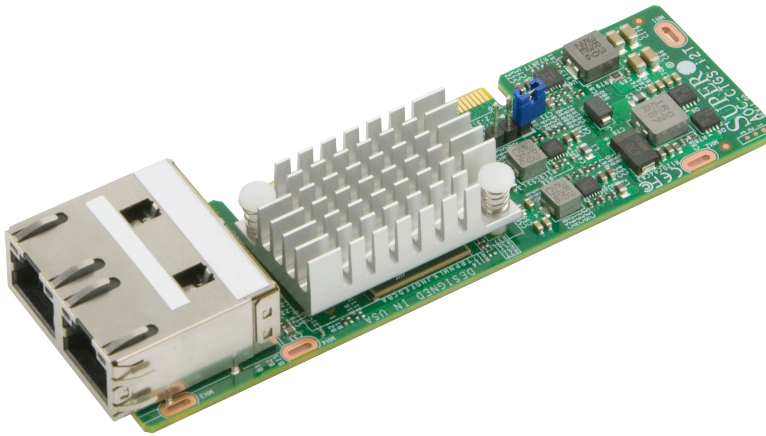
AOC-CTGS-i2T



User's Guide

Revision 1.0a

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User's Guide Revision 1.0a

Release Date: April 7, 2016

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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-CTGS-i2T add-on card.

About this Add-on Card

The AOC-CTGS-i2T is the latest microLP 2-port 10Gbase-T controller for our compact and high density MicroCloud and Twin series servers. With a compact design and lower power consumption, it can fit in small spaces while providing the highest networking bandwidth for data centers. The AOC-CTGS-i2T with NC-SI allows customers to monitor the servers remotely. Based on the latest Intel® X550 controller, the AOC-CTGS-i2T is an excellent choice for customers who are looking to expand their network connectivity with highest bandwidth.

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.

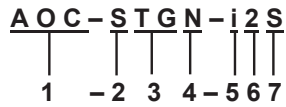
Conventions Used in the User's Guide

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



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)	5.4" (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
PTG-i1S	10GbE	Proprietary	PCI-E x8	Intel® 82599EN	1 SFP+ (10Gb/port)	10.04" (25.5cm) x .78" (2.0cm)	7.5
UG-i4	GbE	UIO FH	PCI-E x8	Intel® 82571EB	4 RJ45 (1Gb/port)	6.6" (16.7cm) x 3.9" (9.8cm)	10
UIBF-m1	FDR IB	UIO LP	PCI-E x8	Mellanox® ConnectX-3	1 QSFP (56Gb/port)	5.63" (14.3cm) x 2.73" (6.9cm)	7
UIBQ-m1	QDR IB	UIO LP	PCI-E x8	Mellanox® ConnectX-2	1 QSFP (40Gb/port)	5.63" (14.3cm) x 2.73" (6.9cm)	7
UIBQ-m2	QDR IB	UIO LP	PCI-E x8	Mellanox® ConnectX-2	2 QSFP (40Gb/port)	5.63" (14.3cm) x 2.73" (6.9cm)	8
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® 82580	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

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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

- Dual RJ45 Connectors
- MicroLP Form Factor
- PCI Express 3.0 x4 (8GT/s)
- Network Virtualization Offloads: VXLAN and NVGRE
- VMDq and SR-IOV for Virtualized Environment
- Ethernet Flow Director
- Jumbo Frame Support up to 15.5KB
- IEEE 802.3az Energy Efficient Ethernet (EEE)
- DMA coalescing
- Supports RJ-45 Category-6 and 6A (10GBASE-T)
- RoHS compliant 6/6

1-3 Technical Specifications

General

- Intel® X550 10GbE controller with integrated 10GBase-T copper PHYs
- MicroLP Form Factor
- PCI-E 3.0 x4 (8GT/s) interface
- Dual RJ45 connectors with speeds up to 10Gb/s per port
- Load balancing on multiple CPUs
- Intel® PROSet Utility for Windows® Device Manager

I/O Features

- Two integrated interfaces operate at 10GBASE-T, 1000BASE-T and 100BASE-TX
- MSI/MSI-X support
- 128 Tx and Rx queues per port

Network Features

- Supports jumbo frames up to 15.5KB
- IEEE 802.3az Energy Efficient Ethernet (EEE)

Performance Features

- TCP/UDP Segmentation Offload
- IPv6 Support for IP/TCP and IP/UDP Receive Checksum Offload
- Intel® Flow Director
- Receive-Side Scaling (RSS)
- TCP Receive Side Coalescing (RSC)

