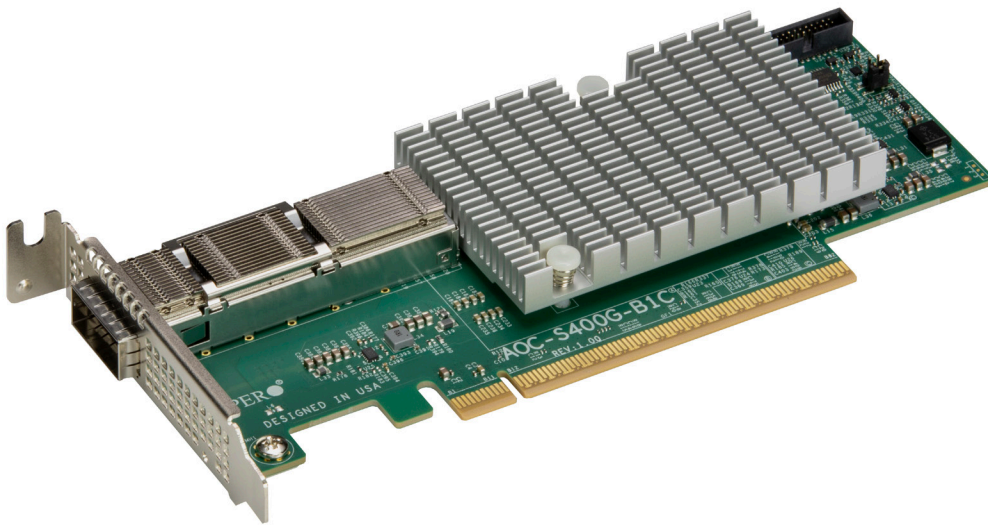




AOC-S400G-B1C



USER'S MANUAL

Revision 1.0

The information in this user's manual has been carefully reviewed and is believed to be accurate. The manufacturer assumes no responsibility for any inaccuracies that may be contained in this document, and makes no commitment to update or to keep current the information in this manual, or to notify any person or organization of the updates. **Please Note: For the most up-to-date version of this manual, please see our website at www.supermicro.com.**

Super Micro Computer, Inc. ("Supermicro") reserves the right to make changes to the product described in this manual at any time and without notice. This product, including software and documentation, is the property of Supermicro and/or its licensors, and is supplied only under a license. Any use or reproduction of this product is not allowed, except as expressly permitted by the terms of said license.

IN NO EVENT WILL Super Micro Computer, Inc. BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, SPECULATIVE OR CONSEQUENTIAL DAMAGES ARISING FROM THE USE OR INABILITY TO USE THIS PRODUCT OR DOCUMENTATION, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN PARTICULAR, SUPER MICRO COMPUTER, INC. SHALL NOT HAVE LIABILITY FOR ANY HARDWARE, SOFTWARE, OR DATA STORED OR USED WITH THE PRODUCT, INCLUDING THE COSTS OF REPAIRING, REPLACING, INTEGRATING, INSTALLING OR RECOVERING SUCH HARDWARE, SOFTWARE, OR DATA.

Any disputes arising between manufacturer and customer shall be governed by the laws of Santa Clara County in the State of California, USA. The State of California, County of Santa Clara shall be the exclusive venue for the resolution of any such disputes. Supermicro's total liability for all claims will not exceed the price paid for the hardware product.

FCC Statement: This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in industrial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the manufacturer's instruction manual, may cause harmful interference with radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case you will be required to correct the interference at your own expense.

California Best Management Practices Regulations for Perchlorate Materials: This Perchlorate warning applies only to products containing CR (Manganese Dioxide) Lithium coin cells. "Perchlorate Material-special handling may apply. See www.dtsc.ca.gov/hazardouswaste/perchlorate".



WARNING: This product can expose you to chemicals including lead, known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, go to www.P65Warnings.ca.gov.

