



USER GUIDE

**SMC10GPCle-10BT
SMC10GPCle-XFP**

**TigerCard™ 10G
10GBASE-T and XFP
Ethernet Server Adapters**



TigerCard 10G User Guide

From SMC's Tiger line of feature-rich workgroup LAN solutions

SMC[®]

Networks

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* SMC will provide warranty service for one year following discontinuance from the active SMC price list. Under the limited lifetime warranty, internal and external power supplies, fans, and cables are covered by a standard one-year warranty from date of purchase.

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Compliances

Federal Communication Commission Interference 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 instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

You may use Category 5e or better twisted-pair for 10 Gbps RJ-45 connections. For fiber optic connections, you may use 50/125 or 62.5/125 micron multimode fiber or 9/125 micron single-mode fiber.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CE Mark Conformance Declaration - Class A

SMC contact for these products in Europe is:

SMC Networks Europe,
Edificio Conata II,
Calle Fructuós Gelabert 6-8, 2^o, 4^a,
08970 - Sant Joan Despí, Barcelona, Spain.

This information technology equipment complies with the requirements of the Council Directive 89/336/EEC on the Approximation of the laws of the Member States relating to Electromagnetic Compatibility and 73/23/EEC for electrical equipment used within certain voltage limits and the Amendment Directive 93/68/EEC. For the evaluation of the compliance with these Directives, the following standards were applied:

- RFI Emission:** Limit class A according to EN 55022:1998
Limit class A for harmonic current emission according to EN 61000-3-2/1995
Limitation of voltage fluctuation and flicker in low-voltage supply system according to EN 61000-3-3/1995
- Immunity:** Product family standard according to EN 55024:1998
Electrostatic Discharge according to EN 61000-4-2:1995
(Contact Discharge: ± 4 kV, Air Discharge: ± 8 kV)
Radio-frequency electromagnetic field according to EN 61000-4-3:1996
(80 - 1000 MHz with 1 kHz AM 80% Modulation: 3 V/m)
Electrical fast transient/burst according to EN 61000-4-4:1995
(AC/DC power supply: ± 1 kV, Data/Signal lines: ± 0.5 kV)
Surge immunity test according to EN 61000-4-5:1995
(AC/DC Line to Line: ± 1 kV, AC/DC Line to Earth: ± 2 kV)
Immunity to conducted disturbances, Induced by radio-frequency fields:
EN 61000-4-6:1996 (0.15 - 80 MHz with 1 kHz AM 80% Modulation: 3 V/m)
Power frequency magnetic field immunity test according to
EN 61000-4-8:1993 (1 A/m at frequency 50 Hz)
Voltage dips, short interruptions and voltage variations immunity test
according to EN 61000-4-11:1994 (>95% Reduction @10 ms, 30%
Reduction @500 ms, >95% Reduction @5000 ms)

About This Guide

Purpose

This guide details of the hardware features of the Ethernet adapter card, including its physical and performance-related characteristics, and how to install the card.

Audience

The guide is intended for use by system administrators who are responsible for installing and setting up computer network equipment; consequently, it assumes a basic working knowledge of PC operating systems and LANs (Local Area Networks).

Conventions

The following conventions are used throughout this guide to show information:

Note: Emphasizes important information or calls your attention to related features or instructions.

Caution: Alerts you to a potential hazard that could cause loss of data, or damage the system or equipment.

Warning: Alerts you to a potential hazard that could cause personal injury.

Related Publications

The following publication gives basic information on how to install and use the Ethernet adapter card.

Quick Installation Guide

Revision History

This section summarizes the changes in each revision of this guide.

June 2008 Revision

This is the second revision of this guide. It includes the following changes:

- Added iSCSI support.
- Added MSI-X support.
- Added Receive Side Scaling (RSS) support.
- Updated Microsoft Windows Server® installation.
- Updated Linux installation.

January 2008 Revision

This was the first revision of this guide.

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Chapter 1: Introduction

The SMC TigerCard™ 10G 10GBASE-T and XFP Ethernet Server Adapters combine the speed and performance of cutting edge networking with the ease of deployment and user friendliness of traditional Ethernet. The speed and efficiency of 10G networking coupled with iSCSI support enables converged networking, reducing cost and the complexity of wiring, and simplifying management. SMC's VNIC architecture provides the key to efficient server I/O and is flexible enough to be applied to multiple server deployment scenarios. These deployment scenarios are:

- **Kernel Driver** – This deployment uses a single instance of a VNIC interface for standard operating drivers. This interface provides a performance-optimized path for the kernel TCP/IP stack and contention-free access from the driver, resulting in extremely low latency and competitive CPU efficiency.
- **Accelerated Virtual I/O** – The second deployment scenario greatly improves I/O for virtualized operating systems. The SMC VNIC architecture provides thousands of protected interfaces to the host system, granting any application or virtualized (guest) operating system direct access to the network hardware. This hypervisor bypass technology, unique to SMC Ethernet controllers, is the only way to provide solid I/O performance to virtualized guest operating systems.

