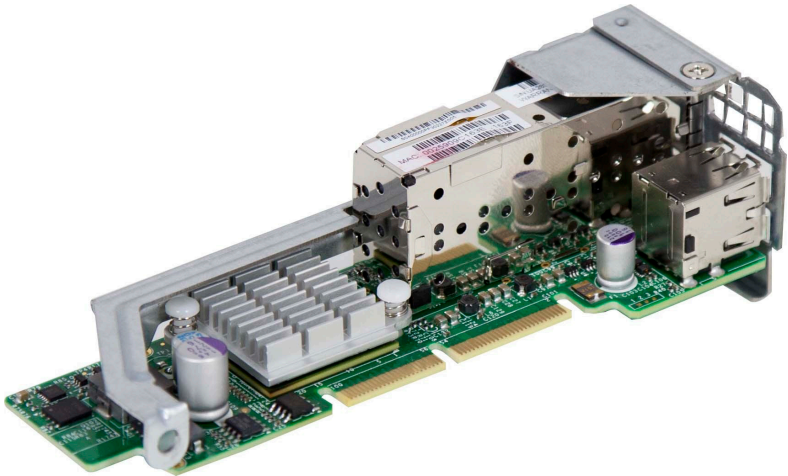


SUPER[®]

AOC-CTG-i2S



User's Guide

Revision 1.0c

The information in this User's Guide has been carefully reviewed and is believed to be accurate. The vendor 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 user's guide, or to notify any person or organization of the updates. **Please Note: For the most up-to-date version of this user's guide, 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 user's guide 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 the manufacturer and the 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 a commercial 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: 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.

User's Guide Revision 1.0c

Release Date: January 4, 2016

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 © 2016 by Super Micro Computer, Inc.
All rights reserved.

Printed in the United States of America

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-CTG-i2S add-on card.

About this Add-on Card

The AOC-CTG-i2S 10-Gigabit Ethernet Adapter is a flexible and scalable Ethernet adapter designed for demanding data center environments. Based on Intel's 82599ES 10GbE network controller, the AOC-CTG-i2S addresses the demanding needs of next-generation data centers by providing virtualization features, LAN and SAN networking flexibility, and proven reliable performance. The AOC-CTG-i2S is designed in a small microLP form factor to fit within Supermicro MicroCloud and Twin 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 to prevent damage to the system or injury to yourself:



Warning: Important information given to ensure proper system installation or to prevent damage to the components or injury to yourself.



Note: Additional information given to differentiate between various models or provides information for correct system setup.

Naming Convention

A O C - S T G N - i 2 S
 | | | | | | | | | |
 1 - 2 3 4 - 5 6 7

Character	Representation	Options
1st	Product Family	AOC: Add On Card
2nd	Form Factor	S: Standard, P: Proprietary, C: MicroLP, U: UIO
3rd	Product Type/Speed	G: GbE (1Gb/s), TG: 10GbE (10Gb/s), 40G: 40GbE (40Gb/s), IBF: FDR IB (56Gb/s), IBQ: QDR IB (40Gb/s)
4th	Chipset Model (Optional)	N: Niantec (82599), P: Powerville (i350), S: Sageville (X550)
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, Q: QSFP+