The products sold by Supermicro are not intended for and will not be used in life support systems, medical equipment, nuclear facilities or systems, aircraft, aircraft devices, aircraft/emergency communication devices or other critical systems whose failure to perform be reasonably expected to result in significant injury or loss of life or catastrophic property damage. Accordingly, Supermicro disclaims any and all liability, and should buyer use or sell such products for use in such ultra-hazardous applications, it does so entirely at its own risk. Furthermore, buyer agrees to fully indemnify, defend and hold Supermicro harmless for and against any and all claims, demands, actions, litigation, and proceedings of any kind arising out of or related to such ultra-hazardous use or sale.

Manual Revision 1.0

Release Date: November 14, 2024

Unless you request and receive written permission from Super Micro Computer, Inc., you may not copy any part of this document. Information in this document is subject to change without notice. Other products and companies referred to herein are trademarks or registered trademarks of their respective companies or mark holders.

Copyright © 2024 by Super Micro Computer, Inc.
All rights reserved.

Printed in the United States of America

Preface

About This Manual

This user's guide is written for system integrators, PC technicians, and knowledgeable PC users. It provides information for the installation and use of the AOC-S400G-B1C add-on card.

About This Add-On Card

The Supermicro® AOC-S400G-B1C is based on the Broadcom® BCM57608 Ethernet Controller and offers a 1x400G-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. They can be used in a wide range of hardware designs, including 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

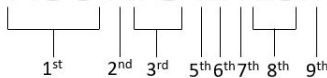
For your system to work properly, follow the links below to download all necessary drivers/utilities and the user's manual for your server.

- 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

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

Naming Convention

AOC-ATG-i2T2SM



Character	Representation	Options
1 st	Product Family	AOC: Add On Card
2 nd	Form Factor	S: Standard, P: Proprietary, C: MicroLP, M: Super IO Module (SIOM), MH: SIOM Hybrid A: Advanced IO Module (AIOM), AH: AIOM Hybrid
3 rd	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
4 th	Chipset Model (Optional)	N: Niantec (82599), P: Powerville (i350), S: Sageville (X550), F: Fortville (XL710/X710), L: Lewisburg (PCH)
5 th	Chipset Manufacturer	i: Intel, m: Mellanox, b: Broadcom
6 th	Number of Ports	1: 1 port, 2: 2 ports, 4: 4 ports, 8: 8 ports
7 th	Connector Type (Optional)	S: SFP/SFP+/SFP28, T: 10GBase-T, Q: QSFP+, C: QSFP28
8 th	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, 2S: 2x SFP+
9 th	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)
Sales-USA@supermicro.com (Sales Inquiries)
Government_Sales-USA@supermicro.com (Gov. Sales Inquiries)
support@supermicro.com (Technical Support)
RMA@supermicro.com (RMA Support)
Webmaster@supermicro.com (Webmaster)

Website: 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_Europe@supermicro.com (Sales Inquiries)
Support_Europe@supermicro.com (Technical Support)
RMA_Europe@supermicro.com (RMA Support)

Website: 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: Sales-Asia@supermicro.com.tw (Sales Inquiries)
Support@supermicro.com.tw (Technical Support)
RMA@supermicro.com.tw (RMA Support)

Website: www.supermicro.com.tw

Table of Contents

Chapter 1 Introduction

1.1 Overview.....	8
1.2 Key Features.....	8
1.3 Specifications	9

Chapter 2 Hardware Components

2.1 Add-On Card Image and Layout.....	12
2.2 Major Components.....	13
2.3 QSFP-DD400/QSFP112 Ethernet Connections.....	14
2.4 Port and Port LED.....	15
2.5 NC-SI Header.....	16
2.6 Jumper Settings	17
2.7 PCIe 5.0 x16 Connector.....	18

Chapter 3 Installation

3.1 Static-Sensitive Devices.....	19
3.2 Before Installation.....	20
3.3 Installing the Add-on Card.....	20
3.4 Installing Drivers (for Broadcom BCM57608).....	21

