



AOC-MH25G-b2S2G AOC-MH25G-b2S2GM



USER'S MANUAL

Revision 1.0a

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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-MH25G-b2S2G and AOC-MH25G-b2S2GM add-on cards.

About This Add-On Card

The Supermicro® AOC-MH25G-b2S2G and AOC-MH25G-b2S2GM, which is supported by Broadcom's BMC57414, offers one of the most advanced networking controllers in the market. Featuring dual-port 25GbE SFP connectivity in the SIOM (Super I/O Module) form factor with networking capabilities including XLAN, NVGRE, and NIC partitioning, this add-on card offers unparalleled performance, functionality, and density. It supports an additional two GbE LAN ports, which are based on Intel® i350, and provides NC-SI side-band connections for IPMI remote management. The AOC-MH25G-b2S2G and AOC-MH25G-b2S2GM is the most versatile 25GbE controller in the market. It is an excellent choice to enhance network connectivity in data centers and enterprise 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

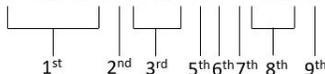
For your system to work properly, please follow the links below to download all necessary drivers/utilities and the user's manual for your server.

- Supermicro product manuals: <http://www.supermicro.com/support/manuals/>
- Product drivers and utilities: <ftp://ftp.supermicro.com>
- 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.

Naming Convention

AOC-ATG-i2T2SM



| 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 | 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+ |
| 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 Introduction

| | |
|---------------------------|----|
| 1.1 Overview..... | 9 |
| 1.2 Key Features..... | 9 |
| 1.3 Specifications..... | 10 |
| 1.4 Available SKUs..... | 14 |
| 1.5 Similar Products..... | 15 |

Chapter 2 Hardware Components

| | |
|--|----|
| 2.1 Add-On Card Image and Layout..... | 16 |
| 2.2 Major Components..... | 18 |
| 2.3 SFP28 Ethernet Connections..... | 19 |
| 2.4 RJ45 LAN Ports and LAN LED Indicators..... | 20 |
| 2.5 DIP Switch..... | 22 |

Chapter 3 Installation

| | |
|---|----|
| 3.1 Static-Sensitive Devices..... | 23 |
| 3.2 Before Installation..... | 24 |
| 3.3 Installing the Add-on Card..... | 25 |
| 3.4 Installing the Add-on Card without Swappable Bracket..... | 26 |
| 3.5 Installing the Add-on Card with Swappable Bracket..... | 27 |
| 3.6 Installing Drivers on Windows (for Intel® i350-AM2)..... | 28 |
| 3.7 Installing Drivers (for Intel® i350-AM2)..... | 29 |
| 3.8 Installing Drivers on FreeBSD (for Intel® i350-AM2)..... | 30 |
| 3.9 Installing Drivers (for Broadcom®BCM57414)..... | 33 |

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 <http://www.supermicro.com/products/nfo/networking.cfm#adapter>.

1.2 Key Features

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

- Super I/O Module (SIOM) Form Factor
- Broadcom® BCM57414 25GbE controller, dual SFP28 connectors
- Intel® i350-AM2 GbE controller, dual RJ45 connectors
- Network Virtualization: VXLAN and NVGRE (25GbE controller only)
- NIC Partitioning (NPAR) (25GbE controller only)
- Broadcom TruFlow (25GbE controller only)
- PCI-SIG SR-IOV
- IEEE1588 Time Sync
- Jumbo Frames support
- NC-SI for IPMI Remote Management (GbE controller only)
- Asset Management Features
- RoHS compliant 6/6 

1.3 Specifications

General

- Super I/O Module (SIOM) Form Factor
- Broadcom® BCM57414 25GbE controller – dual SFP28 connectors with speed up to 25Gbps per port
- Intel® i350-AM2 1GbE GbE controller – dual RJ45 connectors with speed up to 1Gbps per port

Cables Support

- 25GbE SFP28: Direct attach copper cables and Fiber-optic cables (with required optional transceivers)
- GbE RJ45: RJ45 Category-5/5e up to 100m

Power Consumption

- Maximum 9W

Operating Condition

- Operating temperature: 0°C to 55°C (32°F to 131°F)
- 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: 92mm (3.62in) x 87.1mm (3.43in) (WxD)

Supported Platforms

- Supermicro® motherboards with Super I/O Module slot
- Supermicro® server systems with Super I/O Module slot (see SIOM Compatibility Matrix on-line at http://www.supermicro.com/support/resources/AOC/AOC_Compatibility_SIOM.cfm)



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

25GbE SFP28 Specifications

Networking Features

- Jumbo frames
- 802.3x flow control
- Link Aggregation (802.3ad)
- Virtual LANs- 802.1q VLAN tagging
- Configurable flow acceleration
- IEEE 1588 and Time Sync
- vSAN/RDMA

Stateless Offload Features

- TCP, UDP, IPv4, IPv6 checksum offload
- Large send offload
- Receive segment coalescing
- TCP segmentation offload
- Large receive offload
- 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 Multiqueue
- Support for 128 Virtual functions
- VXLAN, NVGRE, and Geneve
- Edge Virtual Bridging (EVB)