Advanced Features

- **Virtual NIC Support** – The core of SMC's technology. Protected VNIC interfaces can be instantiated for each running guest operating system or application, giving it a direct pipeline to the Ethernet network. This architecture provides the most efficient way to maximize network and CPU efficiency. The SMC Ethernet controller supports up to 4096 VNIC interfaces.
- **PCI Express** – Implements PCI Express 1.1.
- **Plug-and-Play** – Provides binary compatibility with all data center and HPC applications.
- **10 Gigabit Ethernet** – 10 times the throughput of 1G Ethernet, 10G enables the ability to design a cost-effective, high-performance 10 Gigabit Ethernet solution.
- **iSCSI Support** – Reduced TCO (total cost of ownership) for shared storage and converged fabrics.
- **iSCSI Acceleration in Virtual Environment** – Reduce CPU utilization, lower networking latency, improved machine utilization, and easier management.
- **RSS** – Receive Side Scaling raises the utilization levels of multi-core servers dramatically by distributing I/O load across all CPUs and cores.

- **IP/UDP/TCP Checksum Offload** – Calculation and validation for the checksums found in IP, TCP and UDP headers. This feature saves a significant amount of valuable CPU cycles.
- **Transmit Rate Pacing (per queue)** – Provides a mechanism for enforcing bandwidth quotas across all guest operating systems. Software re-programmable on-the-fly to allow for adjustment as congestion increases on the network.
- **Jumbo Frame Rate (9K)** – Smaller per packet overhead, increased network utilization.
- **MSI and MSI-X** – Both MSI and MSI-X support enable higher levels of performance on both legacy and up-to-date systems.
- **Remote Boot** – Support for Etherboot, PXE boot, and Linux® BIOS provides flexibility in cluster design and diskless servers. A small programmable on-board ROM contains the boot code that provides this functionality.
- **IP Flow Filtering** – Enables the hardware to steer packets based on IP, TCP, and UDP header contents.

Hardware Description

SMC TigerCard™ 10G 10GBASE-T Ethernet Server Adapter comes equipped with:

- One RJ-45 connector for 10 Gbps connections
- Three LED indicators

The components of the SMC TigerCard™ 10G 10GBASE-T Ethernet Server Adapter are shown in the figure below.



Note: A Low-Profile bracket is also included.

The SMC TigerCard™ 10G 10GBASE-XFP Ethernet Server Adapter comes equipped with:

- One XFP slot for 10 Gbps XFP transceivers (SR or LR)
- Three LED indicators

The components of the SMC TigerCard™ 10G 10GBASE-XFP Ethernet Server Adapter are shown in the figure below.



Note: Shown with an XFP transceiver (not included).

LED Indicators

The following table describes the TigerCard™ 10G states reported by the LEDs.

LED	Condition	Status
Red (Error Checking)	Off	No fault.
	On	Fault.
Green (Link)	Off	There is no valid link on the port.
	On	The card has established a valid network connection.
	Flashing	SMC10GPCIe-10BT: Obtaining a link. SMC10GPCIe-XFP: Receiving.
Amber (Activity)	Off	There is no valid link on the port.
	On	The network connection is operating at 10 Gbps.
	Flashing	SMC10GPCIe-10BT: Receiving or transmitting. SMC10GPCIe-XFP: Transmitting.

Equipment Checklist

After unpacking the TigerCard™ 10G Ethernet Server Adapter, check the contents of the box to be sure you have received the following items:

- SMC TigerCard™ 10G, SMC10GPCIe-10BT or SMC10GPCIe-XFP
- Driver and Documentation CD
- SMC Warranty Registration Card
- Low-Profile Bracket

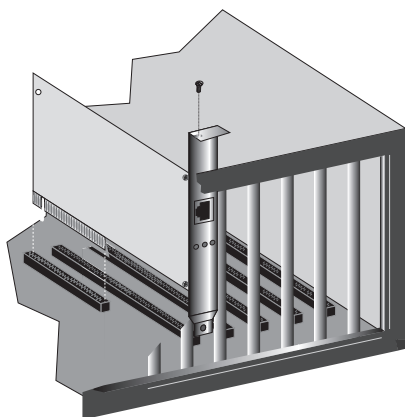
Immediately inform your dealer in the event of any incorrect, missing or damaged parts. If possible, please retain the carton and original packing materials in case there is a need to return the product.

Please register this product online at SMC's web site, <http://www.smc.com/>. The SMC TigerCard™ 10G is covered by a limited lifetime warranty.

Chapter 2: Hardware Installation

Caution: Network cards are sensitive to static electricity. To protect the card, avoid touching its electrical components and always touch the metal chassis of your computer before handling the card.

