

Broadcom[®] NetXtreme[®] BCM57XX User Guide

Last revised: January 2021

2CS57XX-CDUM518

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Section 1: Installing the Hardware

- [Safety Precautions](#)
- [Preinstallation Checklist](#)
- [Installing the Adapter](#)
- [Connecting the Network Cables](#)



Note: This section applies only to add-in NIC models of Broadcom NetXtreme Gigabit Ethernet adapters.

Safety Precautions



Caution! The adapter is being installed in a system that operates with voltages that can be lethal. Before you remove the cover of your system, you must observe the following precautions to protect yourself and to prevent damage to the system components:

- Remove any metallic objects or jewelry from your hands and wrists.
- Make sure to use only insulated or non-conducting tools.
- Verify that the system is powered OFF and unplugged before you touch internal components.
- Install or remove adapters in a static-free environment. The use of a properly grounded wrist strap or other personal antistatic devices and an antistatic mat is strongly recommended.

Preinstallation Checklist

1. Verify that your server is using the latest BIOS.
2. If your system is booted to an operating system, gracefully power down the OS.
3. When system shutdown is complete, turn off the power and unplug the power cord.
4. Holding the adapter card by the edges, remove it from its shipping package and place it on an antistatic surface.
5. Check the adapter for visible signs of damage, particularly on the card edge connector. Never attempt to install any damaged adapter.

Installing the Adapter

The following instructions apply to installing the Broadcom NetXtreme Gigabit Ethernet adapter (add-in NIC) in most servers. Refer to the manuals that were supplied with your server for details about performing these tasks on your particular server.

1. Review the [Safety Precautions](#) and [Preinstallation Checklist](#). Before installing the adapter, ensure the system power is OFF and unplugged from the power outlet, and that proper electrical grounding procedures have been followed.
2. Open the system case, and select any empty PCI Express slot.
3. Remove the blank cover-plate from the slot that you selected.
4. Align the adapter connector edge with the connector slot in the system.
5. Applying even pressure at both corners of the card, push the adapter card into the slot until it is firmly seated. When the adapter is properly seated, the adapter port connectors are aligned with the slot opening, and the adapter faceplate is flush against the system chassis.



Caution! Do not use excessive force when seating the card as this may damage the system or the adapter. If you have difficulty seating the adapter, remove it, realign it, and try again.

6. Secure the adapter with the adapter clip or screw.
7. Close the system case and disconnect any personal antistatic devices.

Connecting the Network Cables

Copper

The Broadcom NetXtreme Gigabit Ethernet adapter has one or more RJ-45 connectors used for attaching the system to an Ethernet copper-wire segment.



Note: The Broadcom NetXtreme Gigabit Ethernet adapter supports Automatic MDI Crossover (MDIX), which eliminates the need for crossover cables when connecting machines back-to-back. A straight-through Category 5 cable allows the machines to communicate when connected directly together.

1. Select an appropriate cable. [Table 1: “10/100/1000BASE-T Cable Specifications”](#) lists the cable requirements for connecting to 10/100/1000BASE-T ports:

Table 1: 10/100/1000BASE-T Cable Specifications

Port Type	Connector	Media	Maximum Distance
10BASE-T	RJ-45	Category 3, 4, or 5 UTP	100 meters (328 feet)
100/1000BASE-T ¹	RJ-45	Category 5 ² UTP	100 meters (328 feet)

¹1000BASE-T signaling requires four twisted pairs of Category 5 balanced cabling, as specified in ISO/IEC 11801:1995 and EIA/TIA-568-A (1995) and tested using procedures defined in TIA/EIA TSB95.

²Category 5 is the minimum requirement. Category 5e and Category 6 are fully supported.

2. Connect one end of the cable to the adapter.
3. Connect the other end of the cable to an RJ-45 Ethernet network port.



Note: After the cable is properly connected at both ends, the port LEDs on the adapter should be functional. See [Table 1: “10/100/1000BASE-T Cable Specifications,” on page 8](#) for a description of network link and activity indications

Section 2: Functionality and Features

- [Functional Description](#)
- [Features](#)
- [Supported Operating Environments](#)
- [Network Link and Activity Indication](#)

Functional Description

Broadcom NetXtreme Gigabit Ethernet adapters connect a PCI Express™ compliant system to a Gigabit Ethernet network. Broadcom NetXtreme Gigabit Ethernet adapters incorporate a technology that transfers data at a maximum rate of 1 gigabit per second—10 times the rate of Fast Ethernet adapters.

Using the Broadcom teaming software, you can split your network into virtual LANs (VLANs) as well as group multiple network adapters together into teams to provide network load balancing and fault tolerance functionality. See [Teaming](#) and [Broadcom Gigabit Ethernet Teaming Services](#) for detailed information about teaming. See [Virtual LANs](#) for a description of VLANs. See [Configuring Teaming](#) for instructions on configuring teaming and creating VLANs on Windows operating systems.

Features

The following is a list of the Broadcom NetXtreme Gigabit Ethernet adapter features for all supported operating systems:

- Integrated quad 10/100/1000BASE-T and quad 1000BASE-X/SGMII 1.25 Gbaud SerDes transceivers
- Energy Efficient Ethernet™ compliant with IEEE Std 802.3az-2010
- IEEE 802.3ap Clause 73 auto-negotiation
- Quad 10/100/1000BASE-T full-duplex/half-duplex MACs
- Quad 1000BASE-X/SGMII full-duplex/half-duplex MACs
- Automatic MDI crossover
- x2 PCI Express v2.0 at 5 GT/s or 2.5 GT/s
- MSI and MSI-X capabilities—up to 17 MSIX vectors
- I/O Virtualization support for VMware NetQueue and Microsoft VMQ
 - 17 receive queues and 16 transmit queues
 - 17 MSI-X vectors supporting per queue interrupt to host
- Flexible MSI-X vector to transmit/receive queue association
- Function Level Reset
- Receive Side Scaling (RSS) with per queue MSI-X vector support and support for UDP RSS hash type
- Transmit Side Scaling (TSS) and multi-Tx queue with per queue MSI-X vector support
- Jumbo frame support for up to 9000-byte payload

- Virtual LAN (VLAN) support— IEEE 802.1q VLAN tagging
- TCP, IP, UDP checksum offload
- Large Send Offload (LSO), TCP Segmentation Offload (TSO)
- Hardware assist for IEEE 1588 and IEEE 802.1AS time synchronization implementations
- IEEE 802.3x flow control
- SMBus 2.0 Interface
- Statistics for SNMP MIB II, Ethernet-like MIB and Ethernet MIB (IEEE 802.3z, Clause 30)
- ACPI power management compliance
- Advanced power management by a Central Power Management Unit (CPMU)
- Efficient integrated switching regulator controller
- On-chip temperature monitor
- PCI Express CLKREQ support
- Power Management Offload (PM Offload)
- Serial flash and EEPROM NVRAM support; flash auto-configure
- ECC error detection and correction on internal SRAM
- JTAG boundary scan support

Power Management

Wake on LAN (Magic Packet, Wake Up Frame, specific pattern) is supported.



