SUPER®

AOC-STG-b4S

User's Guide

Revision 1.0b

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WARNING: Handling of lead solder materials used in this product may expose you to lead, a chemical known to the State of California to cause birth defects and other reproductive harm.

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-STG-b4S add-on card.

About this Add-on Card

The Supermicro AOC-STG-b4S is the most energy-efficient and cost-effective 4-port 10GbE adapter solution for data centers in today's market. The AOC-STG-b4S supports a wide range of popular networking features. These features include TCP Offload, PXE boot, Virtualization technology (VMDq and PC-SIG SR-IOV), and Energy Efficient Ethernet (IEEE 802.3az). The Supermicro AOC-STG-b4S add-on card offers the highest performance with the lowest power consumption currently available on the market. This add-on card is intended to be used with Supermicro's servers or motherboards as an integrated solution package. For more information regarding product support or updates, please refer to our website at http://www.supermicro.com/products/nfo/networking.cfm#adapter.

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 for safety instructions 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 for proper system setup.

Naming Convention

Naming Convention

$$\underset{1}{\underline{A\,O\,C}} - \underset{2}{\underline{S}}\;\underset{3}{\underline{T}}\;\underset{4}{\underline{G}}\;\underset{5}{\underline{N}} - \underset{5}{\underline{i}}\;\underset{6}{\underline{2}}\;\underset{7}{\underline{S}}$$

Character	Representation	Options
1st	Product Family	AOC: Add On Card
2nd	Form Factor	U: UIO, S: Standard, P: Proprietary, C: MicroLP
3rd	Product Type/Speed	G: GbE (1Gb/s), TG: 10GbE (10Gb/s) , IBF: IB FDR (56Gb/s) IBQ: IB QDR (40Gb/s), INF: InfiniBand DDR (20Gb/s)
4th	Chipset Model (Optional)	N: Niantec (82599ES), P: Powerville (i350)
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+, T: 10GBase-T

SMC Networking Add-on Cards

Model	Type	Form Factor	Interface	Controller	Connection	Dimension (w/o Brackets) (L x H)
S40G-i2Q	40GbE	Standard LP	PCI-E x8	Intel® XL710	2 QSFP+ (40Gb/port)	5.9" (14.9cm) x 2.73" (6.9cm)
SGP-i2	GbE	Standard LP	PCI-E x4	Intel® i350AM2	2 RJ45 (1Gb/port)	3.9" (9.91cm) x 2.73" (6.9cm)
SGP-i4	GbE	Standard LP	PCI-E x4	Intel® i350	4 RJ45 (1Gb/port)	3.9" (9.9cm) x 2.73" (6.9cm)
STG-b4S	10GbE	Standard LP	PCI-E x8	Broadcom® BCM57840S	4 SFP+ (10Gb/port)	5.4" (13.7cm) x 2.73" (6.9cm)
STG-i2T	10GbE	Standard LP	PCI-E x8	Intel® X540	2 RJ45 (10Gb/port)	6.4" (16.3cm) x 2.73" (6.9cm)
STGN-i2S	10GbE	Standard LP	PCI-E x8	Intel® 82599ES	2 SFP+ (10Gb/port)	4.0" (10.2cm) x 2.73" (6.9cm)
STGN-i1S	10GbE	Standard LP	PCI-E x8	Intel® 82598EN	1 SFP+ (10Gb/port)	4.0" (10.2cm) x 2.73" (6.9cm)
STG-i2	10GbE	Standard LP	PCI-E x8	Intel® 82598EB	2 CX4 (10Gb/port)	5.6" (14.1cm) x 2.73" (6.9cm)
PG-i2+	GbE	Proprietary LP	PCI-E x4	Intel® 82576EB	2 RJ45 (1Gb/port)	3.8" (9.6cm) x 2.5" (6.4cm)
PTG-i1S	10GbE	Proprietary	PCI-E x8	Intel 82599EN	1 SFP+ (10Gb/port)	10.04" (25.5cm) x .78" (2.0cm)
UG-i4	GbE	UIO FH	PCI-E x8	Intel® 82571EB	4 RJ45 (1Gb/port)	6.6" (16.7cm) x 3.9" (9.8cm)
UIBF-m1	FDR IB	UIO LP	PCI-E x8	Mellanox® ConnectX-3	1 QSFP (56Gb/port)	5.6" (14.0cm) x 2.5" (6.4cm)
UIBQ-m1	QDR IB	UIO LP	PCI-E x8	Mellanox® ConnectX-2	1 QSFP (40Gb/port)	5.6" (14.3cm) x 2.5" (6.4cm)
UIBQ-m2	QDR IB	UIO LP	PCI-E x8	Mellanox® ConnectX-2	2 QSFP (40Gb/port)	5.6" (14.3cm) x 2.5" (6.4cm)
CGP-i2	GbE	MicroLP	PCI-E x4	Intel® i350	2 RJ45 (1Gb/port)	4.4" (11.3cm) x 1.3" (3.4cm)
CG-i2	GbE	MicroLP	PCI-E x4	Intel® 82580	2 RJ45 (1Gb/port)	4.4" (11.3cm) x 1.3" (3.4cm)
CIBF-m1	FDR IB	MicroLP	PCI-E x8	Mellanox® ConnectX-3	1 QSFP (56Gb/port)	4.4" (11.3cm) x 1.3" (3.4cm)
CIBQ-m1	QDR IB	MicroLP	PCI-E x8	Mellanox® ConnectX-3	1 QSFP (40Gb/port)	4.4" (11.3cm) x 1.3" (3.4cm)
CTG-i1S	10GbE	MicroLP	PCI-E x8	Intel® 82599EN	1 SFP+ (10Gb/port)	4.4" (11.3cm) x 1.3" (3.4cm)
CTG-i2S	10GbE	MicroLP	PCI-E x8	Intel® 82599ES	2 SFP+ (10Gb/port)	4.4" (11.3cm) x 1.3" (3.4cm)
CTG-i2T	10GbE	MicroLP	PCI-E x8	Intel® X540	2 RJ45 (10Gb/port)	4.9" (12.3cm) x 3.0" (7.7cm)

