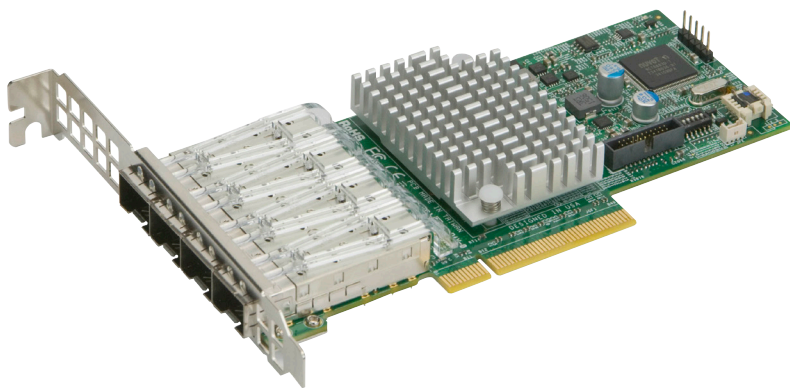




# AOC-STG-i4S



## User's Guide

Revision 1.0b

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User's Guide Revision 1.0b

Release Date: November 18, 2019

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## 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-i4S add-on card.

### About this Add-on Card

The STG-i4S is an advanced, market-leading 10GbE SFP+ controller. The four LAN ports on the card provide a connection speed of 10 Gbps. The card features the Intel® XL170-AM1 controller and is supported on the Windows and Linux operating systems. It expands virtualization beyond the server level to the network level, and combines with hardware optimizations and offloads. It provides unmatched features for virtualization, flexibility for LAN and SAN networks, and reliable performance. This is the best choice for rapid provisioning of networks in an agile data center.

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

### 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 for Standard Network Adaptors

AOC-MHIBF-m2Q2G

1<sup>st</sup>
2<sup>nd</sup>
3<sup>rd</sup>
5<sup>th</sup>
6<sup>th</sup>
7<sup>th</sup>
8<sup>th</sup>

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
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), IBF: FDR IB (56Gb/s), IBQ: QDR IB (40Gb/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
7th	Connector Type (Optional)	S: SFP+/SFP28, T: 10GBase-T, Q: QSFP+, C: QSFP28
8th	2 <sup>nd</sup> Controller/Connector Type (Optional)	G: 1x GbE RJ45, 2G: GbE 2x RJ45, S: 1x 10G SFP+, T: 10GBase-T, 2T: 2x 10GBase-T

## Networking Adapter List

Model	Type	Form Factor	Controller	Connection	Dimension (w/o Brackets) (L x H)	Power (W)
AOC-MGP-i2	GbE	SIOM	Intel® i350 AM2	2 RJ45 (10Gb/port)	3.622" (92mm) x 3.428" (87.08mm)	3.7
AOC-MGP-i4	GbE	SIOM	Intel® i350 AM4	4 RJ45 (10Gb/port)	3.622" (92mm) x 3.428" (87.08mm)	4.4
AOC-MTGN-i2S	10GbE	SIOM	Intel® 82599E5	2 SFP+ (10Gb/port)	3.622" (92mm) x 3.428" (87.08mm)	7.2
AOC-MTG-i4S	10GbE	SIOM	Intel® XL710-BM1	4 SFP+ (10Gb/port)	3.622" (92mm) x 3.428" (87.08mm)	7
AOC-MTG-b2T	10GbE	SIOM	Broadcom® BCM57416	2 RJ45 (10GBase-T)	3.622" (92mm) x 3.428" (87.08mm)	11
AOC-MTG-i2T	10GbE	SIOM	Intel® X550-A12	2 RJ45 (10GBase-T)	3.622" (92mm) x 3.428" (87.08mm)	13
AOC-MTG-i4T	10GbE	SIOM	2x Intel® X550-A12	4 RJ45 (10GBase-T)	3.622" (92mm) x 3.428" (87.08mm)	26
AOC-MHIBF-m1Q2G	FDR IB GbE	SIOM	Mellanox® ConnectX-3 Pro Intel® i350	1 QSFP (96Gb/port) 1 RJ45 (10Gb/port)	3.622" (92mm) x 3.428" (87.08mm)	9
AOC-MHIBF-m2Q2G	FDR IB GbE	SIOM	Mellanox® ConnectX-3 Pro Intel® i350	2 QSFP (96Gb/port) 2 RJ45 (10Gb/port)	3.622" (92mm) x 3.428" (87.08mm)	11
AOC-MHIBE-m1CG	EDR IB GbE	SIOM	Mellanox® ConnectX-4 VPI Intel® i210	1 QSFP28 (100Gb/port) 1 RJ45 (10Gb/port)	3.622" (92mm) x 3.428" (87.08mm)	19
AOC-MH2SG-b2S2G	25GbE	SIOM	Broadcom® BCM57414 Intel® i350	2 SFP28 (25Gb/port) 2 RJ45 (10Gb/port)	3.622" (92mm) x 3.428" (87.08mm)	9
AOC-MH2SG-m2S2T	25GbE	SIOM	Mellanox® ConnectX-4 Lx EN Intel® X550-A12	2 SFP28 (25Gb/port) 2 RJ45 (10GBase-T)	3.622" (92mm) x 3.428" (87.08mm)	26
AOC-M2SG-m4S	25GbE	SIOM	Mellanox® ConnectX-4 Lx EN	4 SFP28 (25Gb/port)	3.622" (92mm) x 3.428" (87.08mm)	20
AOC-M2SG-i2S	25GbE	SIOM	Intel® XXV710	2 SFP28 (25Gb/port)	3.622" (92mm) x 3.428" (87.08mm)	11.8
AOC-MHFI-1C	Omni-Path	SIOM	Intel® OP HFI ASIC (Wolf River WFR-B)	1 QSFP28 (100Gb/port)	3.622" (92mm) x 3.428" (87.08mm)	15