1. Switch off the computer, unplug the power cord, and remove the computer's cover.
2. Select an unused PCI Express (PCIe) bus-master slot and remove its protective bracket.
3. Carefully insert the card and press until all the edge connectors are firmly seated inside the slot. Then screw the card's bracket securely into the PC's chassis.



4. Connect the TigerCard™ 10G directly to a network switch.
 - a. For the 10GBASE-T card, use UTP cable (use appropriate 10GBASE-T cable; see “UTP Cables” on page B-1). The maximum allowable length of UTP cable connections is 100 meters (328 ft). When inserting an RJ-45 plug, be sure the tab on the plug clicks into position to ensure that it is properly seated.
 - b. For the XFP card, use 9/125 micron single-mode fiber cable, or 50/125 or 62.5/125 micron multimode fiber cable, depending on the XFP transceiver installed (10GBASE-SR or 10GBASE-LR). For more information, see “Fiber Cables” on page B-1.

5. Replace the computer's cover and power it on. The TigerCard™ 10G should be automatically configured by the host computer's BIOS. However, if you have an older computer, you may have to manually configure the computer's BIOS settings. See "Troubleshooting" on page A-1."

Once hardware installation is complete, see Chapter 3 "Driver Installation" for information on installing the appropriate driver for your operating system.

Chapter 3: Driver Installation

The Driver and Documentation CD that accompanies the TigerCard™ 10G contains all the operating system drivers supported by this card. See the “RELEASE.TXT” file on the CD for a list of all drivers. Refer to this guide for instructions on installing drivers.

Any new or updated drivers can be downloaded from SMC’s Web site, <http://www.smc.com/>.

Note: The install procedures in this guide show how to install the SMC10GPCle-10BT drivers. The install procedures for the SMC10GPCle-XFP drivers are identical.

Windows Driver Installation

Download the following package from the SMC support site:

SMC10GPCle-10BT: Windows Driver Package

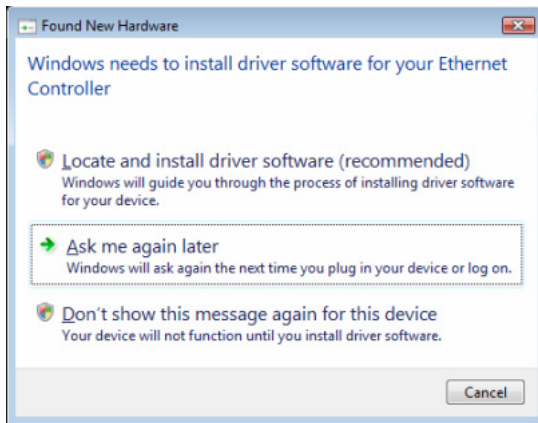
This package contains a Microsoft Windows® Installer (MSI) Setup Wizard for the Windows drivers.

You will need local administrative privileges on the target machine in order to install the SMC network drivers. If you do not have administrative privileges on the target machine, contact your system administrator for assistance.

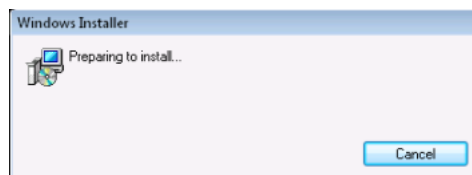
Driver installation can be performed before or after installing the TigerCard™ 10G into the target machine. However, SMC recommends users install the TigerCard™ 10G into the target machine before installing the SMC drivers. The SMC Setup Wizard can install drivers automatically without requiring you to manually follow the steps of the “Found New Hardware Wizard.”

1. On the first boot after installing the TigerCard™ 10G into the target machine, Windows may prompt you with the “Found New Hardware” dialog. Click “Cancel.”

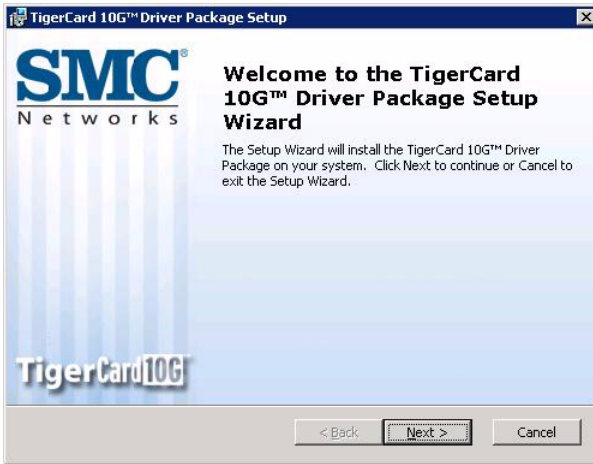
If the “Found New Hardware” dialog appears later during the installation process, it can be safely ignored.

