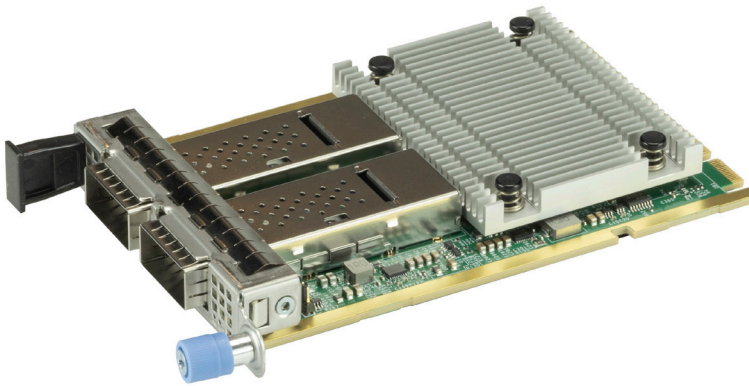
AOC-A100G-m2CM



User's Guide

Revision 1.0

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User's Guide Revision 1.0

Release Date: June 11, 2021

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Preface

About this User's Guide

This user's guide is written for system integrators, IT professionals, and knowledgeable end users. It provides information for the installation and use of the AOC-A100G-m2CM 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 to support the most advanced I/O technologies. The AOC-A100G-m2CM is one of the most feature-rich and low-power consumption 100GbE controllers in the market. Based on the Mellanox ConnectX-6 Dx controller with features such as VXLAN, NVGRE, and RDMA, it provides unparalleled density, performance, and functionality. The Supermicro® AOC-A100G-m2CM is the industry's most secure and advanced cloud network interface card to accelerate mission-critical datacenter applications, such as security, virtualization, SDN/NFV, big data, machine learning, and storage.

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 of 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.

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: http://www.supermicro.com/wftp
- Product safety info: http://www.supermicro.com/about/policies/safety_information.cfm
- 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.

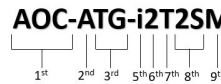
Conventions Used in the User's Guide

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 for Standard Network Adaptors



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.

Contacting Supermicro

Headquarters

Address:	Super Micro Computer, Inc. 980 Rock Ave. San Jose, CA 95131 U.S.A.
Tel:	+1 (408) 503-8000
Fax:	+1 (408) 503-8008
Email:	marketing@supermicro.com (General Information) support@supermicro.com (Technical Support)
Web Site:	www.supermicro.com

Europe

Address:	Super Micro Computer B.V. Het Sterrenbeeld 28, 5215 ML 's-Hertogenbosch, The Netherlands
Tel:	+31 (0) 73-6400390
Fax:	+31 (0) 73-6416525
Email:	sales@supermicro.nl (General Information) support@supermicro.nl (Technical Support) rma@supermicro.nl (Customer Support)
Web Site:	www.supermicro.nl

Asia-Pacific

Address:	Super Micro Computer, Inc. 3F, No. 150, Jian 1st Rd. Zhonghe Dist., New Taipei City 235 Taiwan (R.O.C)
Tel:	+886-(2) 8226-3990
Fax:	+886-(2) 8226-3992
Email:	support@supermicro.com.tw
Web Site:	www.supermicro.com.tw

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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 in quality and performance.

1-2 Key Features

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

- Advanced I/O Module (AIOM) Form Factor
- Mellanox® ConnectX-6 Dx 100GbE controller
- Dual QSFP28 connectors
- PCIe Gen 4.0
- RDMA over Converged Ethernet (RoCE)
- VXLAN, NVGRE, and Geneve
- Asset Management Features with thermal sensor
- Network Controller Sideband Interface (NC-SI) for Remote Management

1-3 Additional Features

General

- Advanced I/O Module (AIOM) Form Factor
- Mellanox® ConnectX-6 Dx 100GbE controller
- Dual QSFP28 ports

Storage Accelerations

- NVMe over Fabric offloads for target
- Storage protocols: iSER, NFSoRDMA,
- SMB Direct, NVMe-oF, and more
- T-10 Dif/Signature Handover

RDMA over Converging Ethernet (RoCE)

- RoCE v1/v2
- Zero-Touch RoCE: no ECN, no PFC
- RoCE over overlay networks
- IPsec over RoCE
- Selective repeat
- Programmable congestion control interface
- GPUDirect®
- Dynamically Connected Transport (DCT)
- Burst buffer offload