Model	Type	Form Factor	Interface	Controller	Connection	Dimension (w/o Brackets) (L x H)	Power (W)
AOC-SGP-I2	GbE	Standard LP	PCI-E x4	Intel® i350 AM2	2 RJ45 (1Gb/port)	3.9" (99mm) x 2.73" (69mm)	3.5
AOC-SGP-I4	GbE	Standard LP	PCI-E x4	Intel® i350 AM4	4 RJ45 (1Gb/port)	3.9" (99mm) x 2.73" (69mm)	5
AOC-STG-I2T	10GbE	Standard LP	PCI-E x8	Intel® X540-A2T	2 RJ45 (10GBase-T)	5.9" (150mm) x 2.73" (69mm)	13
AOC-STG5-I1T	10GbE	Standard LP	PCI-E x4	Intel® X550-AT	1 RJ45 (10GBase-T)	5.9" (150mm) x 2.73" (69mm)	9
AOC-STG5-I2T	10GbE	Standard LP	PCI-E x4	Intel® X550-A2T	2 RJ45 (10GBase-T)	5.9" (150mm) x 2.73" (69mm)	11
AOC-STG-b2T	10GbE	Standard LP	PCI-E x8	Broadcom® BCM57416	2 RJ45 (10GBase-T)	5.6" (142mm) x 2.73" (69mm)	13.1
AOC-STG-I4T	10GbE	Standard LP	PCI-E x8	Intel® XL710-BM1	4 RJ45 (10GBase-T)	5.9" (149mm) x 2.73" (69mm)	15.5
AOC-STGN-I1S	10GbE	Standard LP	PCI-E x8	Intel® 82599EN	1 SFP+ (10Gb/port)	4.0" (102mm) x 2.73" (69mm)	10
AOC-STGN-I2S	10GbE	Standard LP	PCI-E x8	Intel® 82599ES	2 SFP+ (10Gb/port)	4.0" (102mm) x 2.73" (69mm)	11.2
AOC-STGF-I2S	10GbE	Standard LP	PCI-E x8	Intel® X710-BM2	2 SFP+ (10Gb/port)	5.19" (132mm) x 2.73" (69mm)	5.6
AOC-STG-b4S	10GbE	Standard LP	PCI-E x8	Broadcom® BCM57840S	4 SFP+ (10Gb/port)	5.4" (137mm) x 2.73" (69mm)	14
AOC-STG-I4S	10GbE	Standard LP	PCI-E x8	Intel® XL710-BM1	4 SFP+ (10Gb/port)	5.9" (150mm) x 2.73" (69mm)	8
AOC-S25G-m2S	25GbE	Standard LP	PCI-E x8	Mellanox® CX-4 LX	2 SFP28 (25Gb/port)	5.6" (142mm) x 2.713" (69mm)	8.7
AOC-S25G-b2S	25GbE	Standard LP	PCI-E x8	Broadcom® BCM57414	2 SFP28 (25Gb/port)	5.6" (142mm) x 2.713" (69mm)	5.2
AOC-S25G-I2S	25GbE	Standard LP	PCI-E x8	Intel® XXV710	2 SFP28 (25Gb/port)	6.1" (155mm) x 2.713" (69mm)	7.2
AOC-S40G-I1Q	40GbE	Standard LP	PCI-E x8	Intel® XL710-BM1	1 QSFP+ (40Gb/port)	5.9" (150mm) x 2.73" (69mm)	6.5
AOC-S40G-I2Q	40GbE	Standard LP	PCI-E x8	Intel® XL710-BM2	2 QSFP+ (40Gb/port)	5.9" (150mm) x 2.73" (69mm)	7
AOC-S100G-m2C	100GbE	Standard LP	PCI-E x16	Mellanox® CX-4 EN	2 QSFP28 (100Gb/port)	6.6" (168mm) x 2.73" (69mm)	16.3
AOC-S100G-b1C	100GbE	Standard LP	PCI-E x16	Broadcom® BCM57454	2 QSFP28 (100Gb/port)	6.6" (168mm) x 2.73" (69mm)	17.8
AOC-CGP-I2	GbE	MicroLP	PCI-E x4	Intel® i350 AM2	2 RJ45 (1Gb/port)	4.45" (113mm) x 1.54" (39mm)	4
AOC-CTG-I1S	10GbE	MicroLP	PCI-E x8	Intel® 82599EN	1 SFP+ (10Gb/port)	4.85" (123mm) x 1.54" (39mm)	10
AOC-CTG-I2S	10GbE	MicroLP	PCI-E x8	Intel® 82599ES	2 SFP+ (10Gb/port)	4.85" (123mm) x 1.54" (39mm)	11
AOC-CTG-I2T	10GbE	MicroLP	PCI-E x8	Intel® X540-A2T	2 RJ45 (10GBase-T)	4.8" (123mm) x 2.76" (77mm)	13
AOC-CTG5-I2T	10GbE	MicroLP	PCI-E x4	Intel® X550-A2T	2 RJ45 (10GBase-T)	4.45" (113mm) x 1.54" (39mm)	12
AOC-C25G-m1S	25GbE	MicroLP	PCI-E x8	Mellanox® CX-4 Lx EN	1 SFP28 (25Gb/port)	4.45" (113mm) x 1.54" (39mm)	8.5

