

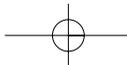
# NETGEAR™

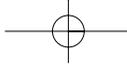
## Gigabit Ethernet Cards Reference Guide



MODEL  
**GA 620**

MODEL  
**GA 620T**





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It is hereby certified that the NETGEAR Model GA620 and Model GA620T Gigabit Ethernet Cards have been suppressed in accordance with the conditions set out in the BMPT-AmtsblVfg 243/1991 and Vfg 46/1992. The operation of some equipment (for example, test transmitters) in accordance with the regulations may, however, be subject to certain restrictions. Please refer to the notes in the operating instructions.

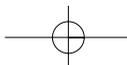
Federal Office for Telecommunications Approvals has been notified of the placing of this equipment on the market and has been granted the right to test the series for compliance with the regulations.

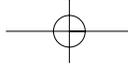
### Federal Communications Commission (FCC) Compliance Notice: Radio Frequency Notice

⇒ **Note:** Modifications to this device change it from the original state it was in when tested and may alter the device so that it no longer complies with FCC testing limitations for Class B digital devices. According to FCC regulations, the user could be prohibited from operating this equipment if it is modified.

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.
2. This device must accept any interference received, including interference that may cause undesired operation.





⊞ **Note:** This 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. This 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 this 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 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 help.

#### **EN 55 022 Statement**

This is to certify that the NETGEAR Model GA620 and Model GA620T Gigabit Ethernet Card are shielded against the generation of radio interference in accordance with the application of Council Directive 89/336/EEC, Article 4a. Conformity is declared by the application of EN 55 022 Class B (CISPR 22).

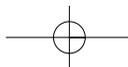
Compliance is dependent upon the use of shielded data cables.

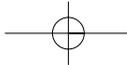
#### **Canadian Department of Communications Radio Interference Regulations**

These digital apparatus (NETGEAR Model GA620 and Model GA620T Gigabit Ethernet Card) do not exceed the Class B limits for radio-noise emissions from digital apparatus as set out in the Radio Interference Regulations of the Canadian Department of Communications.

#### **Règlement sur le brouillage radioélectrique du ministère des Communications**

Ces appareils numériques (NETGEAR Model GA620 et Model GA620T Gigabit Ethernet Cards) respectent les limites de bruits radioélectriques visant les appareils numériques de classe B prescrites dans le Règlement sur le brouillage radioélectrique du ministère des Communications du Canada.





### **Customer Support**

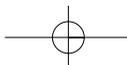
For assistance with installing and configuring your NETGEAR system or with questions or problems following installation:

- Check the NETGEAR Web page at <http://www.NETGEAR.com>.
- Call Technical Support at the phone number listed on the Support Information Card that shipped with your switch.
- Email Technical Support at [support@NETGEAR.com](mailto:support@NETGEAR.com).

Defective or damaged merchandise can be returned to your point-of-purchase representative.

### **Internet/World Wide Web**

NETGEAR maintains a World Wide Web home page that you can access at the universal resource locator (URL) <http://www.NETGEAR.com>. A connection to the Internet and a Web browser such as Internet Explorer or Netscape are required.



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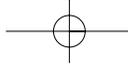
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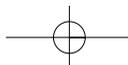
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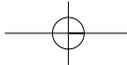
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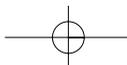
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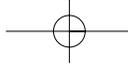
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## CHAPTER 1: INTRODUCTION

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Congratulations on your purchase of the NETGEAR™ Model GA620 or Model GA620T Gigabit Ethernet Card. Designed especially for high-performance systems, such as servers and high-end workstations, the Model GA620 and Model GA620T Gigabit Ethernet Cards offer 2 gigabits per second (Gbps) of aggregate bandwidth and optimize performance while minimizing network overhead on the host system. This guide describes the installation and use of the Model GA620 or Model GA620T Gigabit Ethernet Card for operation in a Microsoft® Windows NT®, Windows 2000®, or Novell NetWare environment.

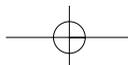
This chapter provides information about the features of the Model GA620 and Model GA620T Gigabit Ethernet Cards. The Model GA620 and Model GA620T Gigabit Ethernet Cards connect your PCI-compliant server or workstation to a Gigabit Ethernet network, incorporating a new technology that transfers data at a rate of 1 Gbps or 1000 megabits per second (Mbps), which is 100 times the rate of Ethernet.

### Benefits

Performance is optimized and network overhead on the host system is minimized with the use of the Model GA620 and Model GA620T Gigabit Ethernet Cards. These devices introduce CruiseControl, a NETGEAR feature that uses a set of functions to offload the host PC by providing interrupt coalescing and zero host copy.

With interrupt coalescing, the Model GA620 and Model GA620T Gigabit Ethernet Cards provide adaptive host interrupt frequency based on traffic load. In light traffic, they interrupt the host as soon as a packet arrives in order to minimize latency. In heavy traffic, the cards optimize host efficiency by coalescing interrupts—receiving back-to-back packets and issuing a single interrupt only when buffer space is low or its timer has expired. In this way, interrupt coalescing eliminates unnecessary interrupts, maximizing cycles for applications.

The Model GA620 and Model GA620T Gigabit Ethernet Cards can move packet headers and data to and from various memory locations, offloading CPU-consuming



copy operations from the host. In addition, data can be transferred directly between a network card and the application data buffer, allowing zero host copy packet processing.

The Model GA620 and Model GA620T Gigabit Ethernet Cards have demonstrated interoperability with all major Gigabit Ethernet equipment on the market that is compliant with IEEE 802.3z standards. In addition, because the Model GA620 and Model GA620T Gigabit Ethernet Cards use standard Ethernet frame and Media Access Control (MAC) formats, they provide full compatibility with 10 Mbps Ethernet and 100 Mbps Fast Ethernet network equipment through network switches from a variety of vendors, including NETGEAR.

## Features

The key features of the Model GA620 and Model GA620T Gigabit Ethernet Cards are:

- Full-duplex operation (2,000 Mbps: 1,000 Mbps each way) with DMA (Direct Memory Access) Gigabit Ethernet interface (IEEE 802.3z)
- Duplex SC fiber connector for 62.5-micron or 50-micron multimode fiber cable (Model GA620)
- RJ-45 connector for Category 5 unshielded twisted pair (UTP) cable (Model GA620T)
- Interoperability with existing Ethernet and Fast Ethernet equipment assuming standard Ethernet minimum and maximum frame size (64 to 1518 bytes), frame format, and compliance with the following standards and protocols:
  - Gigabit Ethernet (IEEE 802.3z)
  - Logical Link Control (IEEE 802.2)
  - Flow Control (IEEE 802.3x)

An Ethernet switch with a Gigabit port (for example, the NETGEAR Model FS509 Fast Ethernet Switch) or a buffered repeater meets the criteria for interoperability with the Model GA620 and Model GA620T Gigabit Ethernet Card.

- Standard Ethernet frame size (up to 1,518 bytes)
- Adaptive interrupt frequency

Adaptive interrupt frequency minimizes CPU utilization, therefore maximizing PCI bus and network throughput.
- 33/66 MHz, 32/64-bit PCI bus master (Local Bus Revision 2.2 compliant) with adaptive DMA channels

The Model GA620 and Model GA620T Gigabit Ethernet Cards each contain two independent DMA channels for simultaneous read and write operations. As bus masters, the network cards request access to the PCI bus instead of waiting to be polled.
- Software driver support for Windows NT 4.0, Windows 2000, and NetWare 4.2 and 5.0
- Universal dual-voltage signaling (3.3 V and 5 V)
- Five-year warranty
- Toll-free telephone support

## CHAPTER 2: HARDWARE INSTALLATION

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This chapter provides information about the package contents, system requirements, and installation of the NETGEAR Model GA620 and Model GA620T Gigabit Ethernet Cards.

### Package Contents

The product package should contain:

- Model GA620 or Model GA620T Gigabit Ethernet Card
- *Model GA620/GA620T Gigabit Ethernet Card Driver and Documentation CD*
- *Model GA620/GA620T Gigabit Ethernet Card Installation Guide*
- Warranty & Registration Card
- Support Information Card

Call your reseller or customer support in your area if there are any wrong, missing, or damaged parts. Refer to the Support Information Card for the telephone number of customer support in your area.

Keep the Support Information Card, along with the original packing materials. Use the packing materials to repack the Model GA620 and Model GA620T Gigabit Ethernet Card if you need to return it for repair.

To qualify for product updates and product warranty registrations, fill out the warranty and registration information within 30 days of purchase. For priority service, register online on the NETGEAR Web page at:

*<http://www.NETGEAR.com>*

You can also fill out and return the Warranty & Registration Card that is included in your product package. Requirements

## Requirements

Before installing the Model GA620 or Model GA620T Gigabit Ethernet Card, verify the software and hardware requirements outlined in Table 2-1.