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)
- 8 traffic classes per port; fully DCB compliant per 802.1Qbb

Power Savings

- ACPI compliant power management
- PCI Express Active State Power Management (ASPM)
- Ultra low-power mode
- Pass-through Energy Efficient Ethernet (IEEE802.3az-2010)

GbE Specifications

Ethernet Features

- IEEE 802.3 auto-negotiation for speed, duplex, and flow control
- IEEE 802.3x and 802.3z compliant flow control support
- Automatic cross-over detection function (MDI/MDI-X)
- 1Gb/s Ethernet IEEE 802.3, 802.3u, 802.3ab PHY specifications compliant
- IEEE 1588 protocol and 802.1AS implementation

Power Management and Efficiency

- Energy Efficient Ethernet (EEE)
- DMA Coalescing reduces platform power consumption
- Active State Power Management (ASPM) support
- LAN disable function
- MAC Power Management controls
- Low Power Link Up – Link Speed Control

Virtualization Features

- PC-SIG SR-IOV support
- VM to VM packet forwarding (Packet Loopback)

- Flexible port partitioning
- IEEE 802.1q VLAN support
- IEEE 802.1q advanced packet filtering
- Jumbo frames support

Performance Features

- TCP/UDP, IPv4 and IPv6 checksum offloads to improve CPU usage
- Low Latency Interrupts
- Tx TCP segmentation offload (IPv4, IPv6) increases throughput and lowers processor usage
- Receive Side Scaling (RSS) for Windows environment, scalable I/O for intelligent interrupt generation

Management Features

- Preboot eXecution Environment (PXE) support
- iSCSI remote boot support
- NC-SI for remote management

1.4 Available SKUs

| SKUs | Bracket Included | Description |
|-------------------------|------------------|---|
| AOC-MH25G-b2S2G | AOC-MH25G-b2S2G | 2-port 25 Gigabit & 2-port Gigabit Ethernet Adapter |
| | BKT-0112L | Swappable bracket for 2U+ chassis |
| AOC-MH25G-b2S2GM | AOC-MH25G-b2S2GM | 2-port 25 Gigabit & 2-port Gigabit Ethernet Adapter |
| | BKT-0113L | Internal bracket |