Note: Adapter speed connection when the system is down waiting for a wake-up signal is either 10 Mbps or 100 Mbps, but can return to 1000 Mbps when the system is up and running if connected to a 1000 Mbps capable switch. Systems intending to use Wake on LAN (WOL) should be connected to a switch capable of both 1000 and 10/100 Mbps speeds.

Adaptive Interrupt Frequency

The adapter driver intelligently adjusts host interrupt frequency based on traffic conditions, to increase overall application throughput. When traffic is light, the adapter driver interrupts the host for each received packet, minimizing latency. When traffic is heavy, the adapter issues one host interrupt for multiple, back-to-back incoming packets, preserving host CPU cycles.

Dual DMA Channels

The PCIe interface on Broadcom NetXtreme Gigabit Ethernet adapters contains two independent DMA channels for simultaneous read and write operations.

ASIC with Embedded RISC Processor

The core control for Broadcom NetXtreme Gigabit Ethernet adapters resides in a tightly integrated, high-performance ASIC. The ASIC includes a RISC processor. This functionality provides the flexibility to add new features to the card and adapts it to future network requirements through software downloads.

Broadcom NetXtreme manageability operations such as DMTF, SMASH, DASH, and NC-SI pass-through run on a high-performance application processor engine (APE), which is a separate from the traditional network processing engine.

Supported Operating Environments

The Broadcom NetXtreme Gigabit Ethernet adapter has software support for the following operating systems:

- Microsoft® Windows® Server 2016 or 2019
- Linux® RHEL 7.9 or 8.3 SLES 15 SP 2
- VMware ESXi 6.7 U3 or ESXi 7.0 U1

Network Link and Activity Indication

For copper-wire Ethernet connections, the state of the network link and activity is indicated by the LEDs on the RJ-45 connector, as described in [Table 2: “Network Link and Activity Indicated by RJ-45 Port LEDs,” on page 11](#). Broadcom Advanced Control Suite also provides information about the status of the network link and activity (see [Viewing Adapter Information](#)).

Table 2: Network Link and Activity Indicated by RJ-45 Port LEDs

Port LED	LED Appearance	Network State
Link LED	Off	No link (cable disconnected)
	Continuously illuminated	Link (Green–1 Gb, Amber –10 or 100 Mb)
Activity LED	Off	No network activity
	Blinking	Network activity

Section 3: Windows Driver and Management Application Installation

- [Installing the Driver Software](#)
- [Modifying the Driver Software](#)
- [Repairing or Reinstalling the Driver Software](#)
- [Removing the Device Drivers](#)
- [Viewing or Changing the Properties of the Adapter](#)
- [Setting Power Management Options](#)

Installing the Driver Software



Note: These instructions are based on the assumption that your Broadcom NetXtreme adapter was not factory installed. If your controller was installed at the factory, the driver software has been installed for you.

When Windows first starts after a hardware device (such as a Broadcom NetXtreme Adapter) has been installed, or after the existing device driver has been removed, the operating system automatically detects the hardware and prompts you to install the driver software for that device.



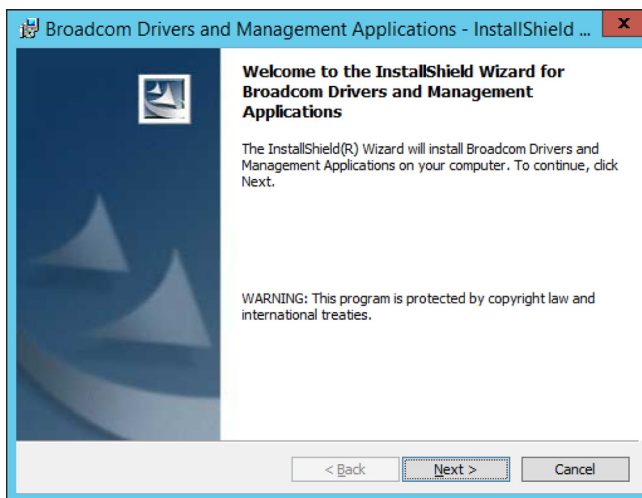
Notes:

- Before installing the driver software, verify that the Windows operating system has been upgraded to the latest version with the latest service pack applied.
- A network device driver must be installed before the Broadcom NetXtreme Gigabit Ethernet adapter can be used with your Windows operating system. Drivers are located on the installation CD.

Download the driver installer from the following link:

<http://www.dell.com/support>

Use the self-extracting zip file.



Using Silent Installation

Refer to the readme.txt file in the installation folder for command line instructions.

**Notes:**

- All commands are case sensitive.
- For detailed instructions and information about unattended installs, refer to the Silent.txt file in the Driver_Management_Apps_Installer folder.



Note: The REINSTALL switch should only be used if the same installer is already installed on the system. If upgrading an earlier version of the installer, use `setup /s /v/qn` as listed above.

Modifying the Driver Software

To modify the driver software

1. In Control Panel, double-click **Add or Remove Programs**.
2. Click **Broadcom Drivers and Management Applications**, and then click **Change**.
3. Click **Next** to continue.
4. Click **Modify, Add, or Remove** to change program features. This option does not install drivers for new adapters. For information on installing drivers for new adapters, see [Repairing or Reinstalling the Driver Software](#).
5. Click **Next** to continue.
6. Click on an icon to change how a feature is installed.
7. Click **Next**.
8. Click **Install**.
9. Click **Finish** to close the wizard.
10. The installer will determine if a system restart is necessary. Follow the on-screen instructions.