**Table 2-1. Software and Hardware Requirements**

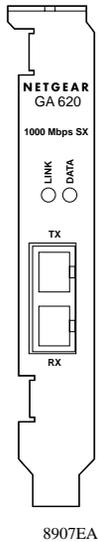
| System              | Requirements   |
|---------------------|--|
| <b>Windows NT</b>   |  |
| Hardware            | A Pentium-based server that meets Windows NT 4.0 software requirements<br>One open 32-bit or 64-bit PCI slot<br>Minimum 64 MB memory   |
| Operating System    | Windows NT 4.0 with Service Pack 5 or above. To download the latest Service Pack, go to the following Microsoft location on the Web:<br><a href="http://www.microsoft.com/downloads/search.asp">http://www.microsoft.com/downloads/search.asp</a><br>and search for the latest service pack  |
| Software            | Model GA620 and Model GA620T Gigabit Ethernet Card driver software, version 2.30 (or higher) for Windows NT; included on the <i>Model GA620 and Model GA620T Gigabit Ethernet Card Driver and Documentation CD</i> in the \nt40 directory are: <ul style="list-style-type: none"> <li>• <i>NETGA620.SYS</i> (network device driver file)</li> <li>• <i>NETGA620.DLL</i> (information used by installation program)</li> </ul>      |
| <b>Windows 2000</b> |  |
| Hardware            | A Pentium-based server that meets Windows 2000 software requirements<br>One open 32-bit or 64-bit PCI slot<br>Minimum 64 MB memory   |
| Operating System    | Windows 2000 Professional, Windows 2000 Server, or Windows 2000 Advanced Server  |
| Software            | Model GA620 and Model GA620T Gigabit Ethernet Card driver software, version 2.30 (or higher) for Windows 2000; included on the <i>Model GA620 and Model GA620T Gigabit Ethernet Card Driver and Documentation CD</i> in the \win2000 directory are: <ul style="list-style-type: none"> <li>• <i>GA620ND5.SYS</i> (network device driver file)</li> <li>• <i>NETGA620.INF</i> (information used by installation program)</li> </ul> |

**Table 2-1. Software and Hardware Requirements (continued)**

| System           | Requirements   |
|------------------|--|
| <b>NetWare</b>   |  |
| Hardware         | <p>A Pentium-based server that meets NetWare 4.2 or NetWare 5.0 software requirements</p> <p>One open 32-bit or 64-bit PCI slot</p> <p>Minimum 64 MB memory</p>  |
| Operating System | <p>If you are using NetWare 4.2, you must have the most recent support pack (Support Pack 8 or later). To download the latest support pack, go to the following Novell location on the Web:</p> <p><a href="http://support.novell.com/products/nw42/patches.htm">http://support.novell.com/products/nw42/patches.htm</a></p> <p>If you are using NetWare 5.0, you should try to download the most recent support pack (Support Pack 4 or later). To download the latest support pack, go to the following Novell location on the Web:</p> <p><a href="http://support.novell.com/products/nw5/patches.htm">http://support.novell.com/products/nw5/patches.htm</a></p> |
| Software         | <p>Model GA620 and Model GA620T Gigabit Ethernet Card driver software, version 2.30 (or higher) for NetWare (Included on the <i>Model GA620 and Model GA620T Gigabit Ethernet Card Driver and Documentation CD</i> in the \netware directory:</p> <ul style="list-style-type: none"> <li>• <i>GA620.LAN</i> (network device driver file)</li> <li>• <i>GA620.LDI</i> (information used by installation program)</li> </ul>   |

## Hardware Descriptions

As illustrated in Figure 2-1, the Model GA620 Gigabit Ethernet Card has a Tx (transmit) port, an Rx (receive) port, and the two port LEDs described in Table 2-2.

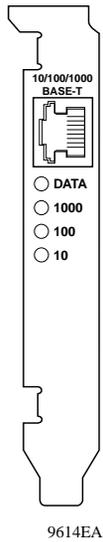


**Figure 2-1. Front Panel of Model GA620 Gigabit Ethernet Card**

**Table 2-2. Model GA620 Port LEDs**

| Label | Activity        | Description   |
|-------|-----------------|---|
| LINK  | Blinking slowly | The port is disabled.   |
|       | On              | A good link exists on the port.   |
|       | Off             | No link exists on the port. There could be a bad cable, a bad connector, or a configuration mismatch. |
| DATA  | Blinking or On  | Data is detected on the port.   |
|       | Off             | No data is detected on the port.  |

As illustrated in Figure 2-2, the Model GA620T Gigabit Ethernet Card has an RJ-45 connector port and four port LEDs.



**Figure 2-2. Front Panel of Model GA620T Gigabit Ethernet Card**

The front panel of the Model GA620T has four LEDs: one for each port speed option (10 Mbps, 100 Mbps, and 1000 Mbps), to indicate which link is active, and one LED for data transfer status. Until the driver software is properly installed, all four LEDs will remain lit when the server is powered on. Once the hardware and its driver software have been properly installed on your system, the LEDs will indicate as described in Table 2-3.

**Table 2-3. Model GA620T Port LEDs**

| Label | Activity | Description  |
|-------|----------|--|
| DATA  | Blinking | Brief bursts of data detected on the port.   |
|       | On       | Streams of data detected on the port.  |
|       | Off      | No data detected on the port.  |
| 1000  | On       | Good 1000 Mbps Gigabit Ethernet link.  |
|       | Off      | No 1000 Mbps link; possible link at different speed, possible bad cable, bad connector, or configuration mismatch. |
| 100   | On       | Good 100 Mbps Fast Ethernet link.  |
|       | Off      | No 100 Mbps link; possible link at different speed, possible bad cable, bad connector, or configuration mismatch.  |
| 10    | On       | Good 10 Mbps Ethernet link   |
|       | Off      | No 10 Mbps link; possible link at different speed, possible bad cable, bad connector, or configuration mismatch.   |

⊕ **Note:** If all four LEDs remain lit simultaneously, the card driver software is either missing or improperly installed.

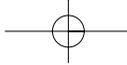
### Preparing to Install Your Gigabit Ethernet Card

Follow the instructions provided in this section for installing the Model GA620 or Model GA620T Gigabit Ethernet Card in your server or workstation. For additional information about performing these tasks on your particular system, refer to the manuals included with your system hardware.

Before installing your Gigabit Ethernet Card:

1. Make sure that your system meets the hardware and software requirements provided in Table 2-1.
2. Make sure that your system uses the latest BIOS.

For information on BIOS parameters, refer to Table 6-3 on page 6-6 of Chapter 6 "Troubleshooting."



3. Turn off the power to your PC.

- If you are running Windows, close all applications and click on Start from the desktop menu, select Shut Down, and then select Shut down the computer.
- If you are running NetWare, use the following commands to shut down the server functions and reach the DOS prompt:

```
server_name: down
```

```
server_name: exit
```



**Danger:** You are installing the card in a machine that operates with voltages that can be dangerous. Follow the steps after this warning to protect yourself and to prevent damage to the PC components.

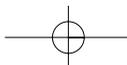
4. Protect yourself, the card, and your server by taking these precautions:

- a. Shut down the server software and turn the power off to your server.
- b. Use only insulated or nonconducting tools.
- c. Hold the Gigabit Ethernet Card by the edges and place it on an antistatic surface.
- d. Check the card for visible signs of damage, particularly to the connector on the edge of the card. Never attempt to install a damaged card.

### Installing Your Gigabit Ethernet Card

To install your Model GA620 or Model GA620T Gigabit Ethernet Card:

1. Remove the PC cover.
2. Choose an available 32-bit or 64-bit PCI expansion slot (PCI slots are usually the shorter slots) and remove the corresponding back plate from the PC chassis.



3. Insert the card into the PCI expansion slot.

- ⇒ **Note:** To avoid damaging any components on the card, handle it by the edges, using your thumbs to push it securely into the PCI slot. Do not use excessive force, but make sure the card is fully inserted into the slot to prevent the PC operating system from freezing at startup.

The connector dock in a 32-bit PCI slot is shorter than in a 64-bit PCI slot. When installed in a 32-bit PCI slot, part of the connector edge remains undocked. This situation is normal.

4. Fasten the card to the rear of the computer chassis by tightening the screw that is on the PC.
5. Replace the PC cover and reconnect the power cord to the PC.

### Connecting the Network Cables

The Model GA620 Gigabit Ethernet Card has one SC-type connector for attaching the server or workstation to a Gigabit Ethernet fiber segment. The port is capable of auto negotiating and supports full-duplex operation.

To connect a network cable:

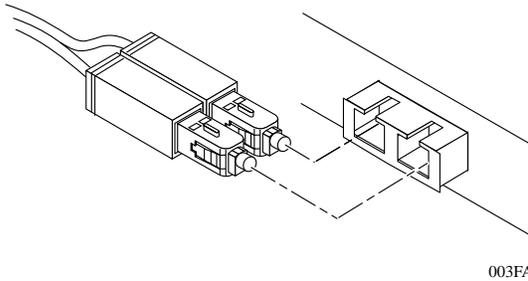
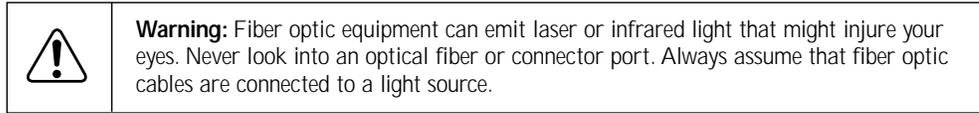
1. Choose an appropriate cable, using the information listed in Table 2-4.