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)
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@supermicro.nl (General Information)
                 support@supermicro.nl (Technical Support)
                 rma@supermicro.nl (Customer 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: support@supermicro.com.tw
Website: www.supermicro.com.tw

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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/nfo/networking.cfm#adapter.

1-2   Product Highlights

The product highlights of this add-on card include the following:

- Quad SFP+ Ports

- Low-Profile Standard Form Factor

- PCI Express 3.0 (8GT/s)

- TCP Offload Engine (TOE)

- VMDq and PC-SIG SR-IOV for Virtualized Environments

- Jumbo Frame Support

- IEEE 802.3az Energy Efficient Ethernet (EEE)

- Low Power Consumption (about 14W)

- iSCSI Remote Boot Support

- PXE Boot Support

- RoHS Compliance 6.6

1-3 Technical Specifications

General

- Broadcom BMC57840S controller

- Compact size low-profile standard form factor

- PCI-E 3.0 x8 (8GT/s) interface

- Quad SFP+ connectors

Ethernet Features

- Energy Efficient Ethernet IEEE 802.az supported

- Traffic Steering for MAC address and VLAN Tag

- Up to 32 queues/port supported for RSS (Receive Side Scaling)

- Congestion Notification 802.1au

- Large Send Offload (LSO) and Large Receive Offload (LRO)

- Link Aggregation 802.3ad

Network Features

- Jumbo Frames up to 9600 Bytes

- Clause 73 Auto-negotiation

- IEEE 801.2q VLAN

- External PHY support

- TCP Offload Engine (TOE) reduces host CPU utilization while preserving the rich and flexible nature of soft OS stack implementation

- iSCSI Acceleration

- IPv6 Acceleration

- Support port aggregation, failover, load balancing

Remote Boot Options

- Preboot eXecution Environment (PXE) support

- iSCSI remote boot

Virtualization Features

- Up to 128 per port for VMDq

- SR-IOV with up to 64 Virtual Functions (VFs) for Guest Operating Systems (GOS) per port

- Supports NetQueue and VMQueue

- Supports Data Center Bridging which provides secure data delivery, lower latency, and standards-based bandwidth sharing of data center physical links