Repairing or Reinstalling the Driver Software

To repair or reinstall the driver software

1. In Control Panel, double-click **Add or Remove Programs**.
2. Click **Broadcom Drivers and Management Applications**, and then click **Change**.
3. Click **Next** to continue.
4. Click **Repair or Reinstall** to repair errors or install drivers for new adapters.
5. Click **Next** to continue.
6. Click **Install**.
7. Click **Finish** to close the wizard.
8. The installer will determine if a system restart is necessary. Follow the on-screen instructions.

Removing the Device Drivers

When removing the device drivers, any management application that is installed is also removed.



Note: Windows Server 2008 and later provide the Device Driver Rollback feature to replace a device driver with one that was previously installed. However, the complex software architecture of the NetXtreme device may present problems if the rollback feature is used on one of the individual components. Therefore, we recommend that changes to driver versions be made only through the use of a driver installer.

To remove the device drivers

1. In Control Panel, double-click **Add or Remove Programs**.
2. Click **Broadcom Drivers and Management Applications**, and then click **Remove**. Follow the on-screen prompts.
3. Reboot your system to completely remove the drivers. If you fail to reboot your system, you will not be able to successfully install the drivers.

Viewing or Changing the Properties of the Adapter

To view or change the properties of the **Broadcom network adapter**

1. In Control Panel, click **Broadcom Control Suite 4**.
2. Click the Advanced section of the **Configurations** tab.

Setting Power Management Options

You can set power management options to allow the operating system to turn off the controller to save power or to allow the controller to wake up the computer. If the device is busy doing something (servicing a call, for example) however, the operating system will not shut down the device. The operating system attempts to shut down every possible device only when the computer attempts to go into hibernation. To have the controller stay on at all times, do not click the **Allow the computer to turn off the device to save power** check box.



Note: Power management options are not available on blade servers.



Notes:

- The Power Management tab is available only for servers that support power management.
- To enable Wake on LAN (WOL) when the computer is on standby, click **Allow the device to bring the computer out of standby** box.
- If you select **Only allow management stations to bring the computer out of standby**, the computer can be brought out of standby *only by Magic Packet*.



Caution! Do not select **Allow the computer to turn off the device to save power** for any adapter that is a member of a team.

Section 4: Linux Driver and Management Application Installation

- [Packaging](#)
- [Installing TG3 Driver Software](#)
- [Network Installations](#)
- [Unloading/Removing the TG3 Driver](#)
- [Driver Messages](#)
- [Teaming with Channel Bonding](#)

Packaging

The Linux TG3 driver is released in the following packaging formats (file names):

- Source RPM (*tg3-version.3dkms.src.rpm*)
- Supplemental (*tg3_sup-version.tar.gz*)
- Compressed tar (*tg3-version.tar.gz*)

Identical source files to build the driver are included in both RPM and TAR source packages. The tar file contains additional utilities such as patches and driver disk images for network installation.

Installing TG3 Driver Software

- [Installing the Source RPM Package](#)
- [Building the Driver from the Source TAR File](#)

Installing the Source RPM Package

Prerequisites:

- Linux kernel source
- C compiler

Procedure:

1. Install the source RPM package.

```
rpm -ivh tg3-version.src.rpm
```

2. Change the directory to the RPM path and build the binary driver for your kernel (the RPM path is different for different Linux distributions).

```
cd /usr/src/redhat,OpenLinux,turbo,packages,rpm ...  
rpm -bb SPECS/tg3.spec or rpmbuild -bb SPECS/tg3.spec  
rpmbuild -bb SPECS/tg3.spec (for RPM version 4.x.x)
```



Note: During your attempt to install a source RPM package, the following message may be displayed:

```
error: cannot create %sourcedir /usr/src/redhat/SOURCE
```

The most likely cause of the error is that the rpm-build package has not been installed. Locate the rpm-build package on the Linux installation media and install it using the following command:

```
rpm -ivh rpm-build-version.i386.rpm
```

Complete the installation of the source RPM.

3. Install the newly-built package (driver and man page).

```
rpm -ivh RPMS/x86_64/tg3-version.i386.rpm
```

Depending on the kernel, the driver is installed to the following path:

2.6.x kernels:

```
/lib/modules/kernel_version/kernel/drivers/net/tg3.ko
```

4. Load the driver.

```
modprobe tg3
```

To configure the network protocol and address, refer to the Linux version-specific documentation.

Building the Driver from the Source TAR File

1. Create a directory (*tg3-version*) and extract the TAR files to the directory.

```
tar xvzf tg3-version.tgz
```

2. Build the driver *tg3.o* as a loadable module for the running kernel.

```
CD tg3-version
make clean
make; make install
```

3. Test the driver by loading it.

```
rmmod tg3
modprobe tg3
```

No message should be returned if this command runs properly.



Note: See the RPM instructions above for the location of the installed driver.

4. To configure network protocol and address, refer to the manuals supplied with your operating system.

Network Installations

For network installations through NFS, FTP, or HTTP (using a network boot disk or PXE), use the *tg3* driver that is part of the Linux operating system distribution.

Unloading/Removing the TG3 Driver

- [Unloading/Removing the Driver from an RPM Installation](#)
- [Removing the Driver from a TAR Installation](#)

Unloading/Removing the Driver from an RPM Installation

To unload the driver, use **ifconfig** to bring down all *ethX* interfaces opened by the driver, and then type the following:

```
rmmod tg3
```

If the driver was installed using **rpm**, do the following to remove it:

```
rpm -e tg3-<version>
```

Removing the Driver from a TAR Installation

If the driver was installed using **make install** from the tar file, the *tg3.o* driver file has to be manually deleted from the operating system. See [Installing the Source RPM Package](#) for the location of the installed driver.

If there is an interface configuration that is related to the *tg3* driver, then bring the interface down first by using **ifconfig ethx down** and then **rmmod tg3**.

Driver Messages

The following are the most common sample messages that may be logged in the `/var/log/messages` file. Use **dmesg -n/level** to control the level at which messages appear on the console. Most systems are set to level 6 by default.