**Table 2-4. Model GA620 (1000BASE-SX) Cable Characteristics**

| Multimode Fiber | 62.5/125 Micron* | 50/125 Micron*                                      |
|-----------------|------------------|---|
| Operating Range | 2 to 260 meters  | 2 to 550 meters<br>(in compliance with IEEE 802.3z) |

\*Shortwave laser optics (850 nm)

Connect one end of the cable to the Model GA620 Gigabit Ethernet Card, as shown in Figure 2-3.



**Figure 2-3. Fiber Connector for the Model GA620 Gigabit Ethernet Card**

3. Connect the other end of the cable to a Gigabit Ethernet network port.

Attach the cable connector so that the Tx port on the Model GA620 Gigabit Ethernet Card is connected to the Rx port of the device at the other end of the cable.

4. Turn on power to the PC and then to the connected device.
5. Verify that the Link LED is on (on the Model GA620 Gigabit Ethernet Card), indicating that there is a good link on the port.

If the Link LED is off, it could indicate a bad cable, a bad cable connector, or a configuration mismatch. For more information about troubleshooting your problem, refer to Chapter 6 "Troubleshooting," before installing a driver as outlined in Chapter 3 "Windows NT Driver Software," Chapter 4 "Windows 2000 Driver Software," or Chapter 5 "Novell NetWare Driver Software."

The Model GA620T has one RJ-45 connector used for attaching the system to an Ethernet copper-wire segment. When link negotiation is disabled, the port supports 10 Mbps, 100 Mbps, or 1000 Mbps signaling and either half-duplex or full-duplex operation.

1. Prepare an appropriate cable.

Table 2-5 lists the cable characteristics for connecting to 10/100/1000BASE-T ports.

**Table 2-5. Model GA620T (10/100/1000BASE-T) Cable Characteristics**

| Port Type      | Connector | Media              | Maximum Distance      |
|----------------|-----------|--------------------|-----------------------|
| 10BASE-T       | RJ-45     | CAT 3, 4, or 5 UTP | 100 meters (325 feet) |
| 100/1000BASE-T | RJ-45     | CAT 5 UTP          | 100 meters (325 feet) |

- ⊕ **Note:** 1000BASE-T signaling requires four twisted pairs of Category 5 balanced cabling, as specified in ISO/IEC 11801:1995 and ANSI/EIA/TIA-568-A (1995) and tested using procedures defined in TIA/EIA TSB95.
2. Connect one end of the cable to the Model GA620T.
  3. Connect the other end of the cable to an RJ-45 Ethernet network port.
- ⊕ **Note:** The port LEDs are not functional (they will not reflect port link or data status) until the driver software is installed. See Table 2-3 on page 2-6 for a description of port LED operation. See Chapter 3 through 5 for driver installation and configuration instructions.
4. Turn on power to the PC and then to the connected device.
  5. Verify that one of the three link speed LEDs is on, indicating that there is a good link on the port.

## CHAPTER 3: WINDOWS NT DRIVER SOFTWARE

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This chapter provides information about the Microsoft Windows NT driver software. Use the Windows NT driver software if you installed the NETGEAR Model GA620 or Model GA620T Gigabit Ethernet Card in a PC that is operating in a Windows NT environment.

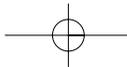
This chapter also gives directions for performing the following procedures:

- Installing the driver software (this page)
- Changing the driver configuration after the driver software is installed (page 3-7)
- Updating or reinstalling the driver software (page 3-8)
- Moving the network card and removing the driver software (page 3-9)
- Internal loopback test

⊖ **Note:** To prevent a system abend when using the Windows NT Network Monitor, be sure to upgrade the operating system *bhnt.sys* file to the latest version available.

### Installing the Driver Software

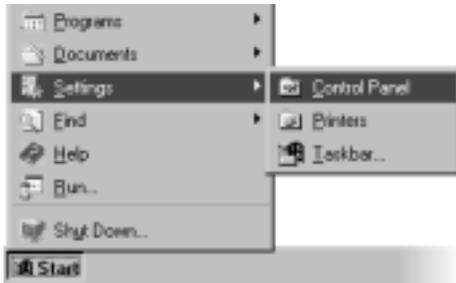
Your Gigabit Ethernet Card must be physically installed in the server before installing the software driver. If you are installing more than one Gigabit Ethernet Card, you must perform the following procedure for each card.



To install the driver software if you are operating in a Windows NT environment:

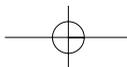
1. Start your Windows NT system and log in.

You must have Network Administrator privileges to install the driver software.



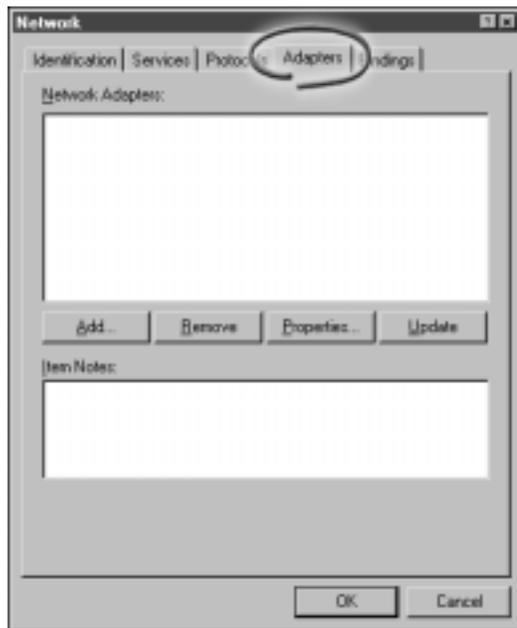
2. Click on Start from the Windows desktop menu; select Settings and then Control Panel.

The Control Panel window opens, displaying a group of icons including the Network icon.



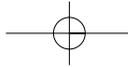
3. Double-click on the Network icon.

The Network window opens.



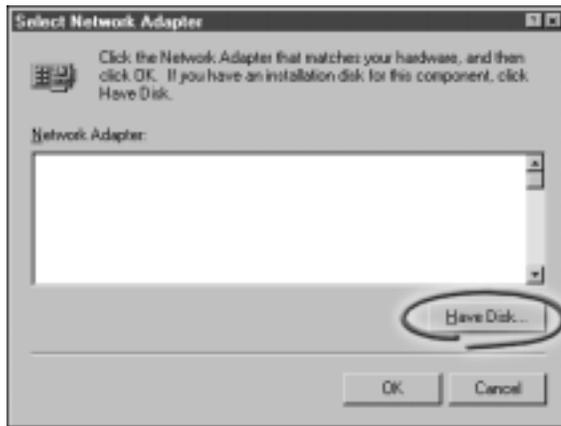
If there are any previously installed Model GA620 or Model GA620T Gigabit Ethernet Card drivers listed, the drivers must be updated (as outlined in "Updating the Driver Software" on page 3-8) before installing another driver for a new card.

If there are no previously installed drivers, proceed to step 4.



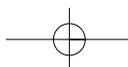
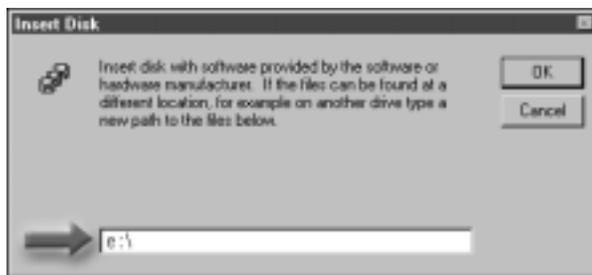
4. Click on the Adapters tab, and then click on Add.

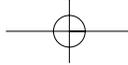
The Select Network Adapter window opens.



5. Click on Have Disk.

The Insert Disk window opens.





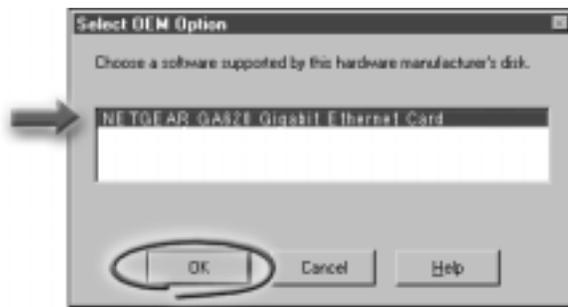
6. Insert the *Model GA620/GA620T Gigabit Ethernet Card Driver and Documentation CD* into the CD-ROM drive in your PC, type the path to the driver that matches your system, and then click on OK.

For example, enter the following path:

e:\

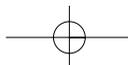
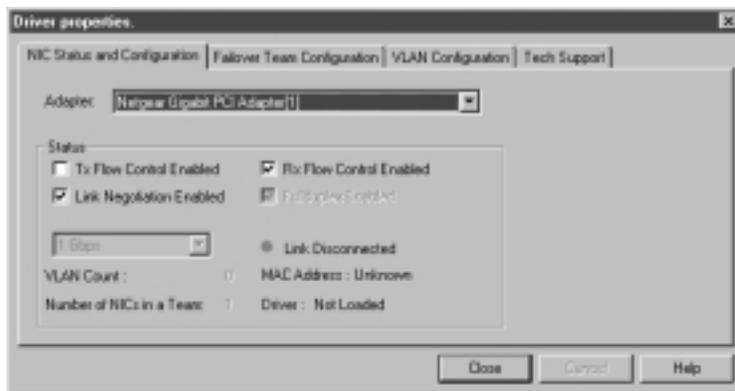
In this example, the letter e: is the CD-ROM drive.

