HUGHES
NETWORK SYSTEMS

DIRECWAY®

Remote Terminal User Guide

Models: DW7000, DW7700

1035978-0001
Revision A
June 3, 2005

Important safety information

For your safety and protection, read this entire guide before you attempt to use the DIRECWAY DW7000 or DW7700 remote terminal. In particular, read this safety section carefully. Keep this safety information where you can refer to it if necessary.

Types of warnings used in this manual

This section introduces the various types of warnings used in this guide to alert you to possible safety hazards.

⚠ WARNING

Indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury.

⚠ CAUTION

Indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury.

CAUTION

Indicates a situation or practice that might result in property damage.

Note: A note provides additional information.

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About this document

Scope and audience

This guide describes components and features common to both DIRECWAY DW7000 and DW7700 remote terminals. DW7700 is an enterprise-class broadband communications solution used by enterprise customers, which are typically large businesses.

DW7700 Supplemental User Guide Information (1036332-0001) discusses components and features unique to the DW7700 terminal. The audience for this guide consists of end uses of the equipment, including telecommunications managers, planners, and technicians.

Certain procedures, contact information, parts, and other operational considerations may vary depending on the user's location. This manual clearly identifies those differences when applicable.

Organization of this guide

This guide is organized into the following chapters and appendices:

Chapter 1 – *Introduction* describes the remote terminal and explains how it functions within the DIRECWAY system architecture.

Chapter 2 – *System Control Center* describes the terminal's internal web interface used to access system information.

Chapter 3 – *Remote terminal LEDs* explains the LEDs on the front of the terminal.

Chapter 4 – *Troubleshooting* provides troubleshooting strategies.

Appendix A – *Frequently asked questions (FAQs)* lists answers to frequently asked questions about the terminal and the DIRECWAY service.

Appendix B – *Typical operating system settings* explains how to configure operating system settings so your computer can communicate with the terminal.

Appendix C – *Home networking* describes how the terminal functions in a home network.

Appendix D – *Declaration of Conformity* provides product compliance information.

This guide also contains a list of abbreviations and acronyms and an index.

Conventions

This manual follows the typographical conventions shown below to help clarify instructions:

Example	Explanation
Click **Exit**.	Indicates the names of command buttons that execute an action.
The system displays the following: `Are you ready?`	Indicates all system messages and prompts as the system displays them.
Type **`exit`**	Indicates operator input.
Enter a value in the Time field.	Indicates the names of fields on windows.
Retrieve the following file: *`O:\template\techman_r3`*	Indicates file names or file paths referenced in the manual.
Press **ALT+V** to view the menu.	Indicates function or keyboard keys. Press two keys simultaneously—in this case, Alt and V.
Select the **Edit** menu.	Indicates the names of menu bar options on a software screen.
Go to **Edit** → *Spelling Checker*	Indicates a menu/submenu sequence for selecting an action or option

Revision record

Revision	Date of issue	Scope
A	06/03/05	Production release

Chapter 1
Introduction

This chapter discusses general topics related to the remote terminal. Topics include:

Contact information

If you need warranty or repair support, your contact information varies depending on your location.

For United States users who purchased through a DIRECWAY retail channel

If you purchased this product through a DIRECWAY retail channel:

- Access the System Control Center by launching a browser, typing **`www.systemcontrolcenter.com`** in the URL location bar, and pressing **ENTER**. Type **`192.168.0.1`** in the location bar if you are unable to access the System Control Center with the **www.systemcontrolcenter.com** URL.
- Check our web site **www.myDIRECWAY.com** for more information.
- Send an e-mail to technical support by selecting **Email** under Help Center on our **www.myDIRECWAY.com** web site.
- Call 1-866-DIRECWAY (1-866-347-3292).

For United States users who purchased through a value added reseller

If you purchased this product from one of our value added reseller (VARs), do not contact DIRECWAY. Contact your VAR according to the procedure supplied by them for technical support. They are trained to help you with any technical problem.

Remote terminal overview

Congratulations on your purchase of a DIRECWAY® model DW7000 or DW7700 remote terminal! After your terminal has been professionally installed, you can use a web browser to surf the Internet. You will also be able to operate a local area network (LAN) after you configure your computers with network interface cards (NICs), connect them with Ethernet cable or through a wireless base station, and configure your computers' operating system network properties.

The terminal has a System Control Center that provides access to system information such as your site account number (SAN), site ID, terminal Internet Protocol (IP) address, and subnet mask; the terminal IP address and the subnet mask may be required to configure a network. The System Control Center is described in Chapter 2 – *System Control Center*, on page 7.

The instructions in this manual also apply to the enterprise-class DW7700 terminal. The DW7700 terminal includes the functionality of a DW7000 terminal in addition to being equipped with an internal telephone modem, serial port, and two Ethernet ports. The model number appears on a label next to the DC IN connector on the back of the terminal.

In this guide, the terms *remote terminal* and *terminal* may refer to a DW7000 or DW7700 model remote terminal. The terms *DW7000* and *DW7700* are used when it is necessary to differentiate between the two models.

System requirements

Make sure your computer meets the following minimum requirements to achieve optimal terminal performance:

- Operating system
  - PC: Windows 98 Second Edition (SE), Windows Millennium Edition (Me), Windows 2000, Windows XP
  - MAC: 10.1 or higher
- Processor
  - PC: Pentium II 333 Mhz or faster
  - MAC: 300 Mhz or faster
- Memory
  - PC: 64MB RAM, Windows 98SE and Me; 128MB RAM Windows 2000 and XP.
  - MAC: 128MB
- Free hard drive space
  - PC: 100MB
  - MAC: 150MB

How the remote terminal works

Figure 1 shows how the remote terminal fits into the DIRECWAY system architecture. The remote terminal is independent of the operating systems of the computers connected to it, meaning a computer using a Windows or MacIntosh operating system can browse the Internet when connected to the terminal. The terminal is a self-hosted unit, meaning the software required to operate the terminal resides in the terminal; there is no need to install software on the computer(s) connected to the terminal.

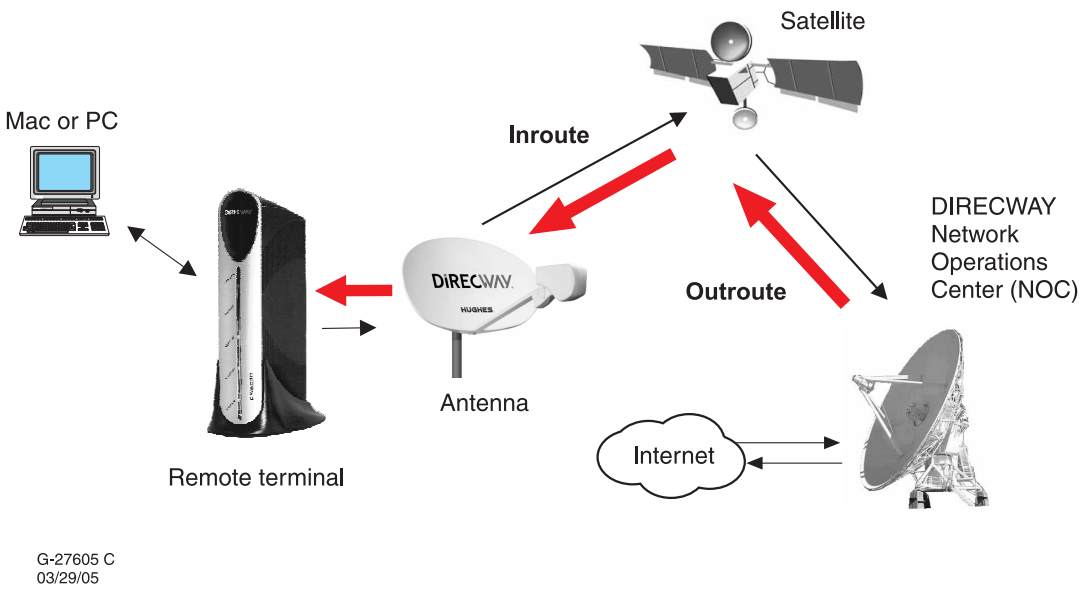

Figure 1: Remote terminal's role in the DIRECWAY system architecture

The terminal, in combination with an antenna, can also provide satellite connectivity for multiple computers on a wireless or wired (Ethernet) LAN. After the terminal and network are installed, every computer on the network can surf the Internet. To learn more about using the terminal with a network, see Appendix C – *Home networking*.

Note: You can connect multiple home computers and laptops to a single DIRECWAY Internet connection at no additional cost. To do this, you need to have home networking equipment, which is not included with this product. For network setup, support and configuration, contact your network hardware manufacturer and/or operating system software developer (Hughes Network Systems, LLC (HNS) is not responsible for home network management and troubleshooting). Simultaneous use of high bandwidth applications by multiple users may result in degradation of speed. Actual speeds may vary. Speed and uninterrupted use of service are not guaranteed.

Professional installation or service requirement

The Federal Communications Commission (FCC) requires professional installation and service of the two-way antenna assembly because it transmits radio frequency (RF) energy.

⚠ CAUTION

- **The two-way satellite dish must be installed in a location or manner not readily accessible to children and so that the dish bottom is at least 5 feet above ground level.**
- **Professional installation or service of the two-way satellite dish is required by the Federal Communications Commission because the radio transmits radio frequency energy.**
- **This device emits radio frequency energy when in transmit mode. To avoid injury, do not place head or other body parts between the feed horn and satellite dish when the system is operational.**
- **Unplug the indoor power connection before performing maintenance or adding upgrades to any satellite dish components.**
- **Do not allow anything to come in contact with the front surface of the satellite dish.**

Grounding requirement

The coaxial cable and the ground block to which it is connected must meet specific grounding requirements. The requirements are listed in the following warning.

⚠ WARNING

The coaxial cable must be connected to a ground block. The ground block should be located at the point where the coaxial cable enters the building. The ground wire must be connected to the ground block and routed to the earth ground.

Preventive maintenance

To maintain your terminal:

- Keep the convection cooling vents free from blockage.
- Dust the unit as often as needed with a soft cloth.
- Do not use solvent or abrasive powder when cleaning.

No internal cleaning or service is required. The terminal does not contain user serviceable parts. Opening or tampering with the unit voids its warranty.

Operating considerations

You must observe the warnings and cautions below to prevent personal injury or damage to the terminal.

⚠ WARNING

- **Do not insert objects through the vents.**
- **Inserting objects through the vents may result in severe personal injury or death due to electric shock.**
- **In addition, inserting objects through the vents may damage the terminal.**

CAUTION

- **Keep the terminal in a well-ventilated space. Do not place anything on top of it. Doing so may reduce heat dissipation and cause operational problems or damage the unit.**
- **Do not install near heat sources, such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.**
- **Never unplug the DC power cord from the terminal while it is powered on. Doing so could damage the pins and also cause a short in the system.**
- **When power needs to be removed from a terminal that uses an AC/DC power supply, always unplug the AC power cord from the wall outlet, surge protector, or power strip.**
- **When power needs to be removed from a terminal that uses a DC/DC power supply, always unplug the DC input cable connector from the power supply.**
- **Do not place the terminal near equipment that produces dust. Certain copiers or computer printers produce carbon dust which can cause malfunctions.**
- **Position the terminal on a stable surface where it will not be bumped or dropped.**
- **Prevent moisture from getting inside the terminal.**

Chapter 2

System Control Center

The System Control Center is a web interface that provides access to important system information, configuration parameters, documentation, and help topics. Access the System Control Center by opening a web browser on a computer connected to the terminal and browsing to **www.systemcontrolcenter.com**.

Note: Each terminal's software is updated periodically over the satellite link. Always refer to the System Control Center's Help page for current information about the System Control Center and the terminal's software.

The DW7700 also has a System Control Center, which is described in the *DW7700 Supplemental User Guide* (1036332-0001). The DW7700 is an enterprise-class broadband communications solution used by enterprise customers, which are typically large businesses.

This chapter discusses the following System Control Center topics:

Accessing the System Control Center

Use any web browser, such as Internet Explorer or Netscape, to access the System Control Center. During installation, a shortcut to the System Control Center was placed on your desktop. If there is not a shortcut on your desktop, follow the instructions below to access the System Control Center. If you cannot access the System Control Center after completing the instructions, refer to *Cannot access the System Control Center* on page 37.

1. Go to **Start**→*Programs*→*Internet Explorer* (or Netscape). The browser interface appears.
2. Place the cursor in the Internet Explorer Address bar or the Netscape Location Bar.
3. Type **`www.systemcontrolcenter.com`**.
4. Press **ENTER**. The System Control Center home page shown in Figure 2 appears.

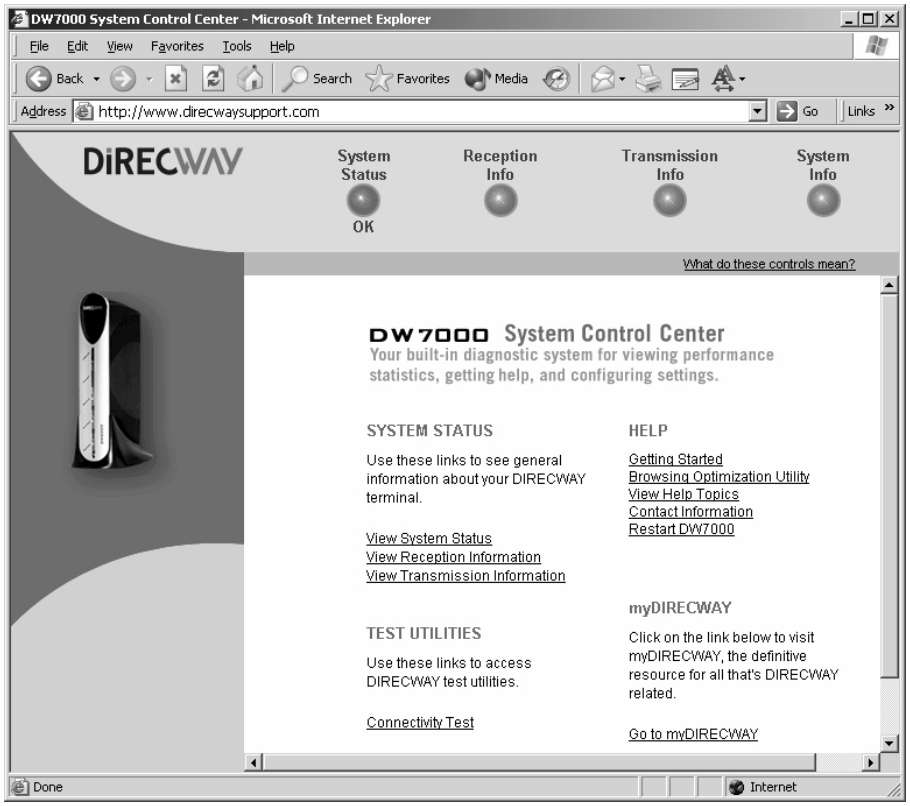

Figure 2: System Control Center home page

If there is not a shortcut on the desktop and **www.systemcontrolcenter.com** does not work, type **`http://192.168.0.1`** in the Internet Explorer Address or Netscape Location bar and press **ENTER**. The System Control Center should appear. If you cannot access the System Control Center, see *Cannot access the System Control Center* on page 37.

Creating a shortcut to the System Control Center

Follow these steps to create a shortcut to the System Control Center if there is not one on your desktop:

1. Place your cursor on the computer desktop.
2. Right-click and select **New**→*Shortcut* as shown in Figure 3.

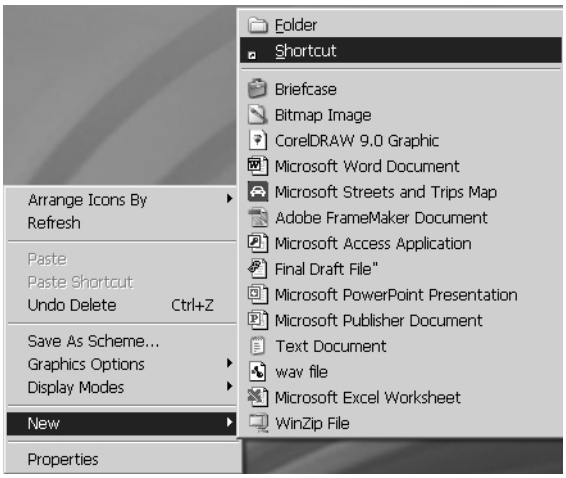

Figure 3: Creating a shortcut to the System Control Center

3. Type **`192.168.0.1`** in the field on the Create Shortcut window as shown in Figure 4.

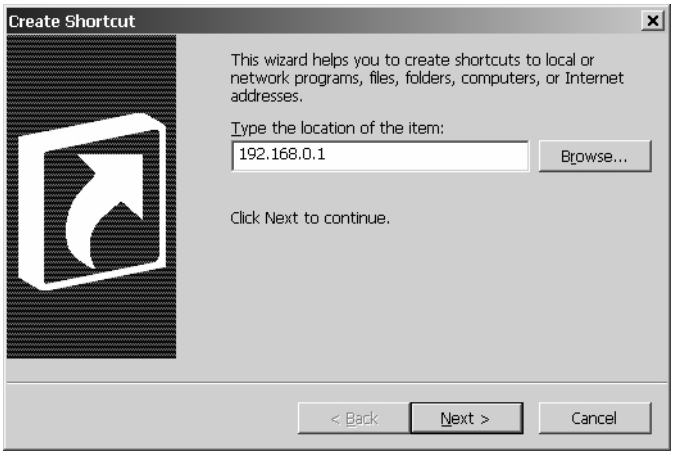

Figure 4: Entering the System Control Center URL in the Create Shortcut window

4. Click **Next**.
5. Type **`System Control Center`** in the field on the Select a Title for the Program window as shown in Figure 5.