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:

- Broadcom® BCM57608 1x400GbE controller
- PCIe Gen 5.0 x16 low-profile standard form factor
- Single QSFP-DD400 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 by default)
- RoHS compliant 6/6 

1.3 Specifications

Networking Interface

- Eight SerDes capable of 100/50G PAM4 and 25G NRZ
- QSFP-DD400
- QSFP112
- 1x400 GbE, 1x200/100/50/25/10 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)
- Platform Level Data Model (PLDM) for Monitoring and FW Update

Stateless Offload Features

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

- Receive Segment Coalescing (RSC)
- TTCP 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 filters 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 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

- Typical power consumption: 19 W
- Maximum power consumption: 25.4 W (at 100°C)

Environmental Conditions

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

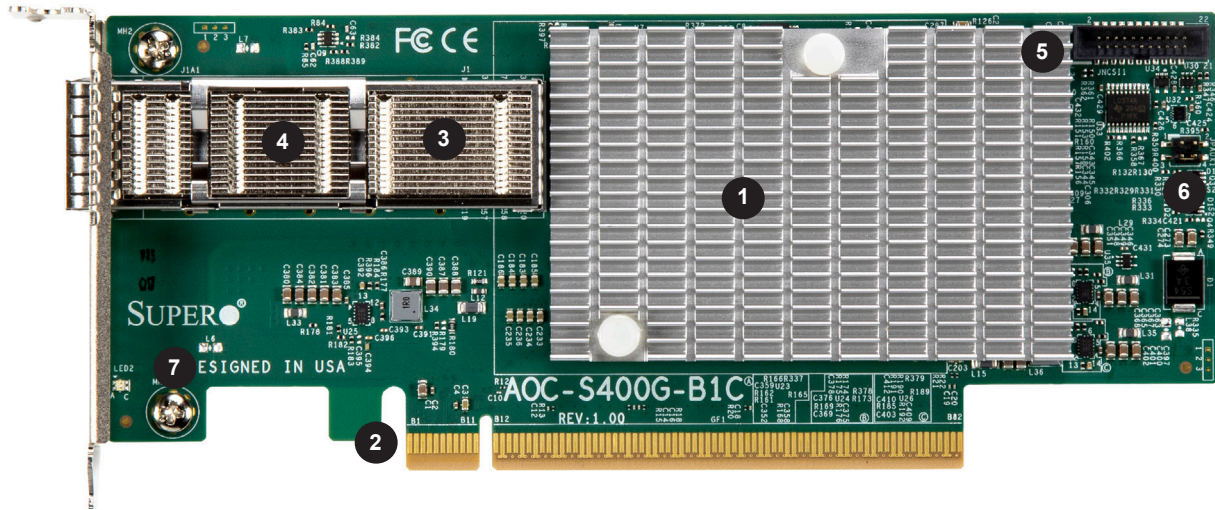
Physical Dimensions

- Card PCB dimensions: 6.6" (167.64 mm) x 2.713" (68.91 mm) (L x W)