- Supports up to 68 Rx/Tx Descriptor Queues for Virtualization per port

- Supports up to 136 MAC Addresses per port

- Supports EEE 802.1Qau Congestion Notification

Cable Support

- SFP+ direct attached twin axial cables, up to 5 meters

- LC-LC fiber-optic cables (with required optional transceivers)

OS Support

The AOC-STG-b4S add-on card supports the following operating systems (OS):

- Windows® 2008 Server R2 (with HyperV), Server 2012 (with HyperV)

- Linux: RedHat EL 5, 6, and 7

- SuSE SLES 10, 11, and 12

- VMware ESX 5.0 (vSphere 5.0), 5.1 (vSphere 5.1), and 6.0 (vSphere 6.0)

- Solaris 11

Physical Dimensions

- Card PCB dimensions: 13.72cm (5.4in) x 6.90cm (2.73in) (L x H)

- Height of end brackets: Standard 12cm (4.725in), low-profile 7.94cm (3.13in)

Optional Accessories

- AOC-E10GSFPSR: SFP+ transceiver module for short range fiber cables (up to 300m)

- AOC-E10GSFPLR: SFP+ transceiver module for long range fiber cables (up to 3000m)

- AOC-TSR-FS: SFP+ transceiver module for short range fiber cables (up to 300m)

- AOC-GBIC-FSR2: SFP+ transceiver module for short range fiber cables (up to 300m), single speed (10Gb)

- CBL-0347L: 39.37" (100cm) 10GbE SFP+ to SFP+, Twinax copper cable

- CBL-0456L: 78.74" (200cm) 10GbE SFP+ to SFP+, Twinax copper cable

- CBL-0348L: 118.11" (300cm) 10GbE SFP+ to SFP+, Twinax copper cable

- CBL-0349L: 196.85" (500cm) 10GbE SFP+ to SFP+, Twinax copper cable

Operating Conditions

- Operating temperature: 0°C to 55°C (32°F to 131°F)

- Storage temperature: -40°C to 70°C (-40°F to 158°F)

    🖉 **Note**: This product is intended to be used with Supermicro server systems or motherboards as an integrated solution package.

1-4   Compliance/Operating Environment

The AOC-STG-b4S add-on card is compliant with the following environmental regulations:

- RoHS Compliant 6/6, Pb Free

1-5   SMC Platform Support

The following platforms are supported by the AOC-STG-b4S add-on card:

- Supermicro motherboards with minimum PCI-E x8 slot with enough clearance

- Supermicro Server systems with low-profile or full-height PCI-E x8 expansion slot with enough clearance

- Supermicro chassis as specified in the Matrix below:

AOC-STGN-b4S Fitment Matrix			
Chassis	FH Slot	LP Slot	Notes
F627R3-RTB+/72B+			Top** slot is blocked by a rivet, other 3 can be used
F617R2-RT+/R72+*			Top** slot is blocked by a rivet, other 3 can be used
F617R3/2-FT+			Top** slot is blocked by a rivet, other 3 can be used
F627R2-F73			Cannot be installed
F627G2-FT+/F73+		x	
118G(Q)	x		Will work with SFP+ cable in all 4 slots, but rivet keeps transciever from working in top** slot
213-LPB		x	
213-WIO	x	x	
216-LPB		x	
417-LPB		x	
819TQ-WIO	x	x	
825-LPB		x	
825-WIO	x	x	
825M-LPB		x	
826-LPB		x	
827H			Cannot be installed
827HQ			Cannot be installed
847-LPB		x	
847-WIO	x	x	
938H			Cannot be installed

x = can be installed

* = There will be a tooling change for the low-profile slot.

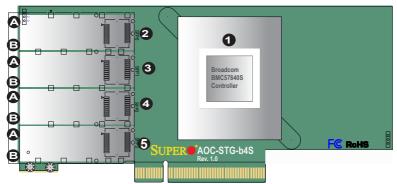** = Top slot is the SFP+ port farthest from the PCI-Express Goldfinger on the PCB.