- Supports Fibre Channel over Ethernet (FCoE)
- DMA coalescing

Virtualization

- Support for Virtual Machine Device Queues (VMDq1 and Next Generation VMDq)
- L2 Ethernet MAC Address filters and VLAN filters
- PCI-SIG SR-IOV (64 VFs)
- RSS table per VF
- Simple VEPA, VEB (Virtual Ethernet Bridge)
- E-tag filtering
- 802.1q VLAN support
- Network Virtualization Stateless Offload: VXLAN and NVGRE

Management Features

- Preboot eXecution Environment (PXE) support
- iSCSI remote boot
- Statistics for Management and Remote Network Monitoring (RMON)
- IEEE 1588 with per-packet timestamp
- Controller asset tags such as part number, revision, serial number, and MAC addresses
- Controller thermal sensor
- NC-SI for remote management

OS Support

- 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, ESXi 5.5 and ESXi 6.0 X86-64

Cable Support

- RJ-45 Category-6 up to 55m; Category-6A up to 100m

Power Consumption

- Typical power consumption: 11.8W

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

Physical Dimensions

- Card PCB dimensions: 11.3cm (4.45in) x 3.9cm (1.54in) (L x H)

Optional Accessories

- CBL-NTWK-0603: RJ45 CAT6A 550MHz Rated Blue 3 ft. patch cable
- CBL-NTWK-0604: RJ45 CAT6A 550MHz Rated Blue 5 ft. patch cable
- CBL-NTWK-0605: RJ45 CAT6A 550MHz Rated Blue 6 ft. patch cable

- CBL-NTWK-0606: RJ45 CAT6A 550MHz Rated Blue 9 ft. patch cable
- CBL-NTWK-0607: RJ45 CAT6A 550MHz Rated Blue 10 ft. patch cable
- CBL-NTWK-0608: RJ45 CAT6A 550MHz Rated Blue 12 ft. patch cable
- CBL-NTWK-0609: RJ45 CAT6A 550MHz Rated Blue 15 ft. patch cable
- CBL-NTWK-0610: RJ45 CAT6A 550MHz Rated Blue 18 ft. patch cable
- CBL-NTWK-0611: RJ45 CAT6A 550MHz Rated Blue 21 ft. patch cable
- CBL-NTWK-0612: RJ45 CAT6A 550MHz Rated Blue 24 ft. patch cable

Platform Support

- Supermicro Twin Server and MicroCloud Systems with MicroLP expansion slot (See MicroLP Compatibility Matrix online)

http://www.supermicro.com/support/resources/aoc/microLP_compatibility.cfm

1-4 Compliance/Operating Environment

The AOC-CTGS-i2T add-on card is compliant with the following environmental regulations:

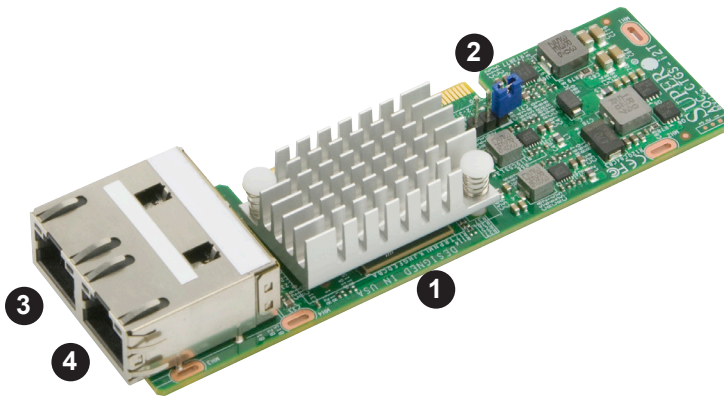
- RoHS Compliant 6/6, Pb Free

Notes

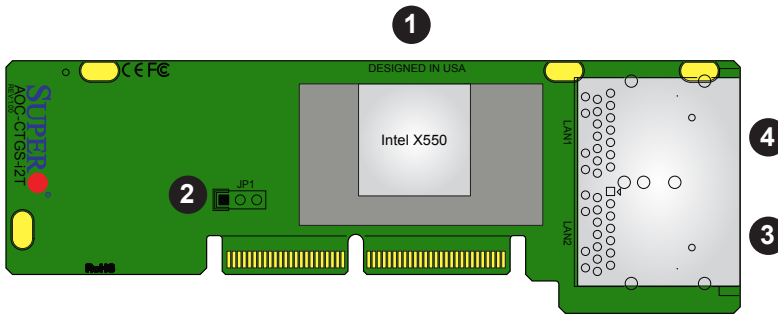
Chapter 2

Hardware Components

2-1 Add-On Card Image and Layout



The AOC-CTGS-i2T Image



The AOC-CTGS-i2T Layout

2-2 Major Components

The following major components are on the AOC-CTGS-i2T:

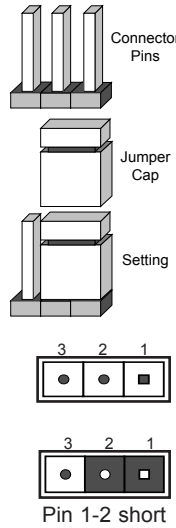
1. Intel® X550 10GbE LAN Controller
2. 3.3V Standby Power Enable Jumper
3. (RJ45 Ethernet) LAN Port 2 & LAN2 LED Indicator
4. (RJ45 Ethernet) LAN Port 1 & LAN1 LED Indicator

2-3 Jumpers and Indicators

Explanation of Jumpers

To modify the operation of the add-on card, a jumper can be used to choose between optional settings. A jumper creates shorts between two pins to change the function of the connector. Pin 1 is identified with a square solder pad on the printed circuit board. See the add-on card layout on page 2-1 for the jumper location.

Note: On two-pin jumpers, "Closed" means the jumper is on and "Open" means the jumper is off the pins.



Pin 1-2 short

3.3V Standby Power Enable

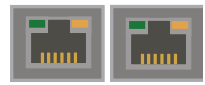
The 3.3V Standby Power Enable jumper is located at JP1 on the add-on card. Refer to the layout on page 2-1 for the location of the jumper. Close pins 1 & 2 to enable 3.3V Standby Power for Wake-on-LAN support. The default setting is **Disabled**.

Note: If this jumper is set to "Enabled," LAN chip overheat may occur. Be sure to provide adequate system cooling when the jumper is enabled.

3.3V Standby PWR Enable Jumper Settings	
Pins	Definition
1-2	Enabled (See the note below)
2-3	**Disabled** (default)

2-4 LED Indicators

Activity LED



Link LED

GLAN Port LEDs

Two LAN ports (LAN 1/LAN 2) are located on the add-on card. Each Ethernet LAN port has two LEDs. The green LED on the left indicates activity; while the other LED on the right may be green, amber or Off to indicate the speeds of the connections. See the tables on the right for more information.

LAN 1/LAN 2 Activity LED (Left) LED State		
Color	Status	Definition
Amber	Flashing	Active

LAN 1/LAN 2 Link LED (Right) LED State	
LED Color	Definition
Green	10 Gbps
Amber	1 Gbps
Off	100 Mbps or No Connection

LAN Ports Pin Definition			
Pin#	Definition		
1	M_MDI0_P0		
2	M_MDI0_N0		
3	M_MDI0_P1	9	LINK0_10G
6	M_MDI0_N1	10	LINK0_1G
4	M_MDI0_P2	11	LINK0_LINKUP
5	M_MDI0_N2	12	LINK0_ACT_N
7	M_MDI0_P3	13	GND
8	M_MDI0_N3	14	GND

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.
- 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 remove it before adding, removing or changing any hardware components.

3-2 Before Installation

Before you install the add-on card, 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 a wrist strap and follow the precautions 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.

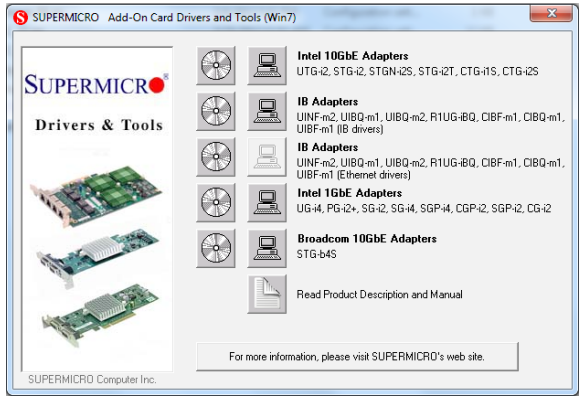
1. Remove the server cover and, if any, set aside any screws for later use.
2. Remove the add-on card slot cover. If the slot cover has a screw, place it aside for later use.
3. Position the add-on card directly over the PCI connector and gently push down on both sides of the card until it slides into the 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 system cover.
7. Plug in the power cord and power up the system.

3-4 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 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.

3-5 Installing Drivers on Linux

Follow the steps below to install the drivers in Linux.

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 zxf 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>
```

3-6 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 drive 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 dirctory 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 affect.

Notes

(Disclaimer Continued)

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