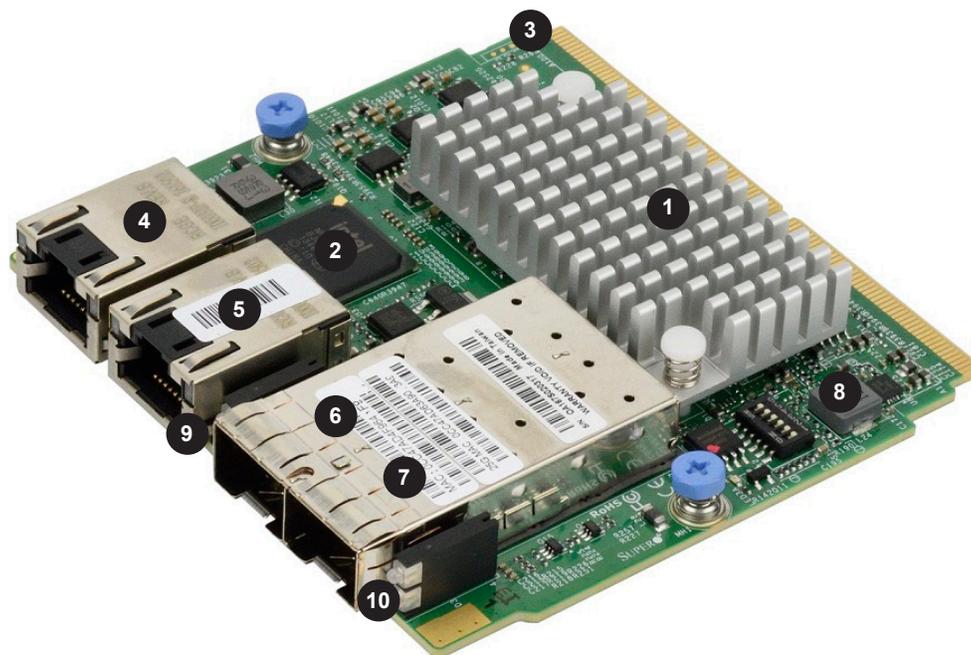
1.5 Similar Products

| Product Part Number | Form Factor | Protocols | Connector Type | Total Ports | Controller |
|------------------------|-------------|-----------------------|----------------|-------------|---|
| AOC-MGP-i2 | SIOM | 1GbE | RJ45 | 2 | Intel® i350 |
| AOC-MGP-i4 | SIOM | 1GbE | RJ45 | 4 | Intel® i350 |
| AOC-MTGN-i2S | SIOM | 10GbE | SFP+ | 2 | Intel® 82599 |
| AOC-MTG-i4S | SIOM | 10GbE | SFP+ | 4 | Intel® XL710 |
| AOC-MTG-i2T | SIOM | 10GbE | RJ45 | 2 | Intel® X550 |
| AOC-MTG-i4T | SIOM | 10GbE | RJ45 | 4 | Intel® X550 |
| AOC-MH25G-m2S2T | SIOM | 25GbE 10GbE | SFP28 RJ45 | 2 2 | Mellanox® ConnectX-4 Lx EN Intel® X550 |
| AOC-MHIBF-m2Q2G | SIOM | InfiniBand FDR GbE | QSFP+ RJ45 | 2 2 | Mellanox® ConnectX-3 Pro Intel® i350 |
| AOC-MHIBF-m1Q2G | SIOM | InfiniBand FDR GbE | QSFP+ RJ45 | 1 2 | Mellanox® ConnectX-3 Pro Intel® i350 |
| AOC-MHFI-i1C | SIOM | Omni-Path | QSFP28 | 1 | Intel® OPA HFI |

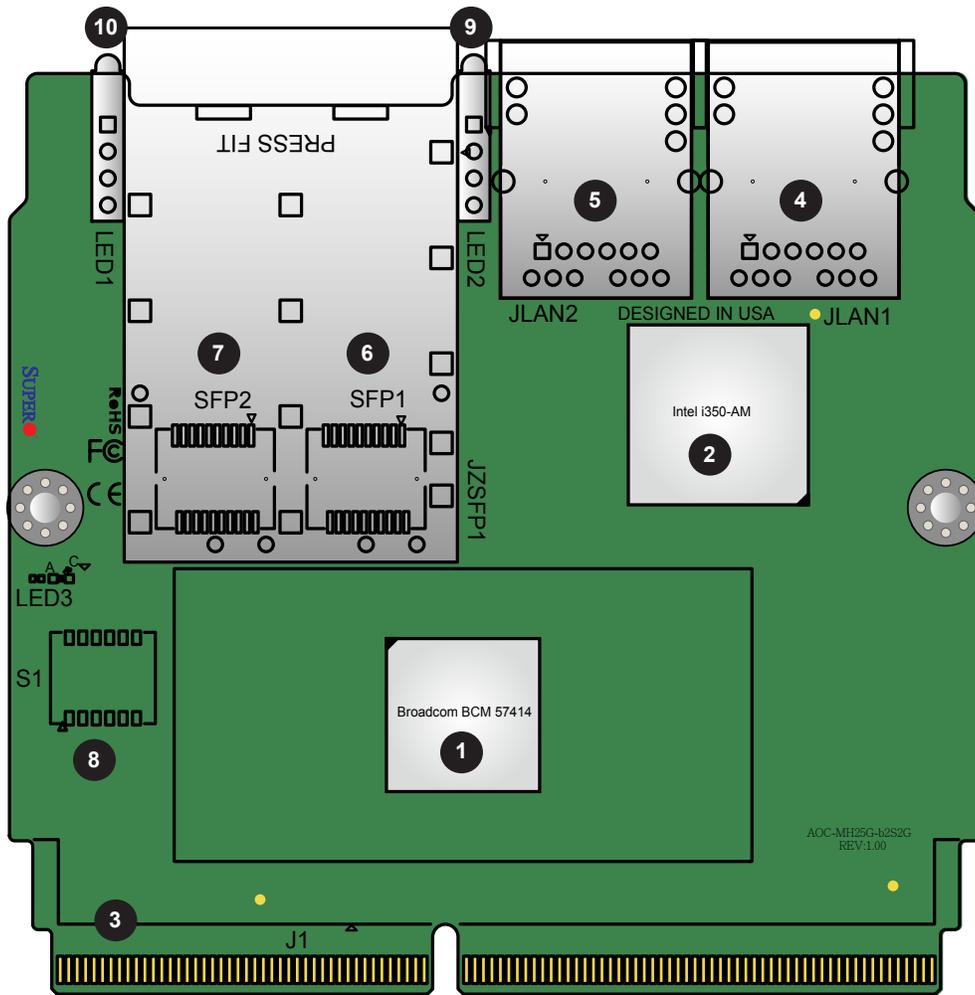
Chapter 2

Hardware Components

2.1 Add-On Card Image and Layout



AOC-MH25G-b2S2G View



AOC-MH25G-b2S2G Layout

2.2 Major Components

The following major components are installed on AOC-MH25G-b2S2G and AOC-MH25G-b2S2GM:

| AOC-MH25G-b2S2G/-b2S2GM Major Components | | |
|---|-------------------------------|------------------------|
| No | Component Name | Definition |
| 1 | Broadcom® BCM57414 Controller | SFP28 LAN controller |
| 2 | Intel® i350-AM Controller | RJ45 LAN controller |
| 3 | J1 | PCI-E Gen2 x4/Gen3 x8 |
| 4 | LAN1 | RJ45 Port 1 |
| 5 | LAN2 | RJ45 Port 2 |
| 6 | LAN3 | SFP28 Port 1 |
| 7 | LAN4 | SFP28 Port 2 |
| 8 | S1 | DIP Switch |
| 9 | 25G_LED1 | LAN3 Link/Activity LED |
| 10 | 25G_LED2 | LAN4 Link/Activity LED |