Notes

Chapter 2

Hardware Components

2-1   Add-On Card Image and Layout

The AOC-STG-b4S Image

The AOC-STG-b4S Layout

2-2   Major Components

The following major components are installed on the AOC-STG-b4S:
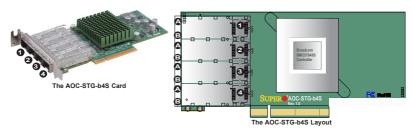
1. Broadcom BMC57840S Controller

2. SFP+ Connector 1

3. SFP+ Connector 2

4. SFP+ Connector 3

5. SFP+ Connector 4

2-3 Connectors: LAN Ports and LAN LED Indicators

LAN Ports

Four network LAN ports (SFP+1-SFP+4) are located on the add-on card. These LAN ports support connection speeds of 10Gbps and 1Gbps. Plug the Direct Attached Copper (DAC) cables into the SFP+ ports for network connections.
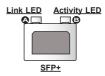
✎ **Note 1**: To make sure that LAN ports function properly, be sure to use the following cables specified by the manufacturer:

● Direct-attached twin-axial copper cables, or

● Short Range or Long Range fiber optic cables used in conjunction with optional optical transceiver.

✎ **Note 2**: For detailed information on the cables and transceivers recommended by the manufacturer, please refer to "Optional Accessories" on Page 1-4 or SMC product information posted online.

The AOC-STG-b4S Card

The AOC-STG-b4S Layout

LAN Port LED Indicators

Four LAN ports (SFP+1-SFP+4) are located on the add-on card. Each LAN port has two LEDs. The LED on the left indicates link speeds, and the other LED on the right indicate the status of activity of the connector. See the table below for more information.

Link LED   Activity LED

SFP+

Link Speed	Link LED (Left Side of the Port)	Activity LED (Right Side of the Port)
10Gb	Green: On	Green: Blinking
1Gb	Orange: On	Orange: Blinking

LAN Ports
1. SFP+ Port 1
2. SFP+ Port 2
3. SFP+ Port 3
4. SFP+ Port 4
LAN LED Indicators
A. Link LED
B. Activity LED

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 your system, make sure that the person handling it is static protected.

> ✎ **Note**: To avoid damaging your components and to ensure proper installation, be sure to always connect the power cord last, and always remove 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 3-1 to avoid damage caused by ESD.

4. Familiarize yourself with the server, motherboard, and/or chassis documenta- tion.

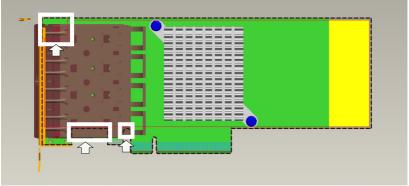5. Confirm that your operating system includes the latest updates and hotfixes.

3-3   Installing the Add-on Card

Follow the steps below to install 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, and gently push down on both sides of the card until it slides into the PCI connector.

4. Secure the add-on card 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.

8. Replace the chassis cover.

Note: This add-on card is designed to support the standard low-profile PCI-Express form factor; however, it may not fit in your chassis due to the physical dimensions of the card. See the drawing below for illustration.
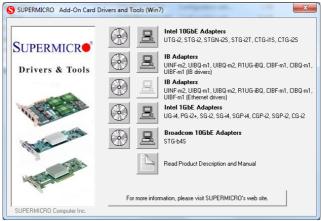

Note: The area enclosed by the dotted line indicates the dimensions of the standard low-profile PCI-Express form factor. The areas that are enclosed in white rectangles might interfere with the components on your motherboard and prevent the card from being integrated into your system.

3-4   Installing the Windows Operating System

Follow the steps below to install the drivers needed for your Windows OS support. The controller comes with a driver on the CD-ROM CDR-NIC.

1. Run the CDR-NIC. (If you do not have a product CD-ROM, download drivers from the Supermicro Support Website and then transfer them to your system.)

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.

4. Follow the prompts to complete the installation.

3-5   Installing Other Operating Systems

For detailed instructions on how to install the driver to an operating system other than the Windows OS, please refer to the Driver CD that came with this add-on card or refer to the Broadcom\Manuals section posted in Supermicro's ftp site.

(Disclaimer Continued)

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