Driver Sign on

```
tg3.c:version (date)
```

NIC Detected

```
eth#: Tigon3 [partno (BCM95xxx) rev 4202 PHY (57xx) (PCI Express) 10/100/1000BaseT
Ethernet :00:xx:xx:xx:xx:xx
eth#: RXcsuns [1] LinkChg REG [0] MIirq [0] ASF [0] Split [0] Wirespeed [1]TSOcap [1]
eth#: dma_rwctrl [76180000]
ACPI : PCI interrupt 0000:02:02.0 [A] -> GSI 26 (level,low) -> IRQ 233
```

Flow Control

```
tg3: eth#: Flow control is configured for TX and for RX.
```

Link Up and Speed Indication

```
tg3: eth#: Link is up at 1000 Mbps, full duplex.
```

Link Down Indication

```
tg3: eth#: Link is down.
```

Teaming with Channel Bonding

With the TG3 driver, you can team adapters together using the bonding kernel module and a channel bonding interface. Refer to your Linux documentation for more information on Linux Channel Bonding.

Section 5: VMware Driver Software

- [Packaging](#)
- [Drivers](#)

Packaging

The VMware driver is released in the following packaging format.

Table 3: VMware Driver Packaging

Format	Drivers
VMware VIB	vmware-esx-drivers-net-tg3-version.x86_64.vib

Drivers

Download, Install, and Update Drivers

To download, install, or update the VMware ESX/ESXi driver for NetXtreme I GbE network adapters, see <http://www.vmware.com/support>.

Driver Parameters

NetQueue

The optional parameter **force_netq** can be used to set the number of Rx and Tx net queues. BCM57XX devices that support NetQueue are the BCM5718, BCM5719, and BCM5720.

Allowed values for x are -1 to 15:

- 1–15 will force the number of NetQueues for the given NIC.
- 0 disables NetQueue.
- -1 specifies to use the default driver NetQueue value.

The number of “x” entries can go up to 32, which means the maximum supported NICs = 32.

Example usage:

```
esxcfg-module -s force_netq=-1,0,1,2 tg3]
```

- tg3 NIC 0: Use the default number of NetQueues.
- tg3 NIC 1: Disable the NetQueue feature.
- tg3 NIC 2: Use 1 NetQueue.
- tg3 NIC 3: Use 2 NetQueues.

Note that the NIC # above does not correspond to the `vmnic<#>`. The NIC number is the system `vmnic` probe order number. Optimally, the number of NetQueues matches the number of CPUs on the machine.

Driver Parameters

Several optional parameters can be supplied as a command line argument to the `vmkload_mod` command. These parameters can also be set via the `esxcfg-module` command. See the man page for more information.

Driver Defaults

Table 4: VMware Driver Defaults

Parameter	Default Value
Speed	Autonegotiation with all speeds advertised
Flow Control	Autonegotiation with rx and tx advertised
MTU	1500 (range 46–9000)
Rx Ring Size	200 (range 0–511). Some chips are fixed at 64.
Rx Jumbo Ring Size	100 (range 0–255). Not all chips support the jumbo ring and some chips that support jumbo frames do not use the jumbo ring.
Tx Ring Size	511 (range (MAX_SKB_FRAGS+1) – 511). MAX_SKB_FRAGS varies on different kernels and different architectures. On a 2.6 kernel for x86, MAX_SKB_FRAGS is 18.
Coalesce RX Microseconds	20 (range 0–1023)
Coalesce RX Microseconds irq	20 (range 0–255)
Coalesce rx frames	5 (range 0–1023)
Coalesce rx frames irq	5 (range 0–255)
Coalesce TX Microseconds	72 (range 0–1023)
Coalesce tx usecs irq	20 (range 0–255)
Coalesce tx frames	53 (range 0–1023)
Coalesce tx frames irq	5 (range 0–255)
Coalesce stats usecs	1000000 (approx. 1 sec.). Some coalescing parameters are not used or have different defaults on some chips.
MSI	Enabled (if supported by the chip and passed the interrupt test).
WoL	Disabled

Driver Messages

The following are the most common sample messages that may be logged in the file `/var/log/messages`. Use `dmesg -n <level>` to control the level at which messages will appear on the console. Most systems are set to level 6 by default. To see all messages, set the level higher.

Driver Sign On

```
tg3.c:v3.118g (Jan 4, 2012)
```

NIC Detected

```
vmnic0#: Tigon3 [partno (BCM95xxx) rev 4202 PHY (57xx) (PCI Express) 10/100/1000BaseT
Ethernet :00:xx:xx:xx:xx:xx
vmnic0#: RXchecksums [1] LinkChg REG [0] MIirq [0] ASF [0] Split [0] Wirespeed [1]TSOcap [1]
vmnic0#: dma_rwctrl [76180000]
ACPI : PCI interrupt 0000:02:02.0 [A] -> GSI 26 (level,low) -> IRQ 233
```

Link Up and Speed Indication

```
tg3: vmnic0: Link is up at 1000 Mbps, full duplex.
tg3: vmnic0: Flow control is on for TX and on for RX.
```

Link Down Indication

```
tg3: vmnic0: Link is down.
```

Section 6: Specifications

- [10/100/1000BASE-T Cable Specifications](#)
- [Performance Specifications](#)

10/100/1000BASE-T Cable Specifications

Table 5: 10/100/1000BASE-T Cable Specifications

Port Type	Connector	Media	Maximum Distance
10BASE-T	RJ-45	Category 3, 4, or 5 unshielded twisted pairs (UTP)	100m (328 ft)
100/1000BASE-T ¹	RJ-45	Category 5 ² UTP	100m (328 ft)

¹1000BASE-T signaling requires 4 twisted pairs of Category 5 balanced cabling, as specified in ISO/IEC 11801:1995 and ANSI/EIA/TIA-568-A (1995) and tested for additional performance using testing procedures defined in TIA/EIA TSB95.

²Category 5 is the minimum requirement. Category 5e and Category 6 are fully supported.