Management and Control

- NC-SI, MCTP over SMBus and MCTP over PCIe – Baseboard Management Controller interface
- PLDM for Monitor and Control DSP0248
- PLDM for Firmware Update DSP026
- I2C interface for device control and configuration

Remote Boot

- Remote boot over Ethernet
- Remote boot over iSCSI
- UEFI support for x86 and Arm servers
- PXE boot

Standards

- IEEE 802.3bs, 200 Gigabit Ethernet
- IEEE 802.3cd, 50, 100 and 200 Gigabit Ethernet
- IEEE 802.3bj, 802.3bm 100 Gigabit Ethernet
- IEEE 802.3by, 25, 50 Gigabit Ethernet supporting all FEC modes
- IEEE 802.3ba 40 Gigabit Ethernet
- IEEE 802.3ae 10 Gigabit Ethernet
- IEEE 802.3az Energy Efficient Ethernet (supports only “FastWake” mode)
- IEEE 802.3ap based autonegotiation and KR startup
- IEEE 802.3ad, 802.1AX Link Aggregation
- IEEE 802.1Q, 802.1P VLAN tagsand priority

- IEEE 802.1Qaz (ETS)
- IEEE 802.1Qbb (PFC)
- IEEE 802.1Qbg
- 25/50 Ethernet Consortium “Low Latency FEC” for50GE/100GE/200GE PAM4 links
- PCI Express Gen 3.0 and 4.0

Power Consumption

- Maximum 23.7W

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

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

1-4 Available SKUs

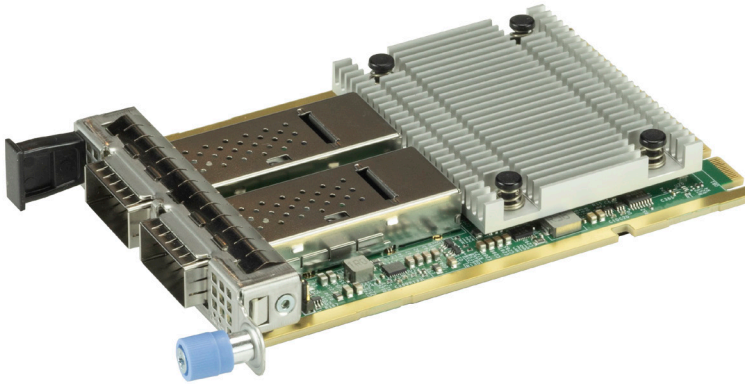
Note: This product is sold only as part of an integrated solution with Supermicro server systems.

Product Part Number	Bracket Included	Description
AOC-A100G-m2CM	BKT-0170L	2-port 100 Gigabit Ethernet Adapter with a 0.5U height bracket.