Microsoft Windows Server® 2008:**Microsoft Windows Server® 2003:**

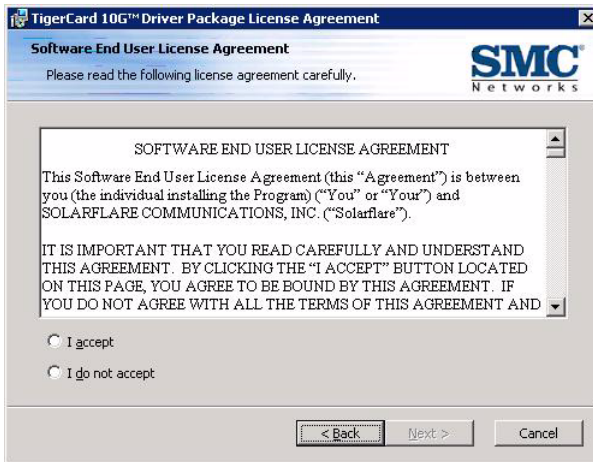
2. Double click on the MSI installation file.



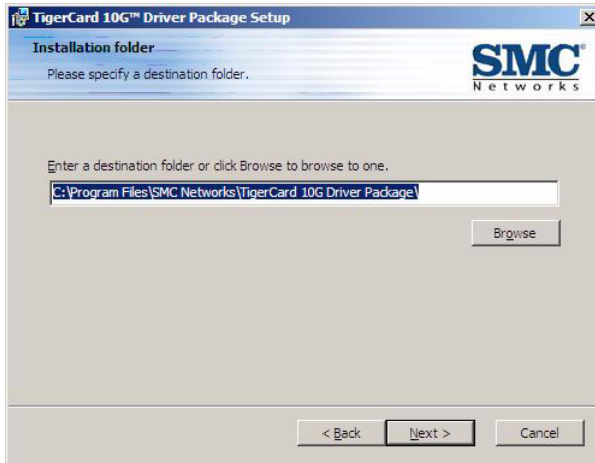
After a brief pause the Setup Wizard is displayed. Click “Next” to continue with the installation.



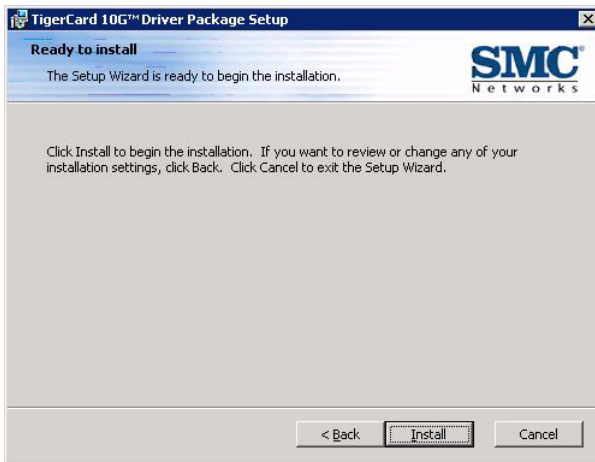
3. The software end-user license agreement is displayed. To install the drivers, you must indicate you accept this agreement and click “Next.”



4. Select the destination folder for the driver package and click “Next.”

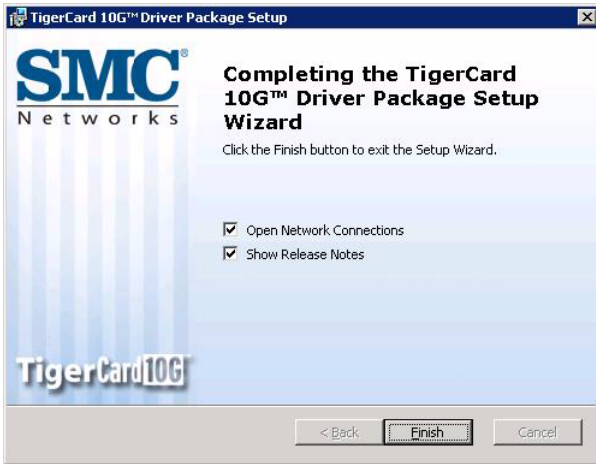


5. No further configuration of the installation process is necessary. Click “Install” to begin the driver installation.

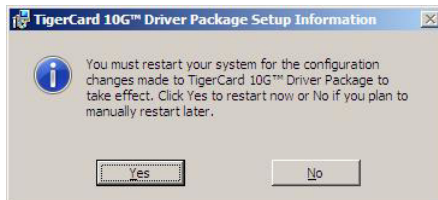


6. The driver installation process can take a few minutes. The Setup Wizard displays its status and progress during this period.

7. Once driver installation is complete the final page of the Setup Wizard is displayed. Click "Finish" to complete the installation.
 - **Open Network Connections** — Selecting this causes the Windows Network Connections control panel to be displayed when the Setup Wizard has completed. This is helpful to configure TCP/IP settings on the newly added 10G network interface.
 - **Show Release Notes** — Selecting this causes the release notes to be displayed when the Setup Wizard has completed.



8. The Setup Wizard may request for permission to restart your system. Click "Yes" to restart now or "No" if you want to manually restart your system later.