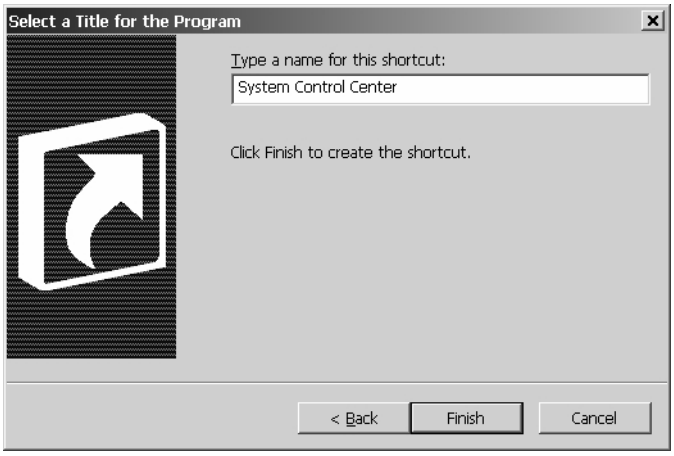

Figure 5: Entering the name of the shortcut

6. Click **Finish** to save the shortcut to your desktop.

Note: You can also add the System Control Center to your browser's Favorites or Bookmark list; refer to your browser's documentation for instructions.

Home page

The System Control Center home page has system indicators and links to terminal features and important information regarding the operation of your terminal.

System indicators

The system indicators appear at the top of the home page. The system indicators are described below and are shown in Figure 6.

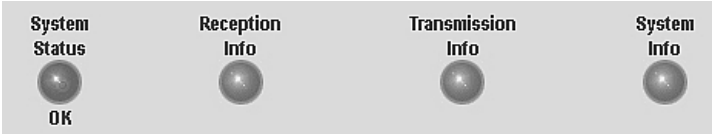

Figure 6: System indicators

Note: The System Status indicator may be red, yellow, or green while other indicators are always blue.

- **System Status** provides access to the System Status page. The System Status page displays general system status information such as signal strength and commissioning status. For more information, see *System Status page* on page 13.

  If the indicator is green and **OK** appears below it, as shown in Figure 6, the satellite connection is operating properly.

  If the indicator is red and **Problem** appears below it, as shown in Figure 7, there is a problem with satellite connectivity. Click the indicator to access the System Status page to view problem details.

  If the indicator is yellow, Web Acceleration is being bypassed.

Figure 7: System Status indicator reporting a problem

- **Reception Info** provides access to the Reception Information page, which displays terminal receive data. For more information, see *Reception Information page* on page 14.
- **Transmission Info** provides access to the Transmission Information page, which displays terminal transmit data. For more information, see *Transmission Information page* on page 15.
- **System Info** provides access to the System Information page, which displays system information such as the terminal IP address, SAN, and the site ID. For more information, see *System Information page* on page 16.

Links

The System Control Center home page has four groups of links:

- System Status
- Test Utilities
- Help
- myDIRECWAY (visible only to users in the United States who purchased a unit through a retail channel)

System Status

The following links provide access to system status information:

- **View System Status** provides access to the System Status page, which displays general system status information such as signal strength and commissioning status. For more information, see *System Status page* on page 13.

- **View Reception Information** provides access to the Reception Information page, which displays terminal receive data. For more information, see *Reception Information page* on page 14.
- **View Transmission Information** provides access to the Transmission Information page, which displays terminal transmit data. For more information, see *Transmission Information page* on page 15.

Test Utilities

The **Connectivity Test** link provides access to the Connectivity Test page, which can be used to test the connection between your terminal and the Network Operations Center (NOC). For more information, see *Connectivity Test page* on page 18.

Help

The following links provide access to help-related information:

- **Getting Started** explains how the terminal works and provides access to operating instructions and recommended settings.
- **Browsing Optimization Utility** provides access to a utility that enhances web browsing performance. The utility has no effect on download and upload speeds.
- **View Help Topics** provides access to the Help page. Refer to the Help page for a variety of help topics ranging from an overview of the terminal to answers to frequently asked questions. For more information, see *Help page* on page 19.
- **Contact Information** provides access to technical support contact information. The contact information displayed may vary by service plan.
- **Restart DW7000** enables you to restart the terminal.

myDIRECWAY

The **Go to myDIRECWAY** link provides access to **myDIRECWAY.com**, a valuable resource for additional features and information. Access to **myDIRECWAY.com** is determined by the service plan you purchased. This feature is not shown in the sample figures that follow.

Note: myDIRECWAY will be visible only to users in the United States who purchased their unit through a retail channel.

System Status page

The System Status page is shown in Figure 8.

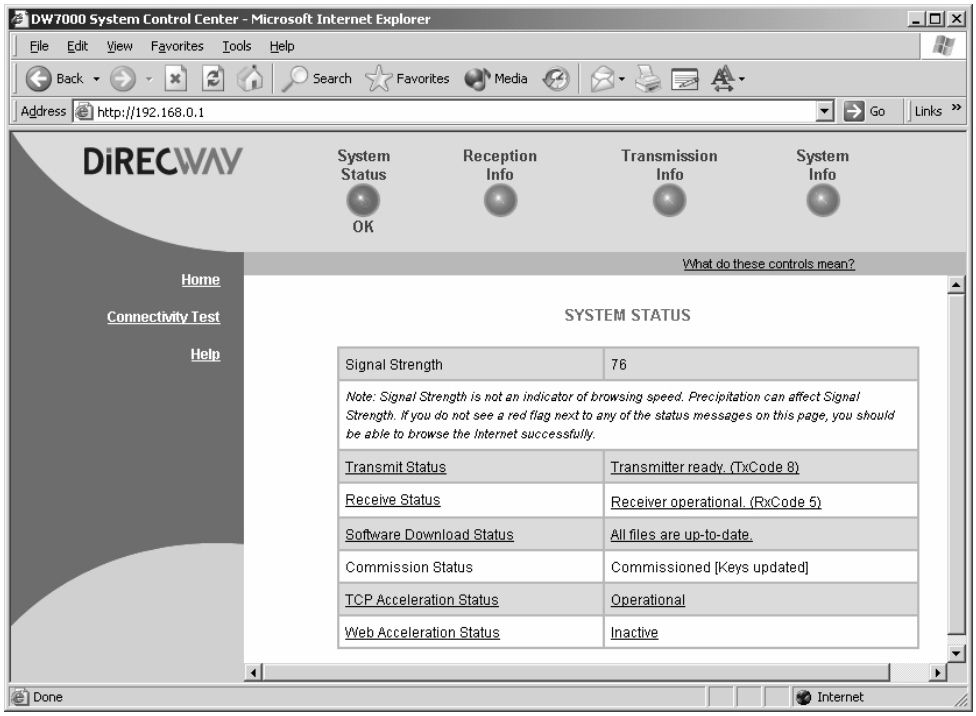

Figure 8: System Status page

- Signal Strength - displays the receive signal strength. A value of 30 or less indicates an appropriate signal is not being received. Refer to *Weather and signal strength* on page 24 for more information on factors that might affect signal strength.
- Transmit Status - indicates whether the transmit data path is operational. Clicking on the status message displays corresponding help information.
- Receive Status - indicates if the receive data path is operational. Clicking on the status message displays corresponding help information.
- Software Download Status - indicates whether DW7000 software and configuration is current.
- Commission Status - indicates whether or not the DW7000 is commissioned.
- TCP Acceleration Status - indicates whether or not TCP Acceleration is operational. TCP acceleration must be operational for optimal performance on a DW7000.

- Web Acceleration Status - indicates whether or not Web Acceleration is operational. If it is operational the server ID will also be displayed. Web Acceleration is operational if you have recently browsed HTTP-based web sites. Web Acceleration may be inactive if you are browsing on a secure HTTP site (https). Secure HTTP does not support Web Acceleration, which will resume operation once you return to an HTTP site. The status indicator will be yellow if Web Acceleration is being bypassed.

Reception Information page

The Reception Information page is shown in Figure 9.

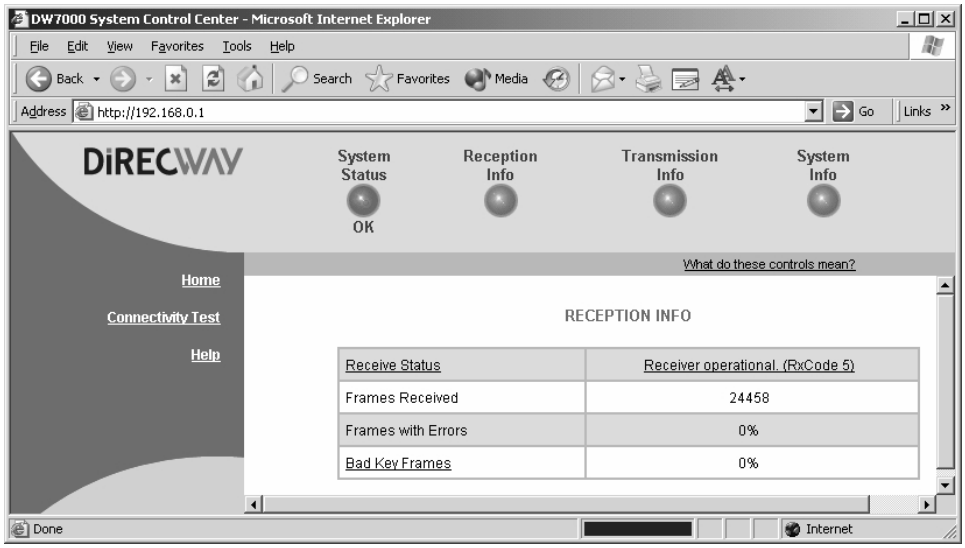

Figure 9: Reception Information page

- Receive Status - reports the status of the receive data path. Clicking on the blue status message displays corresponding help information.
- Frames Received - reports the number of data messages received by the DW7000 over the satellite link.
- Frames with Errors - reports the percentage of frames received that were corrupted. A continuously increasing value indicates problems in the receive path. This may happen in adverse weather conditions or if there is a problem with the receive cable or the antenna. However, if a low non-increasing value is displayed and the system is functioning, there is no reason for concern. You do not need to do any troubleshooting or contact customer support.

- Bad Key Frames - indicates the percentage of received frames that could not be decrypted successfully. All data received over the satellite is encrypted. A continuously increasing value indicates the DW7000 is not commissioned. Click on **System Status** and check the Commission Status field on the page that appears. If it indicates the DW7000 is not commissioned, contact customer support.

Transmission Information page

The Transmission Information page is shown in Figure 10.

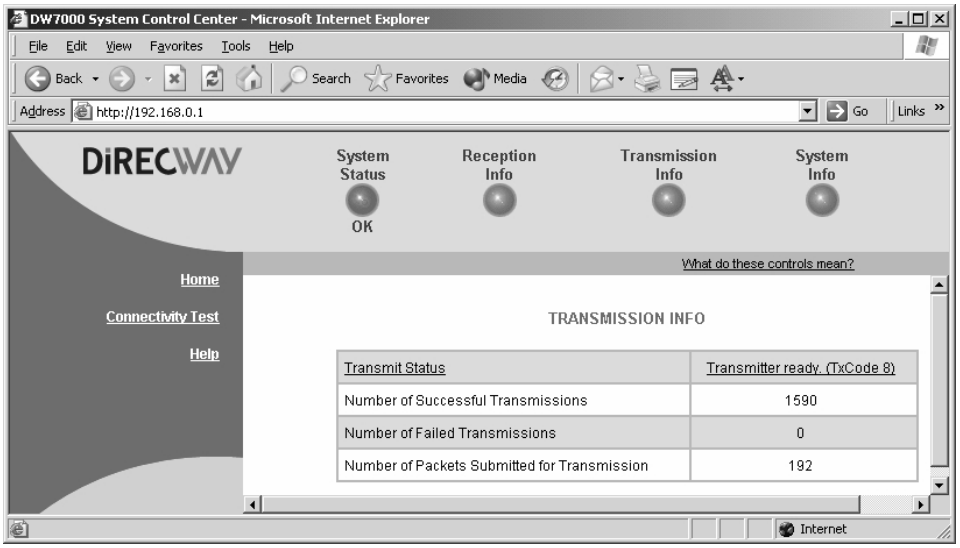

Figure 10: Transmission Information page

- Transmit Status - reports the status of the transmit data path. Clicking on the blue status message displays corresponding help information.
- Number of Successful Transmissions - reports the number of successful transmissions (frames) to the satellite.
- Number of Failed Transmissions - reports the number of frames that could not be sent. A continuously increasing value indicates a problem with transmitting. However, if a low non-increasing value is displayed and the system is functioning, there is no reason for concern. You do not need to troubleshoot or contact customer support.
- Number of Packets submitted for transmission - indicates the total number of data packets transmitted.

System Information page

The System Information page shown in Figure 11 has four sections: DW7000 Info, Satellite, Software Configuration, and Transmit Radio Info. Each section displays a number of fields. While all of the information displayed in the fields may be useful at some time, the most important fields are discussed below.

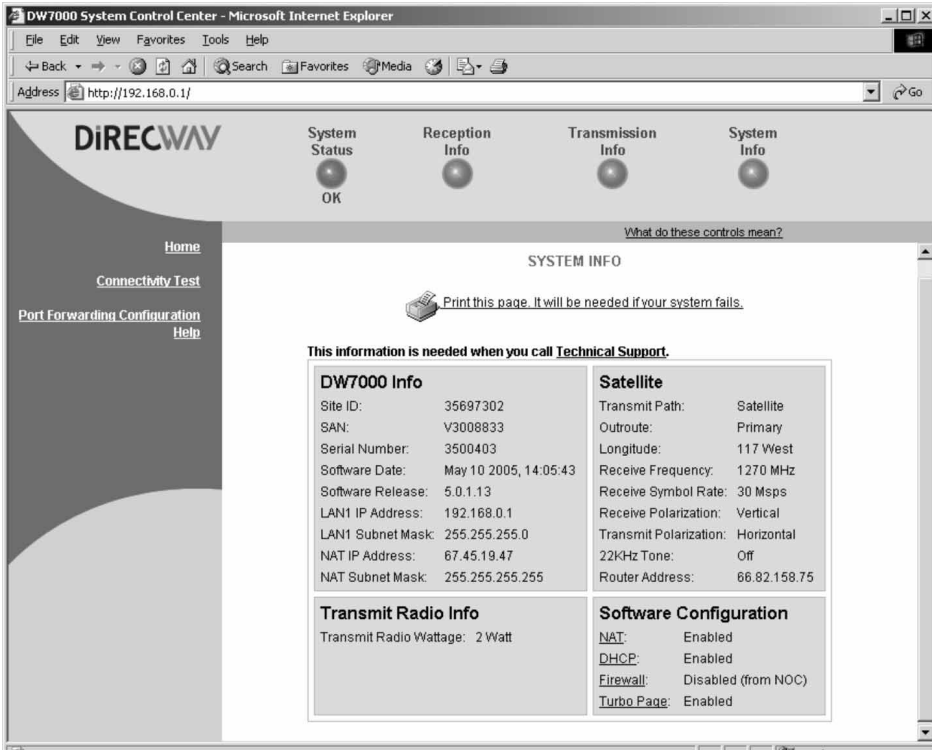

Figure 11: System Information page

Note: Print the System Information page and save it. The System Information page may not be accessible if a problem occurs; the printed copy of the System Information page is useful if you need to contact your service provider for assistance.

- DW7000 Info
  - Site ID - site identification number.
  - SAN - site account number.
  - Serial Number - DW7000 serial number. You need to provide the serial number if you contact technical support for assistance.
  - Software Date - software build date.

  - Software Release - version of the software on the DW7000. Typically, this is the factory-installed software version. If the NOC downloads a newer version of software to your DW7000, the newer software version is displayed in this field.
  - IP Address - the IP address of the DW7000 on the user's LAN.
  - Subnet Mask - defines the range of addresses assigned to the DW7000.

- Satellite
  - Longitude - satellite longitude.
  - Receive Frequency - transponder frequency configured for the DW7000.
  - Receive Polarization - polarization orientation, which is either horizontal or vertical.
  - Router Address - IP address of the primary router at the NOC used to route data sent by the DW7000.

- Software Configuration - Turbo Page, network address translation (NAT), the firewall, and dynamic host configuration protocol (DHCP) are enabled or disabled depending on the service offering purchased by the customer. These settings cannot be changed by the customer.
  - Network Address Translation (NAT) - typically used to allow multiple computers to share a single address on the Internet. It also allows pre-configured remote networks to be integrated easily with the DIRECWAY network.
  - Dynamic Host Configuration Protocol (DHCP) - if enabled, this simplifies the network configuration of the computers. The computers need to be configured to automatically obtain IP addresses.
  - Firewall - if enabled, allows you to specify packet filtering rules.
  - Turbo Page - if enabled, speeds web browsing.

- Transmit Radio Info
  - Transmit Radio Name - name of the transmit radio on the antenna assembly (if available).
  - Transmit Radio Part Number - transmit radio part number (if available).
  - Transmit Radio Wattage - indicates whether a 1 watt or 2 watt transmit radio is on the antenna assembly.