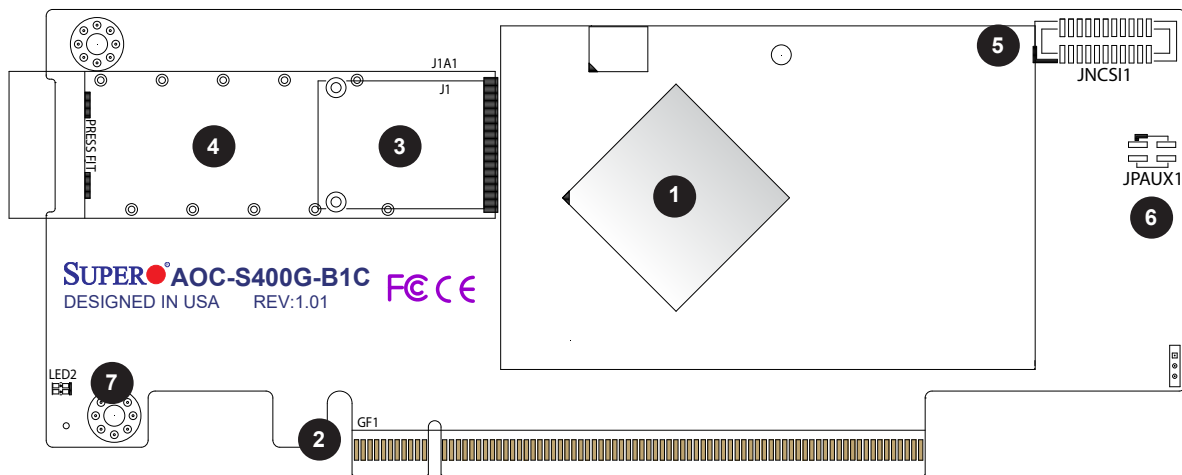
Chapter 2

Hardware Components

2.1 Add-On Card Image and Layout



AOC-S400G-B1C View



AOC-S400G-B1C Layout

2.2 Major Components

The following major components are installed on AOC-S400G-B1C:

AOC-S400G-B1C Major Components		
No	Component Name	Definition
1	Broadcom® BCM57608	Ethernet 400 GbE controller
2	GF1	PCIe Gen 5.0 x16 connector
3	J1	Connector cage
4	J1A1	Quad Small Form Factor Pluggable Double Density 400 (QSFP-DD400)/ Quad Small Form Factor Pluggable 112 (QSFP112)
5	JNCSI1	NC-SI Header
6	JPAUX1	1-2: Enable AUX Power
		3-4: Disable AUX Power (default)
7	LED2	QSFP-DD400/QSFP112 Port LED

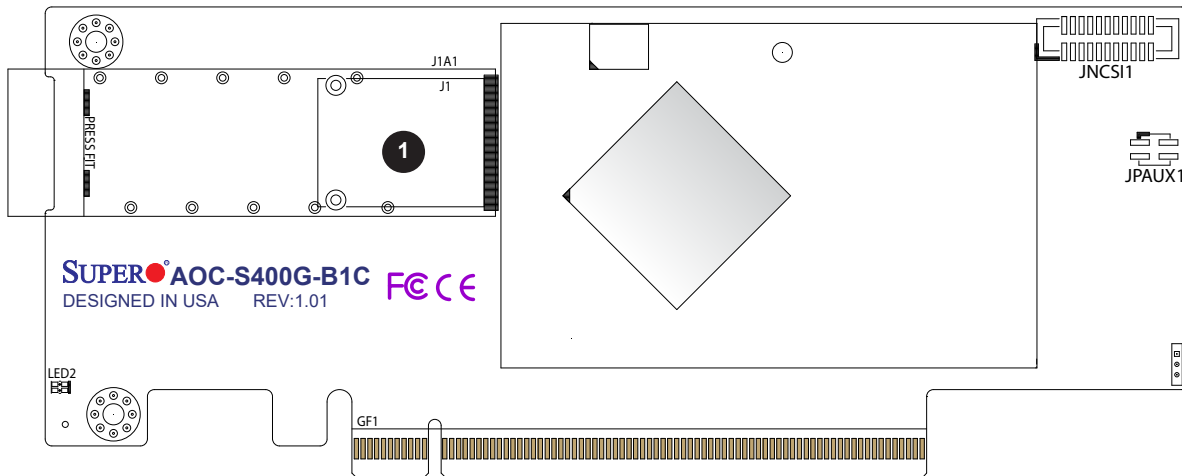
2.3 QSFP-DD400/QSFP112 Ethernet Connections

QSFP-DD400/QSFP112 Connector

A Quad Small Form-Factor Pluggable DD400 (QSFP-DD400) or Quad Small Form Factor Pluggable 112 (QSFP112) connector is located at J1A1 on the add-on card. The QSFP-DD400/QSFP112 port operates at up to 400 Gb/s. Plug the Direct Attached Copper (DAC) cable into the DD400/QSFP112 port for network connections.