SMC Networking Add-on Cards

Model	Type	Form Factor	Interface	Controller	Connection	Dimension (w/o Brackets) (L x H)	Power (W)
SGP-i2	GbE	Standard LP	PCI-E x4	Intel® i350 AM2	2 RJ45 (1Gb/port)	3.9" (9.9cm) x 2.73" (6.9cm)	3.5
SGP-i4	GbE	Standard LP	PCI-E x4	Intel® i350 AM4	4 RJ45 (1Gb/port)	3.9" (9.9cm) x 2.73" (6.9cm)	5
STG-b4S	10GbE	Standard LP	PCI-E x8	Broadcom® BCM57840S	4 SFP+ (10Gb/port)	5.8" (13.7cm) x 2.73" (6.9cm)	14
STG-i2T	10GbE	Standard LP	PCI-E x8	Intel® X540	2 RJ45 (10Gb/port)	5.9" (14.99cm) x 2.73" (6.9cm)	13
STGN-i2S	10GbE	Standard LP	PCI-E x8	Intel® 82599ES	2 SFP+ (10Gb/port)	4.0" (10.2cm) x 2.73" (6.9cm)	11.2
STGN-i1S	10GbE	Standard LP	PCI-E x8	Intel® 82598EN	1 SFP+ (10Gb/port)	4.0" (10.2cm) x 2.73" (6.9cm)	10
STG-i4S	10GbE	Standard LP	PCI-E x8	Intel® XL710-AM1	4 SFP+ (10Gb/port)	5.9" (14.9cm) x 2.73" (6.9cm)	8
S40G-i2Q	40GbE	Standard LP	PCI-E x8	Intel® XL710 AM2	2 QSFP+ (40Gb/port)	5.9" (14.9cm) x 2.73" (6.9cm)	7.5
PTG-i1S	10GbE	Proprietary	PCI-E x8	Intel® 82599EN	1 SFP+ (10Gb/port)	10.04" (25.5cm) x .78" (2.0cm)	7
UG-i4	GbE	UIO FH	PCI-E x8	Intel® 82571EB	4 RJ45 (1Gb/port)	6.8" (16.7cm) x 3.9" (9.8cm)	10
CGP-i2	GbE	MicroLP	PCI-E x4	Intel® i350 AM2	2 RJ45 (1Gb/port)	4.45" (11.3cm) x 1.54" (3.9cm)	4
CG-i2	GbE	MicroLP	PCI-E x4	Intel® 82590	2 RJ45 (1Gb/port)	4.45" (11.3cm) x 1.3" (3.4cm)	4
CIBF-m1	FDR IB	MicroLP	PCI-E x8	Mellanox® ConnectX-3	1 QSFP (56Gb/port)	4.85" (12.3cm) x 1.54" (3.9cm)	7
CIBQ-m1	QDR IB	MicroLP	PCI-E x8	Mellanox® ConnectX-3	1 QSFP (40Gb/port)	4.85" (12.3cm) x 1.54" (3.9cm)	7
CTG-i1S	10GbE	MicroLP	PCI-E x8	Intel® 82599EN	1 SFP+ (10Gb/port)	4.85" (12.3cm) x 1.54" (3.9cm)	10
CTG-i2S	10GbE	MicroLP	PCI-E x8	Intel® 82599ES	2 SFP+ (10Gb/port)	4.85" (12.3cm) x 1.54" (3.9cm)	11
CTG-i2T	10GbE	MicroLP	PCI-E x8	Intel® X540	2 RJ45 (10Gb/port)	4.8" (12.3cm) x 2.75" (7.7cm)	13
CTGS-i2T	10GbE	MicroLP	PCI-E x4	Intel® X550	2 RJ45 (10Gb/port)	4.45" (11.3cm) x 1.54" (3.9cm)	12

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)

Asia-Pacific

Address: Super Micro Computer, Inc.
4F, No. 232-1, Liancheng Rd.
Chung-Ho Dist., New Taipei City 235
Taiwan, R.O.C.

Tel: +886-(2) 8226-3990

Fax: +886-(2) 8226-3991

Website: www.supermicro.com.tw

Email: support@supermicro.com.tw (Technical Support)

Tel: +886-(2) 8226-5990 (Technical Support)

Table of Contents

Preface

About this User's Guide	3
About this Add-on Card	3
An Important Note to the User	3
Returning Merchandise for Service.....	3
Conventions Used in the User's Guide	4
Naming Convention	4
SMC Networking Add-on Cards	4
Contacting Supermicro	5

Chapter 1 Overview

1-1 Overview	1-1
1-2 Key Features	1-1
1-3 Specifications	1-2

Chapter 2 Hardware Components

2-1 Add-On Card Image and Layout.....	2-1
2-2 Major Components	2-1
2-3 Connectors and LEDs	2-2
USB Ports.....	2-2
SFP+ Ports	2-2
SFP+ Port LEDs.....	2-2

Chapter 3 Installation

3-1 Static-Sensitive Devices.....	3-1
Precautions	3-1
Unpacking	3-1
3-2 Add-On Card Brackets	3-2
3-3 Before Installation	3-3
3-4 Installing the Add-on Card	3-3
3-5 Installing Drivers on Windows.....	3-4
3-6 Installing Drivers on Linux.....	3-4
Build a Binary RPM Package.....	3-4
3-7 Installing Drivers on FreeBSD	3-6