Connectivity Test page

The Connectivity Test page has a link that can be used to test the DW7000's connectivity to the NOC.

See Chapter 4 – *Troubleshooting* for instructions explaining how to access and perform the test.

Port Forwarding Configuration page

The Port Forwarding page shown in Figure 12 may be used to define rules for allowing TCP and UDP traffic on the Internet to access servers on your network.

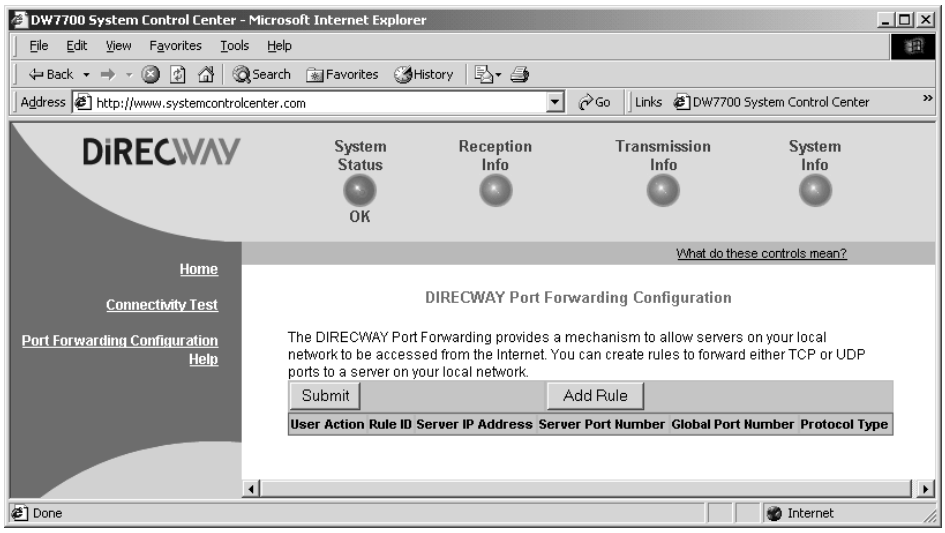

Figure 12: Port Forwarding Configuration page

Defining port forwarding rules

Follow these steps to use the Port Forwarding Configuration page to define port forwarding rules:

1. Open a web browser on a computer connected to the DW7700.

   You may also use a computer on the LAN if the DW7700 is connected to an Ethernet device, such as a hub or router.

2. Type **`www.systemcontrolcenter.com`** in the browser's location or address bar and press **ENTER**.
3. Click **Port Forwarding Configuration** on the System Control Center home page or in the left frame of the page you are currently on.
4. Click **Add Rule** on the Port Forwarding Configuration page. See Figure 12.

5. Enter the appropriate values in the following fields: Rule ID, Server IP Address, Server port, and Global port. See Figure 13.

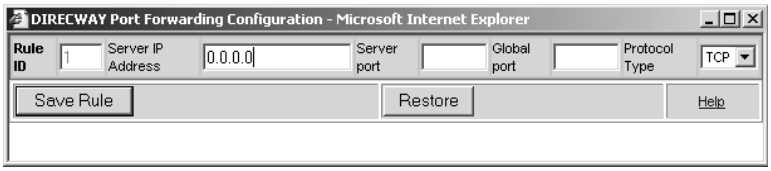

Figure 13: Entering port forwarding rules

Help page

The main Help page shown in Figure 14 provides access to help-related information ranging from frequently asked questions (FAQs) to advanced troubleshooting statistics. This section does not discuss all the information accessible through the Help page, so thoroughly review the Help page to become familiar with your DW7000 and the System Control Center.

Access the Help page by clicking on **View Help Topics** on the System Control Center home page or clicking **Help** in the left pane of the page you are on if you are not on the home page.

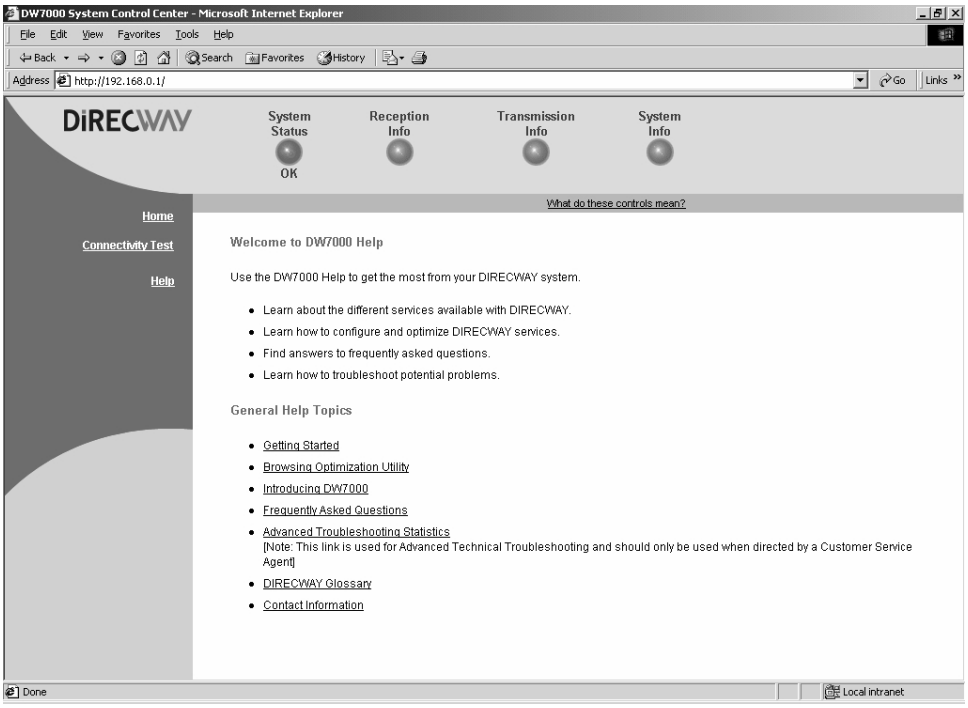

Figure 14: Help page

Browsing optimization utility

DIRECWAY offers a browsing optimization utility called the LAN Client Configuration Utility (LCCU). The utility configures certain settings on Windows operating systems to improve your Internet browsing experience. Follow these steps to download and install the utility:

1. Open a web browser on a computer connected to the DW7000.
2. Navigate to the System Control Center.
   Refer to *Accessing the System Control Center* on page 8 for instructions explaining how to access the System Control Center.
3. Click **View Help Topics** on the System Control Center home page or click **Help** in the left pane of the page.
4. Click **Browsing Optimization Utility** to access the Browsing Optimization Utility page shown in Figure 15.
5. Click **Download**.

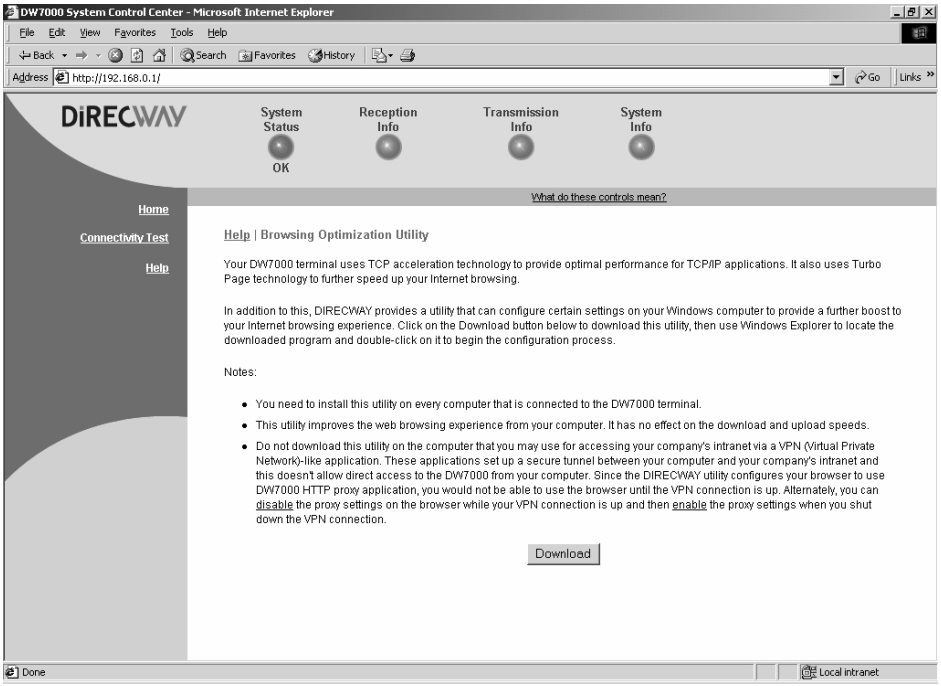

Figure 15: Downloading the browsing optimization utility

myDIRECWAY

Users who purchased their DW7000 from a DIRECWAY retail channel have access to myDIRECWAY, a feature-rich portal that contains a variety of interactive tools. Users can check online usage, test satellite speed, manage passwords, check their account and service plan information, and more. Select one of the following methods to access myDIRECWAY:

- Click **myDIRECWAY** on the left side of a System Control Center page.
- Type **www.mydirecway.com** in a web browser address bar and press **ENTER**.

Note: myDirecway is visible only to users in the United States who purchased a unit through a retail channel.

Chapter 3

Remote terminal LEDs

The LEDs provide information about operating status.

If the LEDs are not functioning as described in this chapter, refer to *Using the terminal LEDs to troubleshoot* on page 38.

This chapter discusses the following LED topics:

Overview

The terminal has five LED indicators on its front panel. They are described below.

Note: If the LEDs do not function properly as described in this chapter, refer to the sticker on the power supply to verify you have the correct power supply. The HNS part number for the AC/DC power supply is 1031105-0001; the HNS part number for the DC/DC power supply is 1033554-0001.

- **LAN -** indicates whether the LAN is connected and usable, and whether there is receive or transmit activity.
- **Transmit -** indicates whether the terminal can transmit, is transmitting, or if some condition is preventing transmission.
- **Receive -** indicates whether the terminal has acquired the correct outroute, is receiving, or if some condition is preventing reception.
- **System -** indicates whether the terminal is operational or not. This indicator steadily flashes on a DW7700 when the DW7700 is connected through DIRECWAY Virtual Private Network Automatic Dial Backup (DVADB).
- **Power -** indicates whether the terminal is powered on and operating normally.

The terminal also has two LED indicators on its back panel at the Ethernet port. These indicate whether the Ethernet connection is functional and if the port is passing data.

Fatal error indication

If the Power LED is off and one or more of the other LEDs is flashing, the unit may have to be replaced. Try power cycling the terminal by unplugging the power cord from the power source and then plugging it back in. The terminal may recover. If the fatal error indication continues, the terminal must be replaced. Contact customer support.

Weather and signal strength

Rain or snow can interfere with signal strength. The terminal stops receiving satellite signals, and the Receive LED turns off.

Heavy rain or snow can interfere with the antenna's reception of the signal. In addition, buildup of moisture, snow, or ice on the antenna can interfere with the signal. Similar conditions at the NOC can interfere with signals for brief periods of time.

Severe weather conditions may interfere with signal reception. Signal strength is restored as the rain or snow subsides.

LED appearance during normal operation

This section describes the LEDs' appearance during typical terminal operation. Refer to Figure 16 for LED locations.

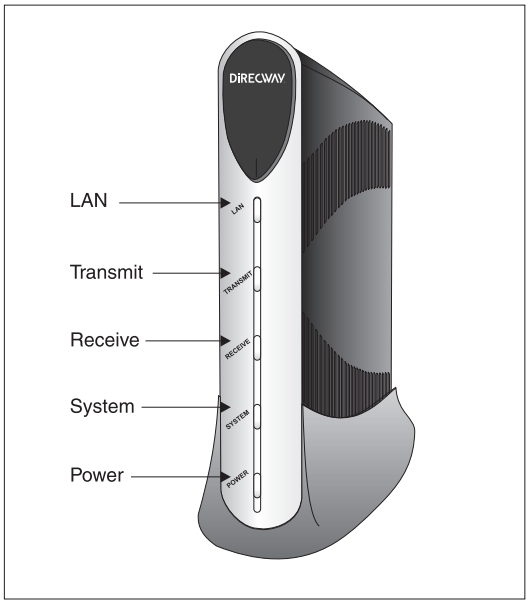

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Figure 16: Remote terminal LEDs

Note: If the power LED blinks, the terminal is operating with a backup version of software referred to as the fallback.bin. This usually happens when the unit is first installed. The unit may operate with the fallback.bin if the primary version of software, referred to as the main.bin, does not successfully load; in this case, power cycle the unit by disconnecting the power cord from the power source, waiting 10 seconds, and then plugging it back in.

Front panel LEDs

When the terminal is powered on and transmitting or receiving data:

- The LAN LED is on and blinks intermittently as frames are transmitted or received.
- The Transmit LED is on and blinks intermittently as frames are transmitted.
- The Receive LED is on and blinks intermittently as frames are received.
- The System LED is on. The indicator steadily flashes on a DW7700 when the DW7700 is connected through DVADB.
- The Power LED is on.

Ethernet port LEDs

The DW7000 has one RJ-45, 10/100BaseT Ethernet port. The port has a green and a yellow LED. A flashing green LED indicates a valid link between the DW7000 and Ethernet device; a dark LED indicates an invalid link. An illuminated yellow LED indicates the port is operating in 100BaseT mode; a dark yellow LED indicates the port is operating in 10BaseT mode. The Ethernet port and indicators are shown in Figure 17.

Note: Figure 17 shows the Ethernet port of a DW7000 that is vertically mounted in a pedestal base.

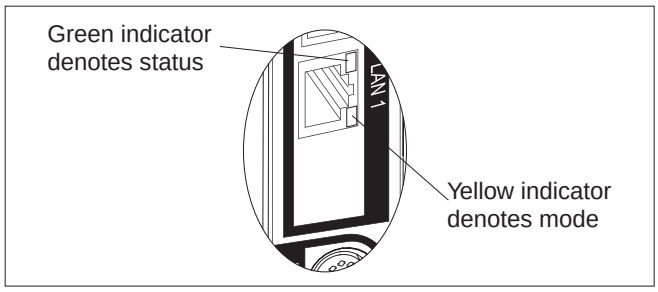

Figure 17: Ethernet port LED operation

The Ethernet port supports a wide range of devices, including:

- PCs equipped with Network Interface Cards (NICs)
- Hubs
- Routers
- Switches

Additional LED appearance information

Refer to Table 1 for additional information on LED appearance and descriptions.

Table 1: Remote terminal LED operation

LED	Appearance	Description
LAN	Solid blue	LAN is connected and usable
	Flashing blue	There is transmit or receive activity on the LAN
Transmit	Solid blue	OK
	Flashing blue	Transmitting frames
	Off	Condition preventing transmission
Receive	Solid blue	OK
	Flashing blue	Receiving frames
	Off	Condition preventing acquisition of outroute (preventing receipt)
System	Solid blue (DW7000 and DW7700)	System operating normally via satellite
	Flashing blue (DW7700)	System is operating normally and DVADB mode is enabled
	Off	Condition preventing full operation
Power	Solid blue	Power is on and unit is functioning normally
	Blinking	Unit is operating with the fallback.bin (backup) version of software
	Off	No power
	Off with other LED flashing	Fatal error
	Off with all other LEDs flashing in unison	Unrecoverable key error

Chapter 4
Troubleshooting

This chapter provides general troubleshooting procedures.

The following topics are discussed:

Note: The illustrations in this chapter are examples.

Note: Some troubleshooting steps in the following sections require you to power-cycle the terminal. When power-cycling a terminal that uses an AC/DC power cord, always disconnect the AC power cord from the wall outlet, surge protector, or power strip. When power-cycling a terminal that uses a DC/DC power cord, always disconnect the DC input cable connector from the power supply.

Cannot surf but can access the System Control Center

If you cannot surf the Internet but can access the System Control Center, follow the troubleshooting procedures for:

- *Confirming the terminal is commissioned*
- *Confirming receive signal*
- *Confirming transmit signal*
- *Confirming TCP acceleration is operational*
- *Confirming Web Acceleration is operational*
- *Confirming NOC connectivity*
- *Confirming Internet connectivity*
- *Checking for viruses and firewall issues*

There is a possibility that the problem you are experiencing may be the result of several causes. If you implement a troubleshooting procedure but still cannot surf, proceed to the next procedure. Also, try the troubleshooting procedures more than once before contacting customer support.

If you cannot access the System Control Center by clicking on the shortcut or typing **`www.systemcontrolcenter.com`** in the URL address or location bar, try typing **`http://192.168.0.1`** in the bar and pressing **ENTER**.

Confirming the terminal is commissioned

Follow these steps to confirm the terminal is commissioned:

1. At the System Control Center, click on the **System Info** indicator. The System Information page appears. See Figure 18.