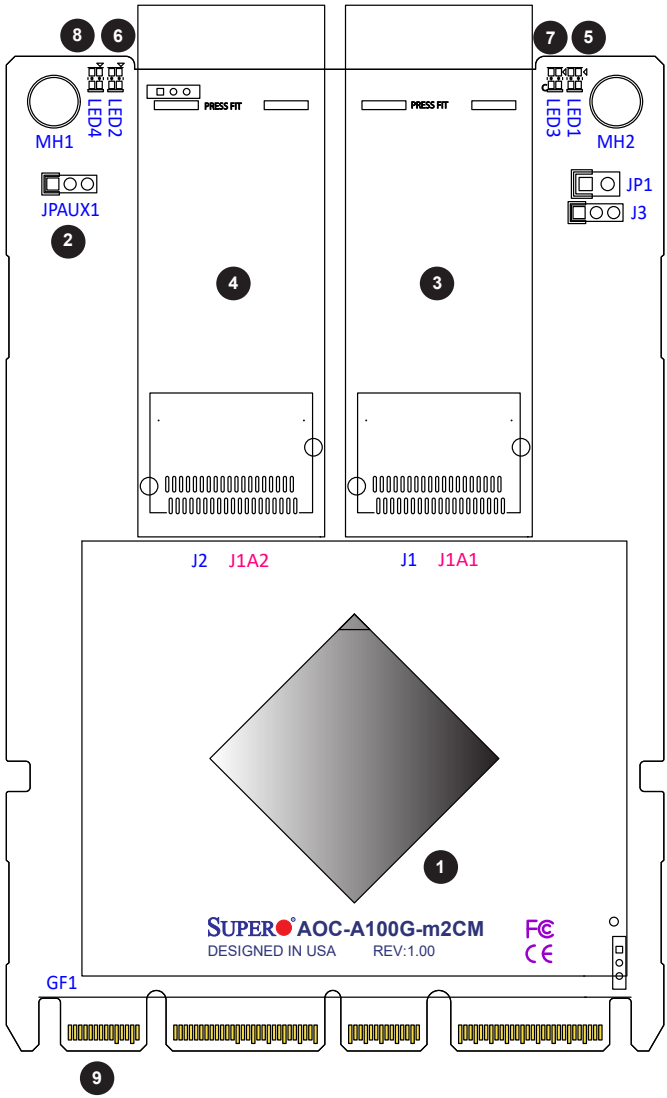
Chapter 2

Hardware Components

2-1 Add-On Card Image and Layout



AOC-A100G-m2CM Image



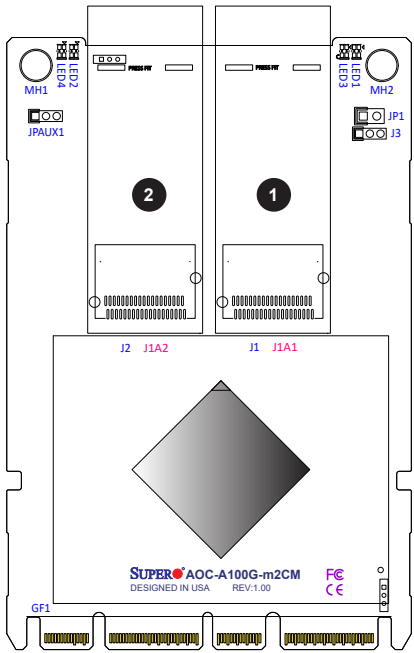
AOC-A100G-m2CM Layout

2-2 Major Onboard Components

AOC-A100G-m2CM Major Components		
No	**Component Name**	**Definition**
1	Mellanox ConnectX-6 Dx	100GbE controller
2	JPAUX1	1-2: Enable AUX Power
		2-3: Disable AUX Power
3	J1/J1A1	Quad Small Form-Factor Pluggable 28 Port 1
4	J2/J1A2	Quad Small Form-Factor Pluggable 28 Port 2
5	LED1	QSFP28 Port 1 Link LED
6	LED2	QSFP28 Port 2 Link LED
7	LED3	QSFP28 Port 1 Active LED
8	LED4	QSFP28 Port 2 Active LED
9	GF1	PCIe 4.0 AIOM form factor

2-3 QSFP28 Ethernet Connections

Two Quad-Small-Form-Factor-Pluggable 28 (QSFP28) connectors are located on the add-on card. The QSFP28 ports operate at up to 100GbE. Plug the Direct Attached Copper (DAC) cable into the QSFP28 ports for network connections. See the layout below for the location.



1. QSFP28 Port 1
2. QSFP28 Port 2

2-4 Ports and Port LEDs

QSFP28 Ports

Two QSFP28 adapter ports are located on the AIOM Form factor card. Connect a Direct Attach Copper cable or an LC Fiber-Optic cable to the ports to provide 100 Gigabit Ethernet communication. Refer to the AIOM Form factor card layout on Page 2-2 for the location of the QSFP28 port.

QSFP28 Port LEDs

There are two LEDs per port located on the card to indicate the speed and activity status of each port. See the table below for more information.

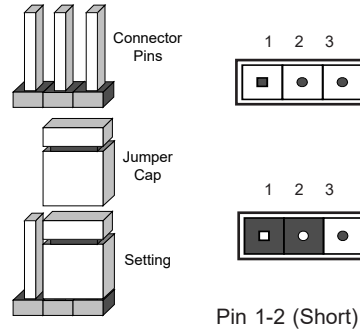
QSFP28 Port LEDs		
LED	**Color**	**Definition**
Activity	Blinking Green	Activity
Link	Amber	< 100 Gbps Link Speed
	Green	100 Gbps Link Speed

2-5 Jumper Settings

Explanation of Jumpers

To modify the operation of the add-on 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.

Note: JPAUX1 is for production use only.