Linux Installation Instructions

SMC recommends users install the TigerCard™ 10G into the target machine before installing the Linux network drivers.

The Linux drivers are available both in a source RPM or pre-built binary RPMs for a selection of distributions and kernel variants. The source RPM builds cleanly on a large variety of Linux 2.4 and 2.6 kernel variants. SMC recommends using the pre-built RPMs where they are available from SMC Networks.

You will need root privileges on the target machine in order to install the SMC network drivers. If you do not have root privileges on the target machine, contact your system administrator for assistance.

Installation From a Binary RPM

The following pre-built binary RPMs are available on the SMC support site:

- Linux NET driver RHEL4 binary RPMs
- Linux NET driver RHEL5 binary RPMs
- Linux NET driver SLES9 binary RPMs
- Linux NET driver SLES10 binary RPMs

These packages contain a “tar” file containing RPMs for various kernel variants plus a “readme” listing the kernel variants supported. The readme can be viewed on the support site before downloading the associated package.

If your Linux distribution is not contained in the above list of packages, you will need to build a binary RPM from source. See “Building the Source RPM” on page 3-8.

To determine the exact kernel version running on the target machine type:

```
[user@myhost1]>uname -a
```

Browse the readme in the associated package to see if a binary RPM is available for your kernel version. If a binary RPM is available, download the associated package. If not, you will need to build a binary RPM from source. See “Building the Source RPM” on page 3-8.

Note: The kernel module RPM naming convention is:

```
kernel-module-sfc-<kernel-ver><kernel-type>-<SMC driver
version number>-0.sf.2.<Linux distro tag>.<arch>.rpm
```

An example of the Kernel Module for SUSE Linux Enterprise Server 9 is:

```
kernel-module-sfc-2.6.5-7.201-smp-2.1.0041-0.sf.2.SLES9.i586
.rpm
```

RedHat Enterprise Linux Distributions

These instructions cover installation and configuration of the SMC Server Adapter on RedHat Enterprise Linux 4 and 5 distributions (RHEL4 and RHEL5).

1. Install the RPMs. The following is an example for Red Hat Enterprise 4:

```
[root@myhost1 i686]# rpm -ivh kernel-module-sfc-2.6.9-5.ELsmp
-2.1.0111-0.sf.1.RHEL4.i686.rpm
```

2. There are two tools that can be used for configuring the SMC Server Adapter:
 - a. SMC recommends using the Network Administration Tool ("neat") to configure the new network interface. Neat is a GUI-based application and therefore requires an X server to run.
 - b. Alternatively the command line program "kudzu" can be used. However, you may find when kudzu is run that you are NOT presented with an option to configure the new network interface. If this occurs, carefully clear details of the SMC Server Adapter from the hardware database by removing all entries with "vendor id: 1924" in `etc/sysconfig/hwconf`. Rerunning kudzu should now provide an option to configure the newly added network interface.
3. Apply the new network settings:
 - a. "neat" provides an option to "Activate" the new interface. The new network interface can then be used immediately (there is no need to reboot or restart the network service).
 - b. If you are not using "neat," you will need to reboot or restart the networking service (`[root@myhost1 i686]# service network restart`) before the new SMC interface can be used.

SuSE Linux Enterprise Server distributions

These instructions cover installation and configuration of the SMC Server Adapter on Suse Linux Enterprise Sever 9 and 10 distributions (SLES9 and SLES10).

1. The SMC drivers are currently classified as "unsupported" by Suse Enterprise Linux 10. To allow unsupported drivers to load in SLES10, edit the file `"/etc/sysconfig/hardware/config"`. Find the line:

```
LOAD_UNSUPPORTED_MODULES_AUTOMATICALLY=no
```

and change it to

```
LOAD_UNSUPPORTED_MODULES_AUTOMATICALLY=yes
```

2. Install the RPMs. The following is an example for SLES9:

```
[root@myhost1 i586]# rpm -ivh kernel-module-sfc-2.6.5-7.244
-smp-2.1.0111-0.sf.1.SLES9.i586.rpm
```

3. Run "yas" to configure the SMC Server Adapter. You will see two new Ethernet Controllers available for configuration, only one of which needs to be configured for correct operation. When you select an Ethernet Controller to configure, the "Configuration Name" will take one of the following forms:

- a. `eth-bus-pci-dddd:dd:dd.N` where N is either 0 or 1.
- b. `eth-id-00:0F:53:XX:XX:XX`

The correct Ethernet Controller to configure is usually the first controller in the pair, and the "Configuration Name" either takes the first form ending in ".0", or the second form. If the "Configuration Name" ends in ".1" then you have selected the incorrect Ethernet Controller and you should select the other one in the pair.

Once configured, the "Configuration Name" for the correct Ethernet Controller will change to the second form, and an `ethY` interface will appear on the host. If the incorrect Ethernet Controller is chosen and configured, then the "Configuration Name" will remain as "eth-bus-pci-dddd:dd:dd.1" after configuration by YaST, and an `ethY` interface will not appear on the system. In this case, you should remove the configuration for this Ethernet Controller and configure the other Ethernet Controller of the pair.