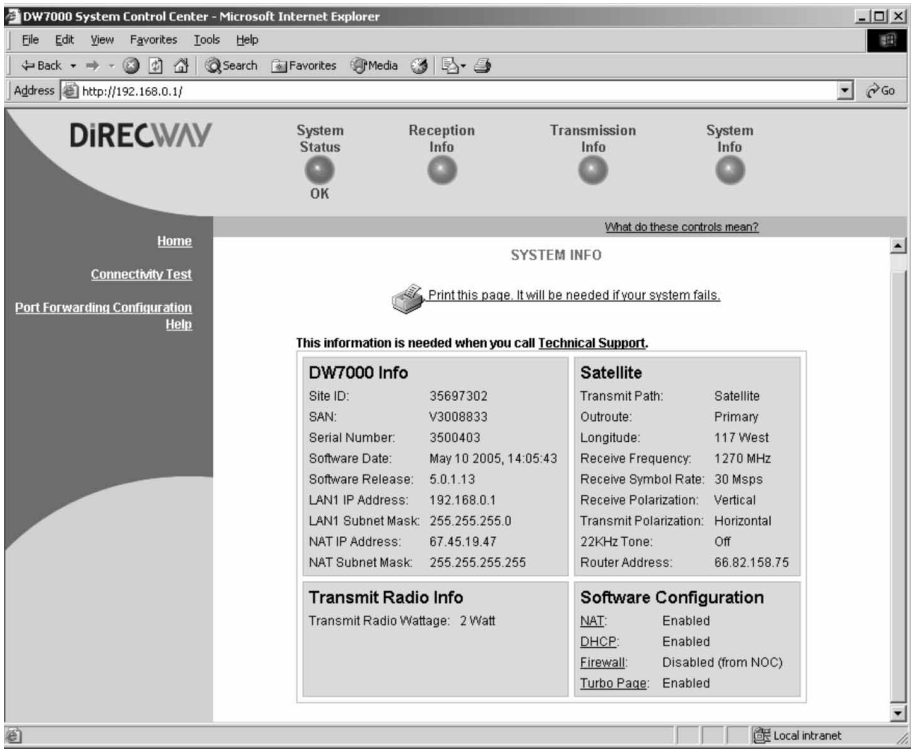

Figure 18: System Information page

2. Observe the value in the Site ID field.
   If the numerical site ID appears, the unit is commissioned. Proceed to the next troubleshooting step.
   If `Not Commissioned` appears, the terminal is not commissioned. Contact customer support.

Confirming receive signal

The terminal will not function if satellite signals are not received properly.

1. At the System Control Center, click on the **Reception Info** indicator. The Reception Information page appears. See Figure 19.

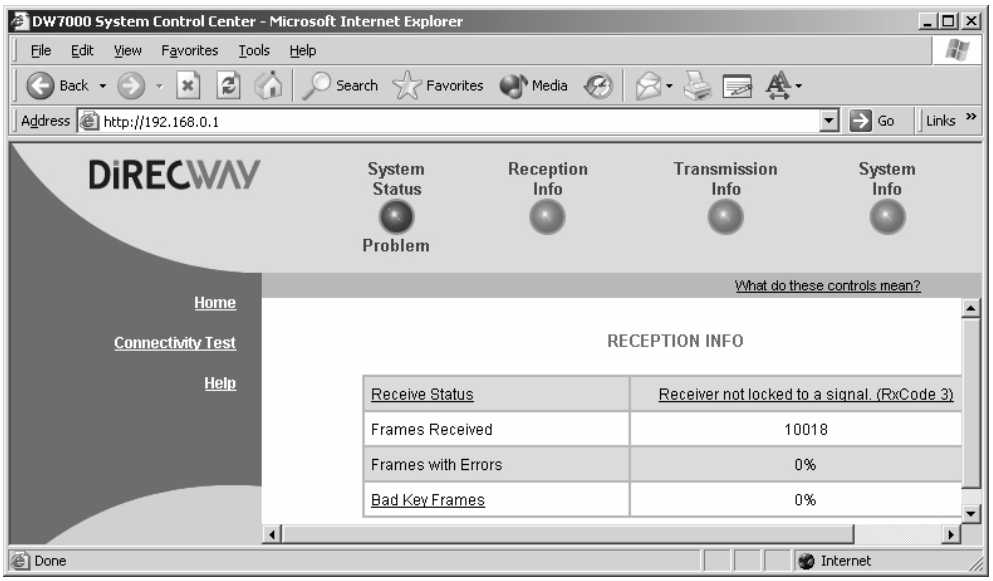

Figure 19: Confirming receive signal

2. Observe the receive (Rx) code in the Receive Status field.
   If `The receiver is operational (RxCode 5)` appears in the Receive Status field, the terminal is receiving signals properly. Proceed to the next procedure.
   If any other code appears, the terminal is not receiving signals properly. Click on the code, which is a link, and follow the troubleshooting procedure that appears.

Confirming transmit signal

The terminal will not function if satellite signals are not transmitted properly.

1. At the System Control Center, click on the **Transmission Info** indicator. The Transmission Information page appears. See Figure 20.

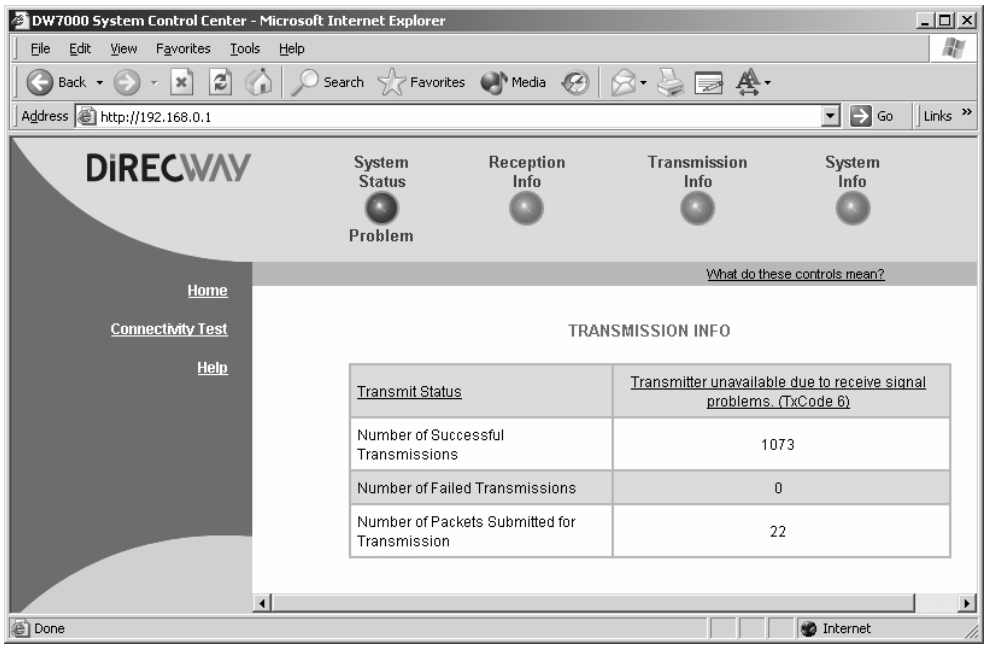

Figure 20: Confirming transmit signal

2. In the Transmit Status field, check the transmit (Tx) code.
   If `Transmitter available for Normal Operation (TxCode 8)` appears in the Transmit Status field, the terminal is transmitting signals properly. Proceed to the next troubleshooting step.
   If any other code appears, the terminal is not transmitting signals properly. Click on the code, which is a link, and follow the troubleshooting procedure that appears.

Confirming TCP acceleration is operational

Transmission Control Protocol (TCP) Acceleration is a proprietary protocol provided by DIRECWAY. It optimizes performance for TCP and Internet Protocol (IP)-based applications, including faster downloads over satellite.

1. At the System Control Center, click on the **System Status** indicator. The System Status page appears. See Figure 21.

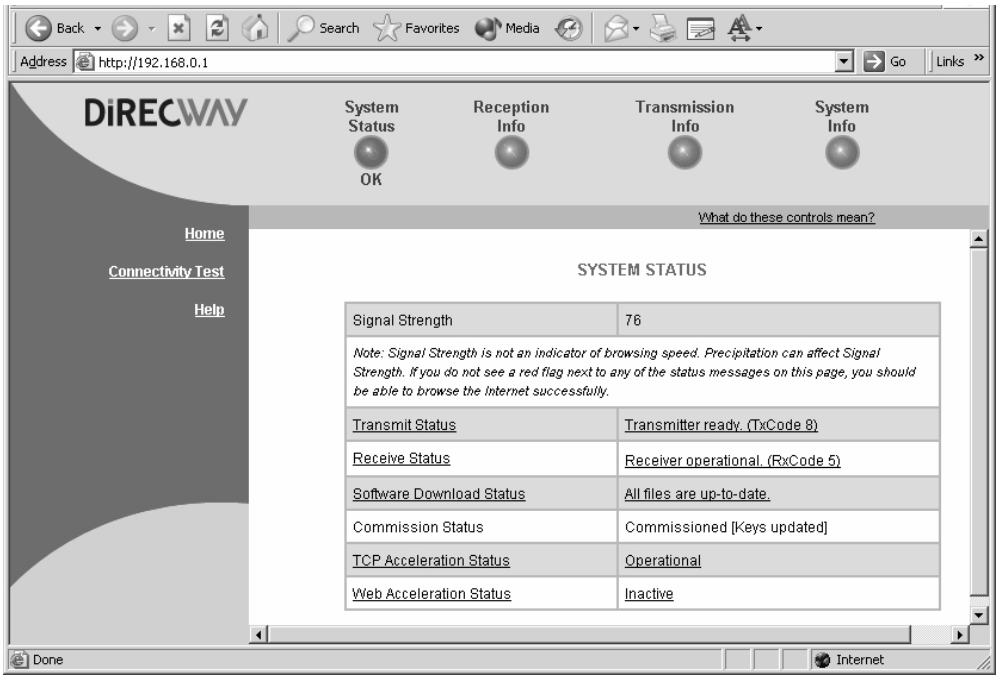

Figure 21: Confirming TCP acceleration is operational

2. Check the message in the TCP Acceleration Status row.
   If the message says `Operational`, TCP Acceleration is enabled. Proceed to the next troubleshooting step.
   If the message says `Not Operational`, TCP Acceleration is disabled. Perform the following steps:
   a. Check that receiving and transmitting are working. If they are not, troubleshoot them as per the previous two sections.
   b. If receiving and transmitting are working but TCP Acceleration is still not operational, power cycle the terminal by unplugging the power cord from the power source, waiting 10 seconds, and plugging it back in. Check the TCP Acceleration status again. If it is not operational, or operational but you still cannot surf the Internet, proceed to the next troubleshooting step.
   c. If TCP Acceleration is still disabled after power cycling, contact customer support for assistance.

Confirming Web Acceleration is operational

Web Acceleration is a proprietary protocol provided by DIRECWAY. It optimizes Web browsing performance.

1. At the System Control Center, click on the **System Status** indicator. The System Status page appears. See Figure 22.

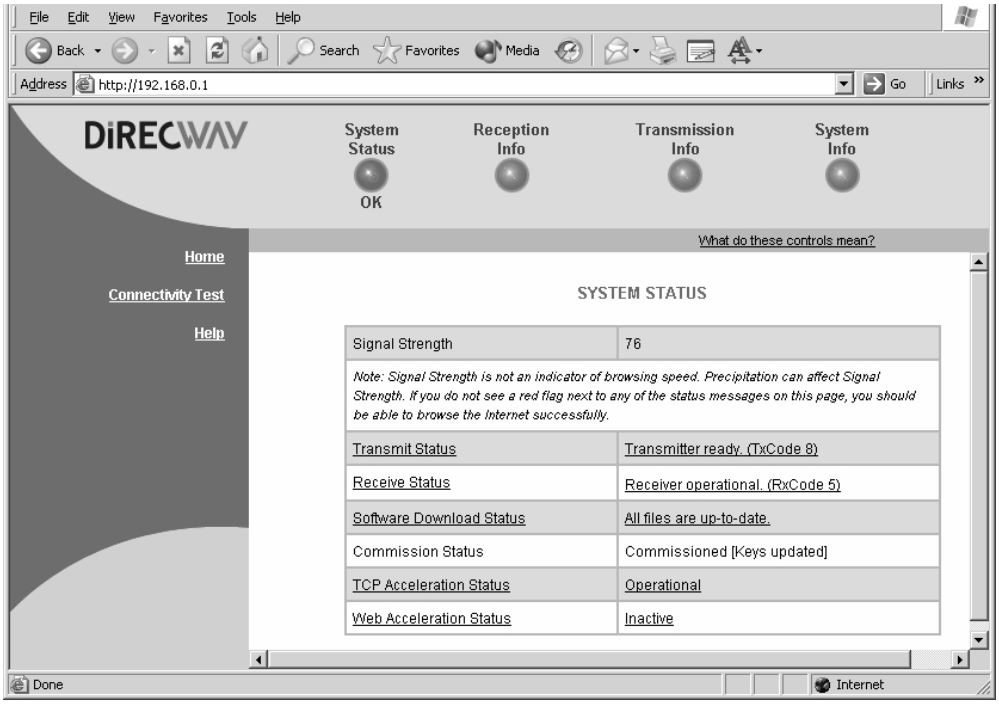

Figure 22: Confirming Web Acceleration is operational

2. Check the message in the Web Acceleration Status row.
   If the message says `Operational`, Web Acceleration is enabled and the System Status indicator is green. Proceed to the next troubleshooting step.
   If the message says `Not Operational`, Web Acceleration is disabled and the System Status indicator is yellow. Perform the following steps:
   a. Check that receiving and transmitting are working. If they are not, troubleshoot them as previously described.
   b. Wait two hours. If Web Acceleration has not returned to Operational, go to step b.
   c. Power cycle the terminal by unplugging the power cord from the power source, waiting 10 seconds, and plugging it back in. Check the Web Acceleration status again. If it is still not operational, or operational but you still cannot surf the Internet, proceed to the next troubleshooting step.
   d. If Web Acceleration is still not operational after power cycling, contact customer support for assistance.

Confirming NOC connectivity

Use the **Connectivity Test** link to check connectivity to the DIRECWAY NOC.

Note: You may want to open a second browser window to access the Help page while conducting the Connectivity Test.

1. Click **Connectivity Test** on the left side of the System Control Center. The Connectivity Test page shown in Figure 23 appears.

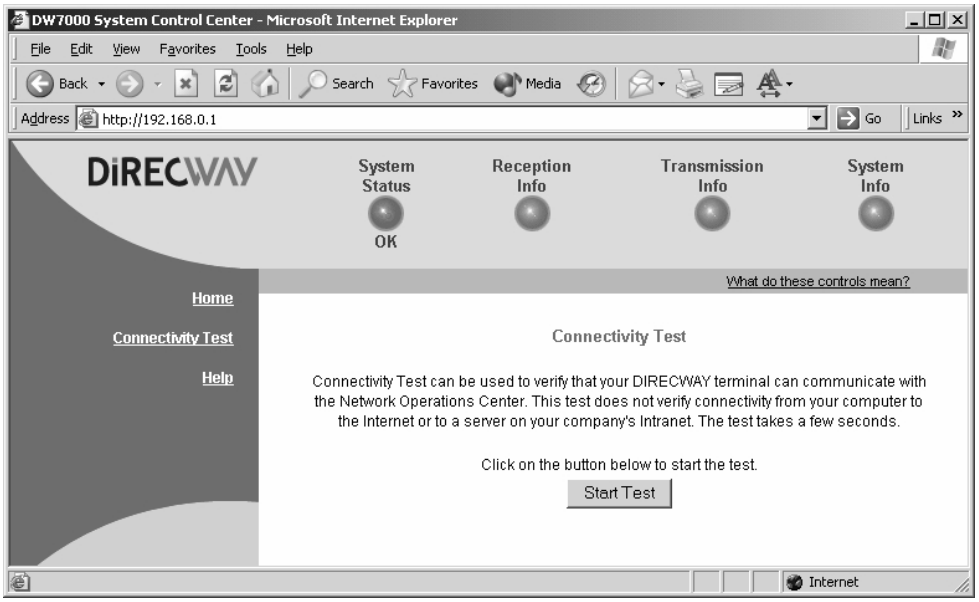

Figure 23: Accessing the Connectivity Test page

2. Click **Start Test**. A message appears informing you if the test was successful.
3. If the connectivity test succeeds but you still cannot surf the Internet, try pinging the Router Address from your computer. Ping is a DOS command that lets you verify a particular IP address exists and can accept requests. Ping is used diagnostically to ensure that a host computer you are trying to reach is actually operating. Ping operates by sending a packet to a designated address and waiting for a response. Windows and MacIntosh operating systems both let you use ping.
   a. At the System Control Center, click on the **System Info** indicator. The System Information page appears.
   b. Record the router address listed in the Satellite section of the System Information page.
   c. In Windows, go to **Start**→ *Run.* The Run box appears.

d. Type **command** in the Open field and click **OK**. The Command window appears. See Figure 24.

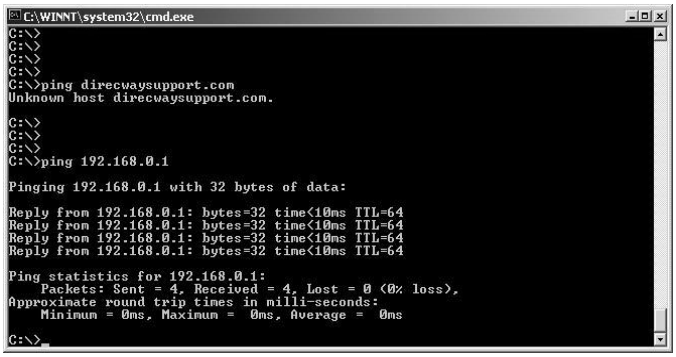

Figure 24: Successful ping test

e. At the prompt, type **ping** followed by a space and then type the router address and press **ENTER**. For example, if the router address is 100.100.100.100, type **ping 100.100.100.100** and press **ENTER**. If the ping is successful, the message in Figure 24 appears. If it fails, the message shows the packets were lost; timeout messages may also appear. See Figure 25.