2.3 SFP28 Ethernet Connections

SFP28 (LAN3/LAN4) Connectors

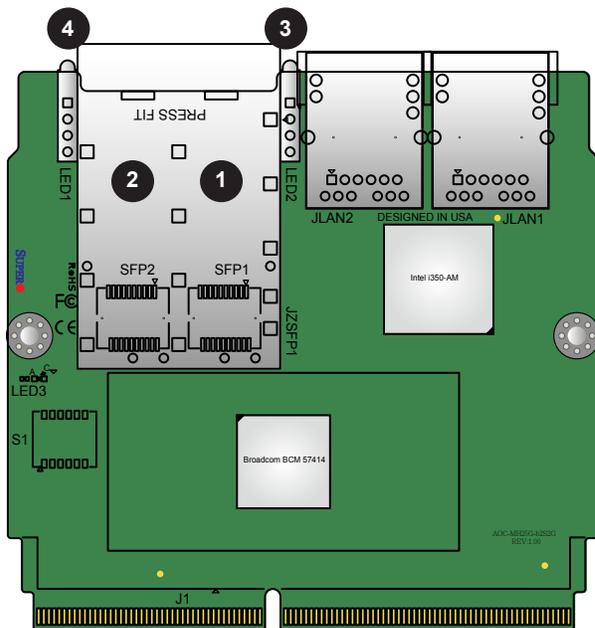
Two small form-factor pluggable (SFP28) optical transceiver connectors (LAN3/LAN4) are located on the add-on card. These SFP28 ports provide Ethernet up to 25GbE network connections. See the layout below for the locations.

SFP28 (LAN3/LAN4) Link/Activity LED Indicators

Two LAN Link/Activity LED indicators are located at 25G_LED1 and 25G_LED2 on the add-on card. 25G_LED1 is used for the SFP28 LAN3 connector, and 25G_LED2, for SFP28 LAN4 connector. See the table below for the LED states

| LAN Port Activity LED Indicators Assignment/State | |
|---|-----------------------|
| LED | LAN Port Assigned |
| 25G_LED1 | LAN3 Active |
| 25G_LED2 | LAN4 Active |
| Green | SFP28 LAN Port Active |

| LAN Port Link LEDs LED State | |
|------------------------------|------------|
| LED | Definition |
| Amber | 10 Gbps |
| Green | 25Gbps |



1. SFP28 Port 1
2. SFP28 Port 2
3. LAN3 Link/Activity LED Indicators
4. LAN4 Link/Activity LED Indicators

2.4 RJ45 LAN Ports and LAN LED Indicators

RJ45 LAN Ports (LAN1/LAN2)

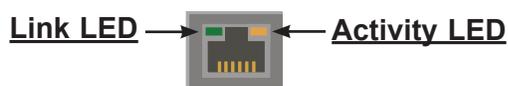
There are two RJ45 LAN ports (LAN1/LAN2) on the AOC-MH25G-b2S2G. These LAN ports support connection speeds of 1Gbps. Use a direct-attach RJ45 type LAN cable. See the layout below for the location.



Note: Please refer to page 1-2 for recommended cables.

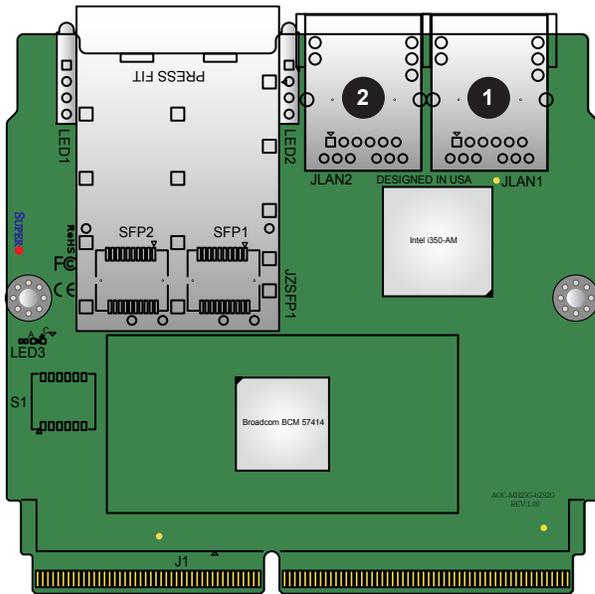
RJ45 LAN Ports LED Indicators

Each LAN port has two LEDs to indicate speed and data activity. Refer to the table below for LED color and definition.



| RJ45 LAN Port Link LED (Left) LED State | |
|--|------------|
| LED Color | Definition |
| Amber | 1 Gbps |
| Green | 100 Mbps |

| RJ45 LAN Port Activity LED (Right) LED State | | |
|---|----------|---------------|
| LED Color | Status | Definition |
| Off/None | Off | No Connection |
| Green | Solid | Link |
| Green | Flashing | Active |



1. RJ45 LAN Port 1
2. RJ45 LAN Port 2

2.5 DIP Switch

The DIP switch at S1 provides SMBUS address selection. You can configure the card with a static SMBUS address. Refer to the tables below for address selections. See the layout below for the location.