Building the Source RPM

The source RPM is also available on the support site:

SMC10GPCle-10BT: Linux NET driver source RPM

The source RPM can be used to build a binary RPM for that can be installed as detailed in the section "Installation From a Binary RPM" on page 3-6.

1. Before building the source RPM, the kernel headers for your running kernel must be installed at `/lib/modules/<kernel-version>/build`. On RedHat and Fedora systems, install the appropriate `kernel-smp-devel` or `kernel-devel` package. On SuSE systems, install the `kernel-source` package.
2. To build a binary RPM for the running kernel type

```
rpmbuild --rebuild <package name>
```

Note: Unfortunately, the location of the generated rpm is dependent on the distribution you are using, and often the version of the distribution and the rpm build tools. The following steps may be useful to locate the newly built rpm:

- The rpmbuild process should print out the location of the rpm towards the end of the build process, but it can be hard to find amongst the output.
- Typically the rpm will be placed in `/usr/src/<dir>/RPMS/<arch>/`, where `<dir>` is distribution specific. Possible folders are "redhat", "packages" or "extra." The rpm file will be named using the same convention as the SMC-provided pre-built binary rpms.
- The command

```
find /usr/src -name "*sfc*.rpm"
```

will list the locations of all SMC rpms.

3. The resulting binary RPM package can be installed as detailed in the section "Installation From a Binary RPM" on page 3-6.

Please consult the rpmbuild man pages for other options, for example, details how to build an RPM for a kernel variant other than the current running kernel version.

Appendix A: Troubleshooting

PCI Express Bus Width

Unlike the older PCI and PCIX bus interfaces, PCI Express (PCIe) is implemented with serial links or “lanes.” As a consequence, PCIe slots come in different widths, which are referred to as “by x” where “x” means multiplied. Currently there are 1x, 4x, 8x, and 16x widths. An 8x slot is composed of eight individual lanes. Each lane has a 250 Mbps clock rate in both directions (full duplex).

Cards and slots are upward compatible: A smaller card will fit in (and work in) a larger slot. That is, a 1x card will work in any slot, a 4x card will work in slots 4x and up, and so on. Higher level cards cannot physically fit in a smaller slot; for example, a 16x card will not fit into an 8x slot.

The SMC Server Adapter is designed for 8x operation, with a raw bandwidth of 20 Gbs full duplex on the Ethernet port. On some server motherboards, choice of PCIe slot is important. This is because some slots (including ones that are physically 8 lanes or 16 lanes) may only support 4 lanes or may be limited to a lower bus speed. In 4-lane slots, SMC adapters will continue to work, but will not achieve the best performance possible. Users should consult their server manual for further information.

Common Installation Problems

Problems are often caused by cabling errors, conflicts with other devices installed in the same computer, or software that has been configured incorrectly. If you encounter a problem with the SMC Server Adapter, use the following checklists to identify and correct the problem.

If your computer cannot find the SMC Server Adapter, or the network driver does not install correctly, check the following items before contacting SMC Technical Support.

- Make sure the card is securely seated in the PCIe slot. Check for any hardware problems, such as physical damage to the card's edge connector.
- If there are other network cards in the computer, they may be causing conflicts. Remove all other cards from the computer and test the SMC Server Adapter separately. If you continue to have problems, remove all cards except the SMC Server Adapter and your video card.

Network Connection Problems

There may be a network connection problem if LEDs on the card's bracket do not turn on, or if you cannot access any network resources from the computer. Check the following items before contacting SMC Technical Support.

- Be sure you are using the appropriate cable, and that the length of any cable does not exceed the specified lengths listed in the section "Cable Types" on page B-1.
- Inspect all network cables and connections. Make sure the network cable is securely attached to the card's connector.
- Make sure the correct network card driver is installed for your operating system. If necessary, try reinstalling the driver.
- Make sure the computer and other network devices are receiving power. If you suspect a power outlet to be faulty, plug another device into it to verify that it is working.
- If you cannot access a service on the network, check that you have enabled and configured the service correctly. If you cannot connect to a particular server, ensure that you have access rights and a valid ID and password.
- If you cannot access the Internet, be sure you have configured your system for TCP/IP and configured the IP address, mask and gateway correctly.

Appendix B: Cable Types

UTP Cables

The SMC TigerCard™ 10G 10GBASE-T Ethernet Server Adapter supports transmission over several cable types. The primary cable specified for 10GBASE-T is augmented Category 6 (Cat6a). Other types also work, but the specific installation may have to be qualified for 10G operation. See the IEEE 802.3an-2006 standard and appropriate TIA specifications.