The Select OEM Option window opens, and NETGEAR GA620 Gigabit Ethernet Card is highlighted.



7. Click on OK.

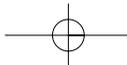
The driver is copied onto your system, and the NETGEAR GA620 Gigabit Ethernet Card installation window opens.



8. Refer to Table 3-1 to set the parameters in the entry fields.

**Table 3-1. Parameter Descriptions**

| Parameter Entry Field      | Description  |
|----------------------------|--|
| Adapter                    | <p>Adapter Instance: To distinguish each network card installed in the system, each is assigned a unique instance number. Typically, the first network card detected is instance 1, and the next is instance 2.</p> <p>Bus: Shows the PCI bus on which the network card is operating. The number shown is typically 0 for a system with up to four PCI slots on its bus. The number may be slightly higher for servers with more than four PCI slots.</p> <p>Slot: Shows the PCI slot number where the Model GA620 or Model GA620T Gigabit Ethernet Card is installed.</p>                     |
| Link Negotiation Enabled   | <p>When checked (default): 802.3z-compliant Gigabit Ethernet Link Negotiation is used. All Model GA620 and Model GA620T Gigabit Ethernet Cards use Link Negotiation by default.</p> <p>When unchecked: Link Negotiation is disabled and only link signal detection is used. Use this setting when connecting to Gigabit Ethernet equipment that does not support Link Negotiation or if there is a problem establishing a link between the card and the connecting device. The link is set for 1000 Mbps. Be sure that the connecting device uses the same duplex mode and speed settings.</p> |
| Rx Flow Control Enabled    | <p>When checked (default) and link negotiation is enabled: The card negotiates 802.3x receive flow control with the device at the other end of the link. If 802.3x flow control is supported by the other device, receive flow control is enabled.</p> <p>When unchecked or link negotiation is disabled: Receive flow control is disabled.</p>  |
| Tx Flow Control Enabled    | <p>When checked and link negotiation is enabled: The card negotiates 802.3x transmit flow control with the device at the other end of the link. If 802.3x flow control is supported by the other device, transmit flow control is enabled.</p> <p>When unchecked (default) or link negotiation is disabled, transmit flow control is disabled.</p>   |
| Failure Team Configuration | This feature is not currently supported in this version of the Windows NT driver.  |
| VLAN Configuration         | This feature is not currently supported in this version of the Windows NT driver.  |



9. Click on OK to accept the changed parameters.

The Network window opens.

10. Click on Close.

If other cards in your system use TCP/IP bindings, the Microsoft TCP/IP Properties window opens. Set any necessary TCP/IP configurations, and click on OK when finished.

11. When prompted to restart your computer, click on Yes.

The system restarts using the new driver and configuration settings.

### Changing Configuration Parameters

You can configure the following card parameters:

- Link negotiation
- Rx flow control
- Tx flow control
- Full-duplex and half-duplex operation
- Port speed

⊖ **Note:** Failover Team Configuration and VLAN Configuration are currently not supported in this version of the Windows NT driver.

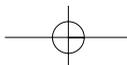
To change the configurable parameters:

1. From the Start Menu on the Windows desktop, select Settings and then Control Panel.

The Control Panel window opens.

2. Double-click on the Network icon.

The Network window opens.



3. Click on the Adapter tab.
4. Click on NETGEAR GA620 Gigabit Ethernet Card, and then click on Properties.

The Properties window opens.

5. Click on the parameter boxes to disable (not selected) or enable (selected) the parameter.
6. Click on OK to accept the settings.

### **Updating the Driver Software**

To replace old driver software with a newer version:

1. Start your Windows NT system and log in.

You must have Network Administrator privileges to install the driver software.

2. From Start on the Windows desktop menu, select Settings and then Control Panel.

The Control Panel window opens.

3. Double-click on the Network icon.
4. Click on the Adapters tab.

Any previously installed software drivers are listed in the Network Adapters list.

5. Click on the adapter that you want to update.
6. Click on Update.

The Select Network Adapter Window opens.

7. Click on Have Disk.

8. Insert the *Model GA620/GA620T Gigabit Ethernet Card Driver and Documentation CD* into the CD-ROM drive in your PC when prompted.
9. Type the path to the driver that matches your system, and then click on OK.

For example, enter the following path:

e:\

In this example, the letter e: is the CD-ROM drive.

The system copies the appropriate files from the CD-ROM.

10. Click on Close in the Network Window when the copying process is complete.
11. Click on Yes when asked if you want to restart your computer.

The system restarts using the new driver and configuration settings.

### **Moving the Network Card to a Different Slot**

Before moving your Model GA620 Gigabit Ethernet Card to a different slot in the same system, you must first remove the card driver software. After removing the driver software, you can move the card to a different slot and reinstall the driver software.

To remove the driver software:

1. Start your Windows NT system and log in.

You must have Network Administrator privileges to remove the driver software.

2. Click on Start from the Windows desktop menu; select Settings and then Control Panel.

The Control Panel window opens.

3. Double-click on the Network icon.

The Network window opens.

4. Click on the Adapter tab.

Any previously installed driver is listed in the Network Adapters list.

5. Click on the network card you want to remove, and then click on Remove.

Repeat step 5 for each network card that you want to remove.

6. Click on Close.

7. Click on Yes when asked if you want to restart you computer.

Your computer restarts using the new configuration.

Install the network card in a new slot by following the instructions in "Installing Your Gigabit Ethernet Card" on page 2-7, and then install a network driver by following the instructions in "Installing the Driver" on page 3-1.

### **Internal Loopback Test**

The Tech Support tab in the GA620 Driver Properties window displays information about how to contact NETGEAR's Technical Support and access to the Windows NT-based internal loopback diagnostic test for the card. Use the internal loopback test to verify that the card firmware is configured and operating correctly.

To perform the internal diagnostic test on an card, follow the steps in this section.

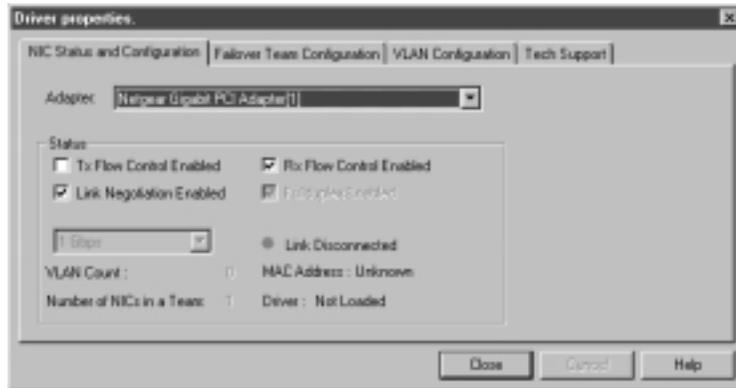
1. Open your system Control Panel and double-click the Network icon.

2. When the Network window opens, select the Adapters tab.



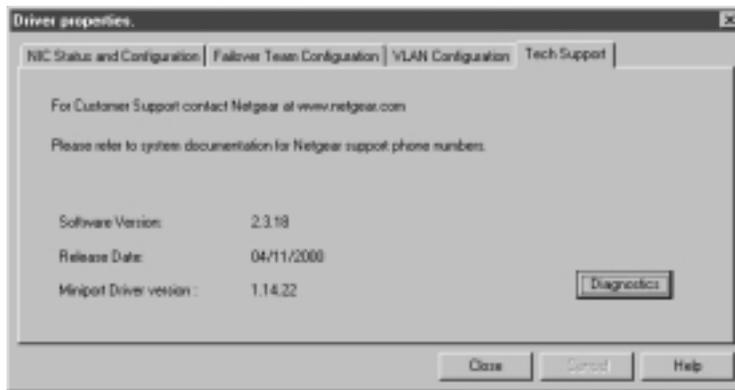
3. Select the card and click the Properties button.

The driver properties window is displayed.



4. If you want to run internal diagnostics on an card, select the NIC Status and Configuration tab is selected, then select the card that will be tested.
5. Click the Tech Support tab.

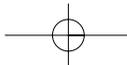
The Tech Support window is displayed:



This window provides contact information and access to the internal diagnostic test.

6. To access the Diagnostics window, click the Diagnostics button.
7. When the GA620 Driver Diagnostics window is displayed, click the Test button to run the internal loopback test for the card.





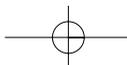
8. To run the internal loopback test for the card, click the Test button.

If you have not yet rebooted the system after installing the card driver, a dialog box is displayed, prompting you to reboot the system. For best results, click the OK button to reboot the system prior to running diagnostics.

During this test, packet data is sent across the MAC chip to verify that traffic can be sent and received through the card. During the test, the Diagnostics window displays messages similar to those listed below, indicating that the test is in progress and the results of the test:

- Diagnostic firmware loaded OK (when running the test for the first time)
- Running diagnostic test
- Test completed OK
- Normal card firmware loaded OK

When the test has been completed, the result (Passed/Failed) is shown in the Internal Loopback Test field.