1. QSFP-DD400/
QSFP112 Port



2.4 Port and Port LED

QSFP-DD400/QSFP112 Port

The QSFP-DD400/QSFP112 adapter port is located on the 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 layout on page 12 for the location of the QSFP-DD400/QSFP112 port.

QSFP-DD400/QSFP112 Port LED

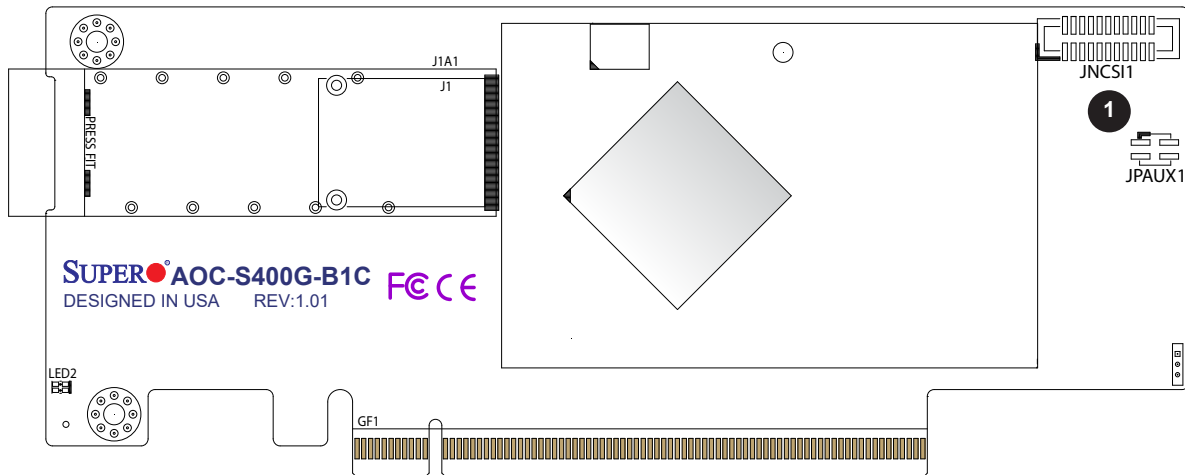
There is one LED located below the single QSFP-DD400/QSFP112 port to indicate the link speed and activity status of the port. The activity LED will blink when there is activity, but the color will be either green or amber to match the indicated link speed.

QSFP-DD400/QSFP112 Port LED		
LED	Color	Definition
Activity	Blinking	Activity
Link	Amber	<400 Gbps Link Speed
	Green	400 Gbps Link Speed

2.5 NC-SI Header

A Network-Controller Sideband Interface (NC-SI) header is located at JNCSI1 on the add-on card. Connect an appropriate cable from this header to a motherboard to provide the out-of-band (sideband) connection between the onboard Baseboard Management Controller (BMC) and a Network Interface Controller (NIC) for remote management. For the network sideband interface to work properly, you will need to use a motherboard that supports NCSI and also need to have a special cable. Please contact Supermicro at www.supermicro.com to purchase the cable for this header.

1. NC-SI Header



2.6 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.