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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/info/networking.cfm#adapter>.

### 1-2 Product Highlights

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

- Quad SFP+ Ports
- Standard Low-Profile Form Factor
- PCI Express 3.0 (8GT/s)
- Network Virtualization Offloads including VXLAN and NVGRE
- Small Packet Performance
- Data Plane Developer Kit for efficient packet processing
- Low Power Consumption
- Intel® Flow Director
- Intelligent Offloads
- Unified networking providing a single wire support for LAN and storage
- Asset Management Features
- RoHS compliant 6/6
- Supports Both Direct Attach Copper and Fiber Cables

## 1-3 Technical Specifications

### General

- Intel® XL710-BM1 controller
- Low Profile Standard form factor
- PCI-E 3.0 x8 (8GT/s) interface
- Quad SFP+ connectors with speed up to 10Gbps per port
- Load balancing on multiple CPUs
- Intel® PROSet Utility for Windows Device Manager
- Time Sync (IEEE 1588)
- Energy Efficient Ethernet (EEE)

### I/O Features

- Intel® Flow Director
- MSI-X support
- Multiple Queues: 1,536 TX and RX queues per port
- Tx/Rx IP, SCTP, TCP, and UDP checksum offloading (IPv4, IPv6) capabilities
- Jumbo Frame (9.5KB)

### Virtualization Features

- Next-Generation VMDq with up to 256 VMDq VMs supported
- PCI-SIG SR-IOV with up to 128 virtual ports
- Virtual Machine Load Balancing (VMLB)
- Advanced Packet Filtering
- VLAN support for up to 4096 VLAN tags

- VXLAN and NVGRE support

### **Storage Interface Features**

- Preboot eXecution Environment (PXE) support
- iSCSI remote boot
- Simple Network Management Protocol (SNMP) and Remote Network Monitoring (RMON) static counters

### **Management Features**

- Asset Management support on Supermicro® X10 generation platforms
- Controller asset tags such as part number, revision, serial number, and MAC addresses
- Controller thermal sensor