## CHAPTER 4: WINDOWS 2000 DRIVER SOFTWARE

This chapter provides information about the Microsoft Windows 2000 driver software. Use the Windows 2000 driver software if you installed the NETGEAR Model GA620 or Model GA620T Gigabit Ethernet Card in a PC that is operating in a Windows 2000 environment.

This chapter also describes how to:

- Install the driver software in the Windows 2000 environment
- Modify driver properties once the card is installed
- Move the card to a different slot
- Update or reinstall the driver software
- Move or remove the driver software

### Installing the Driver Software

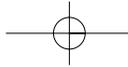
⊞ **Note:** The Gigabit Ethernet card must be physically installed in your server or workstation prior to installing the driver software. See Chapter 2 “Hardware Installation,” for details.

When the Windows 2000 system first boots up after installing a new hardware device, such as a Model GA620 or Model GA620T Gigabit Ethernet Card, the system automatically detects the new hardware and prompts you to install the driver software for the device.

A network driver must be installed before the Gigabit Ethernet card can be used with your Windows 2000 system.

To install the Gigabit Ethernet card software for Windows 2000, perform the following procedure:

1. Verify that the Windows 2000 system is upgraded to the latest version.

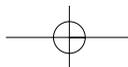


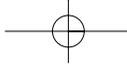
2. Start your Windows 2000 system and log in.

You must have Network Administrator privileges to install the driver software.

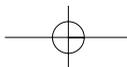
When you boot up the Windows 2000 system after installing the Gigabit Ethernet card, a series of Found New Hardware Wizard windows is displayed.

3. In the Install Hardware Device Drivers window, click Search for a suitable driver for my device (recommended), then click the Next button.

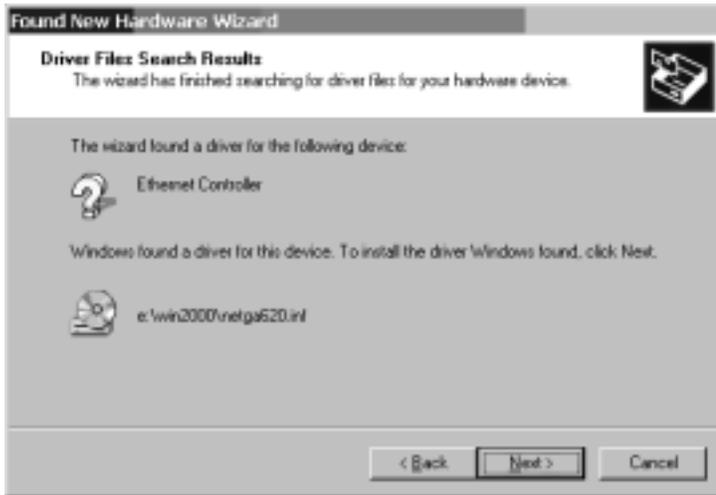




4. In the Locate Driver Files window, check the CD-ROM drives box.



5. In the Driver Files Search Results window, verify that the correct path to the driver software is shown, then click the Next button.



Once installation of the driver software has been completed, you are ready to configure card properties. For the procedure, see the section, "Modifying Configuration Parameters."

### Changing Configuration Parameters

Although the default values should be appropriate in most cases, you may change any of the available options to meet the requirements of your specific system. Once the Gigabit Ethernet card driver software has been installed, you can use this procedure to verify or change the following properties:

- Link Negotiation
- Network Address
- Rx flow control
- Tx flow control

Perform the following procedure to modify the card configuration:

1. On the Desktop, right-click the My Computer icon and select the Properties option from the pop-up menu.

The System Properties window is displayed.

2. Click the Hardware tab and then click the Device Manager button.

The Device Manager window is displayed.

3. Scroll down the list of hardware devices to Network Adapters. Click the plus (+) to the left of the icon to display the list of cards that are currently configured.

4. Double-click on the NETGEAR GA620 Gigabit Ethernet Card you want to configure.

The Properties window is displayed, showing the General tab:



5. Click the Advanced tab.

A window showing the list of configurable properties (and default values) is displayed:



6. Change the operating parameters as desired.

To change operating parameters listed under the Advanced tab, click on the options listed under Property and then use the window under Value to change the default or assigned value.

The following options should be displayed:

- Link Negotiation:
  - When on (default), 802.3-1999 compliant Gigabit Ethernet link negotiation is enabled. Model GA620 and Model GA620T Gigabit Ethernet Cards use link negotiation by default.
  - When off, link negotiation is disabled, only link signal detection is used. Use this setting when connecting to Ethernet equipment that does not support link

negotiation, or if there is a problem establishing a link between the card and the connecting device. For the 1000BASE-SX GA620 Gigabit Ethernet Card, the link will be set for full-duplex at 1 Gbps; unless otherwise specified. The default signaling speed for the 10/100/1000BASE-T GA620T Gigabit Ethernet Card is 1 Gbps.

When link negotiation is disabled, be sure that the connecting device uses the same duplex and speed settings.

⇒ **Note:** When link negotiation is on, the user-configured link speed and duplex settings are ignored in favor of automatically determined settings.

- Network Address

- Enter the Network Address (also known as the MAC address) for the card. The allowed range is 0060CF000000 through 0060CFFFFFFF.

- Rx Flow Control:

- When Rx flow control is on (default) and link negotiation is enabled, the card will negotiate 802.3x receive flow control with the device at the other end of the link, if the card negotiates to full duplex. If the other device supports 802.3x flow control, Rx flow control will be enabled.
- When Rx flow control is on and link negotiation is off, you must turn on Full Duplex in order for Rx flow control to work properly. Rx flow control will not function under half duplex operation.
- When Rx flow control is off, or when full duplex is off, receive flow control is disabled.

- Tx Flow Control:

- When Tx flow control is on and link negotiation is enabled, the card will negotiate 802.3x receive flow control with the device at the other end of the link. If the other device supports 802.3x flow control, Tx flow control will be enabled.

- When Tx flow control is on and link negotiation is off, you must turn on Full Duplex in order for Tx flow control to work properly. Tx flow control will not function under half duplex operation.
  - When Tx flow control is off (default), or when full duplex is off, transmit flow control is off.
7. When all desired configuration is complete, click the OK button to accept the settings.
  8. If prompted to restart your computer, click the Yes button.

While it is not necessary to reboot the system for new card properties to take effect, rebooting is recommended to reinitialize all registers.

### **Moving the Network Card to a Different Slot**

Windows 2000 automatically detects the installation and removal of hardware. To move a Model GA620 or Model GA620T Gigabit Ethernet Card to a different slot in the same system, you need to do the following:

- Shut down the system and remove the card from the PCI slot.
- Install the card in its new PCI slot (see "Installing Your Gigabit Ethernet Card" on page 2-7).
- When the system is powered on, reinstall the driver software (see "Installing the Driver Software" on page 4-1).

### **Removing the Driver Software**

- Under Windows 2000, the driver software is automatically uninstalled when its hardware is removed. To remove a card, do the following:
- Shut down the system and remove the card from the PCI slot.
- When the system is powered on, the driver will be automatically uninstalled.

## CHAPTER 5: NETWARE DRIVER SOFTWARE

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This chapter provides information about the Novell NetWare driver software. Use the NetWare driver software if you installed the NETGEAR Model GA620 or Model GA620T Gigabit Ethernet Card in a PC that is operating in a NetWare environment.

This chapter also describes how to:

- Verify that the required OS support files are installed on the server and the NetWare pre-installation parameters are correctly set.
- Install the driver software in the NetWare environment.
- Reconfigure the driver software after installation, if necessary.

Because network administrators can use more than one method to install device drivers on a NetWare server, this chapter does not provide detailed installation instructions for each method. Several commonly used methods to install a driver on a NetWare server are listed in Table 5-1 on page 5-2, with brief descriptions of the advantages and drawbacks of using each method.

- ⇒ **Note:** If you are installing NetWare 5.0 for the first time on the server, NetWare uses the *nwconfig* program to install the card driver during the installation of the operating system.

**Table 5-1. NetWare Device Installation Methods**

| Method/Program  | OS Support                | Advantage   | Drawback   |
|---|---------------------------|---|--|
| <i>AUTOEXEC.NCF</i>                                   | NetWare 5,<br>NetWare 4.2 | Quick, efficient  | Text file interface requires you to accurately enter parameters, using correct syntax. Cannot be used for initial installation of NetWare 5.0 on a server.   |
| <i>inetcfg.nlm</i><br>(Internetworking Configuration) | NetWare 5,<br>NetWare 4.2 | Straightforward graphical user interface, simpler than either <i>nwconfig</i> or <i>install</i> | Doesn't allow you to modify the parameters database manually. (See Note at the bottom of the table.)   |
| <i>nwconfig/install</i>                               | NetWare 5,<br>NetWare 4.2 | Graphical user interface enables you to enter all card parameters                               | Doesn't allow you to modify parameters. To do so requires you to remove the driver software and re-install it on the server.<br><br>If you are installing Netware 5.0 for the first time on the server, Netware uses the <i>nwconfig</i> program to install the card driver during the installation of the operating system. |

⊖ **Note:** During the installation process, Novell's Internetworking Configuration (*inetcfg.nlm*) program requires you to bind a protocol to the driver.