Cable	Type	Max. Length	Max. Connectors
Category 5e	UTP	45 meters	2
Category 6	UTP	55 meters	2
Category 6a	UTP	100 meters	4
Category 7	STP	100 meters	4

Fiber Cables

The SMC TigerCard™ 10G XFP Ethernet Server Adapter supports transmission over several fiber cable types, depending on the XFP transceiver installed.

Maximum 10GBASE-SR 10 Gigabit Ethernet Cable Lengths			
Fiber Diameter	Fiber Bandwidth	Maximum Cable Length	Connector
62.5/125 micron multimode fiber	160 MHz/km	2-26 m (7-85 ft.)	LC
62.5/125 micron multimode fiber	200 MHz/km	2-33 m (7-108 ft.)	LC
50/125 micron multimode fiber	400 MHz/km	2-66 m (7-217 ft.)	LC
50/125 micron multimode fiber	500 MHz/km	2-82 m (7-269 ft.)	LC
50/125 micron multimode fiber	2000 MHz/km	2-300 m (7-984 ft.)	LC

Maximum 10GBASE-LR 10 Gigabit Ethernet Cable Lengths			
Fiber Diameter	Fiber Bandwidth	Maximum Cable Length	Connector
9/125 micron single-mode fiber	N/A	10 km (6.2 miles)	LC

Appendix C: Specifications

Standards

IEEE 802.3an-2006 10GBASE-T
IEEE 802.3ae-2002 10GBASE-SR, 10GBASE-LR
IEEE 802.3x Flow Control
IEEE 802.1Q VLAN tags and Priority

Interface

SMC10GPCIe-10BT: 1 Cat. 6a RJ-45, Auto MDI/MDI-X

- Cat. 5e up to 45 meters
- Cat. 6 up to 55 meters
- Cat. 6a up to 100 meters
- Cat. 7 up to 100 meters

SMC10GPCIe-XFP: 1 XFP transceiver slot

Network Management

SNMP
ACPI
Remote boot

System Interface

PCI Express 1.1 x8

Interrupt Level

MSI
MSI-X

Data Rate

10 Gbps full duplex

MTBF

966,706 hours @ 25 °C (77 °F)
697,163 hours @ 50 °C (122 °F)

Power Consumption

SMC10GPCIe-10BT: 16 Watts with full traffic
SMC10GPCIe-XFP: 7.5 Watts with full traffic

LED Indicators

Three: Red (error checking), Green (link), Amber (activity)

Dimensions (without bracket)

167 x 69 mm (6.57 x 2.72 in.)

Weight

136 g (0.3 lbs)

Temperature

Standard Operating: 0 to 55 °C (32 to 122 °F)
Storage: -20 to 65 °C (-4 to 149 °F)

Operating Humidity

10% to 90% (Non-condensing)

Certifications

FCC Part 15, Class A

CE Mark Class A

RoHs compliant

Operating Systems

Linux® 2.4 Kernels (32 bit and 64 bit)

Linux® 2.6 Kernels (32 bit and 64 bit)

Prebuilt Linux Support

- RedHat Enterprise Linux 4

- RedHat Enterprise Linux 5

- SUSE Linux Enterprise Server 9

- SUSE Linux Enterprise Server 10

Microsoft Windows Server® 2008 (32 bit and 64 bit)

Microsoft Windows Server® 2003 (32 bit and 64 bit)

VMware ESX 3.5

Citrix XenServer 3.2

Warranty

Limited Lifetime

Glossary

10BASE-T

IEEE 802.3 specification for 10 Mbps Ethernet over two pairs of Category 3, 4, or 5 UTP cable. (Now incorporated in IEEE 802.3-2005.)

100BASE-TX

IEEE 802.3u specification for 100 Mbps Ethernet over two pairs of Category 5 UTP cable. (Now incorporated in IEEE 802.3-2005.)

1000BASE-T

IEEE 802.3ab specification for Gigabit Ethernet over 100-ohm Category 5, 5e or 6 twisted-pair cable (using all four wire pairs). (Now incorporated in IEEE 802.3-2005.)

Adapter

A device used to connect end-user nodes to the network; each contains an interface to a specific type of computer or system bus, for example, EISA, ISA, PCIe, PCMCIA, CardBus.

Alien Crosstalk

An electromagnetic noise that can occur in a cable that runs alongside one or more other signal-carrying cables.

Auto-Negotiation

A signaling method that allows each node to define its operational mode (for example, 1000 Mbps and half/full duplex) and to detect the operational mode of the adjacent node to which it is connected.

Backbone

The core infrastructure of a network. It is the portion of the network that transports information from one central location to another central location where it is unloaded onto a local system.

Bandwidth

The difference between the highest and lowest frequencies available for network signals. Also synonymous with wire speed, the actual speed of the data transmission along the cable.

Checksum Offload

The calculation and validation for the checksums found in IP, TCP and UDP. This feature saves a significant amount of valuable CPU cycles.

End Station

A workstation, server, or other device that does not forward traffic.