Performance Specifications

Table 6: Performance Specifications

Feature	Specification
PCI Express™ Type Controllers (BCM57XX Controllers)	
PCI Express Interface	x1, x2, x4 link width
PCI Express Aggregated Bandwidth (transmit and receive)	2.5 Gbps or 5.0 Gbps
10/100/1000BASE-T	10/100/1000 Mbps (full-duplex)

Section 7: Troubleshooting

- [Troubleshooting Checklist](#)
- [Checking for Network Link and Activity](#)
- [Checking if Current Drivers Are Loaded](#)
- [Running a Cable Length Test](#)
- [Testing Network Connectivity](#)
- [Broadcom Boot Agent](#)
- [Kernel Debugging over Ethernet](#)
- [Miscellaneous](#)

Troubleshooting Checklist



Caution! Before you open the case of your system, review [Safety Precautions](#).

The following checklist provides recommended actions to take to resolve problems installing the Broadcom NetXtreme Gigabit Ethernet adapter or running it in your system.

- Inspect all cables and connections. Verify that the cable connections at the network adapter and the switch are attached properly. Verify that the cable length and rating comply with the requirements listed in [Connecting the Network Cables](#).
- Check the adapter installation by reviewing [Installing the Hardware](#). Verify that the adapter is properly seated in the slot. Check for specific hardware problems, such as obvious damage to board components or the PCI edge connector.
- Check the configuration settings and change them if they are in conflict with another device.
- Verify that your system is using the latest BIOS.
- Try inserting the adapter in another slot. If the new position works, the original slot in your system may be defective.
- Replace the failed adapter with one that is known to work properly. If the second adapter works in the slot where the first one failed, the original adapter is probably defective.
- Install the adapter in another functioning system and run the tests again. If the adapter passed the tests in the new system, the original system may be defective.
- Remove all other adapters from the system and run the tests again. If the adapter passes the tests, the other adapters may be causing contention.

Checking for Network Link and Activity

See [Testing Network Connectivity](#) or [Viewing Adapter Information](#) to check the state of the network link and activity as indicated by the port LEDs.

Checking if Current Drivers Are Loaded

Windows

See [Viewing Adapter Information](#) to view useful information about the adapter, its link status, and network connectivity.

Linux

To verify that the TG3 Linux driver is loaded properly, run:

```
lsmod | grep tg3
```

If the driver is loaded, a line similar to the one below is displayed, where *size* is the size of the driver in bytes, and *n* is the number of adapters configured.

Table 7: Linux Driver

<i>Module</i>	<i>Size</i>	<i>Used by</i>
TG3	<i>size</i>	<i>n</i>

Running a Cable Length Test

In Windows environments, a cable length test can be run. See [Analyzing Cables](#) for information about running a cable length test.

Testing Network Connectivity



Note: When using forced link speeds, verify that both the adapter and the switch are forced to the same speed, or that both sides are configured for auto-negotiation.

Windows

Use the ping command to determine if the network connection is working.



Note: Network connectivity can also be tested using the [Testing the Network](#) feature in Broadcom Advanced Control Suite 2.

1. Verify that the drivers are loaded and enabled.
2. Verify that the cable is attached and you have a proper link.
3. Click **Start**, and then click **Run**.
4. Type **cmd** in the **Open** box, and then click **OK**.
5. Type **ipconfig /all** to view the network connection to be tested.
6. Verify that the IP address is correct for the network to which the adapter(s) is connected.
7. Type **ping IP address**, and then press ENTER.

The ping statistics that are displayed indicate whether the network connection is working or not.

Linux

To verify that the Ethernet interface is up and running, run **ifconfig** to check the status of the Ethernet interface. It is possible to use **netstat -i** to check the statistics on the Ethernet interface. Go to [Linux Driver Software](#) for information on **ifconfig** and **netstat**.

Ping an IP host on the network to verify connection has been established:

From the command line, type **ping IP address**, and then press ENTER.

The ping statistics that are displayed indicate whether the network connection is working or not.

Broadcom Boot Agent

Problem: Unable to obtain network settings through DHCP using PXE.

Solution: For proper operation make sure that the Spanning Tree Protocol (STP) is disabled or that portfast mode (for Cisco) is enabled on the port to which the PXE client is connected. For instance, set `spantree portfast 4/12 enable`.

Kernel Debugging over Ethernet

Problem: When attempting to perform kernel debugging over an Ethernet network on a Windows 8.0 or Windows Server 2012 system, the system will not boot. This problem may occur with some adapters on systems where the Windows 8.0 or Windows Server 2012 OS is configured for UEFI mode. You may see a firmware error on screen, indicating that a Non Maskable Interrupt exception was encountered during the UEFI pre-boot environment.

Solution: Refer to the Microsoft knowledge base topic number 2920163, "[Non Maskable Interrupt error during boot on a system which has been configured for kernel debugging over Ethernet](#)".

Miscellaneous

Problem: Large Send Offload (LSO) and Checksum Offload are not working on my team.

Solution: If one of the adapters on a team does not support LSO, LSO does not function for the team. Remove the adapter that does not support LSO from the team, or replace it with one that does. The same applies to Checksum Offload.

Section 8: Regulatory Information

- [FCC Class B Notice](#)
- [VCCI Class B Notice](#)
- [CE Notice](#)
- [Canadian Regulatory Information \(Canada Only\)](#)
- [MIC Notice \(Republic of Korea Only\)](#)
- [BSMI](#)

FCC Class B Notice

Broadcom NetXtreme Gigabit Ethernet Controller
BCM95721A211
BCM95722A2202

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

The equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. The equipment generates, uses and can radiate radio-frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If the equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for assistance.

Do not make mechanical or electrical modifications to the equipment.



Note: If you change or modify the adapter without permission of Broadcom, you may void your authority to operate the equipment.

Broadcom Corporation
190 Mathilda Place
Sunnyvale, California 94086 USA

VCCI Class B Notice

The equipment is a Class B product based on the standard of the Voluntary Control Council for Interference from Information Technology Equipment (VCCI). If used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction manual.



Caution! The potential exists for this equipment to become impaired in the presence of conducted radio frequency energy between the frequency range of 59–66 MHz. Normal operation will return upon removal of the RF energy source.