### Pre-Installation Requirements

Before you can use the Gigabit Ethernet card in your NetWare system, you must install the network device driver.

First, make sure that the Gigabit Ethernet card is physically installed on your system. Typically, NetWare OS software must already be running on the server. Make sure that your server meets the hardware and operating system software requirements described in Table 2-1 on page 2-2.

Install the latest support pack files to ensure the Gigabit Ethernet card will function correctly. The support pack or patch file(s) needed for the operating system running on your server are indicated in Table 5-2.

**Table 5-2. NetWare Support Files**

| NetWare OS | File Name                                      | File(s) to be Installed             |
|------------|--|-------------------------------------|
| 5          | Support Pack 4<br>(or the latest support pack) | <i>NW5SP4.EXE</i> (or latest file)  |
| 4.2        | Support Pack 8<br>(or the latest support pack) | <i>NW4SP8A.EXE</i> (or latest file) |

- ⇒ **Note:** NetWare 5.0: If you are installing NetWare 5.0 for the first time on a server, you will install the card driver during the OS installation procedure. You will then install the NetWare 5 support pack after you have successfully installed NetWare 5.0 on the server.

To get the latest support pack files, go to the Novell support website at <http://support.novell.com>. Using Table 5-2 as a guide, select and download the latest support pack or patch file(s) for the operating system running on your server.

### Installing the Driver Software

You will use one of two procedures for installing the card software, depending on whether NetWare is already running on the server or if you are performing an initial installation of the NetWare 5.0 operating system:

- If NetWare is already running on the server, you can edit the *AUTOEXEC.NCF* and *STARTUP.NCF* files to load files and configure the card driver. For the procedure, see “Installing the Driver: NetWare Already Installed” on page 5-4.
- If you are installing the card software as part of an initial installation of NetWare 5.0, you can edit the *STARTUP.NCF* file and configure the card driver during the normal NetWare 5.0 installation process. This version of the operating system will not allow you to allocate the actual number of receive buffers required by the card until installation is complete. Install the driver software using the procedure described in “Installing the Driver: Initial Installation of NetWare 5.0” on page 5-7.

## Installing the Driver: NetWare Already Installed

This section provides basic guidelines for installing the card driver on a server already running the NetWare operating system. This procedure works for NetWare 4.2 and 5.0.

1. Place the *Model GA620/GA620T Gigabit Ethernet Card Driver and Documentation CD* into the appropriate CD-ROM drive and mount the CD-ROM on the server.
2. Copy the *GA620.LAN* and the *GA620.LDI* files into the *lsystem* directory.

The NetWare drivers are located in the following driver CD-ROM directory:

GA620:\NETWARE\

- ⊕ **Note:** If you acquired the software on a floppy disk or from the NETGEAR support website, enter the path to where the driver files reside on your system.
3. Edit the *STARTUP.NCF* file. Set the packet receive buffers parameters for the number of cards installed in the system.

To ensure optimum performance, add at least 1024 additional packet receive buffers for each card installed in your system.

- ⊕ **Note:** Depending on your system configuration, the number of clients being supported, and other requirements, more than 1024 packet receive buffers may be needed for each card.

For more information, see "Editing the STARTUP.NCF File" on page 5-10.

4. If the *LISTSLOT.NLM* program has been copied into the *lSYSTEM* directory, enter the following at the system console/command line:

```
LOAD LISTSLOT
```

The following message should be displayed:

```
card found in slot slot-number
```

- ⊕ **Note:** The slot number of the Gigabit Ethernet card you are installing; you will need this parameter when you are editing the *AUTOEXEC.NCF* file.

5. Edit the *AUTOEXEC.NCF* file and modify card load parameters. The card parameters that can be defined in the load statements are described in Table 5-3 on page 5-6.

For example: A valid *AUTOEXEC.NCF* file is shown below. One set of load and bind commands (in bold) is added for each type of frame the card is configured to support:

```
set Time Zone = PST8PDT
set Daylight Savings Time Offset = 1:00:00
set Start Of Daylight Savings Time = (APRIL SUNDAY FIRST 2:00:00 AM)
set End Of Daylight Savings Time = (OCTOBER SUNDAY LAST 2:00:00 AM)
set Default Time Server Type = SINGLE

# Note: The Time zone information mentioned above
# should always precede the SERVER name.
set Bindery Context = O=NETGEAR

file server name MARS
ipx internal net 34881EEE

load conlog maximum=100
; Network driver LOADs and BINDs are initiated via
; INITSYS.NCF. The actual LOAD and BIND commands
; are contained in INITSYS.NCF and NETINFO.CFG.
; These files are in SYS:ETC.
sys:etc\initsys.ncf

load GA620 slot=4 frame=Ethernet_802.2 name=alt_1_e82_2
bind ipx alt_1_e82_2 net=aaaa

mount all

set immediate purge of deleted files = on
set upgrade low priority threads = on
set display spurious interrupt alerts = on
set display lost interrupt alerts = on
```

**Table 5-3. Card Load Parameters**

| Parameter           | Descriptions  |
|---------------------|---|
| slot= <i>n</i>      | Identifies the slot number for the specific card currently being configured. This parameter is not necessary if only a single card is installed.  |
| frame= <i>type</i>  | Defines the frame type being used by this load instance. Valid types are: <ul style="list-style-type: none"> <li>• Ethernet_802.2</li> <li>• Ethernet_802.3</li> <li>• Ethernet_ii</li> <li>• Ethernet_snap</li> </ul>  |
| link= <i>n</i>      | Defines whether 802.3 compliant link negotiation is enabled/disabled. <ul style="list-style-type: none"> <li>• A value of 1 (one) activates the IEEE 802.3 compliant link negotiation (default). All Model GA620 and Model GA620T cards use link negotiation by default.</li> <li>• A value of 0 (zero) enables link signal detection. Use this setting when connecting to Ethernet equipment that does not support link negotiation, or if there is a problem establishing a link between the card and the connecting device. Unless you specify otherwise, the default signaling speed for the 1000BASE-SX and 10/100/1000BASE-T cards is 1 Gbps. When link negotiation is off, be sure that the connecting device uses the same duplex and speed settings</li> </ul> |
| duplex= <i>n</i>    | If link negotiation has been disabled, you can select either half-duplex or full-duplex operation. <ul style="list-style-type: none"> <li>• A value of 1 (one) enables full-duplex signaling (default).</li> <li>• A value of 0 (zero) enables half-duplex signaling.</li> </ul>  |
| name= <i>text</i>   | The name assigned to this card (also specified in the bind statement).  |
| speed= <i>value</i> | If link negotiation has been disabled, you can select port speed to be either 10 (Mbps), 100 (Mbps), or 1000 (Mbps).  |
| rxflow= <i>n</i>    | If link negotiation has been disabled, you can turn 802.3x receive flow control on or off. <ul style="list-style-type: none"> <li>• A value of 1 (one), the default, allows the card to negotiate 802.3x receive flow control with the device at the other end of the link. If 802.3x flow control is supported by the other device, receive pause packets will be respected.</li> <li>• A value of 0 (zero) disables receive flow control.</li> </ul>  |

**Table 5-3. Card Load Parameters (continued)**

| Parameter                  | Descriptions  |
|----------------------------|---|
| <code>txflow=n</code>      | <p>If link negotiation has been disabled, you can turn 802.3x transmit flow control on or off.</p> <ul style="list-style-type: none"> <li>• A value of 1 (one), the default, allows the card to negotiate 802.3x transmit flow control with the device at the other end of the link. If 802.3x flow control is supported by the other device, transmit pause packets will be respected.</li> <li>• A value of 0 (zero) disables transmit flow control.</li> </ul> |
| <code>fdfiltering=n</code> | <p>This option is ignored by these cards. For earlier models, set this value to 1 if the card is attached to a full-duplex repeater. Otherwise, set this value to 0 or leave it blank.</p>  |

6. Save your revisions to the *AUTOEXEC.NCF* file and, if all card configuration has been completed, reboot the server.

### Installing the Driver: Initial Installation of NetWare 5.0

This section provides information you need to install the card driver while performing a fresh install of the NetWare 5.0 operating system.

1. Use the MS-DOS batch file utility *makenw.bat* to copy the *GA620.LAN*, *GA620.LDI*, and *LISTSLOT.NLM* files from the CD-ROM to a floppy disk.

The *MAKENW.BAT* file and NetWare card drivers are located in the following CD-ROM directory:

GA620\

2. Start the NetWare 5.0 installation and proceed as usual until you reach the Devices Detected screen.
3. When you are prompted for an unlisted driver, place the floppy disk into the appropriate drive. Press Insert and select the *GA620.LAN* driver.
4. When the driver configuration screen is displayed, choose Select/Modify driver parameters and protocols.