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 Key Features

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

- Dual SFP+ Connectors
- MicroLP form factor
- PCI Express 2.0 (up to 5GT/s)
- Intel® QuickData Technology
- VMDq, Next-Generation VMDq, and PC-SIG SR-IOV for Virtualized Environments
- Load Balancing on Multiple CPUs
- iSCSI Remote Boot Support
- Fibre Channel over Ethernet (FCoE) Support
- Support for most Network Operating Systems (NOS)
- Supports both DAC Twin Axial and LC Fiber-Optic Cables
- RoHS compliant 6/6

1-3 Specifications

General

- Intel® 82599ES 10GbE controller
- Compact size microLP form factor
- Dual SFP+ and dual USB 2.0 ports
- PCI-E 2.0 x8 (5GT/s)
- Load balancing on multiple CPUs
- iSCSI remote boot support
- Fibre Channel over Ethernet (FCoE) support
- Intel® PROSet Utility for Windows® Device Manager

I/O Features

- Intel QuickData Technology: DMA engine that enhances data acceleration and lowers CPU usage
- Direct Cache Access (DCA) to avoid cache misses
- MSI-X support to minimize the overhead of interrupts, allowing load-balancing between multiple cores/CPU's
- Tx/Rx IP, SCTP, TCP and UDP checksum offloading capabilities (IPv4, IPv6)
- Receive and transmit side scaling for Windows environments and scalable I/O for Linux environments

Virtualization Features

- Supports virtualization features such as VMDq, Next-Generation VMDq (64 queues per port) and PC-SIG SR-IOV implementation
- IPv6 Offloading
- Flexible Port Partitioning: 32 Virtual Functions

- Advanced packet filtering
- VLAN support to allow creation of multiple VLAN segments
- VXLAN through Software

Manageability Features

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

OS Support

- Windows® 7, 8, Server 2003, Server 2008, Server 2008 R2, Server 2012, Vista
- RedHat EL, SuSe SLES
- FreeBSD
- VMware

Cables Support

- SFP+ direct attached twin axial cables, up to 7 meters
- LC-LC fiber-optic SR cables, up to 300 meters (optional SFP+ transceiver is required)
- LC-LC fiber-optic LR cables, up to 3000 meters (optional SFP+ transceiver is required)

Operating Conditions

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

Physical Dimensions

- Card PCB dimensions (without end brackets): 12.32cm (4.85in) x 3.9cm (1.54in) (L x W)

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

Compliance/Environmental

- RoHS Compliant 6/6, Pb Free



Supported Platforms

- Supermicro Twin Server and MicroCloud Systems with microLP expansion slot (see table below)

Type	System	MicroLP Add-On Card				
		AOC-CG-i2	AOC-CGP-i2	AOC-CIBF-m1	AOC-CTG-i1S	AOC-CTG-i2S
Microcloud	5037MC-H8TRF	√ (1)				
	5037MR-H8TRF		√ (1)			
2U Twin ²⁺	2027TR-H70RF+		√ (1)	√ (1)	√ (1)	√ (1)
	2027TR-H71RF+		√ (1)	√ (1)	√ (1)	√ (1)
	2027TR-HTRF+		√ (1)	√ (1)	√ (1)	√ (1)
	6027TR-H70RF+		√ (1)	√ (1)	√ (1)	√ (1)
	6027TR-H71RF+		√ (1)	√ (1)	√ (1)	√ (1)
	6027TR-HTRF+		√ (1)	√ (1)	√ (1)	√ (1)
2U Twin+	6027TR-D70RF+		√ (2)	√ (2)	√ (2)	√ (2)
	6027TR-D71RF+		√ (2)	√ (2)	√ (2)	√ (2)
	6027TR-DTRF+		√ (2)	√ (2)	√ (2)	√ (2)
	2027TR-D70RF+		√ (2)	√ (2)	√ (2)	√ (2)
Fat Twin (8 Nodes)	F617R2-R72+		√ (1)	√ (1)	√ (1)	√ (1)
	F617R2-RT+		√ (1)	√ (1)	√ (1)	√ (1)
Fat Twin (4 Nodes)	F627R3-R72B+		√ (2)	√ (2)	√ (2)	√ (2)
	F627R3-RTB+		√ (2)	√ (2)	√ (2)	√ (2)

(1) - 1U Bracket

(2) - 2U Bracket



Note 1: This add-on card (AOC-CTG-i2S) is not recommended for 12-node MicroCloud systems.