VCCI Class B Statement (Japan)

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラス B 情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。

取扱説明書に従って正しい取り扱いをして下さい。

CE Notice

BЪЛГАРСКИ Bulgarian	<p>Този продукт отговаря на 2006/95/EC (Нисковолтова директива), 2004/108/EC (Директива за електромагнитна съвместимост) и измененията на Европейския съюз.</p> <p>Европейски съюз, Клас B</p> <p>Това устройство на Broadcom е класифицирано за използване в типичната за Клас B жилищна среда.</p> <p>Изготвена е "Декларация за съответствие" според горепосочените директиви и стандарти, която се съхранява в Broadcom Corporation, 190 Mathilda Place, Sunnyvale, California 94086, USA.</p>
ČESKY Czech	<p>Bylo ustanoveno, že tento produkt splňuje směrnici 2006/95/EC (nízkonapěťová směrnice), směrnici 2004/108/EC (směrnice EMC) a dodatky Evropské unie.</p> <p>Evropská unie, třída B</p> <p>Toto zařízení společnosti Broadcom je klasifikováno pro použití v obvyklém prostředí domácnosti (třída B).</p> <p>„Prohlášení o shodě“ v souladu s výše uvedenými směrnici a normami bylo zpracováno a je uloženo v archivu společnosti Broadcom Corporation, 190 Mathilda Place, Sunnyvale, California 94086, USA.</p>
Danish	<p>Denne produkt er fundet i overensstemmelse med 2006/95/EC (Lavvoltage-direktivet), 2004/108/EC (EMC-direktivet) og den Europæiske Unions ændringer.</p> <p>Den Europæiske Union, Klasse B</p> <p>Denne Broadcom-enhed er klassificeret til anvendelse i et typisk Klasse B-hjemligt miljø.</p> <p>En "Overensstemmelseserklæring", som er i henhold til foregående direktiver og standarder, er udført og arkiveret hos Broadcom Corporation, 190 Mathilda Place, Sunnyvale, California 94086, USA.</p>
NEDERLANDS Dutch	<p>Dit product is in overeenstemming bevonden met 2006/95/EC (Laagspanningsrichtlijn), 2004/108/EC (EMC-richtlijn) en amendementen van de Europese Unie.</p> <p>Europese Unie/Klasse B</p> <p>Dit Broadcom-apparaat is geclassificeerd voor gebruik in een typische klasse B woonomgeving.</p> <p>Een "Verklaring van conformiteit" in overeenstemming met de voorgenoemde richtlijnen en standaarden is beschikbaar bij Broadcom Corporation, 190 Mathilda Place, Sunnyvale, California 94086, USA.</p>
English	<p>This product has been determined to be in compliance with 2006/95/EC (Low Voltage Directive), 2004/108/EC (EMC Directive), and amendments of the European Union.</p> <p>European Union, Class B</p> <p>This Broadcom device is classified for use in a typical Class B domestic environment.</p> <p>A "Declaration of Conformity" in accordance with the preceding directives and standards has been made and is on file at Broadcom Corporation, 190 Mathilda Place, Sunnyvale, California 94086, USA.</p>
EESTLANE Estonian	<p>Antud toode vastab direktiividele 2006/95/EU (Madalpinge direktiiv), 2004/108/EU (EMC direktiiv) ja ELi parandustele.</p> <p>Euroopa Liit, Klass B</p> <p>Antud Broadcom toode on klassifitseeritud kasutamiseks tüüpilises B-klassi kodus keskkonnas.</p> <p>Vastavalt ülaltoodud direktiividele ja standarditele on koostatud „Vastavusdeklaratsioon“, mis on arvel ettevõttes Broadcom Corporation, 190 Mathilda Place, Sunnyvale, California 94086, USA.</p>
Finnish	<p>Tämä tuote täyttää Euroopan unionin direktiivin 2006/95/EY (pienjännitedirektiivi) ja direktiivin 2004/108/EY (sähkömagneettisesta yhteensopivuudesta annettu direktiivi), sellaisina kuin ne ovat muutettuina, vaatimuksia.</p> <p>Euroopan unioni, luokka B</p> <p>Tämä Broadcom-laitte on luokiteltu käytettäväksi tyypillisessä luokan B kotiympäristössä.</p> <p>Yllä mainittujen direktiivien ja standardien mukainen vaatimustenmukaisuusvakuutus on tehty, ja sitä säilyttää Broadcom Corporation, 190 Mathilda Place, Sunnyvale, California 94086, USA.</p>
FRANÇAIS French	<p>Ce produit a été déclaré conforme aux directives 2006/95/EC (Directive sur la faible tension), 2004/108/EC (Directive EMC) et aux amendements de l'Union européenne.</p> <p>Union européenne, classe B</p> <p>Cet appareil Broadcom est classé pour une utilisation dans un environnement résidentiel classique (classe B).</p> <p>Une « Déclaration de Conformité » relative aux normes et directives précédentes a été rédigée et est enregistrée auprès de Broadcom Corporation, 190 Mathilda Place, Sunnyvale, California 94086, USA.</p>