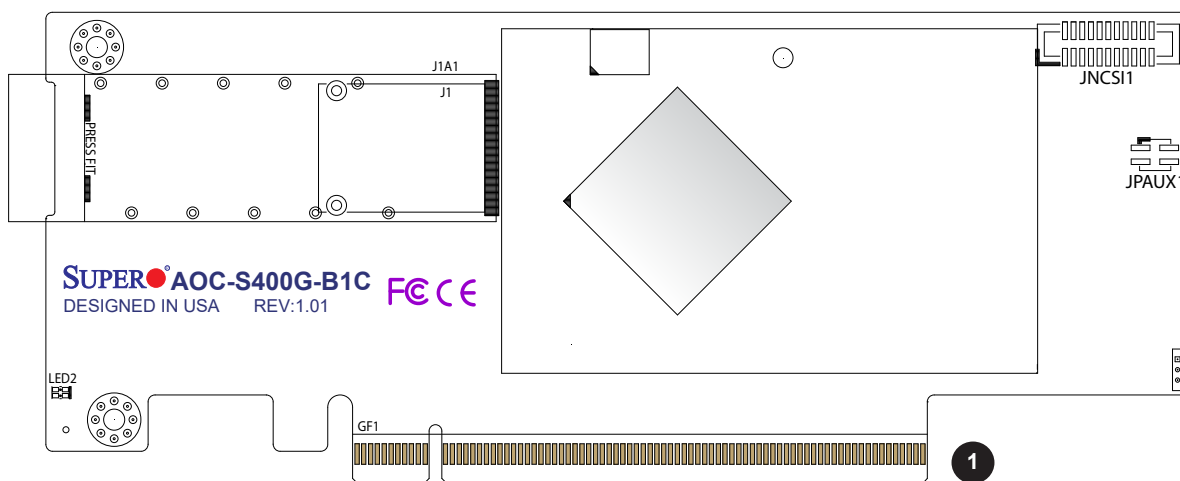
AOC JPAUX1 set to Disabled	When system/motherboard goes into standby mode		
	IPMI Support	FailOver Support	WoL Support
	No	No	No
	When system/motherboard is NOT in standby mode		
	IPMI Support	FailOver Support	WoL Support
	Yes	Yes	N/A
AOC JPAUX1 set to Enabled	When system/motherboard goes into standby 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 <i>No standby power to AOC NIC</i>	Disable jumper to disconnect the standby power	Default
Enable <i>Standby power to AOC NIC</i>	Enable jumper to connect standby power to AOC NIC	Standby Power can be enabled to provide support for NC-SI (IPMI/Failover Support). Please consult Supermicro before enabling it.

2.7 PCIe 5.0 x16 Connector

A PCIe 5.0 x16 connector is located at GF1 on the add-on card. Insert this connector into a PCIe slot on a motherboard to use this add-on card.

1. PCIe 5.0 x16 connector



Chapter 3

Installation

Your system came with the AOC-S400G-B1C add-on card which is designed as a part of an integrated solution. We do not recommend that any part of your system components be removed and reinstalled. However, if you do need to remove or re-install a system component, including this add-on card, follow the instructions below to ensure proper system setup. Also, be sure to remove the power cord first before adding, removing, or changing any hardware components to avoid damaging the system or components.

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 straps) and follow the instructions listed on page 19 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.