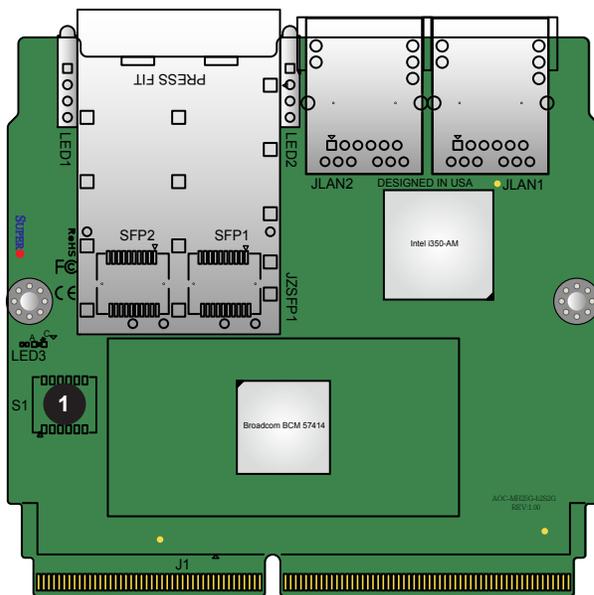


S1:DIP switch for user selection

| Switch Position | OFF (default) | ON |
|-----------------|--------------------------------|---------------------------|
| 1 | SMBUS ARP mode | Static SMBUS address mode |
| 2-5 | Static SMBUS address selection | |
| 6 | Thermal Reading Enable | Thermal Reading Disable |

Static SMBUS address selection table by DIP switch S1

| SMBUS Address | S1 position #5 | S1 position #4 | S1 position #3 | S1 position #2 |
|---------------|----------------|----------------|----------------|----------------|
| 30/D0 | OFF/ON | OFF | OFF | OFF |
| 32/D2 | OFF/ON | OFF | OFF | ON |
| 34/D4 | OFF/ON | OFF | ON | OFF |
| 36/D6 | OFF/ON | OFF | ON | ON |
| 38/D8 | OFF/ON | ON | OFF | OFF |
| 3A/DA | OFF/ON | ON | OFF | ON |
| 3C/DC | OFF/ON | ON | ON | OFF |
| 3E/DE | OFF/ON | ON | ON | ON |



1. DIP Switch

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

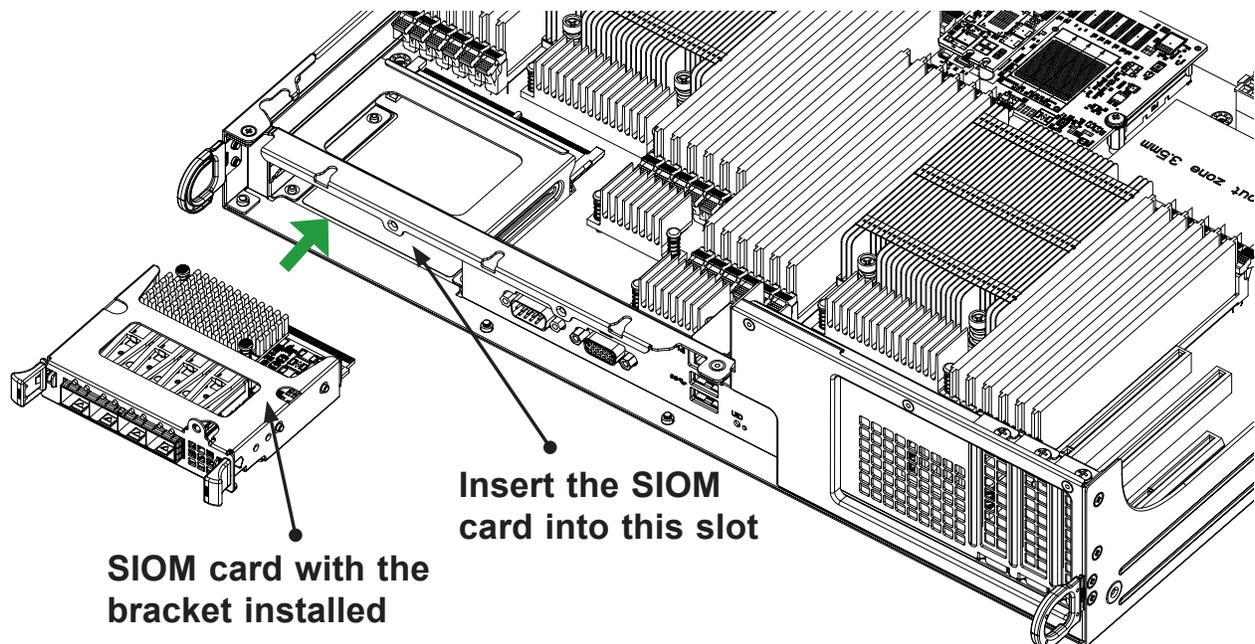
To install the add-on card properly, be sure to follow the instructions below.

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 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 hot fixes.

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 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).

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 front of the SIOM slot and gently push in both sides of the card until it slides into the slot.