DEUTSCH German	<p>Es ist befunden worden, dass dieses Produkt in Übereinstimmung mit 2006/95/EC (Niederspannungs-Richtlinie), 2004/108/EC (EMV-Richtlinie) und Ergänzungen der Europäischen Union steht.</p> <p>Europäische Union, Klasse B Dieses Gerät von Broadcom ist für die Verwendung in einer typisch häuslichen Umgebung der Klasse B vorgesehen. Eine Konformitätserklärung in Übereinstimmung mit den oben angeführten Normen ist abgegeben worden und kann bei Broadcom Corporation, 190 Mathilda Place, Sunnyvale, California 94086, USA.</p>
ΕΛΛΗΝΙΚΟΣ Greek	<p>Το προϊόν αυτό συμμορφώνεται με τις οδηγίες 2006/95/ΕΕ (Οδηγία περί χαμηλής τάσης), 2004/108/ΕΕ (Οδηγία περί ηλεκτρομαγνητικής συμβατότητας), και τροποποιήσεις τους από την Ευρωπαϊκή Ένωση.</p> <p>Ευρωπαϊκή Ένωση, Κατηγορία Β Αυτή η συσκευή Broadcom είναι κατάλληλη για χρήση σε ένα σύνθετες οικιακό περιβάλλον κατηγορίας Β. Μία «Δήλωση Συμμόρφωσης» σύμφωνα με τις προηγούμενες οδηγίες και πρότυπα υπάρχει και είναι αρχειοθετημένη στο Broadcom Corporation, 190 Mathilda Place, Sunnyvale, California 94086, USA.</p>
MAGYAR Hungarian	<p>A termék megfelel a 2006/95/EGK (alacsony feszültségű eszközökre vonatkozó irányelv), a 2004/108/EGK (EMC irányelv) és az Európai Unió ajánlásainak.</p> <p>Európai Unió, „B” osztály Ez a Broadcom eszköz „B” osztályú besorolást kapott, tipikus lakossági környezetben való használatra alkalmas. Az előbbiekben ismertetett irányelvek és szabványok szellemében „Megfelelőségi nyilatkozat” készült, amely az irországi Broadcom Corporation, 190 Mathilda Place, Sunnyvale, California 94086, USA.</p>
PORTUGUES Iberian Portuguese	<p>Este produto está em conformidade com 2006/95/EC (Directiva de baixa tensão), com 2004/108/EC (Directiva de compatibilidade electromagnética) e com as alterações da União Europeia.</p> <p>União Europeia, Classe B Este dispositivo Broadcom está classificado para utilização num ambiente doméstico típico Classe B. Foi elaborada uma “declaração de conformidade” de acordo com as normas e directivas anteriores, encontrando-se arquivada na Broadcom Corporation, 190 Mathilda Place, Sunnyvale, California 94086, USA.</p>
ITALIANO Italian	<p>Il presente prodotto è stato determinato essere conforme alla 2006/95/CE (Direttiva Bassa Tensione), alla 2004/108/CE (Direttiva CEM) e a rettifiche da parte dell'Unione Europea.</p> <p>Unione Europea, Classe B Il presente dispositivo Broadcom è classificato per l'uso nel tipico ambiente domestico di Classe B. Una "Dichiarazione di conformità" secondo gli standard e le direttive precedenti è stata emessa e registrata presso Broadcom Corporation, 190 Mathilda Place, Sunnyvale, California 94086, USA.</p>
LATVISKS Latvian	<p>Sis izstrādājums atbilst direktīvām 2006/95/EK (Direktīva par zemsprieguma iekārtām), 2004/108/EK (Direktīva par elektromagnētisko saderību) un to labojumiem Eiropas Savienības ietvaros.</p> <p>Eiropas Savienība, klase B Šī firmas Broadcom ražotā ierīce ir atzīta par derīgu darbam B klasei atbilstošos mājās apstākļos. “Atbilstības deklarācija”, kas ir saskaņā ar iepriekšminētajām direktīvām un standartiem, ir sastādīta un tiek glabāta firmā Broadcom Corporation, 190 Mathilda Place, Sunnyvale, California 94086, USA.</p>
Lithuanian	<p>Buvo nustatyta, kad šis produktas atitinka direktyvą 73/23/EEB (žemos įtampos direktyvą), 89/336/EEB (elektromagnetinio suderinamumo direktyvą) ir Europos Sąjungos pataisas.</p> <p>Europos Sąjunga, B klasė Šis „Broadcom“ prietaisas yra klasifikuotas naudoti įprastose B klasės gyvenamosiose aplinkose. Atitikties deklaracija pagal visas galiojančias direktyvas ir standartus yra sudaryta ir saugoma įrašyta faile Broadcom Corporation, 190 Mathilda Place, Sunnyvale, California 94086, USA.</p>