### **Advanced Software Features**

- Teaming support
- IEEE 802.3ad (link aggregation control protocol)
- IEEE 802.1Q VLANs
- IEEE 802.3 2005 flow control support
- IEEE 802.1p
- TCP segmentation/large send offload
- Interrupt moderation

## OS Support

The AOC-STG-i4S add-on card supports the following operating systems:

- Windows® Server 2012 R2, 2012, 2008 R2 X86-64
- Linux RedHat EL 6.5 and 7.0 IA-32, X86-64, and IA-64
- Linux SuSE SLES 11 SP3 and 12 IA-32, X86-64, and IA-64
- FreeBSD 9 and 10 IA-32, X86-64, and IA-64
- UEFI 2.1 and 2.3 X86-64 and I-64
- VMware ESXi 5.1 and ESXi 5.5 X86-64

## Cable Support

- SFP+ direct-attach twinaxial copper cables up to 7m
- Fiber-optic cables (with required optional SFP+ transceivers)

## Power Consumption

- Typical power consumption: 4W
- Maximum power consumption: 8W

## Physical Dimensions

- Card PCB dimensions: 14.99cm (5.9in) 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)

- CBL-0347L: 39.37" (100cm) 10GbE SFP+ to SFP+, Twinaxial copper cable
- CBL-0348L: 118.11" (300cm) 10GbE SFP+ to SFP+, Twinaxial copper cable
- CBL-0349L: 196.85" (500cm) 10GbE SFP+ to SFP+, Twinaxial 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)
- Storage humidity: 90% non-condensing relative humidity at 35°C

## Compliance Platforms

- RoHS Compliant 6/6, Pb Free



## Supported Platforms

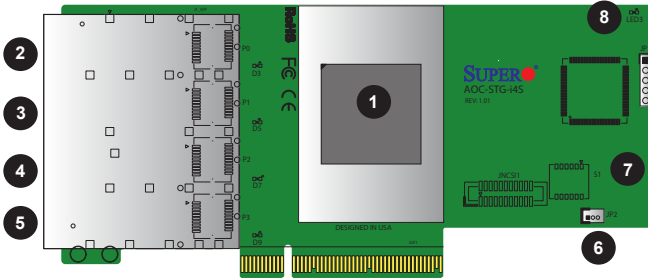
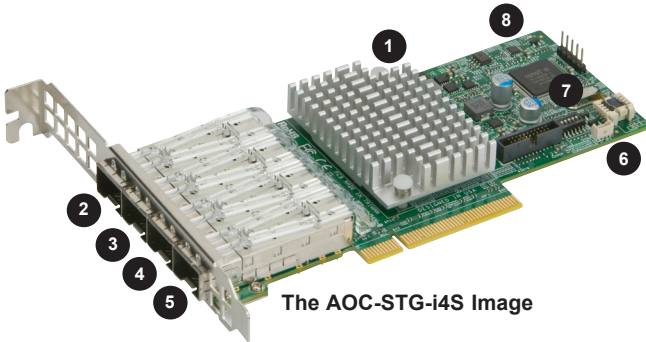
- Supermicro® motherboards with minimum one PCI-E x8 slot
- Supermicro® server systems with minimum one low-profile or full-height PCI-E x8 expansion slot

## Notes

## Chapter 2

### Hardware Components

#### 2-1 Add-On Card Image and Layout



#### 2-2 Major Components


The following major components are on the AOC-STG-i4S

1. Intel XL710-BM1	5. SFP+ Port 3
2. SFP+ Port 0	6. Thermal Alert
3. SFP+ Port 1	7. DIP Switch
4. SFP+ Port 2	8. Thermal Alert LED

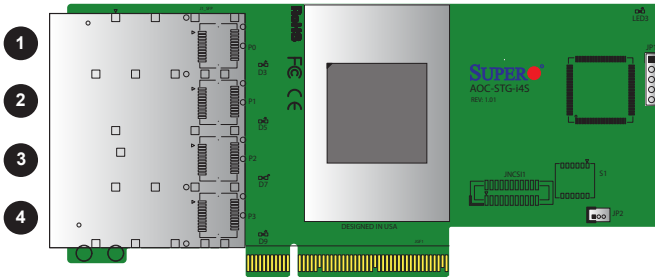
## 2-3 LAN Ports and LAN LED Indicators

### LAN Ports

There are four SFP+ LAN ports on the add-on card. These LAN ports support connection speeds of 10Gbps and 1Gbps. Use a direct-attach twinaxial copper cable.