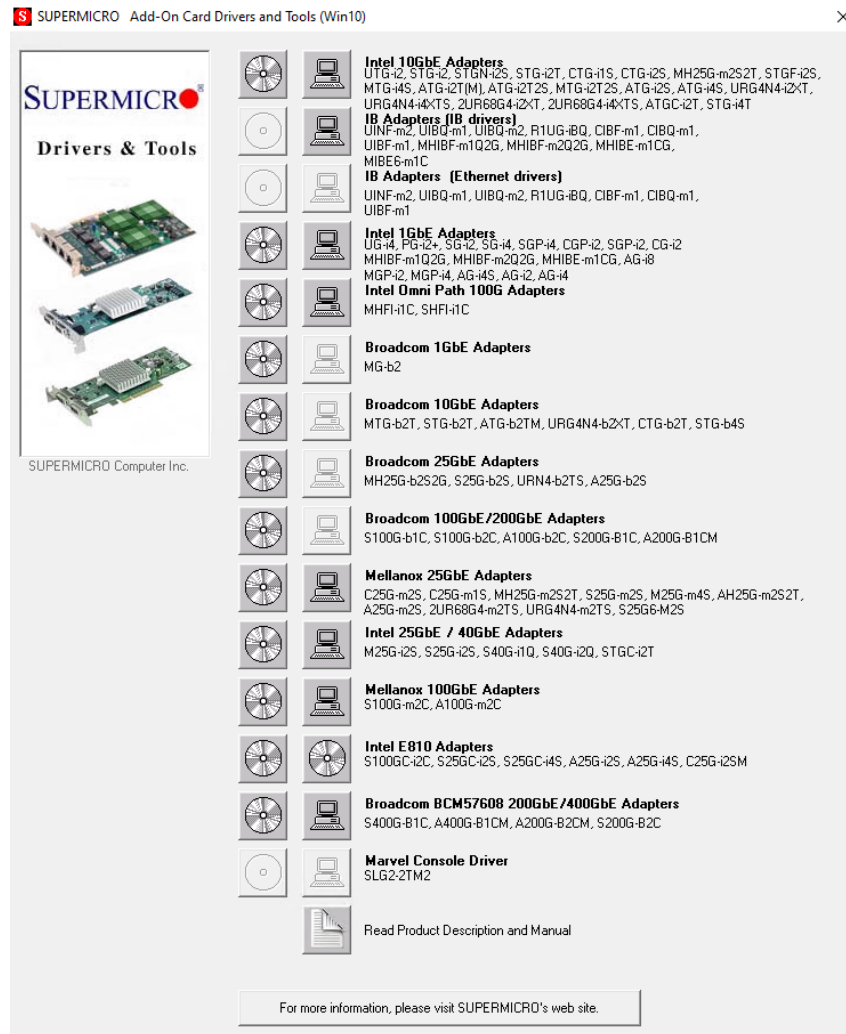
3.3 Installing the Add-on Card

Follow the steps below to install the add-on card into your system.

1. Remove the server cover and, if necessary, set aside any screws for later use.
2. Remove the add-on card slot cover. If the case requires a screw, place the screw aside for later use.
3. Position the add-on card in the slot directly over the connector on the motherboard, and gently push down on both sides of the card until it slides into the PCI connector.
4. Secure the add-on card/motherboard to the chassis. If required, use the screw that you previously removed.
5. Attach any necessary external cables to the add-on card.
6. Replace the chassis cover.
7. Plug the power cord into the wall socket, and power up the system.

3.4 Installing Drivers (for Broadcom BCM57608)

To install drivers for the AOC-S400G-B1C add-on card for either Linux or Windows, 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, first download the following libraries:

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

```
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 following site (https://www.supermicro.com/wdl/Net-working_Drivers/CDR-NIC_1.70_for_Add-on_NIC_Cards/) or CDR-NIC LAN driver CD by going to the following directory: CDR-NIC > Broadcom.

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, 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 following site (https://www.supermicro.com/wdl/Network-ing_Drivers/CDR-NIC_1.70_for_Add-on_NIC_Cards/) or CDR-NIC LAN driver CD by going to the following directory: CDR-NIC > Broadcom.

2. Install the library by entering the following commands:

```
tar xvzf libbnxt_re-<ver>.tar.gz
cd libbnxt_re-<ver>
sh autogen.sh
./configure
make
make install all
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: CDR-NIC > Broadcom.
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)

The products sold by Supermicro are not intended for and will not be used in life support systems, medical equipment, nuclear facilities or systems, aircraft, aircraft devices, aircraft/emergency communication devices or other critical systems whose failure to perform be reasonably expected to result in significant injury or loss of life or catastrophic property damage. Accordingly, Supermicro disclaims any and all liability, and should buyer use or sell such products for use in such ultra-hazardous applications, it does so entirely at its own risk. Furthermore, buyer agrees to fully indemnify, defend and hold Supermicro harmless for and against any and all claims, demands, actions, litigation, and proceedings of any kind arising out of or related to such ultra-hazardous use or sale.