Note 2: This product is only available to Supermicro OEM customers and is sold as an integrated solution with Supermicro server systems. For the most current product information, visit: www.supermicro.com.

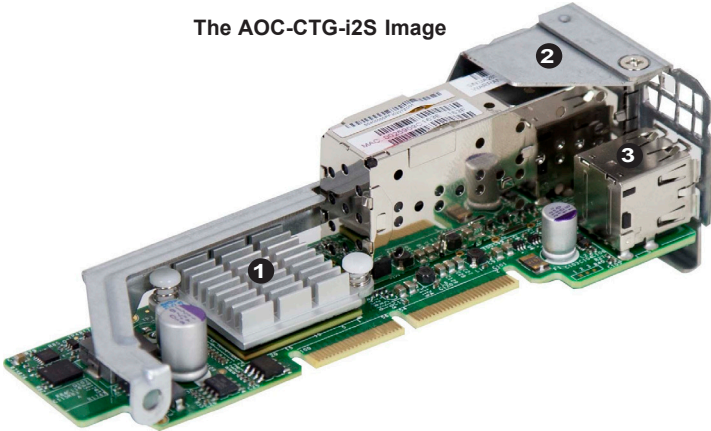
Notes

Chapter 2

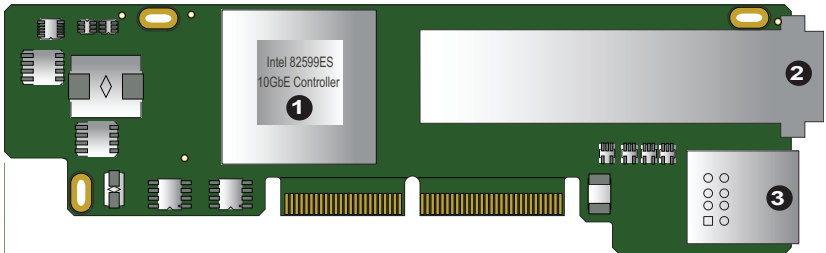
Hardware Components

2-1 Add-On Card Image and Layout

The AOC-CTG-i2S Image



The AOC-CTG-i2S Layout



2-2 Major Components

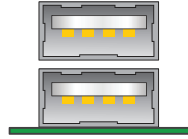
The following major components are installed on the AOC-CTG-i2S:

1. Intel 82599ES 10GbE Controller
2. Dual SFP+ Ports (Bottom: Port 1, Top: Port 2)
3. Dual USB 2.0 Ports

2-3 Connectors and LEDs

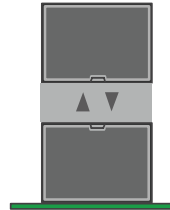
USB Ports

Two USB 2.0 ports are located on the add-on card. Refer to the add-on card layout on page 2-1 for the location of the USB ports.



SFP+ Ports

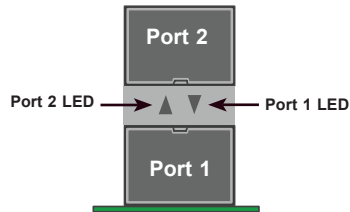
Two SFP+ 10GbE adapter ports are located on the add-on card. Connect a DAC Twin Axial cable or an LC Fiber-Optic cable to the ports to provide Gigabit Ethernet communication. Refer to the add-on card layout on Page 2-1 for the location of the SFP+ port.



Note: For MicroCloud systems, only Molex SFP+ Twinax copper cables are supported.

SFP+ Port LEDs

There are two triangular LEDs located between the dual SFP ports to indicate link speed and activity of each port (left LED is for Port 2, right LED is for Port 1). A 10Gb connection is indicated by a solid or blinking green LED. A 1Gb connection is indicated by a solid or blinking yellow LED. See the table at right for more information.