5. Configure driver parameters, referring to the parameter descriptions below and in Table 5-4.

```
Slot Number:
Node Address:
Link: auto
Duplex: full
Speed: 1000
RxFlowControl: allow
TxFlowControl: off
FDRFiltering: off
Other:
Driver Version:
```

**Table 5-4. Card Configuration Parameters**

| Parameter    | Description   |
|--------------|---|
| Slot Number  | <p>This field is required for proper configuration. Enter the slot of the specific card currently being configured.</p> <p><b>Caution:</b> If this parameter is not correctly supplied and there is more than one card installed in the server, the installation program may crash the system. Use the <i>LISTSLOT.NLM</i> program to identify the slot where a card is installed.</p>  |
| Node Address | <p>To override the default MAC address, specify a node address in this field. The expected range is 0060CF000000 through 0060CFFFFFFF</p>   |
| Link         | <p>When you select this field and press Enter, you are prompted to choose between auto and off settings:</p> <ul style="list-style-type: none"> <li>• The auto setting activates the IEEE 802.3 compliant link negotiation. All NETGEAR Gigabit Ethernet cards and switches use link negotiation by default.</li> <li>• When off is selected, only link signal detection is used. Use this setting when connecting to Ethernet equipment that does not support link negotiation, or if there is a problem establishing a link between the card and the connecting device. Unless you specify otherwise, the default signaling speed for the 1000BASE-SX and 10/100/1000BASE-T cards is 1 Gbps.</li> </ul> <p><b>Note:</b> When link negotiation is off, be sure that the connecting device uses the same duplex and speed settings.</p> |

**Table 5-4. Card Configuration Parameters (continued)**

|                |  |
|----------------|--|
| Duplex         | <p>When you disable link negotiation while installing a Gigabit Ethernet card, you can select either half-duplex or full-duplex operation. If you select this field and press Enter, you are prompted to choose between full and half settings:</p> <ul style="list-style-type: none"> <li>• When full is selected, full-duplex signaling is enabled (default).</li> <li>• When half is selected, half-duplex signaling is used.</li> </ul>  |
| Speed          | <p>If link negotiation has been disabled, you can select port speed to be either 10 Mbps, 100 Mbps, or 1 Gbps.</p>   |
| RxFlowControl  | <p>When you select this field and press Enter, you are prompted to choose between allow and off settings:</p> <ul style="list-style-type: none"> <li>• When allow is selected, and link parameter is set to auto, the card will negotiate 802.3x receive flow control with the device at the other end of the link. If the other device supports 802.3x flow control, Rx flow control will be enabled.</li> <li>• When off is selected, or link parameter is off, receive flow control is disabled.</li> </ul>   |
| TxFowControl   | <p>When you select this field and press Enter, you are prompted to choose between allow and off settings.</p> <ul style="list-style-type: none"> <li>• When allow is selected, and link parameter is set to auto, the card will negotiate 802.3x transmit flow control with the device at the other end of the link. If the other device supports 802.3x flow control, Tx flow control will be enabled.</li> <li>• When off is selected, or link parameter is off, transmit flow control is disabled.</li> </ul> |
| FDRFiltering   | <p>When you select this field and press Enter, you are prompted to choose between on and off settings:</p> <ul style="list-style-type: none"> <li>• Use on if the card is attached to a full-duplex repeater.</li> <li>• Use off or leave the field blank if the card is not connected to a full-duplex repeater.</li> </ul> <p><b>Note:</b> FDRFiltering is ignored on these cards. This parameter is included to maintain driver compatibility with earlier models.</p>  |
| Other          | <p>This parameter is reserved for future features or technical support use.</p>  |
| Driver Version | <p>This information field displays the version of the driver software. This field cannot be edited.</p>  |

6. After NetWare 5.0 has been successfully installed, edit the *STARTUP.NCF* file:  
Set the packet receive buffers parameter to 1024 for each card in the system.

## Editing the STARTUPNCF File

To ensure optimum card performance, add at least 1024 packet receive buffers for each card in the system.

- ⇒ **Note:** Depending on your system configuration, the number of clients being supported, and other requirements, more than 1024 packet receive buffers may be needed for each card.

For example: The default maximum number of receive buffers for the system is 500; the minimum is 128 (see Table 5-5).

**Table 5-5. Example Receive Buffers**

| Values Prior to Card Configuration   | Add 1024 for One Card | Add 2048 for Two Cards |
|--------------------------------------|-----------------------|------------------------|
| Maximum packet receive buffers = 500 | 500 + 1024=1524       | 500 + 2048 = 2548      |
| Minimum packet receive buffers = 128 | 128 + 1024 =1152      | 128 + 2048 = 2176      |

In the *STARTUP.NCF* file listing shown below, the buffer values on the lines in bold have been changed to support one card:

```
LOAD AIC7870.DSK SLOT=2
set maximum packet receive buffers = 1524
set minimum packet receive buffers = 1152

set maximum physical receive packet size = 1530
set cpu hog timeout amount = 0
```

## Verifying or Modifying Card Parameters

When a card configuration is saved, the NetWare install program adds load and bind statements to the *AUTOEXEC.NCF* file. By accessing this file, you can verify the parameters configured for each card, modify them, or enter additional parameters.

- ⊖ **Note:** The NetWare monitor program and the config command are also useful for verifying driver configuration. For information on how to use these programs, see the *Utilities Reference* in your NetWare online documentation.

The parameters that can be defined in the load statements are described in Table 5-3 “Card Load Parameters” on page 5-6. A valid *AUTOEXEC.NCF* file is shown below. One set of load and bind commands (in bold) is added for each frame type the card is configured to support.

```
set Time Zone = PST8PDT
set Daylight Savings Time Offset = 1:00:00
set Start Of Daylight Savings Time = (APRIL SUNDAY FIRST 2:00:00 AM)
set End Of Daylight Savings Time = (OCTOBER SUNDAY LAST 2:00:00 AM)
set Default Time Server Type = SINGLE

# Note: The Time zone information mentioned above
# should always precede the SERVER name.
set Bindery Context = O=NETGEAR

file server name MARS
ipx internal net 34881EEE

load conlog maximum=100
; Network driver LOADs and BINDs are initiated via
; INITSYS.NCF. The actual LOAD and BIND commands
; are contained in INITSYS.NCF and NETINFO.CFG.
; These files are in SYS:ETC.
sys:etc\initsys.ncf
```

```
load GA620 slot=4 frame=Ethernet_802.2 name=alt_1_e82_2
bind ipx alt_1_e82_2 net=aaaa
```

```
load GA620 slot=4 frame=Ethernet_802.3 name=alt_1_e82_3
bind ipx alt_1_e82_3 net=bbbb
```

```
mount all
```

```
set immediate purge of deleted files = on
set upgrade low priority threads = on
set display spurious interrupt alerts = on
set display lost interrupt alerts = on
```

- ⇒ **Note:** If you modify any card parameters, you must reboot the system before the changes will take effect. If you make changes and do not reboot, you may experience configuration problems. If no configuration changes have been made, you can click the No button to close the configuration session without restarting your system.

## CHAPTER 6: TROUBLESHOOTING

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This chapter provides troubleshooting information for the NETGEAR Model GA620 and Model GA620T Gigabit Ethernet Card.

### Using the Hardware Diagnostic Utility

#### Internal Loopback Test (Windows NT)

The Tech Support tab in the GA620 Driver Properties window in Windows NT displays information on how to contact NETGEAR technical support and provides access to the Windows NT-based internal loopback diagnostic test for the card. Please refer back to Chapter 3 "Windows NT Driver Software" for more details.

#### DDTP Internal/External Loopback Test (MS-DOS)

Development and Diagnostic Test Program (DDTP), a diagnostic utility based on MS-DOS, is included on the *Model GA620/GA620T Gigabit Ethernet Card Driver and Documentation CD*. This utility is used for verifying that the card hardware is functional. It performs internal and external loopback tests and provides resulting pass/fail information. Perform the DDTP tests any time you want to rule out or identify possible hardware problems.

To use the DDTP utility:

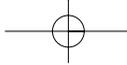
1. Boot your system in MS-DOS mode.

Make sure that you do not have any plug-ins, add-ons, or resident programs installed.

If you want to run the external loopback test, connect a loopback cable between the Rx port and Tx port on the network card.

2. Insert the *Model GA620/GA620T Gigabit Ethernet Card Driver and Documentation CD* into the CD-ROM drive.
3. At the MS-DOS prompt, enter the following command:  

```
>dos4gw e:\diag\ddtp [-c card_number] [-l log_filename] [-e]
```



In the command line:

- The letter e is the designation of the CD-ROM drive on your system.
- The optional -c parameter is used for specifying which card to test.

By default, DDTP tests only the first card detected in the system.

- The optional -l parameter defines a file in which to log the test results.

A text copy of the DDTP test results are placed in the specified file.

For example, to test the second card in a system and store the test results in *log.txt* in the current directory, you could enter the following command:

```
>dos4gw e:\diag\ddtp -c 1 -l log.txt
```

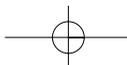
- The optional -e parameter activates the external loopback test. Both the internal and external loopback example tests show 1000 packets successfully received with 0 errors detected, indicating that the card is functioning properly.