Pin 1-2 (Short)

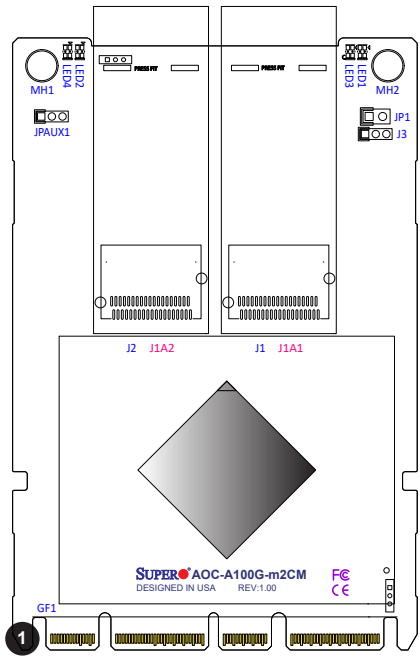
JPAUX1 for Standby Power	IPMI Support	FailOver Support	WoL Support
Disable = No standby power to AOC NIC	Yes	Yes	No
Enable = Standby power to AOC NIC	Yes	Yes	Yes

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

2-6 PCIe 4.0 AIOM Form Factor Connector

Insert the PCI-E 4.0 AIOM form factor connector into a PCIe 4.0 AIOM form factor slot on a motherboard to use this AIOM Form factor card. See the layout below for the location.

1. PCIe 4.0 AIOM Form factor connector



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.

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 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.

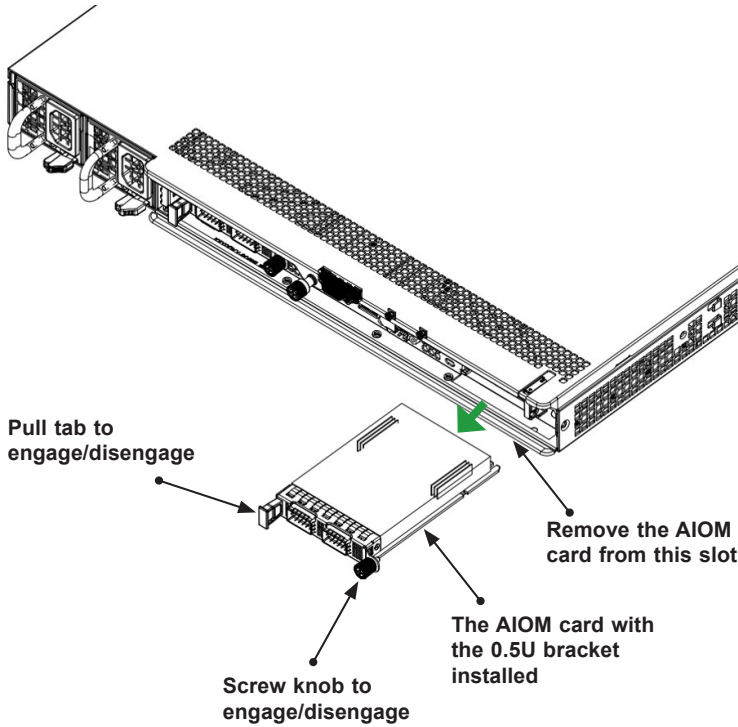
3-3 Installing the Add-on Card

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.

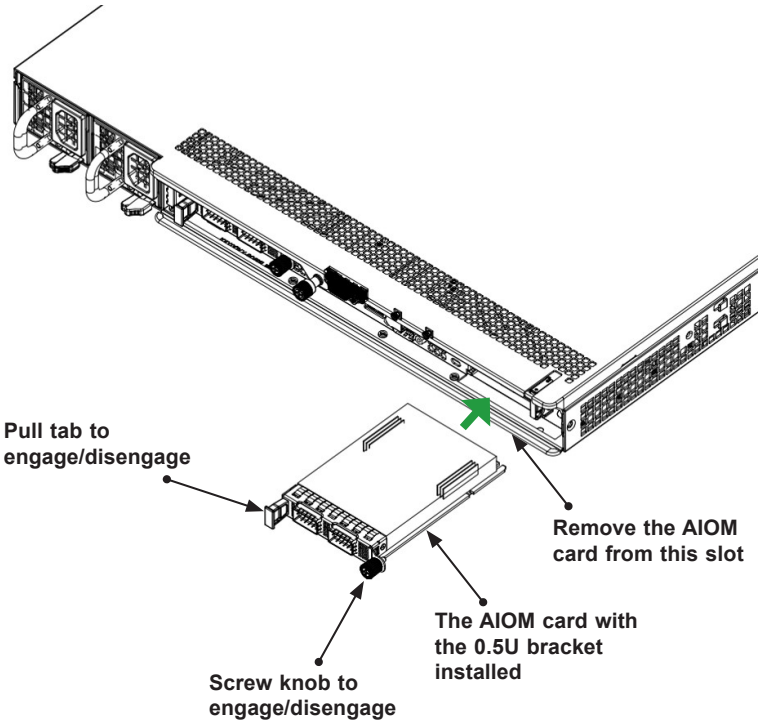
2. Pull on the tab and a knob evenly on both sides of the card to disengage the AIOM module from the motherboard connector, and gently slide the AIOM module out.