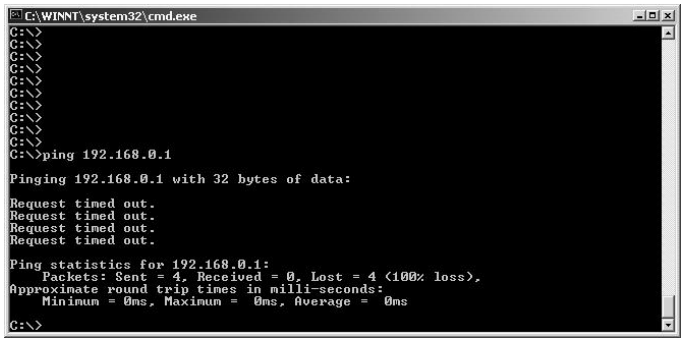

Figure 25: Failed ping test

f. Close the window to end the Command session.

If pinging the router address succeeds but you still cannot surf the Internet, skip to *Confirming Internet connectivity* on page 35.

If pinging the router address fails, and DHCP is disabled on the terminal, the default gateway address is probably not set correctly in the computer's operating system settings. The default gateway address should be the terminal IP address as received during commissioning and displayed in the IP Address field on the System Information page. Fix this in the computer's operating system settings. See Appendix B – *Typical operating system settings,* on page 51. Then repeat the sequence above.

If the tests still fail, power cycle the terminal by unplugging the power cord from the power source, waiting 10 seconds, and plugging it back in. If you still can't surf the Internet, call your service provider.

Confirming Internet connectivity

There might be a temporary Internet problem or a problem with the site you are trying to access. Complete these troubleshooting steps if you use a DW7000. If you use a DW7700, contact your technical support.

1. Open a command prompt on a computer connected to the terminal.
2. Ping the DIRECWAY web server:
   a. Type **`ping www.direcway.com`**.
   b. Press **ENTER**.

   If the ping test is successful, there may be a problem with the web server for the web site you originally tried to access. Wait awhile and then try to access the web site again.

   If the ping test failed, continue with step 3.
3. Ping the DNS address:
   a. Type **`ping 66.82.4.8`** if you purchased the terminal from a DIRECWAY retail channel.
   b. Press **ENTER**.

   If the ping test is successful but you still cannot browse the Internet, complete the procedures in the next section, *Checking DNS settings*.

   If the ping test fails, refer to *Contact information* on page 1 for instructions explaining how to get technical assistance.

Checking DNS settings

Follow the steps below to check the DNS settings on your computer if you can ping your DNS address but cannot browse the Internet. The steps may vary slightly based on your computer's operating system, but they may be used as a guideline.

1. On the Windows task bar, click **Start**→ *Run*.
2. Type **`command`** in the Run window.
3. Click **OK**.
4. Type **`ipconfig /all`** at the command prompt and press **ENTER**.
5. Locate the DNS addresses in the DNS Servers field. Verify `66.82.4.8` appears in this field.
6. Close the Command window.

If the DNS address is correct, wait awhile and try to access a web site again. There may be a temporary Internet connection outage. If you are still unable to access a web site after waiting, complete the procedures in the next section, *Checking for viruses and firewall issues*.

If the DNS address is not correct, contact technical support for assistance.

Checking for viruses and firewall issues

A virus can prevent your computer from operating normally. If you find a virus, delete or disable it and try surfing again.

If you are using a firewall, check that none of its settings are blocking access to the Internet or the DIRECWAY servers. If you do not know how to do this, disable the firewall. If you can surf after disabling the firewall, you need to learn how to set up the firewall so that it does not block DIRECWAY. Refer to the firewall manufacturer's instructions.

Finally, check and make sure you are using the latest version of your virus and/or firewall program. These are updated frequently. If you are not using the latest version, update and run the programs again.

Cannot access the System Control Center

If you cannot access the System Control Center, refer to the troubleshooting procedures for the appropriate hardware configuration:

- *Computer is connected directly to the terminal*
- *Terminal is connected to an Ethernet device*

Computer is connected directly to the terminal

Follow the steps below if your computer is connected directly to the terminal. If you complete a step and the System Control Center does not appear, continue with the next step. Repeat the steps once more before contacting customer support.

1. Locate the shortcut to the System Control Center on your computer desktop.
2. Double-click on the shortcut icon.
3. If double-clicking on the icon does not work, open a web browser.
4. Type **`www.systemcontrolcenter.com`** in the browser's address or location bar.
5. Press **ENTER**.
6. Type **`http://192.168.0.1`** in the browser's address or location bar.
7. Press **ENTER**.

Terminal is connected to an Ethernet device

If your terminal is connected to an Ethernet device such as a router or a wireless base station, follow these steps:

1. Disconnect the Ethernet cable from the device.
2. Connect the Ethernet cable to the Ethernet port on your computer.
3. Restart your computer.
4. Attempt to access the System Control Center by completing the steps in *Computer is connected directly to the terminal* at the top of this page.

If you can access the System Control Center after connecting the terminal directly to your computer, your Ethernet device may not be properly configured. Refer to the documentation for your Ethernet device to properly configure it. Make sure to re-connect the terminal to the Ethernet device before attempting to access the System Control Center.

Continue with *Using the terminal LEDs to troubleshoot* on page 38 if you are still unable to access the System Control Center.

Using the terminal LEDs to troubleshoot

This section explains how to use LED appearance to troubleshoot. Refer to Figure 26 for power and cable connections when completing a troubleshooting procedure.

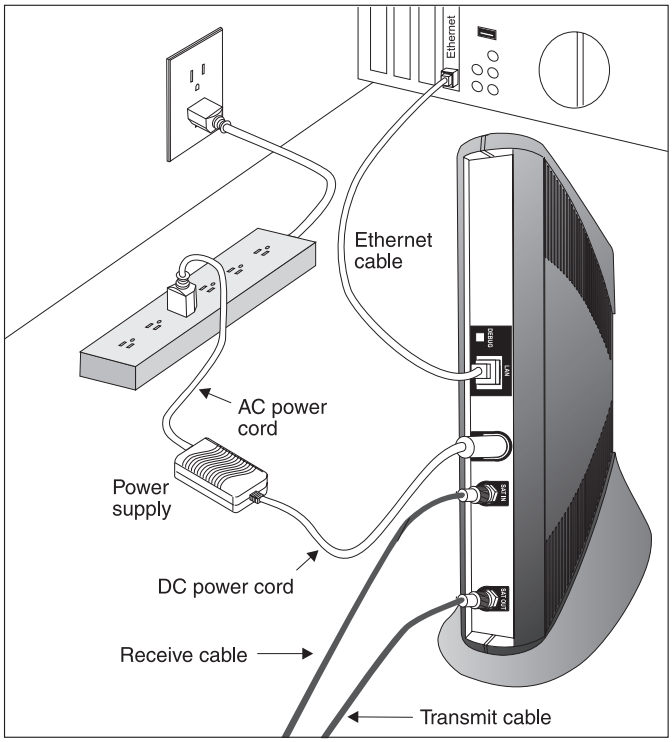

Figure 26: Remote terminal power and cable connections

Fatal error indication

If the Power LED is off and one or more of the other LEDs is flashing, the unit may have to be replaced. If there is not a fatal error indication, proceed to the next troubleshooting step.

First try power cycling the terminal by disconnecting the power from the power strip or surge protector, waiting 10 seconds, and then plugging it back in. The unit may recover.

Note: If the fatal error indication continues, the unit must be replaced. Please contact customer support.

Unrecoverable key error

If the Power LED is off and all the other LEDs are flashing in unison, there is an unrecoverable key error. First try power cycling the terminal by disconnecting the power from the power strip or surge protector, waiting 10 seconds, and then plugging it back in. Call customer support if the unit does not recover.

All LEDs are off

If all the LEDs are off, the power connections may not be secure or the power source may be faulty. Refer to Figure 26 and follow these steps:

1. Make sure the DC power cord is securely connected to the DC IN connector on the terminal.
2. Make sure the AC power cord is securely connected to the power source.
   If the AC power cord is connected to a power strip or surge protector, make sure the power strip or surge protector is turned on.
3. If the LEDs are still off, determine if the power source is faulty:
   a. Unplug the terminal AC power cord from the power outlet. If the terminal AC power cord is connected to a power strip or surge protector, unplug the power strip or surge protector from the power outlet.
   b. Plug a small device, such as a portable radio, to the power outlet. If the device works, there is not a problem with the power source.
4. Call customer support if completing steps 1 - 3 does not resolve the problem.

Checking the Power LED

If the Power LED is lit, proceed to the next troubleshooting step. If it is not lit, wait 15 minutes before proceeding, because a download may be taking place. If the LED is still off after 15 minutes, refer to Figure 26 on page 38 and follow these steps:

1. Power cycle the terminal by unplugging the power cord from the power source, waiting 10 seconds, and plugging it back in.
2. If the Power LED is still not lit, make sure the DC power cord is securely attached to the terminal.
3. If the Power LED is still not lit, plug a small device, such as a portable radio, into both the power strip or surge protector and the wall outlet or other power source. If it works, the power sources are functional. Call customer support for assistance.

Checking the LAN LED

If the LAN LED is lit, proceed to the next troubleshooting step. If it is not lit, perform the following steps:

1. Check that the Ethernet cable is connected to the terminal LAN port and to the computer's Ethernet port.
2. If the LAN LED is still not lit, power cycle the terminal by unplugging the power cord from the power source, waiting 10 seconds, and plugging it back in.

3. If the LAN LED is still not lit, check the Windows Device Manager to see if your computer's NIC is installed correctly.
   a. In Windows 2000, for example, right-click **My Computer** on the desktop and choose *Properties→ Hardware→ Device Manager*. A screen appears listing all the devices installed on the computer.
   b. If the NIC is not properly installed, a red X appears next to its listing. Troubleshoot the NIC installation using the manufacturer's instructions and Windows documentation.
   If the My Computer icon is not available, click **Start**→ *Settings→ Control Panel→ Administrative Tools→ Computer Management→ System Tools→ Device Manager*.
4. If the LAN LED is still not lit after fixing any NIC problems, check the terminal's back panel LEDs.
   a. If the Orange LED is lit and the front panel LAN LED is NOT, contact Technical Support for further assistance.
   b. If both the Orange LED and the front panel LAN LED are not lit, check all network equipment that connects the computer with the terminal, including the computer's Ethernet card, Ethernet cable(s) and any switch or hub. Swap out one or more of the items to isolate the problem.
   c. If all the equipment seems alright, power cycle the terminal by unplugging the power cord from the power source, waiting 10 seconds, and plugging it back in. If this doesn't solve the issue, refer to the vendor that supplied the network equipment.
5. If the LAN LED is still not lit, try connecting the terminal to another computer. If the Power and LAN LEDs are lit, the problem is with your computer. If they are not lit, contact customer support.

LAN LED is illuminated

If the LAN LED is lit, disconnect the Ethernet cable. The LAN LED either stays illuminated or dims. Follow the appropriate instructions below.

If the LAN LED stays illuminated

If the LAN LED stays lit, power cycle both the terminal and the computer by unplugging the power cords from the power strip or surge protector, waiting 10 seconds, and plugging them back in. **Do not reconnect the Ethernet cable.**

If the LAN LED is illuminated after the terminal powers back on, call customer support.

If the LAN LED dims If the LAN LED goes dim, follow these steps:

1. Plug the Ethernet cable back into the Ethernet port.
2. Check the IP address assigned to the computer.
   a. In Windows, go to **Start**→ *Run*. The Run box appears.
   b. Type **`command`** in the Open field and click **OK**. The *Command* window appears.
   c. Type **`ipconfig`** at the prompt and press **ENTER**. Information related to the computer's network configuration appears.
   d. Check the IP Address field. If the IP address is set to `0.0.0.0` or to an address that begins with `169.254`, make sure the TCP/IP settings for your NIC are configured to automatically obtain an IP address. Refer to Appendix B – *Typical operating system settings*, on page 51.
   If the TCP/IP settings are correct, power cycle the computer; this sets the IP address correctly.
   If the ipconfig command did not display IP address information, there might be a problem with the NIC. Refer to the manufacturer's documentation.
3. If the System Control Center is still not available, try pinging the terminal by typing **`ping 192.168.0.1`** at a DOS command line and pressing **ENTER**.
   If ping does not work, power cycle the terminal by unplugging it from the power source, waiting 10 seconds, and plugging it back in. If you still cannot ping, contact customer support.
   If the ping results show `request timed out`, then power cycle the unit.
   You should now be able to access the System Control Center. If you cannot, contact customer support.

Other devices connected to the terminal

If a device other than a computer is connected to the terminal, the System Control Center is probably never accessible. However, you can troubleshoot using the following LED conditions:

- *Receive LED is not illuminated*
- *System LED is not illuminated*
- *Power LED is not illuminated*
- *Power LED is blinking*

Receive LED is not illuminated

If the terminal is not operating normally and the receive LED is not illuminated, take the following steps:

1. Check all cable connections. See Figure 26. Tighten any that seem loose.
2. If the LED still does not come on, power cycle the terminal by unplugging the power cord from the power source, waiting 10 seconds, and plugging it back in.
3. If the problem persists, contact customer support.

Note: Often, if the Receive LED is not on, the other LEDs may not be on.

System LED is not illuminated

If the System LED is not illuminated, but the Transmit and Receive LEDs are on, there may be a problem at the NOC. Follow these steps:

1. Wait awhile. If there is a problem at the NOC, it will soon be corrected and the System LED will come on. You can then resume normal operation.
2. If the LED does not come on after you have waited awhile, power cycle the terminal by unplugging the power cord from the power source, waiting 10 seconds, and plugging it back in.
3. If the problem persists, contact customer support.

Power LED is not illuminated

If the Power LED is not illuminated, take the following steps:

1. Make sure the DC power cord is securely attached to the terminal. See Figure 26.
2. If securing the DC power cord does not solve the problem, check all cable connections. Tighten any that seem loose.

3. If the Power LED still does not come on remain on, power cycle the terminal by unplugging the power cord from the power source, waiting 10 seconds, and plugging it back in.
4. If the problem persists, contact customer support.

Note: If the Power LED is not on, the other front panel LEDs may not be on or may not come on.

Power LED is blinking

If the Power LED is blinking, take the following steps:

1. Make sure the DC power cord is securely attached to the terminal. See Figure 26.
2. If securing the DC power cord does not solve the problem, check all cable connections. Tighten any that seem loose.
3. If the Power LED still does not come on and remain on, power cycle the terminal by unplugging the power cord from the power source, waiting 10 seconds, and plugging it back in.
4. If the problem persists, contact customer support.

The pedestal base

Follow the instructions below to place the terminal in the pedestal base, or remove it from the base.

You do not have to use the pedestal. You can place the terminal in a horizontal position if you prefer. If you do this, do not place objects on top of the terminal. Doing so may damage the unit by interfering with air circulation, which cools the unit.

1. Position the remote terminal and pedestal base as shown in Figure 27.

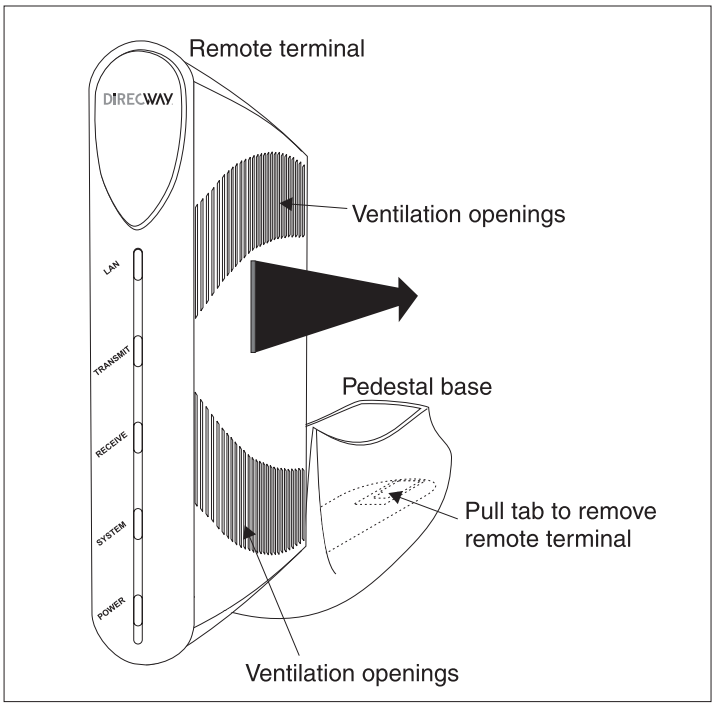

Figure 27: Attaching the terminal to the pedestal base

2. Align the bottom set of ventilation openings on the remote terminal with the guides on the pedestal base. See Figure 27.
3. Gently slide the remote terminal into the pedestal base until the remote terminal locks into position. See Figure 27.

Appendix A

Frequently asked questions (FAQs)

This chapter contains answers to common FAQs.

The following FAQ topics are discussed:

Contact information

If you need warranty or repair support, your contact information varies depending on your location.