Ethernet

A network communication system developed and standardized by DEC, Intel, and Xerox, using baseband transmission, CSMA/CD access, logical bus topology, and coaxial cable. The successor IEEE 802.3 standard provides for integration into the OSI model and extends the physical layer and media with repeaters and implementations that operate on fiber, thin coax and twisted-pair cable.

Full Duplex

Transmission method that allows two network devices to transmit and receive concurrently, effectively doubling the bandwidth of that link.

Gigabit Ethernet

A 1000 Mbps network communication system based on Ethernet and the CSMA/CD access method.

IEEE

Institute of Electrical and Electronic Engineers.

IEEE 802.3

The body of specifications that define the various standards of wired Ethernet and Ethernet physical layers.

IEEE 802.3x

Defines Ethernet frame start/stop requests and timers used for flow control on full-duplex links. (Now incorporated in IEEE 802.3-2005.)

IP Address

IP stands for Internet Protocol. An IP address consists of a series of four decimal numbers separated by periods, which identifies a single, unique Internet computer host. Example: 192.34.45.8.

iSCSI

Internet SCSI (Small Computer System Interface). An Internet Protocol based storage networking standard for linking data storage facilities.

Jumbo Frames

Ethernet frames with more than 1500 bytes of payload (MTU). Conventional jumbo frames can carry up to 9000 bytes of payload.

LED

Light emitting diode used for monitoring a device or network condition.

LAN Segment

A separate LAN or collision domain.

Local Area Network (LAN)

A group of interconnected computer and support devices. A LAN is made up of servers, workstations, a network operating system and communications links. Servers are high-speed machines that hold programs and data shared by network users. The workstations (clients) are the users' personal computers, which perform stand-alone processing and access the network servers as required.

LSO

A technology for reducing CPU overhead of TCP/IP on fast networks. Also known as TCP segmentation offload (TSO) and Generic segmentation offload (GSO).

MAC Address

A MAC (Media Access Control) address is the hardware address of a device connected to a network.

Media Access Control (MAC)

A portion of the networking protocol that governs access to the transmission medium, facilitating the exchange of data between network nodes.

MII

Media Independent Interface. The standard interface for Fast Ethernet, similar to the AUI interface for traditional Ethernet.

MSI/MSIX

A record format and wire protocol used to communicate service-usage information.

MTU

Maximum Transmission Unit. The size (in bytes) of the largest packet that a given layer of a communications protocol can pass onwards.

Network Diameter

Wire distance between two end stations in the same collision domain.

Redundant Power Supply (RPS)

A backup power supply unit that automatically takes over in case the primary power supply should fail.

RJ-45 Connector

A connector for twisted-pair wiring.

RSS

Receive Side Scaling, raises utilization levels of multi-core servers dramatically by distributing the I/O load across all CPUs and cores.

STP

Shielded twisted-pair cable.

Switched Ports

Ports that are on separate collision domains or LAN segments.

TIA

Telecommunications Industry Association

Transmission Control Protocol/Internet Protocol (TCP/IP)

Protocol suite that includes TCP as the primary transport protocol, and IP as the network layer protocol.

TCP

Transmission Control Protocol. TCP and UDP (User Datagram Protocol) are the two transport protocols in TCP/IP. TCP ensures that a message is sent accurately and in its entirety. However, for real-time voice and video, there is really no time or reason to correct errors and UDP is used instead.

UDP

User Datagram Protocol. A protocol within the TCP/IP protocol suite that is used in place of TCP when a reliable delivery is not required. For example, UDP is used for real-time audio and video traffic where lost packets are simply ignored, because there is no time to retransmit. If UDP is used and a reliable delivery is required, packet sequence checking and error notification must be written into the applications.

UTP

Unshielded twisted-pair cable.

Virtual LAN (VLAN)

A Virtual LAN is a collection of network nodes with common requirements that are grouped together, regardless of their physical location or connection point in the network. A VLAN serves as a logical workgroup with no physical barriers, allowing users to share information and resources as though located on the same LAN segment.

TECHNICAL SUPPORT

From U.S.A. and Canada (24 hours a day, 7 days a week)
Phn: 800-SMC-4-YOU / 949-679-8000
Fax: 949-502-3400

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Technical Support information available at www.smc.com

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Informations Support Technique sur www.smc.com

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Technischer Support und weitere Information unter www.smc.com

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En www.smc.com Ud. podrá encontrar la información relativa a servicios de soporte técnico

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Technische ondersteuningsinformatie beschikbaar op www.smc.com

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Informações sobre Suporte Técnico em www.smc.com

SWEDISH

Information om Teknisk Support finns tillgängligt på www.smc.com

INTERNET

E-mail address: techsupport@smc.com

Driver updates

[http://www.smc.com/
index.cfm?action=tech_support_drivers_downloads](http://www.smc.com/index.cfm?action=tech_support_drivers_downloads)

World Wide Web

<http://www.smc.com/>

SMC10GPCIe-10BT
SMC10GPCIe-XFP