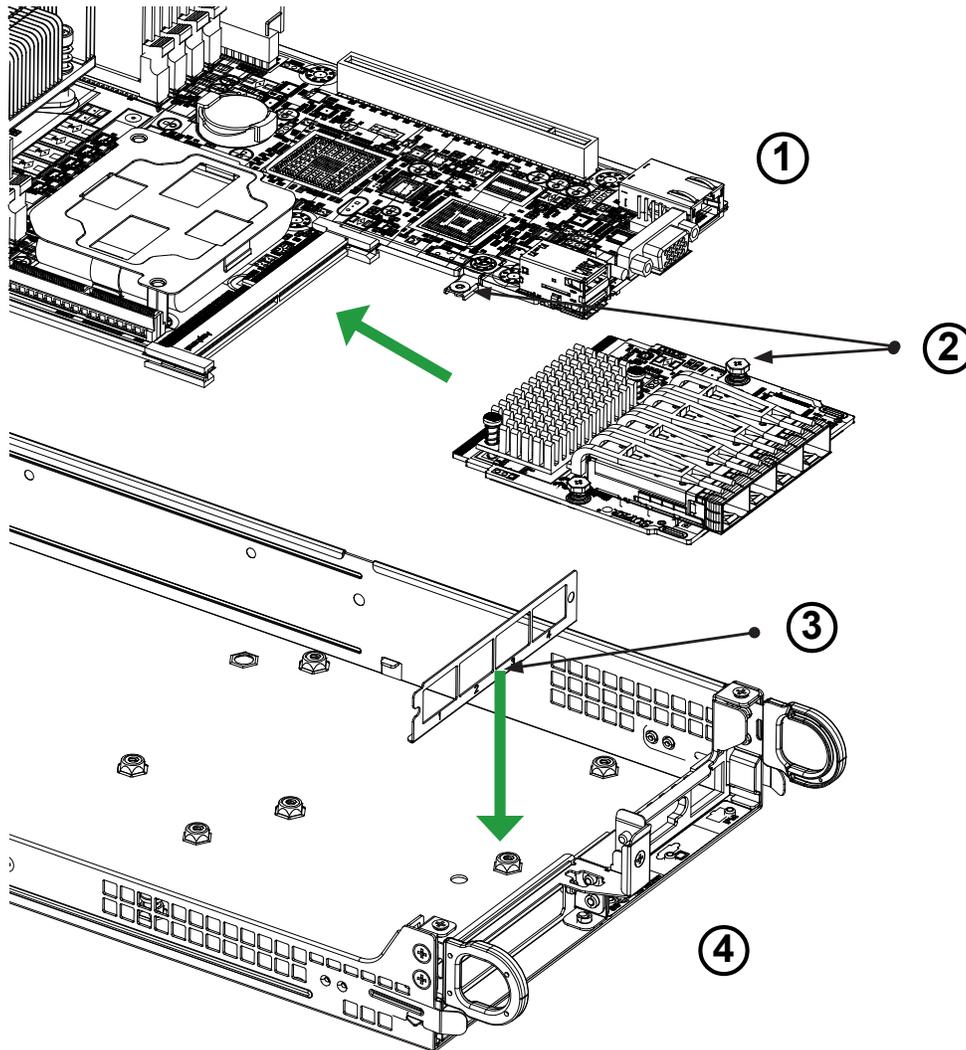


 **Note:** This add-on card does not support hot plug. Please turn off the AC power and remove the power cord from the wall socket before you install or remove the add-on card.

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.

3.4 Installing the Add-on Card without Swappable Bracket

Follow this step to install the add-on card if your system does not support a swappable bracket. Insert the SIOM card in the motherboard and then install the motherboard in the chassis. An internal bracket comes with the SIOM card 1U in the chassis SKU. It needs to be installed onto the chassis.