Maltese	<p>Gie stabbilit li dan il-prodott hu konformi ma' 2006/95/KE (Direttiva dwar il-Vultaġġ Baxx), 2004/108/KE (Direttiva EMC), u emendi ta' l-Unjoni Ewropea.</p> <p>Unjoni Ewropea, Klassi B</p> <p>Dan it-tagħmir Broadcom hu kklassifikat għall-użu f'ambjent residenzjali tipiku ta' Klassi B. Saret "Dikjarazzjoni ta' Konformità" b'konformità mad-direttivi u ma' l-istandards imsemmijin qabel, u din tinsab iffajljata għand Broadcom Corporation, 190 Mathilda Place, Sunnyvale, California 94086, USA.</p>
POLSKI Polish	<p>Niniejszy produkt został określony jako zgodny z dyrektywą niskonapięciową 2006/95/WE i dyrektywą zgodności elektromagnetycznej 2004/108/WE oraz poprawkami do nich.</p> <p>Unia Europejska, klasa B</p> <p>Niniejsze urządzenie firmy Broadcom zostało zakwalifikowane do klasy B, do użytku w typowych środowiskach domowych.</p> <p>Zgodnie ze stosownymi dyrektywami i normami została sporządzona „Deklaracja zgodności”, która jest dostępna w aktach firmy Broadcom Corporation, 190 Mathilda Place, Sunnyvale, California 94086, USA.</p>
ROMAN Romanian	<p>S-a stabilit că acest produs respectă cerințele Directivei 2006/95/CE privind echipamentele de joasă tensiune, ale Directivei 2004/108/CE (Directiva EMC) privind compatibilitatea electromagnetică și ale amendamentelor Uniunii Europene.</p> <p>Uniunea Europeană, Clasa B</p> <p>Acest echipament Broadcom este clasificat pentru utilizare într-un mediu casnic tipic de Clasă B. Conform directivelor și standardelor de mai sus, a fost emisă o „Declarația de Conformitate”, arhivată la sediul Broadcom Corporation, 190 Mathilda Place, Sunnyvale, California 94086, USA.</p>
SLOVENSKY Slovakian	<p>Tento výrobok vyhovuje požiadavkám smernice 2006/95/EC (smernica o nízkom napätí), 2004/108/EC (smernica o elektromagnetickej kompatibilitate) a neskorším zmenám a doplnkom Európskej.</p> <p>Európska únia, Trieda B</p> <p>Toto zariadenie Broadcom triedy B je určené pre domáce prostredie.</p> <p>„Vyhlásenie o zhode“ vydané v súlade s predchádzajúcimi smernicami a štandardmi sa nachádza v spoločnosti Broadcom Corporation, 190 Mathilda Place, Sunnyvale, California 94086, USA.</p>
Slovenian	<p>Ta izdelek je v skladu z 2006/95/ES (Direktiva o nizki napetosti), 2004/108/ES (Direktiva o elektromagnetni združljivosti) in dopolnili Evropske unije.</p> <p>Evropska unija, razred B</p> <p>Ta Broadcomova naprava je razvrščena za uporabo v značilnem bivalnem okolju razreda B.</p> <p>«Izjava o skladnosti» je bila sprejeta v skladu s predhodnimi direktivami in standardi in je shranjena na naslovu Broadcom Corporation, 190 Mathilda Place, Sunnyvale, California 94086, USA.</p>
ESPAÑOL Spanish	<p>Este producto se ha fabricado de conformidad con la Directiva para bajo voltaje 2006/95/EC (Low Voltage Directive), la Directiva para compatibilidad electromagnética 2004/108/EC (EMC Directive) y las emiendas de la Unión Europea.</p> <p>Unión Europea, Clase B</p> <p>Este dispositivo Broadcom está clasificado para ser utilizado en un entorno doméstico convencional de Clase B.</p> <p>Se ha realizado una "Declaración de conformidad" de acuerdo con las directivas y estándares anteriores y está archivada en Broadcom Corporation, 190 Mathilda Place, Sunnyvale, California 94086, USA.</p>
SVENSK Swedish	<p>Denna produkt överensstämmer med EU-direktivet 2006/95/EC (lågspänningsdirektivet), 2004/108/EC (EMC direktivet), och andra ändringar enligt den Europeiska unionen.</p> <p>Europeiska unionen, klass B</p> <p>Den här Broadcom-enheten är klassificerad för användning i vanlig klass B-bostadsmiljö.</p> <p>En "Försäkran om överensstämmelse" i enlighet med de föregående direktiven och standarderna har framställts och finns registrerad hos Broadcom Corporation, 190 Mathilda Place, Sunnyvale, California 94086, USA.</p>
TURK Turkish	<p>Bu ürünün 2006/95/EC (Düşük Voltaj Direktifi), 2004/108/EC (EMC Direktifi), ve Avrupa Birliği'nin ilavelerine uygun olduğu belirlenmiştir.</p> <p>Avrupa Birliği, B Sınıfı</p> <p>Bu Broadcom cihazı, tipik bir B sınıfı, ev içi ortamda kullanılmak üzere sınıflandırılmıştır. Yukarıda belirtilen direktifler ve standartlara uygun olarak, bir "Uygunluk Beyanı" hazırlanmıştır, ve Broadcom Corporation, 190 Mathilda Place, Sunnyvale, California 94086, USA.</p>

Canadian Regulatory Information (Canada Only)

Industry Canada, Class B

This Class B digital apparatus complies with Canadian ICES-003.

Notice: The Industry Canada regulations provide that changes or modifications not expressly approved by Broadcom could void your authority to operate this equipment.

Industry Canada, classe B

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Avis : Dans le cadre des réglementations d'Industry Canada, vos droits d'utilisation de cet équipement peuvent être annulés si des changements ou modifications non expressément approuvés par Broadcom y sont apportés.

MIC Notice (Republic of Korea Only)

B CLASS Device

Broadcom NetXtreme Gigabit Ethernet Controller
 BCM95721A211
 BCM95722A2202

기종별	사용자안내문
B급 기기 (가정용)	이 기기는 가정용으로 전자파적합등록을 한 기기로서 주거지역에서는 물론 모든 지역에서 사용할 수 있습니다.



- 1. 기기의 명칭(모델명) : BCM95721A211
- 2. 인증번호 : E-G021-04-2613(B)
- 3. 인증받은 자의 상호 : Broadcom
- 4. 제조년월일 : 5/12/2004
- 5. 제조자/제조국가 : Foxconn/China



- 1. 기기의 명칭(모델명) : BCM95722A2202G
- 2. 인증번호 : BCM-BCM95722A2202G (B)
- 3. 인증받은 자의 상호 : BROADCOM
- 4. 제조년월일 : 04/30/2007
- 5. 제조자/제조국가 : Foxconn/China

Note that this device has been approved for non-business purposes and may be used in any environment, including residential areas.

BSMI

BSMI 通告（僅限於台灣）

大多數的 Dell 電腦系統被 BSMI（經濟部標準檢驗局）劃分為乙類數位裝置。但是，使用某些選件會使有些組態的等級變成甲類。若要確定您的電腦系統適用等級，請檢查所有位於電腦底部或背面板、擴充卡安裝托架，以及擴充卡上的 BSMI 註冊標籤。如果其中有一甲類標籤，即表示您的系統為甲類數位裝置。如果只有 BSMI 的檢磁號碼標籤，則表示您的系統為乙類數位裝置。

一旦確定了系統的 BSMI 等級，請閱讀相關的 BSMI 通告。請注意，BSMI 通告規定凡是未經 Dell Inc. 明確批准的擅自變更或修改，將導致您失去此設備的使用權。

此裝置符合 BSMI（經濟部標準檢驗局）的規定，使用時須符合以下兩項條件：

- 此裝置不會產生有害干擾。
- 此裝置必須能接受所接收到的干擾，包括可能導致無法正常作業的干擾。

乙類

此設備經測試證明符合 BSMI（經濟部標準檢驗局）之乙類數位裝置的限制規定。這些限制的目的是為了在住宅區安裝時，能防止有害的干擾，提供合理的保護。此設備會產生、使用並散發射頻能量；如果未遵照製造廠商的指導手冊來安裝和使用，可能會干擾無線電通訊。但是，這並不保證在個別的安装中不會產生干擾。您可以透過關閉和開啓此設備來判斷它是否會對廣播和電視收訊造成干擾；如果確實如此，我們建議您嘗試以下列一種或多種方法來排除干擾：

- 重新調整天線的接收方向或重新放置接收天線。
- 增加設備與接收器的距離。
- 將設備連接至不同的插座，使設備與接收器連接在不同的電路上。
- 請向經銷商或有經驗的無線電 / 電視技術人員查詢，以獲得幫助。