If you purchased this product through a DIRECWAY retail channel:

- Access the System Control Center by launching a web browser, typing **`www.systemcontrolcenter.com`** in the URL location bar, and pressing **ENTER**. Type **`192.168.0.1`** in the location bar and press **ENTER** if you are unable to access the System Control Center with the **www.systemcontrolcenter.com** URL.
- Check our web site www.myDIRECWAY.com for more information.
- Send an e-mail to technical support by selecting Email under Help Center on our **www.myDIRECWAY.com** web site.
- Call 1-866-DIRECWAY (1-866-347-3292).

If you purchased this product from a VAR, do not contact DIRECWAY. Contact your VAR according to the procedure supplied by them for technical support. They are trained to help you with any technical problem.

General FAQs

1. What geographic area is covered by the service?

As of this printing, the 48 continental states and Puerto Rico are covered by the service. Check our web site, **www.myDIRECWAY.com**, to see the current coverage area.

2. Can I use the same dish for my DIRECWAY service and my DIRECTV services?

Yes, the system has an upgrade kit that you can install on your existing dish in order to receive DIRECTV services.

3. Why is there a requirement that the satellite dish be professionally installed?

Because the two-way system uses a transmitter, not just a receiver. Professional installation ensures that the system complies with FCC requirements and is installed in a location or manner that is not readily accessible to children and that the satellite dish is fine-pointed for transmission and does not interfere with other satellite users.

4. What are the causes of interference in the operation of my system?

The DIRECWAY system operates in the Ku band frequency. Other devices transmitting in this frequency band, such as radar detectors, can interfere with the system. Rain or snow can interfere with the signal for brief periods of time. Also, snow or ice buildup on the antenna may interfere with the signal.

5. What is Automatic Cross Polarization (ACP)?

The ACP feature provides transmit satellite dish pointing information to your installer and automatic satellite dish re-validation. This ensures your satellite dish remains aligned.

Satellite systems that can send data directly to the Internet through the satellite without a telephone connection need to be checked periodically to be sure that the satellite dish alignment remains correct. Satellite dishes may become misaligned because of structures settling, unauthorized tampering or, more commonly, high winds.

If the satellite dish alignment is not correct, transmissions from your equipment might interfere with other users of the satellite, and your signal might be weak.

The means used in the satellite industry to check transmit satellite dish alignment is *cross polarization co-polarization isolation measurement* or *cross pol* for short. Until recently, cross pol measurements could only be made by satellite maintenance personnel.

Your ACP-equipped system can enter a test mode and initiate an automatic cross pol test session between your satellite dish and the NOC. The test is performed by firmware in the satellite equipment, not on your PC. Since your PC is not involved, the test cannot compromise the security of your system.

If your equipment fails a periodic test, your service provider contacts you to schedule a service call. Other ACP features such as the Antenna Pointing - Transmitter screen are utilized by satellite service personnel to increase the accuracy of satellite dish alignment.

6. What operating systems are compatible with the new DIRECWAY System?

Computers with Windows or Macintosh operating systems can access the Internet when connected to the DW7000. Refer to *System requirements* on page 2 for more information on operating system requirements.

7. Is DIRECWAY compatible with my Mac?

Yes. Refer to *System requirements* on page 2 for a list of Mac system requirements.

8. Why is Mac OS 10.0 not supported?

Because the Mac OS 10.0 release is not supported by Apple, we do not develop products around non-supported OS systems. We recommend you upgrade your Mac OS to 10.1 or higher, which is supported by DIRECWAY.

9. What if my computer did not come with a NIC? What can I do?

Many computers can be upgraded with a 10/100 BaseT Ethernet NIC. If you are comfortable with opening your computer and installing hardware, most Ethernet NICs can be self-installed. Check with your computer manufacturer for more information on the right Ethernet NIC for your system. Make sure your NIC is configured to *auto-negotiate*, which means it can automatically detect and operate at the mode (10/100 BaseT) of the device connected to it.

Also, if you have an available USB port on your computer, you can purchase a USB Ethernet adapter. This may be easier to install than a peripheral component interconnect (PCI) card in your computer. For a laptop, you can purchase a standard personal computer memory card international association (PCMCIA) card that provides an Ethernet connection, or you can purchase a USB Ethernet adapter, as well. We recommend you upgrade your computer to meet all of the requirements listed in *System requirements* on page 2 to get the most out of your Internet experience.

10. Can I use a PCMCIA card adapter for my laptop?

Yes. All you need to connect your computer to the DIRECWAY Modem is either a 10/100 Ethernet Network Interface Card or PCMCIA adapter with an Ethernet connector. The DIRECWAY System includes an Ethernet cable to connect your computer to the DIRECWAY modem.

11. Can I run DIRECWAY on a small network?

Yes, you can connect multiple home computers and laptops to a single DIRECWAY Internet connection at no additional cost. Home networking equipment may be required and is not included with your DIRECWAY System. For network setup, support and configuration, contact your network hardware manufacturer and/or operating system software developer (Hughes Network Systems LLC (HNS) is not responsible for home network configuration or management).

Please understand that all computers on this network share a single connection. Simultaneous use of high bandwidth applications by multiple users may result in degradation of speed. Actual speeds may vary. Speed and uninterrupted use of service are not guaranteed.

12. How fast is DIRECWAY compared to other high-speed services? Aren't they faster?

Everyone's Internet technology is based on shared bandwidth, so sometimes one option allows you to do things in less time than others. Because everyone uses shared bandwidth there's truly no definitive answer.

13. What is transmission latency?

Latency refers to the time it takes for signals to travel to and from the satellite. This typically creates a sub-second lag. For this reason, DIRECWAY may not be ideal for playing some twitch-games and time-sensitive online trading.

14. Can I put this system on a boat or in an RV?

No. The DIRECWAY system is for fixed installations only.

DIRECWAY Professional FAQs

DIRECWAY Professional FAQs are relevant if you purchased the Professional service plan.

1. Can I run DIRECWAY Professional on a virtual private network (VPN)?

Running a VPN client over a satellite network is not an ideal configuration. Although most VPN clients work, your speeds may be affected significantly. While average download speeds are slightly better than dial-up, they are reduced from typical DIRECWAY speeds by as much as 50 to 75 percent. Average upload speeds are comparable to dial-up performance. It is recommended that those accessing secure information over a VPN through DIRECWAY Professional do so on a limited basis. To optimize your performance, disable your VPN client while surfing the Internet, and enjoy the full speed of DIRECWAY. When you need to access information from your corporate LAN, you can enable your VPN client, keeping in mind that you may see a reduction in throughput. At this time, Hughes Network Systems, LLC (HNS) does not endorse or support any VPN products. Customers that run VPN products do so at their own risk and will not receive any support from Hughes Network Systems, LLC (HNS) regarding troubleshooting, configuring, optimizing, or maintaining a VPN connection.

2. Why does the service slow down when used in conjunction with a VPN?

Our communication satellite is located over 22,000 miles from Earth. Each data packet must be sent down separately and acknowledged by the remote site. This process takes time. In order to expedite the delivery of data packets to our end-users, Hughes Network Systems, LLC (HNS) has developed a patented technology for aggregating those packets and sending all of them down simultaneously. VPNs encrypt each data packet, which prevents our technology from aggregating the data packets and reduces the throughput significantly.

3. What can I do to get DIRECWAY high-speed performance if I want to connect to my company network using a VPN client?

Hughes Network Systems offers a service enhancement called DIRECWAY VPN Accelerator. DIRECWAY VPN Accelerator is an enterprise network solution that can be purchased and deployed by your corporate network or IT organization. DIRECWAY VPN Accelerator provides a continuous high-speed connection for VPN clients and does not interfere with DIRECWAY's performance enhancements. See

www.direcway.com for more information, and contact your corporate network manager to see if DIRECWAY VPN Accelerator can be integrated into your DIRECWAY service.

Appendix B

Typical operating system settings

This appendix explains how to configure Windows and MacIntosh operating system settings so that your computer can communicate with the terminal.

The following topics are discussed:

Determining if DHCP is enabled on the remote terminal

You must complete these steps to determine if DHCP is enabled on the remote terminal before configuring the operating system settings on the computer connected to the terminal:

1. Open a web browser on your computer.
2. Type **`www.systemcontrolcenter.com`** or **`http://192.168.0.1`** in the Address field (Internet Explorer) or Location field (Netscape) and press **ENTER**.
3. Click **System Info** on the System Control Center home page.
4. Observe the value in the DHCP field.

   If `Disabled` appears in the field, you must manually configure the computer's operating system to support a static IP address. This means the computer's IP address does not change, even if the computer is restarted. For a Windows operating system, refer to *Configuring Windows for a static IP address* on page 52. For MacIntosh operating systems, refer to *Configuring a MacIntosh for a static IP address* on page 69.

   If `Enabled` appears in the field, you must configure the computer's operating system to support DHCP. For a Windows operating system, refer to *Configuring Windows to support a DHCP-enabled terminal* on page 62. For a MacIntosh operating system, refer to *Configuring a MacIntosh to support a DHCP-enabled terminal* on page 71.

If you are using the terminal with a network, you must have already installed an Ethernet hub or wireless base station and NICs in the computers on your LAN, and if necessary connected the computers to the Ethernet hub with Ethernet cable. See Appendix C – *Home networking on page 73* for more information.

Note: You must complete the appropriate instructions for *each* computer or device that accesses the Internet over the LAN.

Note: Home networking equipment is required but not included. For network setup, support and configuration, contact your network hardware manufacturer and/or operating system software developer (Hughes Network Systems, LLC (HNS) is not responsible for home network management or troubleshooting). Simultaneous use of high bandwidth applications by multiple users may result in degradation of speed. Actual speeds may vary. Speed and uninterrupted use of service are not guaranteed.

Configuring Windows for a static IP address

The instructions for configuring a Windows 98SE, ME, 2000, or XP system with a static IP address vary slightly. Find the appropriate instructions for your system and follow them.

You manually enter the following information to configure your operating system's settings:

- *IP Address.* You need a valid IP address for each computer. Make sure the address does not conflict with any other computer connected to the terminal. You can obtain the entire list of available addresses for use with your terminal from the Frequently Asked Questions section of the System Control Center.
- *Subnet Mask.* This is the subnet mask assigned to your terminal. It is available on the System Information page of the System Control Center. You would also have written this on the Quick Start Guide during registration.
- *Default Gateway.* This is the IP address of the terminal and is also available on the System Information page of the System Control Center. You would have also written this on the Quick Start Guide at the end of registration.

Note: If your terminal will be connected to a router, you must configure the router with the static IP address. Refer to the instructions included with your router to configure it. You must then enable the Dynamic Host Control Protocol (DHCP) on all PCs connected to the router.

Windows 98SE or Me

1. Select **Start**→ *Settings*→ *Control Panel.*
2. Select Network. The Network configuration dialog box opens to the Configuration tab. See Figure 28.

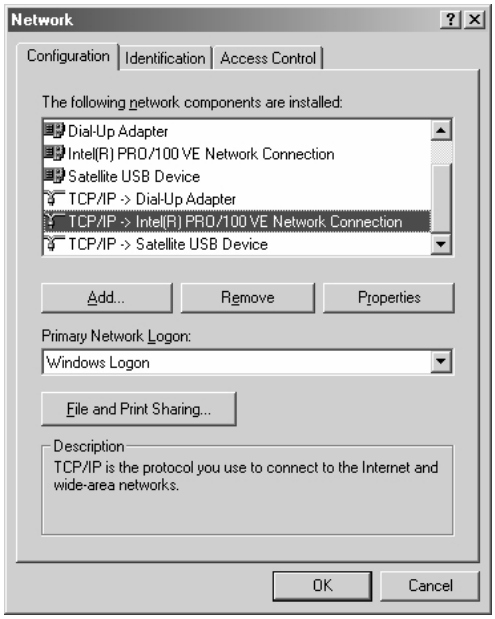

Figure 28: Network dialog with Configuration tab

3. Select the TCP/IP protocol bound to the NIC connected to the remote terminal and select Properties. In Figure 28 it is `TCP/IP -> Intel (R) Pro/100VE Network Connection`. Your system may display different NIC information. The *TCP/IP Properties* box opens to the *IP Address* tab. See Figure 29.

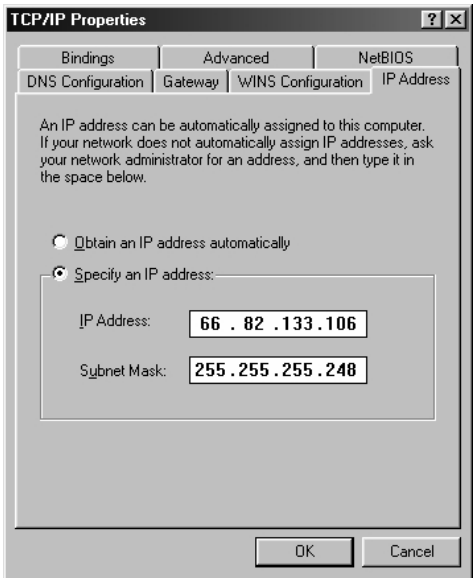

Figure 29: TCP/IP Properties

4. Select **Specify an IP Address**. Enter an appropriate IP address from the range of available IP addresses. Refer to page 52 for more information on how to view available IP addresses.
5. Enter the appropriate subnet mask in the Subnet Mask field. Refer to page 52 for more information on subnet masks.

6. Select the *Gateway* tab. Enter the terminal IP Address in the New Gateway field. See Figure 30.

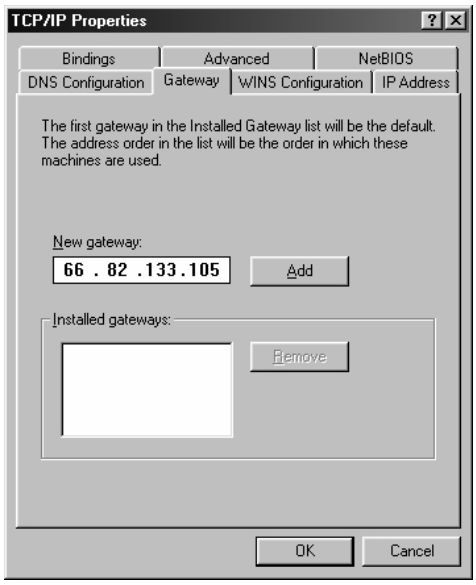

Figure 30: Entering the terminal's IP address

7. Select **Add**.
8. Select the DNS Configuration tab, and verify the following settings:
   a. Make sure Enable DNS is selected.
   b. The Domain Name should be `direcpc.com`.
   c. Under DNS Server Search Order, you should see 66.82.4.8. If you do not, type it in the box and select **Add**.
9. Select **OK** when finished to close the TCP/IP Properties box.
10. Select **OK** again to close the Network dialog box.
11. Select **Yes** in the window that appears to restart the computer.

Windows 2000

1. Select **Start**→ *Settings*→ *Control Panel.*

2. Select the Network and Dialup Connections icon. See Figure 31.

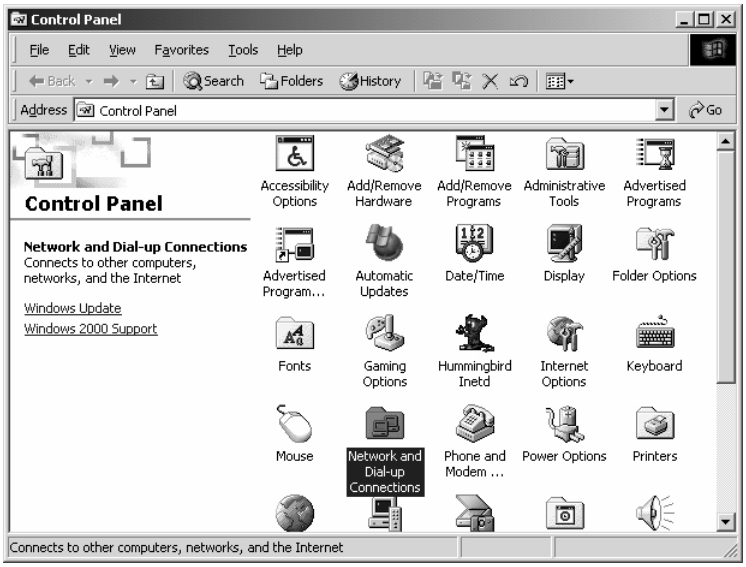

Figure 31: Network and Dialup Connections

3. Right-click on the Local Area Connection that connects to the terminal and select Properties. See Figure 32.

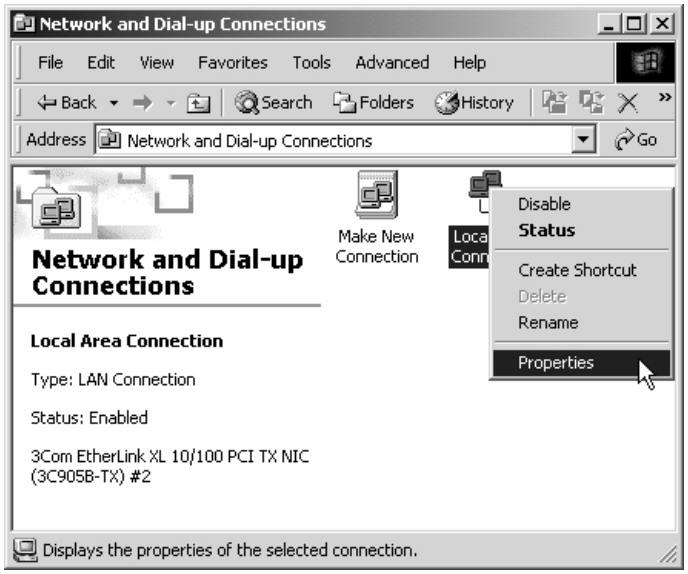

Figure 32: Local Area Connections

4. Ensure the Client for Microsoft Networks and Internet Protocol (TCP/IP) are installed and checked. If NetBEUI is installed, uninstall it.
5. Select Internet Protocol (TCP/IP) being careful not to uncheck it, and then select Properties. See Figure 33.