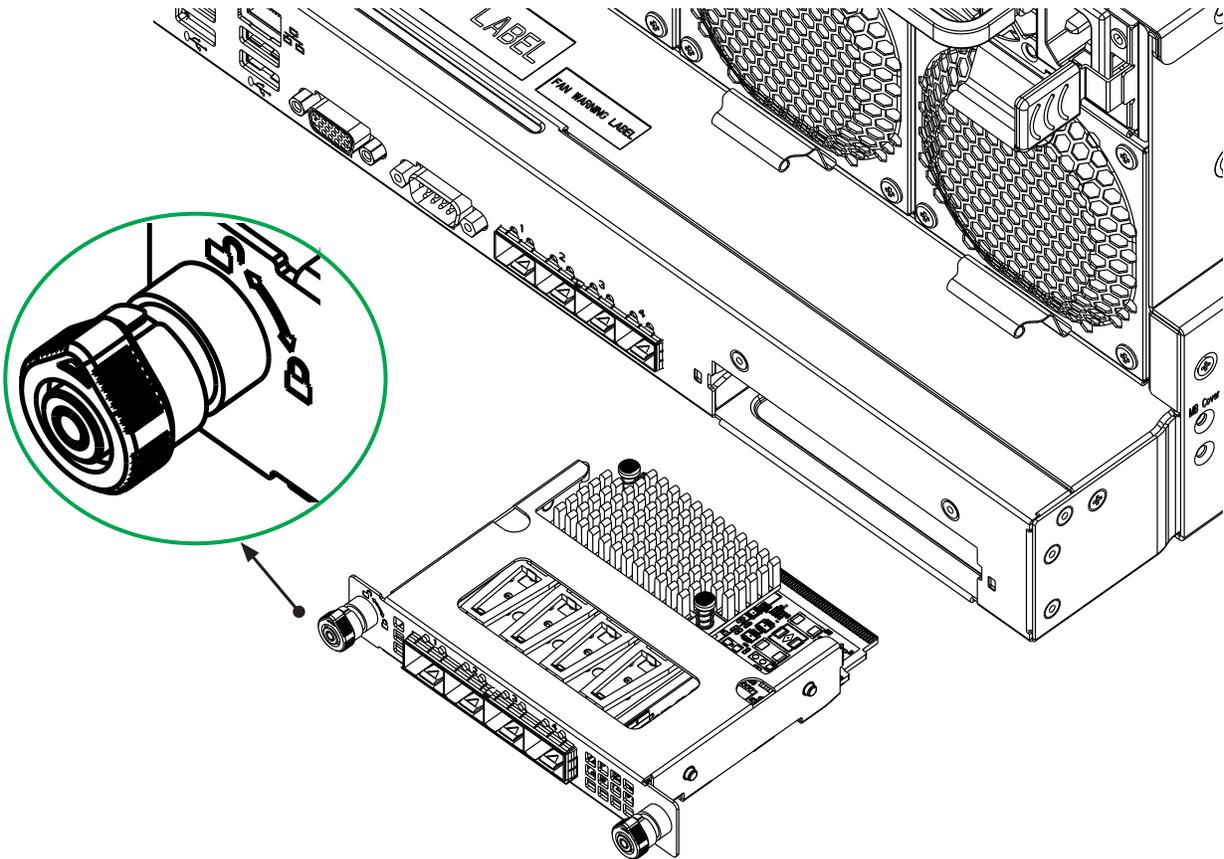
1. Install the SIOM card into the motherboard.
2. Tighten the screw.
3. Install the bracket onto the chassis
4. Install the motherboard in the chassis



Note: Supermicro recommends that this SIOM card be installed by a system integrator or by the manufacturer.

3.5 Installing the Add-on Card with Swappable Bracket

Follow the steps below to install the add-on card into your system that supports a swappable bracket. The add-on card must be installed in the swappable bracket before it can be installed in the system.

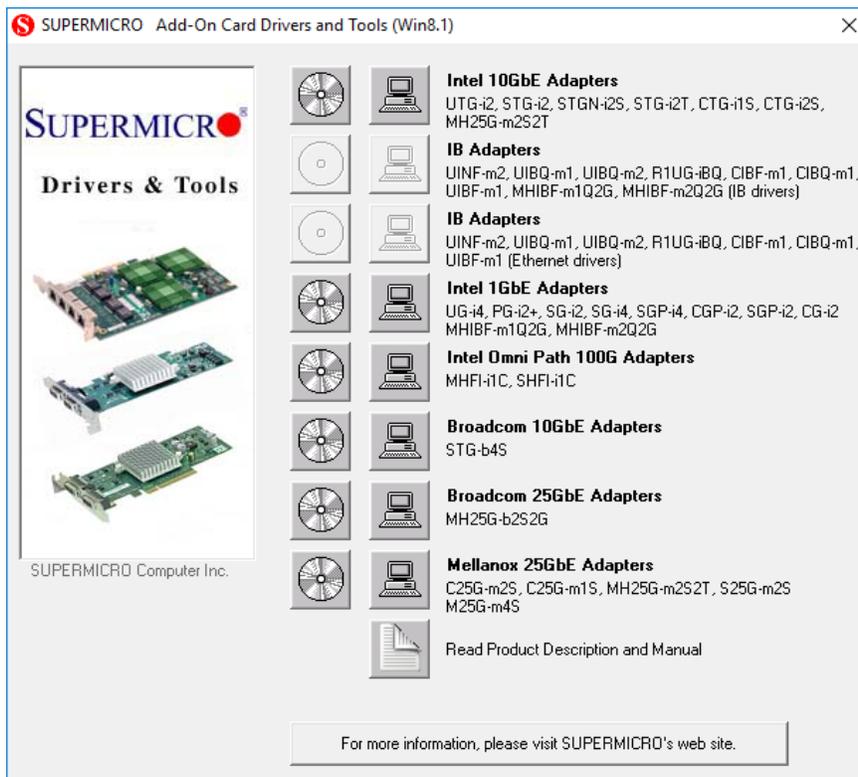


1. Install the add-on card into the swappable bracket.
2. Position the add-on card in front of the SIOM slot and gently push in both sides of the card until it slides into the slot.
3. Once the card is in the slot, push both knobs in and turn to the right to lock the card in the system. The left knob has the unlock/lock symbols next to it. To ensure that the add-on is locked, make sure that the knob position indicator is pointing to the lock symbol.