The test result from the previous example could look like this:

```
Log file created by Development and Diagnostic Test Program v1.02
on: Thu Aug 20 15:28:34 1998
```

```
-----
Development and Diagnostic Test Program (ddtp) v1.02
```

```
PCI bios found. v0.16.
  HW Mech #1 supported
  Number of PCI buses: 1
GA620 #0 found in PCI bus 0.
GA620 #1 found in PCI bus 0.
2 GA620 card(s) detected
Current card set to bus 0 GA620 #1.
internal Loopback Test
```



```

pkts:0  secs:0pkts:48  secs:1pkts:144  secs:2pkts:240
secs:3pkts:320  secs:4pkts:416  secs:5pkts:512  secs:6pkts:592
secs:7pkts:688  secs:8pkts:784  secs:9pkts:864  secs:10pkts:960
secs:11  1000 packets transmitted successfully
      1000 packets received successfully
      0 errors detected
external Loopback Test
pkts:0  secs:0pkts:96  secs:1pkts:192  secs:2pkts:288
secs:3pkts:368  secs:4pkts:464  secs:5pkts:544  secs:6pkts:640
secs:7pkts:736  secs:8pkts:816  secs:9pkts:912  secs:10
1000 packets transmitted successfully
      1000 packets received successfully
      0 errors detected
>

```

The internal loopback test is executed automatically.

- ⊖ **Note:** The external loopback test requires a loopback cable. If a loopback cable is not used, the external loopback test fails. A fiber loopback cable for the Model GA620 can be constructed by connecting the Rx port to the Tx port on the same network card. For the Model GA620T, a Category 5 loopback cable with the following pin configuration is needed:

```

Pin 1 ----- Pin 3
Pin 2 ----- Pin 6
Pin 4 ----- Pin 7
Pin 5 ----- Pin 8

```

If the test results indicate a possible problem, try reinstalling the card or moving it to a different slot or to a different system. Then run the DDTP tests again. If the card still fails, contact Customer Support.

## Checking the Port LEDs

### Model GA620 Card (1000BASE-SX)

Two port LEDs are located on the faceplate of the Model GA620 (1000BASE-SX) card: one to indicate link status and one for data transfer status (see Figure 2-1 on page 2-4). Before the port LEDs can provide troubleshooting information, the card must be connected to the network (see Chapter 2), and the network drivers for your particular operating system must be installed (see Chapter 3 through Chapter 5).

1. Verify that the card driver software has been installed and that the card is connected to a network.
2. Verify that the card status LEDs operate as described in Table 6-1.

**Table 6-1. Model GA620 (1000BASE-SX) Port LED Activity**

| LED  | State           | Description  |
|------|-----------------|--|
| Data | Blinking        | Data detected on the port.   |
|      | On              | Data detected on the port.   |
|      | Off             | No data detected on the port.  |
| Link | Blinking slowly | Port has been disabled by software.                                    |
|      | On              | Good link.   |
|      | Off             | No link; possible bad cable, bad connector, or configuration mismatch. |

### Model GA620T (10/100/1000BASE-T) Card

The faceplate of the Model GA620T (10/100/1000BASE-T) card has four LEDs: one for each port speed option (10 Mbps, 100 Mbps, and 1 Gbps), to indicate which link is active, and one LED for data transfer status (see Figure 2-2 on page 2-5).

Before the port LEDs can provide troubleshooting information, the card must be connected to the network (see Chapter 2), and the network drivers for your particular operating system must be installed (see Chapter 3 through Chapter 5).

1. Verify that the card driver software has been installed and that the card is connected to a network.

2. Verify that the card status LEDs operate as described in the Table 6-2.

**Table 6-2. Model GA620T (10/100/1000Base-T) Port LED Activity**

| LED  | State    | Description  |
|------|----------|--|
| Data | Blinking | Brief bursts of data detected on the port.   |
|      | On       | Streams of data detected on the port.  |
|      | Off      | No data detected on the port.  |
| 10   | On       | Good 10 Mbps Ethernet link   |
|      | Off      | No 10 Mbps link; possible link at different speed, possible bad cable, bad connector, or configuration mismatch.   |
| 100  | On       | Good 100 Mbps Fast Ethernet link.  |
|      | Off      | No 100 Mbps link; possible link at different speed, possible bad cable, bad connector, or configuration mismatch.  |
| 1000 | On       | Good Gigabit Ethernet link.  |
|      | Off      | No 1000 Mbps link; possible link at different speed, possible bad cable, bad connector, or configuration mismatch. |

⊖ **Note:** If all four LEDs remain lit simultaneously, the card driver software is either missing or improperly installed.

### Using a Troubleshooting Checklist

If you need to test the network card further, check the following items:

- Inspect all cables and connections. Check the length and rating of the cable. Make sure that the cable segment is compliant with the requirements shown in Table 2-4 on page 2-8 or Table 2-5 on page 2-10.
- Connect the network card to a different network port and run the tests again. If successful, the original network port may be defective or improperly configured.

- Check the network card installation by reviewing Chapter 2 “Hardware Installation.” Make sure that the network card is properly seated in a PCI slot. Check for specific hardware problems, such as broken traces or loose/broken solder connections.
- Check the configuration settings and change them if they are in conflict with another device.
- Make sure that your system is using the latest BIOS.

Check the PCI BIOS parameters for proper configuration of the slot where the card is installed. Table 6-3 shows several possible PCI BIOS parameters. (These parameters may not all be available on every system.)

**Table 6-3. PCI BIOS Parameters**

| Parameter        | Setting   |
|------------------|---|
| Bus-Master       | Enabled   |
| Interrupt number | Set to any IRQ that does not conflict with another device.                      |
| Interrupt type   | Level   |
| Latency timer    | Recommended range is between 20 and 255. This parameter is typically set to 64. |

- Try inserting the network card in another slot. If the new position works, the original slot in your system may be defective.
- Replace the failed network card with one that is known to work properly. If the second card works in the slot where the first one failed, the original card is probably defective.
- Install the network card in another functioning system and run the tests again. If the card passed the tests in the new system, the original system may be defective.
- Remove all other network cards from the system and run the tests again. If the card passes the tests, the other cards might be causing contention.

## APPENDIX A: SPECIFICATIONS

This appendix provides specifications for the NETGEAR Model GA620 and Model GA620T Gigabit Ethernet Card.

### Link Characteristics Model GA620 (1000BASE-SX)

|              |                               |                 |  |
|--------------|-------------------------------|-----------------|--|
| 62.5 Microns | Shortwave<br>(850 nanometers) | Multimode fiber | 6.5 to 902 feet (2 to 275 meters)  |
| 50 Microns   | Shortwave<br>(850 nanometers) | Multimode fiber | 6.5 to 1804 feet (2 to 550 meters)<br>(in compliance with IEEE 802.3-1999) |

### Cable Specifications Model GA620T (10/100/1000BASE-T)

|                |       |                    |                       |
|----------------|-------|--------------------|-----------------------|
| 10BASE-T       | RJ-45 | CAT 3, 4, or 5 UTP | 325 feet (100 meters) |
| 100/1000BASE-T | RJ-45 | CAT 5 UTP          | 325 feet (100 meters) |

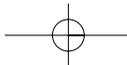
⇒ **Note:** 1000BASE-T signaling requires four twisted pairs of Category 5 balanced cabling, as specified in ISO/IEC 11801:1995 and ANSI/EIA/TIA-568-A (1995) and tested for additional performance using testing procedures defined in TIA/EIA TSB95.

### Performance Specifications

|                                  |  |
|----------------------------------|--|
| PCI clock                        | 66 MHz max   |
| PCI data/address                 | 32-bit and 64-bit  |
| PCI data burst transfer rate     | 132 MB/second (32-bit bus)<br>264 MB/second (64-bit bus)<br>528 MB/second (64-bit bus at 66 MHz) |
| PCI modes                        | Master/slave   |
| Model GA620 (1000BASE-SX)        | 1000 Mbps (full duplex)  |
| Model GA620T (10/100/1000BASE-T) | 10/100/1000 Mbps (full duplex)   |

## Technical Specifications

| Specification                      |   |
|------------------------------------|---|
| Standards Compatibility            | IEEE 802.3z 1000BASE-SX Gigabit Ethernet<br>IEEE 802.3x Flow Control  |
| Model GA620<br>Network Connection  | Duplex SC fiber connector for 62.5/125- or 50/125-micron multimode fiber<br>Full-duplex 2,000 Mbps (1,000 Mbps each way) Gigabit Ethernet |
| Model GA620T<br>Network Connection | RJ-45 connector for Category 5 UTP cable<br>Full-duplex 2,000 Mbps (1,000 Mbps each way) Gigabit Ethernet                                 |
| Host Connection                    | Single slot, short form factor, PCI card with 32- or 64-bit connectors<br>PCI rev 2.2 compliant<br>Clock speed up to 66 MHz               |
| DC Operating Voltage               | +5V +/- 5%  |
| Power Consumption                  | 14 watts, maximum<br>2.8A @ + 5VDC  |
| Dimensions                         | 6.6 x 3.7 in. (16.8 x 9.5 cm)   |
| Weight                             | 3.8 oz. (104 g)   |
| Operating Temperature              | 0 to 40°C   |
| Operating Humidity                 | 10 to 90% noncondensing   |
| Agency Compliance                  | CE mark, commercial<br>FCC, Part 15, Class B<br>EN 55 022 (CISPR 22), Class B<br>Canada ICES-003, Class B                                 |

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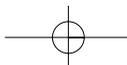
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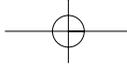
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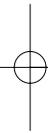
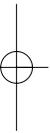




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