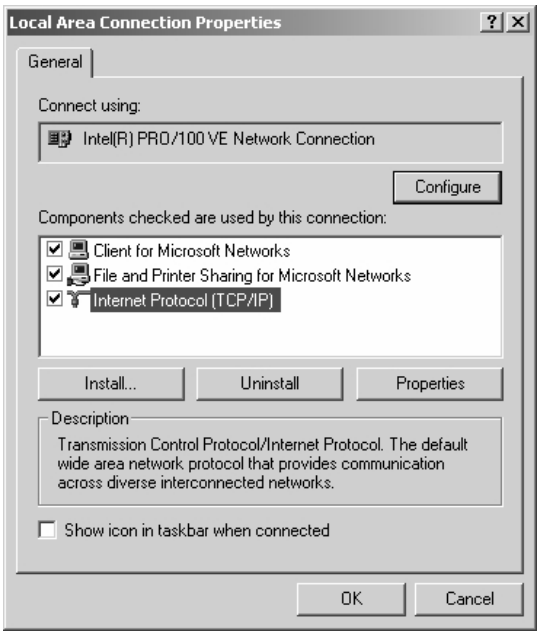

Figure 33: Local Area Connection Properties

6. In the General tab, select Use the following IP address. Enter an appropriate IP Address from the range of available IP addresses.
7. Enter **`255.255.255.0`** for the subnet mask.
8. Enter the terminal IP address as the Default Gateway.

9. Enter **66.82.4.8** for the Preferred DNS server field. See Figure 34.

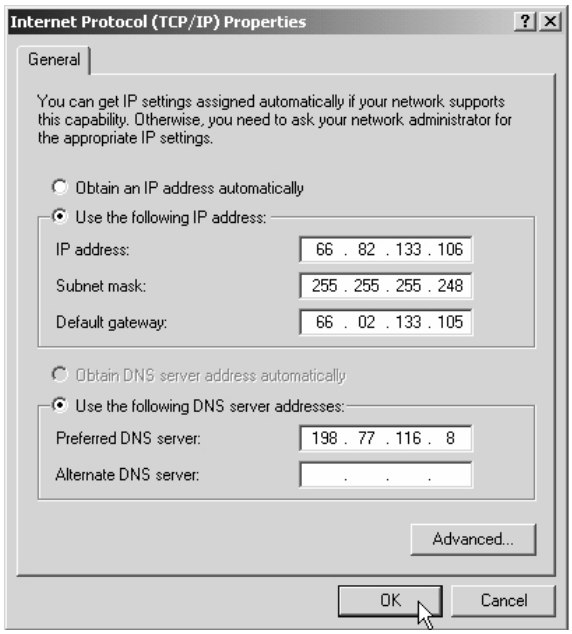

Figure 34: TCP/IP Properties

10. Select **OK** to save and close Internet Protocol (TCP/IP) Properties.
11. Select **Close** again to save and close Local Area Connection Properties.
12. Reboot the PC if necessary.

Windows XP

1. Open the Control Panel by selecting *Start→Settings→Control Panel* and double-click the **Network and Dial-up Connections** icon. See Figure 35.

Note: If the Control Panel is in category view select Network and Internet Connections then select Network Connections.

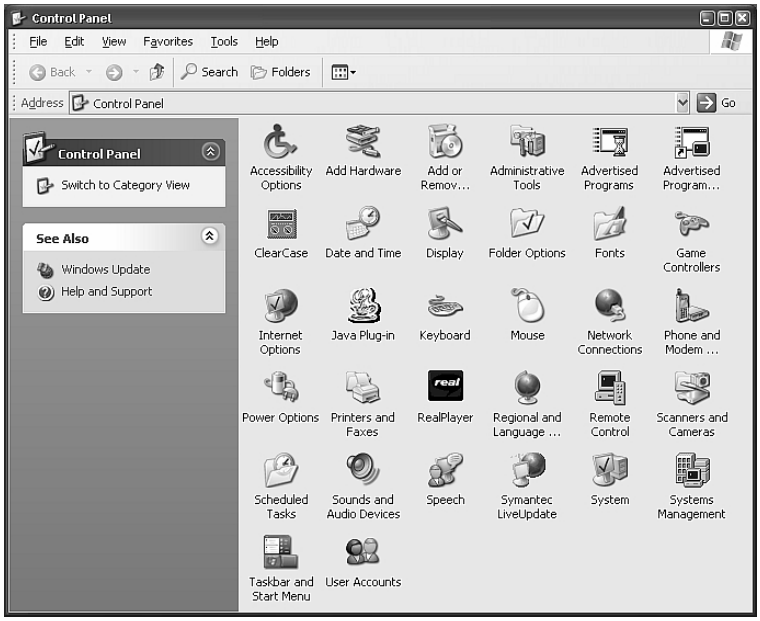

Figure 35: Network and Dialup Connections

2. A list of Network adapters appears. A Local Area Connection icon must be listed under LAN or High-Speed Internet. If not, the network is not installed correctly.
3. Right-click on the Local Area Connection icon that represents the Network adapter that connects the computer to the terminal and select Properties. See Figure 36.

Note: If the Local Area Connection icon appears with a red X then check your connections. The red X must not be present in order to successfully configure your operating system's settings.

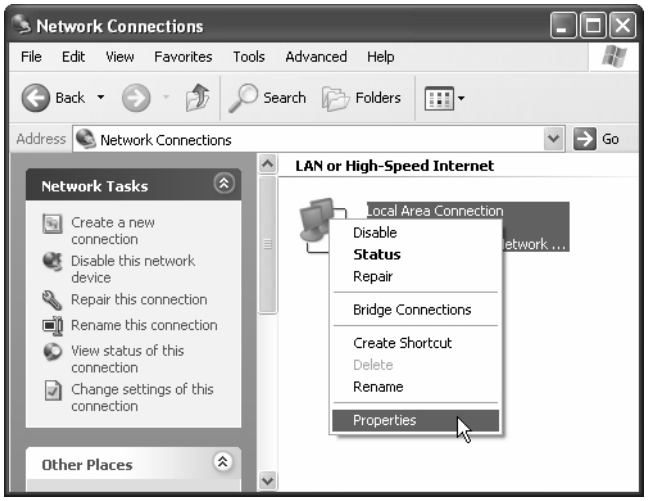

Figure 36: Local Area Connections

4. Ensure the Client for Microsoft Networks and Internet Protocol (TCP/IP) are installed and checked. If NetBEUI is installed, uninstall it.
5. Select Internet Protocol (TCP/IP) and select Properties being careful not to uncheck the check box. See Figure 37.

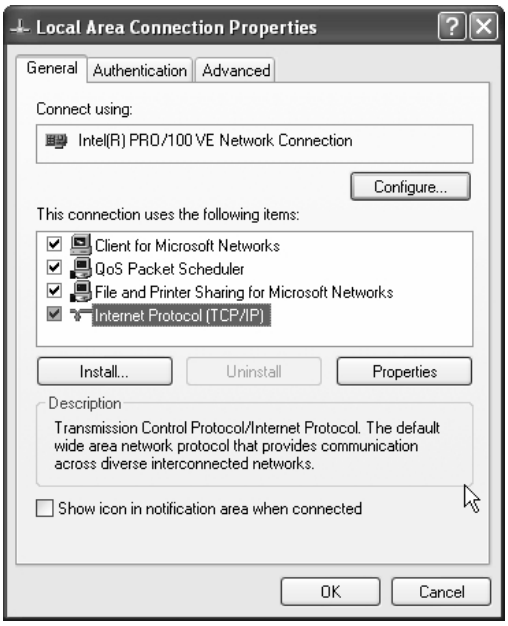

Figure 37: TCP/IP Properties

6. In the General tab, select **`Use the following IP address`**. Enter an appropriate IP address from the range of available IP addresses and the appropriate Subnet Mask for your network in the fields provided. Enter the IP address of the terminal for the Default Gateway. Enter **`66.82.4.8`** in the Preferred DNS server field. See Figure 38.

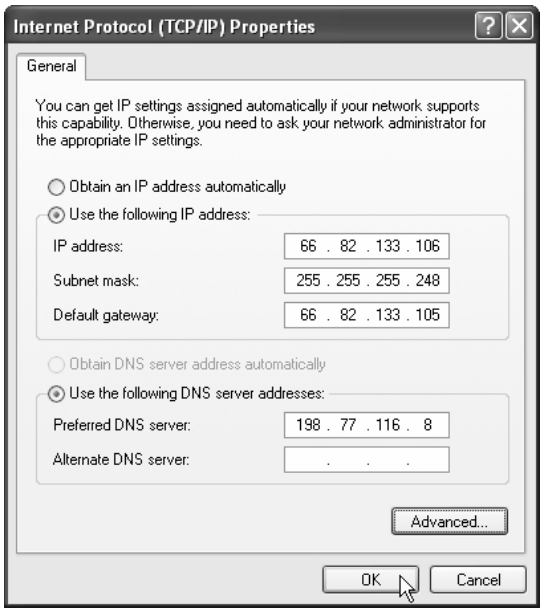

Figure 38: Entering the preferred DNS server address

7. Select **OK** to close the open dialog boxes and finish the configuration.
8. Restart the computer even if Windows does not prompt you to do so. This ensures the network settings are automatically reset.

Configuring Windows to support a DHCP-enabled terminal

This section explains how to configure Windows operating systems to support a DHCP-enabled terminal.

Windows 98SE and Me

1. On the client computer, go to **Start**→ *Settings*→ *Control Panel* and double-click **Network**. See Figure 39.

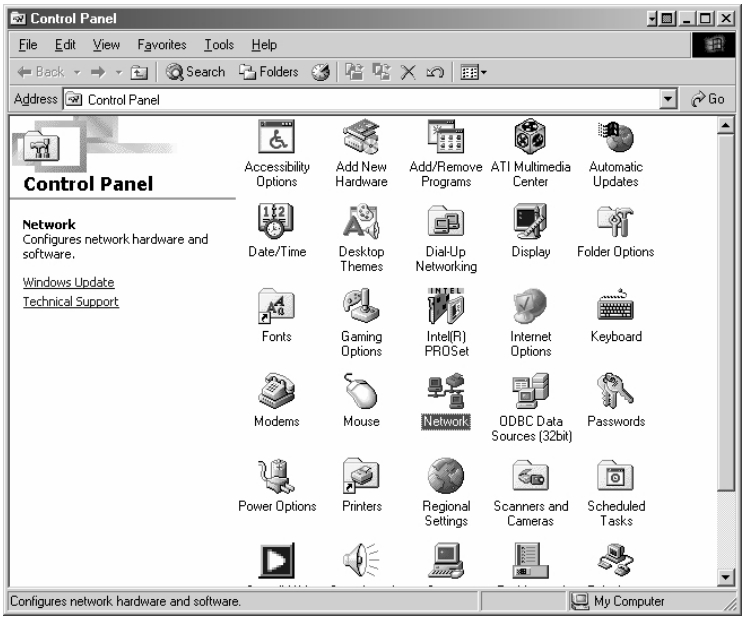

Figure 39: Control Panel

Note: On Windows ME computers, choose View All Control Panel Options to see the Network icon.

2. A list of network components appears. See Figure 40.

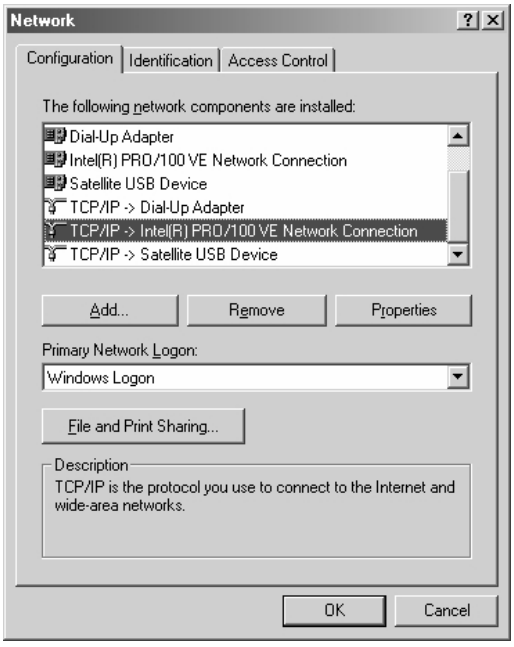

Figure 40: Network window

3. Select the TCP/IP entry associated with the Network Interface Card (NIC) and then select Properties. The TCP/IP Properties window appears. See Figure 41.

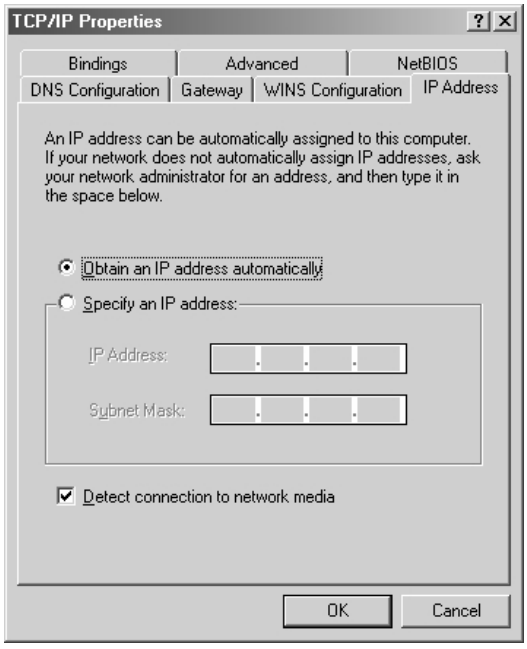

Figure 41: TCP/IP Properties

4. In the IP Address tab, select Obtain an IP address automatically.
5. Select the Gateway tab. Remove any installed gateways by selecting them and selecting **Remove**. See Figure 42.

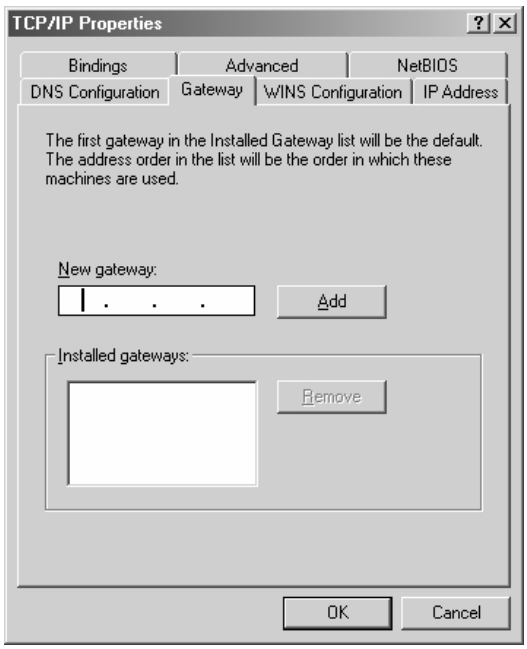

Figure 42: Gateway tab

6. Select the **Disable DNS** radio button on the DNS Configuration tab.
7. Select **OK** to accept the updates for the TCP/IP properties.
8. Select **OK** to close the list of network components. Windows may request the installation CD-ROM to complete updating the TCP/IP settings.
9. Restart the computer if it does not do so automatically.

Windows 2000

1. On the client computer, go to **Start**→ *Settings*→ *Control Panel* and double-click Network and Dial-up Connections.
2. A list of network connections appears. See Figure 43. The Local Area Connection icon must be listed. If it is not, the network is not installed correctly.

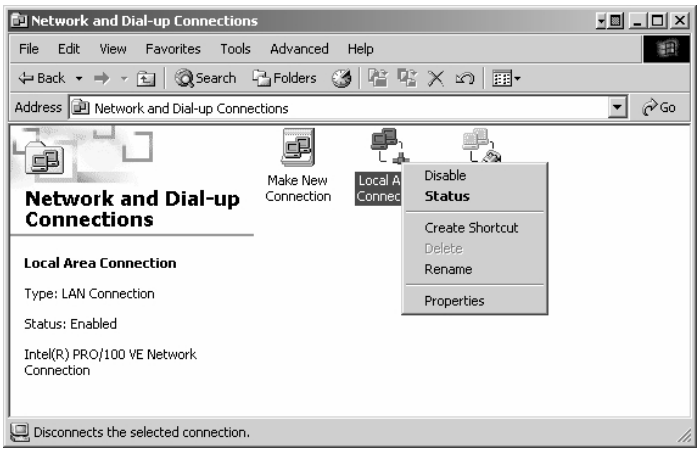

Figure 43: Network and Dialup Connections

3. Right-click the Local Area Connection icon that represents the terminal network connection and select Properties. The Local Area Connections Properties window appears. See Figure 44.