SFP+ Port LEDs		
LED	Color	Definition
Activity	Blinking Green	10Gb/s Activity
	Blinking Yellow	1Gb/s Activity
Link	Solid Green	10Gb/s Link Speed
	Solid Yellow	1Gb/s Link Speed

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

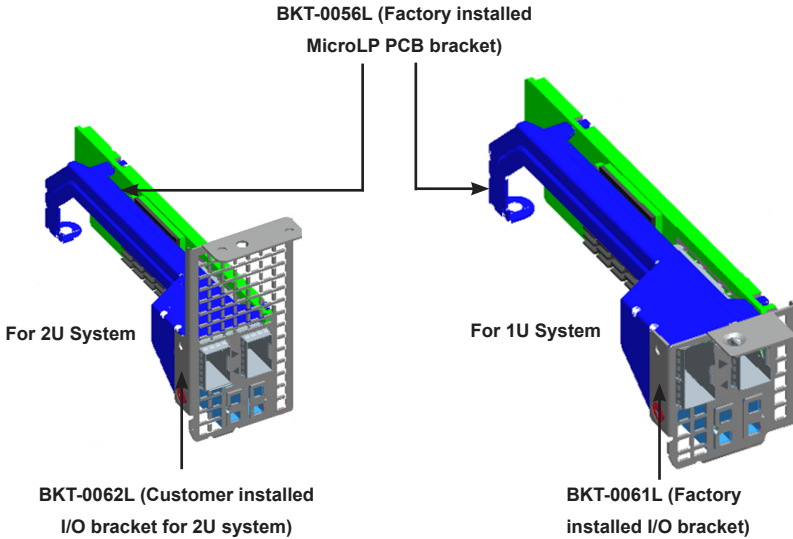
The add-on card is shipped in antistatic packaging to avoid static damage. When unpacking your component or your system, make sure that you are static protected.



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 Add-On Card Brackets

The add-on card ships with a PCB bracket that is pre-installed at the factory. For 1U systems, an I/O bracket is also pre-installed on the card. For 2U systems, the I/O bracket is bundled with the card and must be installed by the customer. See the drawings below for bracket details.



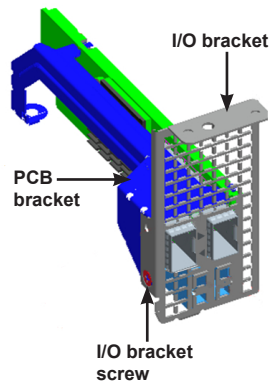
Note: For 2U systems, install the I/O bracket to the add-on card before installing the card inside the system.

Removing/Installing the IO Bracket

Refer to the illustration at right for the following instructions on removing/installing the I/O bracket.

To remove the I/O bracket: Loosen and remove the I/O bracket screw, then gently pull the bracket away from the add-on card.

To install the I/O bracket: Position the bracket so that the I/O cut-outs align with the connectors on the add-on card. Connect the I/O bracket to the add-on card, making sure that the screw hole in the PCB bracket and the I/O bracket are aligned. Secure the bracket to the add-on card using the I/O bracket screw.



3-3 Before Installation

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

1. Power down the system.
2. Remove the power cord from the wall socket.
3. Use industry standard anti-static equipment (such as gloves or wrist strap) and follow the instructions listed on Page 3-1 to avoid damage caused by ESD.
4. Familiarize yourself with the server, motherboard, and/or chassis documentation.
5. Confirm that your operating system includes the latest updates and hotfixes.

3-4 Installing the Add-on Card

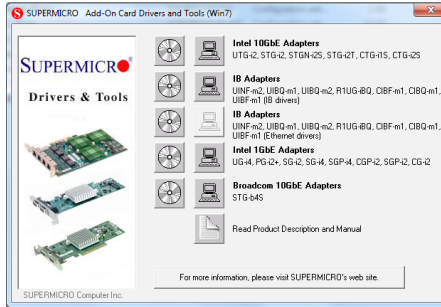
Follow the steps below to install the add-on card into your system.

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.

3-5 Installing Drivers on Windows

Follow the steps below to install the drivers for Windows. Download the drivers from the Supermicro FTP site at ftp://ftp.supermicro.com/Networking_Drivers/.

1. Run the CDR-NIC.
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.

3-6 Installing Drivers on 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.

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>
```

3-7 Installing Drivers on FreeBSD

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



Note: You must have kernel sources installed in 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 xzf 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>
```

- 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>
```

- 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"
```

- 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 affect.

(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.