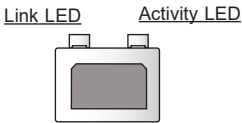
 **Note:** Please refer to "Optional Accessories" on page 1-4 for recommended cables.

The AOC-STG-i4S Layout



### LAN Port LED Indicators

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



#### LAN Ports

1. SFP+ Port 0
2. SFP+ Port 1
3. SFP+ Port 2
4. SFP+ Port 3

LED	Color	Definition
LNK	Green	10 Gb Link Speed
	Yellow	1 Gb Link Speed
ACT	Blinking Green	Activity



## 2-4 Connectors and Switches

### Thermal Alert Connector

Connect an external cable (not included) from the motherboard to the thermal alert connector at JP2 to monitor the chipset die temperature. Refer to the table on the right for the pin definition. Refer to page 2-1 for the location of the jumper.

Thermal Alert Pin Definition	
Pin	Definition
1	GND
2	Thermal_Alert_N
3	GND

### Thermal Alert LED

A thermal alert LED is located at LED3. The yellow LED indicates there is a thermal alert. Refer to the table on the right for the LED status. Refer to page 2-1 for the location of the LED.

Thermal Alert LED Status	
Color	Status
Yellow	Thermal Alert

## DIP Switch

The DIP Switch at S1 provides SMBUS address selection. You can configure the card with static SMBUS address. Refer to the tables below for address selections. Refer to page 2-1 for the location of the switch.



S1 DIP switch for user selection

Switch Position	OFF (default)	ON
1	SMBUS ARP mode	Static SMBUS address mode
2-6	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

## 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. Unplug the power cord.
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**

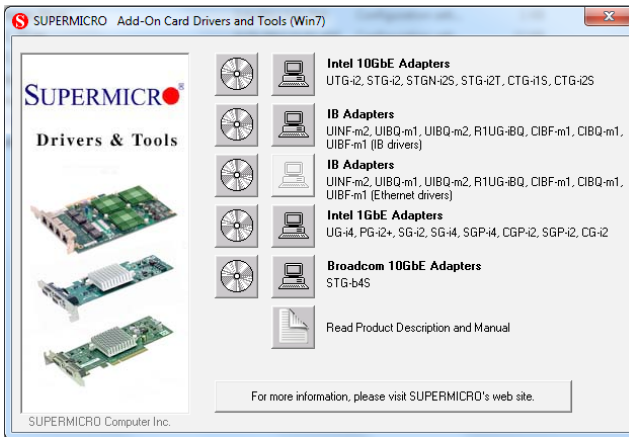
Follow the steps below to install the add-on card into your system.

1. Remove the server cover and, if necessary, set aside any screws for later use.
2. Remove the add-on card slot cover and its screw.
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 server cover.
7. Plug in the power cord and power up the system.

## 3-4 Installing the Drivers in Windows

Follow the steps below to install the drivers for Windows. Download the latest *CDR-NIC* drivers from [ftp://ftp.supermicro.com/Networking\\_Drivers/](ftp://ftp.supermicro.com/Networking_Drivers/).

1. Run the *CDR-NIC* drivers installation.
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 the Drivers in Linux

Follow the steps below to install the driver to a Linux system.

### Build a Binary RPM Package

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.

## 3-6 Building the Driver Manually

Follow the instructions below to build the driver manually.

1. Move the base driver tar file to the directory of your choice. For example, use '/home/username/e1000' or '/usr/local/src/e1000'.
2. Untar/unzip the archive, where <x.x.x> is the version number for the driver tar file:

```
tar xzf e1000-<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 e1000-<x.x.x>/src/
```

4. Compile the driver module:

```
# make install
```

The binary will be installed as:

```
/lib/modules/<KERNEL VERSION>/kernel/drivers/net/e1000/e1000.[k]o
```

The install location listed above is the default location. This may differ for various Linux distributions.

5. Load the module using either the insmod or modprobe command:

```
modprobe e1000
```

```
insmod e1000
```

Note that 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/e1000/e1000.ko
```

With 2.6 based kernels also make sure that older e1000 drivers are removed from the kernel, before loading the new module:

```
rmmod e1000; modprobe e1000
```

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

```
ifconfig eth<x> <IP_address>
```

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>
```

(Disclaimer Continued)

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