3.6 Installing Drivers on Windows (for Intel® i350-AM2)

Follow the steps below to install the drivers for Windows. Download the drivers from Intel Download Center or the Supermicro site at https://www.supermicro.com/wftp/Networking_Drivers.

1. Run 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.

3.7 Installing Drivers (for Intel® i350-AM2)

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

Build a Binary RPM Package

Use the following procedures to install drivers on the Linux operating system. Download the drivers from ftp://ftp.supermicro/Networking_Drivers/.

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.

1. Move the base driver tar file to the directory of your choice. For example:

```
/home/username/ixgbe
```

or

```
/usr/local/src/ixgbe
```

2. Untar/unzip archive, where <x.x.x> is the version number for the driver tar file:

```
tar xzf ixgbe-x.x.x.tar.gz
```

3. Change to the driver src directory, where <x.x.x> is the version number for the driver tar:

```
cd ixgbe-x.x.x/src/
```

4. 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=-DIXGBE_NO_LRO` to the make file when it's being compiled.

```
make CFLAGS_EXTRA="-DIXGBE_NO_LRO" install
```

5. 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
```

6. Assign an IP address to the interface by entering the following, where x is the interface number:

```
ifconfig ethx <IP_address> netmask <netmask>
```

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>
```

3.8 Installing Drivers on FreeBSD (for Intel® i350-AM2)

Follow the instructions below to install the drivers for FreeBSD kernel 4.8 or later. In the instructions below, x.x.x is the driver version as indicated in the name of the drive tar file.



Note: You must have kernel sources installed in the right order to compile the driver module.

1. Move the base driver tar file to the directory of your choice. For example, use `/home/username/ixgb` or `/usr/local/src/ixgb`.

2. Untar/unzip the archive:

```
tar xfz ixgb-x.x.x directory
```

3. To install man page:

```
cd ixgb-x.x.x
```

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

4. To load the driver onto a running system, perform the following steps:

```
cd ixgb-x.x.x
```

```
make
```

or

```
cd ixgb-x.x.x/src
```

```
make load
```

5. To assign an IP address to the interface, enter the following:

```
ifconfig ixgb<interface_num> <IP_address>
```

6. 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>
```

7. If you want the driver to load automatically when the system is booted:

```
cd ixgb-x.x.x/src
```

```
make load
```

```
cp if_ixgb.ko /modules
```

Edit `/boot/loader.conf`, and add the following line:

```
if_ixgb_load="YES"
```

or

compile the driver into the kernel (see item 8). Edit `/etc/rc.conf`, and create the appropriate `ifconfig_ixgb<interface_num>` entry:

```
ifconfig_ixgb<interface_num>="<ifconfig_settings>"
```

Example usage:

```
ifconfig_ixgb0="inet 192.168.10.1 netmask 255.255.255.0"
```

8. If you want to compile the driver into the kernel, enter:

```
cd ixgb-x.x.x/src
mkdir /usr/src/sys/dev/ixgb
cp if_ixgb* /usr/src/sys/dev/ixgb
cp ixgb* /usr/src/sys/dev/ixgb
cp Makefile.kernel /usr/src/sys/modules/ixgb/Makefile
```

Edit the `/usr/src/sys/conf/files.i386` file, and add the following line:

```
dev/ixgb/ixgb_hw.c optional ixgb
dev/ixgb/ixgb_ee.c optional ixgb
dev/ixgb/if_ixgb.c optional ixgb
```

Remove the following lines from the `/usr/src/sys/conf/files.i386` file, if they exist:

```
/dev/ixgb/if_ixgb_fx_hw.c optional ixgb
/dev/ixgb/if_ixgb_phy.c optional ixgb
```

Edit the kernel configuration file (i.e., `GENERIC` or `MYKERNEL`) in `/usr/src/sys/i386/conf`, and ensure the following line is present:

```
device ixgb
```

Compile and install the kernel. Reboot the system for the kernel updates to take effect.

3.9 Installing Drivers (for Broadcom®BCM57414)

Use the following procedures to install drivers on the Linux operating system. Download the drivers from https://www.supermicro.com/wftp/Networking_Drivers.

Installing 25G Drivers for the Linux Operating System

1. Prerequisites: Install the following:

```
yum -y install libibverbs* infiniband-diags perftest qperf li-  
brdmacm-utils
```

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

2. From the CDR-NIC LAN driver CD or the Supermicro site, go to the following directory:
Broadcom > 25G > Linux_Driver.
3. Download the Linux driver package file netxtreme-bnxt_en-<ver>.tar.gz
4. Install the driver by entering the following commands:

```
tar xzvf nextreme-bnxt_en-<ver>.tar.gz
```

```
cd nextreme-bnxt_en-<ver>
```

```
make build
```

```
make install
```

Windows Drivers

Use the following procedures to install drivers on the Windows operating system.

Installing 25G Drivers for the Windows Operating System

1. From the CDR-NIC LAN driver CD or the Supermicro site at https://www.supermicro.com/wftp/Networking_Drivers/, go to the following directory: Broadcom > 25G > Windows.
2. Choose the desired Windows driver package folder.
3. Drivers are in .inf format. You can install the driver from Device Manager.

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