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.

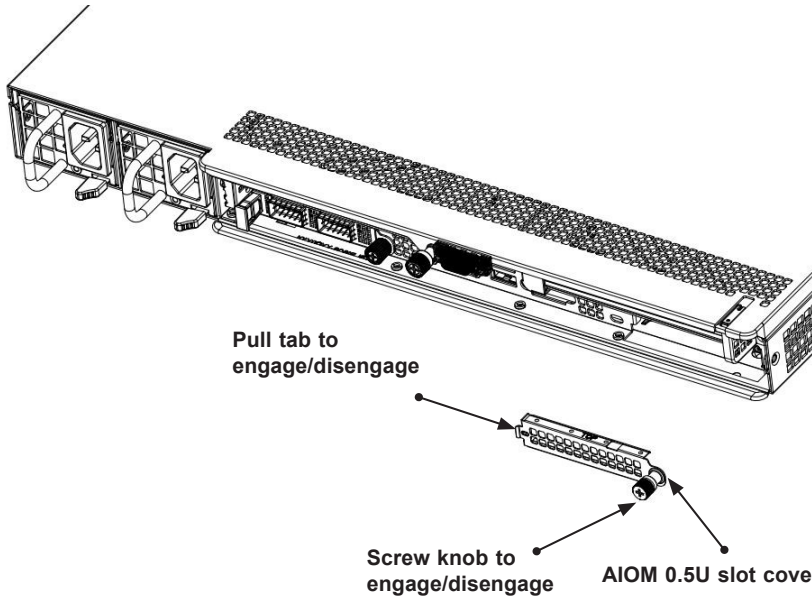


C. Installing an AIOM module (An AIOM slot with an AIOM slot cover)

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.

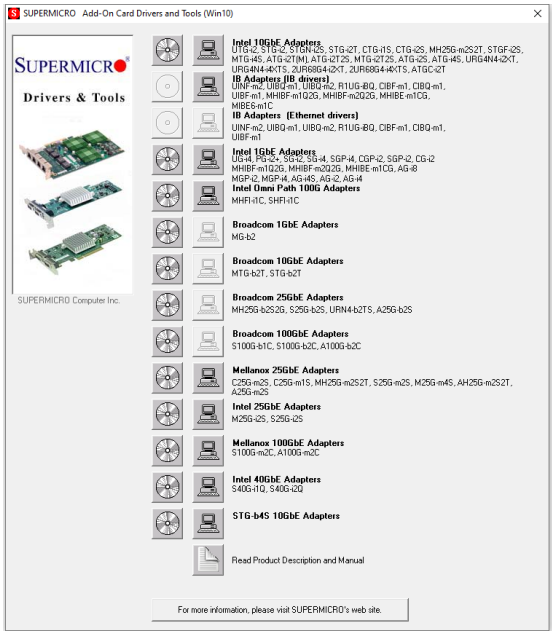


Note 1: This AIOM module does not support hot plug. Please turn off the AC power and remove the power cord from the wall socket before installing or removing an AIOM module.

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

3-4 Installing Drivers (for Mellanox® ConnectX-6 Dx)

To install drivers for the AOC-A100G-m2CM add-on card for either Linux and Windows, please follow the instructions below.



Linux Drivers

Use the following procedures to install the 100GbE driver on the Linux (RedHat/CentOS) operating system.

1. We recommend downloading the latest Mellanox® Driver directly from the Mellanox website: https://mellanox.com/products/infiniband-drivers/linux/mlnx_ofed.

2. Download and extract /untar the MLNX_OFED***.tgz package.

3. Change to the appropriate directory where your newly extracted package is located.

4. Install the driver by entering the following commands:

```
tar xzvf MLNX_OFED_LINUX-<ver>.tgz

cd MLNX_OFED_LINUX-<ver>

./mlnxofedinstall --without-fw-update
```

   This installs the Linux driver to your system. You might be prompted to install kernel dependencies for Linux, in which case you would need to follow on-screen instructions.

Windows Drivers

Use the following procedures to install a 25GbE driver on the Windows operating system.

Installing Ethernet Drivers for the Windows Operating System

1. We recommend downloading the latest Mellanox Driver directly from the Mellanox website: https://mellanox.com/products/adapter-software/ethernet/windows/winof-2.

2. Once the driver is downloaded, run the .exe file to install the driver.

(Disclaimer Continued)

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