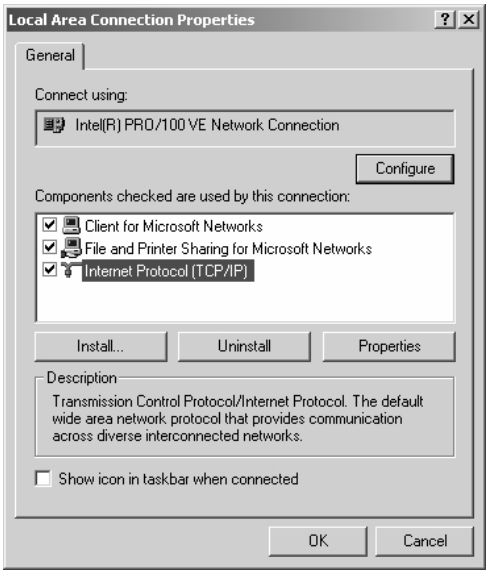

Figure 44: Local Area Connection Properties

4. Ensure that the Client for Microsoft Networks and Internet Protocol (TCP/IP) are installed and checked. If NetBEUI is installed, uninstall it.
5. Select Internet Protocol (TCP/IP). Be careful not to uncheck the check box.
6. Select the Properties button. The Internet Protocol Properties window appears. See Figure 45.

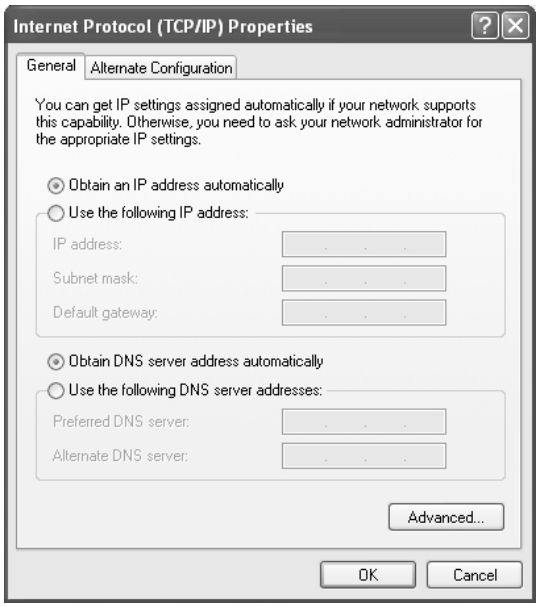

Figure 45: Internet Protocol Properties

7. Ensure that both Obtain an IP Address Automatically and Obtain DNS Server Address Automatically are selected. If not, select them.
8. Select **OK** to close the open dialog boxes and finish the configuration.
9. Restart the computer even if Windows does not require you to do so. This will ensure that the network settings are automatically reset.

Windows XP

1. Go to **Start**→ *Settings*→ *Control Panel*. Double-click the Network and Dial-up Connections icon.

Note: If the Control Panel is in category view select Network and Internet Connections then select Network Connections.

2. A list of network adapters appears. A Local Area Connection must be listed under LAN or High-Speed Internet. See Figure 46. If not, the network is not installed correctly.

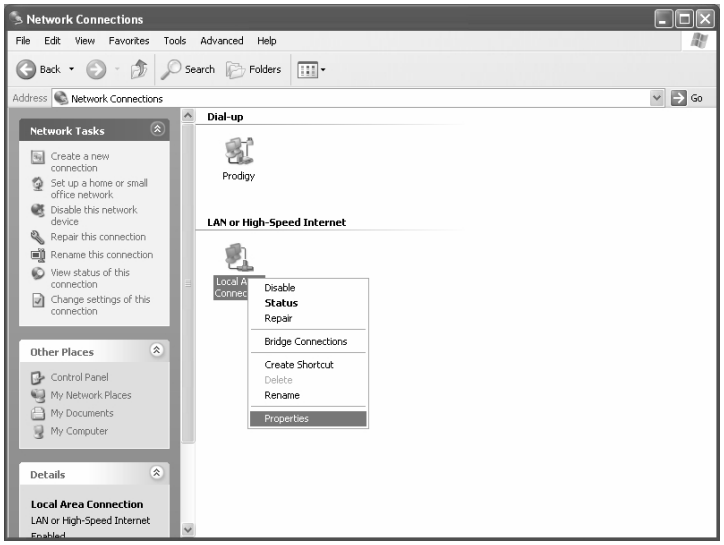

Figure 46: Network Connections

3. Right-click the Local Area Connection icon that represents the Network adapter that connects the computer to the Satellite Gateway and select Properties.

Note: If the Local Area Connection icon appears with a red X then check your connections. The red X must not be present in order for you to successfully configure your system.

4. Ensure that the Client for Microsoft Networks and Internet Protocol (TCP/IP) are installed and checked. See Figure 47. If NetBEUI is installed, uninstall it.

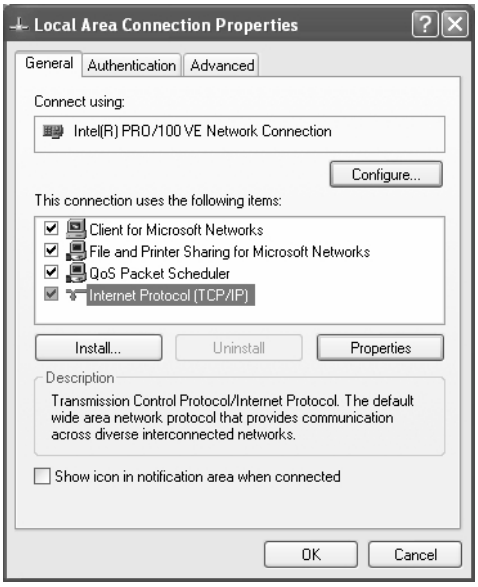

Figure 47: Local Area Connection Properties

5. Select Internet Protocol (TCP/IP) and select Properties. See Figure 48.

Note: Be careful not to uncheck the Internet Protocol when you select it.

Figure 48: Internet Protocol Properties

6. Ensure that both Obtain an IP address automatically and Obtain DNS server address automatically options are selected. If not, select them.
7. Select **OK** to close the open dialog boxes and finish the configuration.
8. Restart the computer even if Windows does not require you to do so. This ensures the network settings are automatically reset.

Configuring a MacIntosh for a static IP address

Follow the steps below to configure a terminal with a static IP address on a MacIntosh system.

1. Select **System Preferences** from the Mac interface. The Systems Preference menu appears.
2. Select the *Network* icon, which is circled in Figure 49. The Network screen shown in Figure 50 appears.

Figure 49: Mac Systems Preferences menu

Figure 50: Mac Network screen

3. Make sure the TCP/IP tab is selected.
4. Select the *Configure* drop-down list. See Figure 51.

Figure 51: Select Manually from the Configure drop-down list

5. Select Manually.

6. Type the appropriate IP address from the range of available IP addresses in the IP Address field. See page 51 for details. Do not use the numbers in the examples, which are for illustrative purposes only.
7. Select the **Apply Now** button. The Mac is now configured.

Configuring a MacIntosh to support a DHCP-enabled terminal

Follow the steps below to configure a terminal with DHCP enabled on a MacIntosh system.

1. Select **System Preferences** from the Mac interface. The Systems Preference menu appears.
2. Select the *Network* icon, which is circled in Figure 52. The Network screen shown in Figure 53 appears.

Figure 52: Mac System Preferences menu

Figure 53: Mac Network screen

3. Make sure the TCP/IP tab is selected.
4. Select the *Configure* drop-down list. See Figure 54.

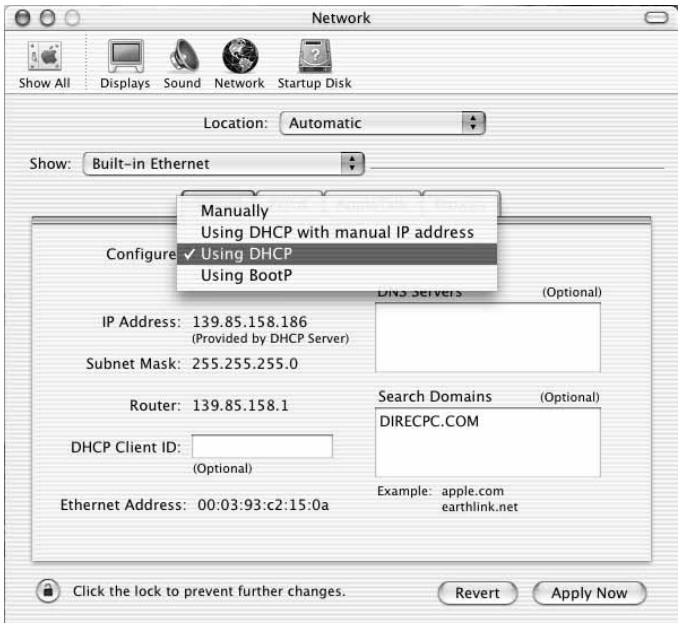

Figure 54: Select DHCP from the Configure drop-down menu

5. Select Using DHCP. Notice the IP Address field grays out.
6. Select the **Apply Now** button. The Mac is now configured.

Appendix C

Home networking

A terminal connected to a properly aligned antenna assembly can provide satellite connectivity for multiple computers on a wireless or wired (Ethernet) LAN. After the terminal and network are installed, every computer on the network can surf the Internet through the satellite signal.

Note: Connect multiple home computers and laptops to a single DIRECWAY Internet connection at no additional cost. Home networking equipment is required but not included. For network setup, support and configuration, contact your network hardware manufacturer and/or operating system software developer (Hughes Network Systems, LLC (HNS) is not responsible for home network management or troubleshooting). Simultaneous use of high bandwidth applications by multiple users may result in degradation of speed. Actual speeds may vary. Speed and uninterrupted use of service are not guaranteed.

If you connect the terminal to a LAN, you must:

- Install and configure an Ethernet hub (or a router if you have a static IP address) or wireless network base station.
- Install and configure a NIC (also called an adapter) in each computer you want to connect to the network. The NICs must be set to auto-negotiate. Refer to the manufacturer's installation instructions.
- If using a wired network, connect the computers to the Ethernet hub with Ethernet cable.

Basic wireless considerations

Wireless networks are easy to install because you do not have to run any cables. Instead, a wireless *base station* is connected to the terminal Ethernet port. Wireless NICs are installed in each computer you want on the network. These components are available at most computer supply stores and outlets. A sample wireless LAN configuration is shown in Figure 55.

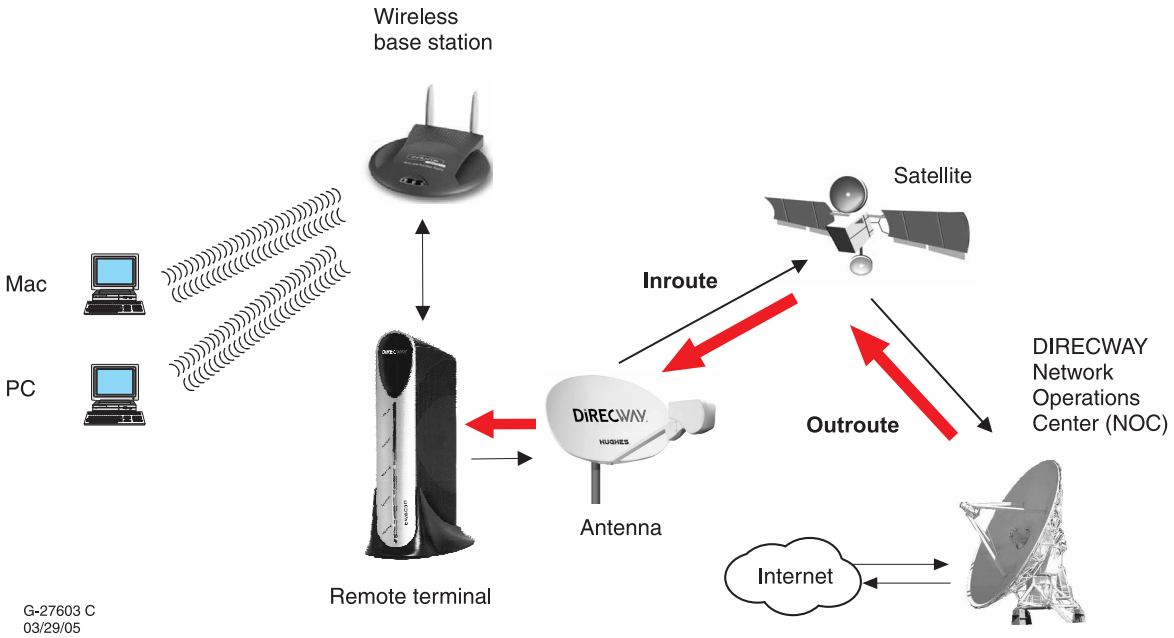

Figure 55: Site with remote terminal and wireless LAN

The base station processes the output from the terminal and broadcasts it to the computers on the network through radio waves. This is especially an advantage if you use laptops, because the computer can receive the radio waves at any location in the building that the signal can reach, and thus can easily be moved around.

If there are multiple PCs on your LAN, configure the base station for use with an IP address. Refer to the documentation that came with your base station for instructions explaining how to configure it. Configure all of the PCs on the LAN to communicate with the base station.

Wireless signals do not penetrate metal or water. Check that any base station you plan to use broadcasts signals as far as you need them. Some base stations broadcast signals 200 feet or more in each direction; others broadcast shorter distances.

Basic Ethernet considerations

Ethernet hubs, cables, and NICs can be purchased at most computer supply stores or outlets. They are relatively inexpensive and easy to install. The Ethernet interface must support *auto-negotiate*, a feature that enables compatibility and inter-operability among Ethernet devices.

Select an Ethernet hub based on how many computers or other devices are connected to the network, and how fast you need the data connection to be. (In network terminology, each computer connected to the network is called a *host*.) You may decide that an older 10Mbps Ethernet connection meets your needs. However, if the users on your network share large files or play computer games, you may wish to install a 100Mbps Ethernet hub. Some hubs enable the network to use both speeds. A sample Ethernet LAN is shown in Figure 56.

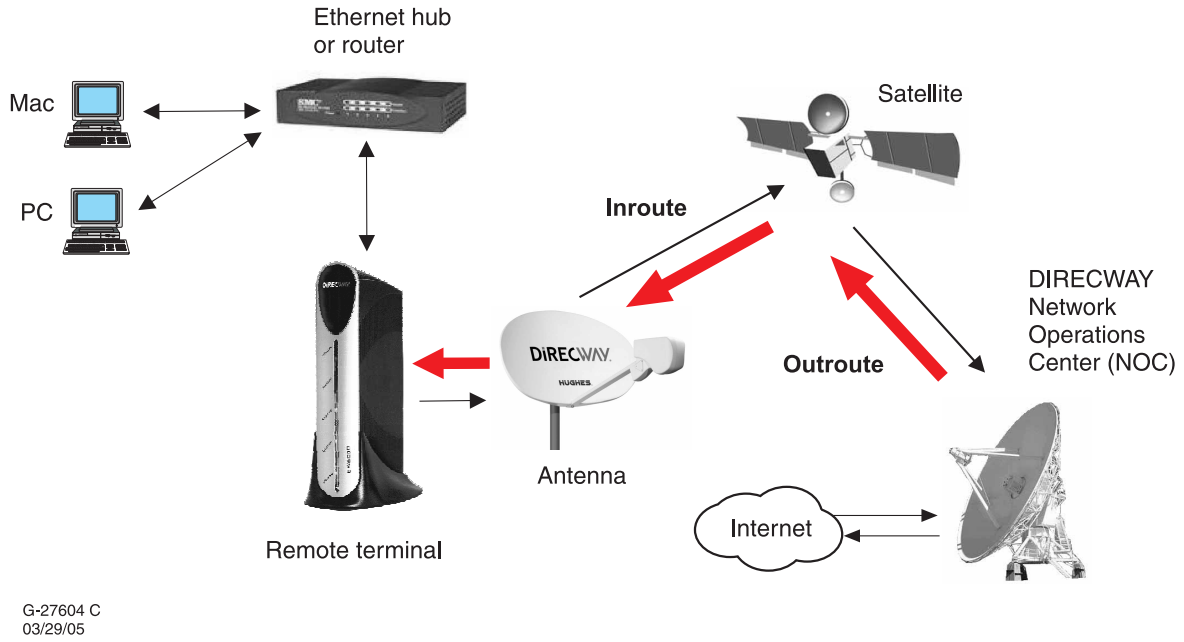

Figure 56: Site with remote terminal and wired Ethernet LAN

Cat5 (Category 5) Ethernet cable is the minimum recommended and supports Fast Ethernet (100Mbps). If you think that the network or devices on the network may use the recently developed Gigabit Ethernet (1Gbps) in the future, consider installing Cat5e Ethernet cable now.

When you install the cable, either run it inside your walls or secure it to floor baseboards and doorway frames. Never use staples to secure Ethernet cable. Always leave some slack in the cable in case you have to repair it, which usually involves cutting away a damaged section.

Remember that prepared Ethernet cable, cable that already has RJ-45 jacks installed at the ends, are usually available in lengths of no more than 50 feet. If the cable length exceeds 50 feet, use a kit to install the RG-45 jacks at both ends of the cable. (This is called *terminating* the cable.) The kits are available at some electronic supply or home supply stores. If you do not feel comfortable installing Ethernet cable yourself, contact a professional installer.

Appendix D

Declaration of Conformity

The DW 7000 and DW7700 comply with the following telecom standards:

- FCC Part 68 standard for North America
- TBR-21 standard for Europe
- CS-03 standard for Canada

Note: All or part of the following Declarations of Conformity on pages iii through vii may not be applicable to your DW7000/DW7700 installation. Contact your service provider for additional information.

Telephone cord and the plug must be compliant with the corresponding telecom standard in a specific country/continent.

FCC standards

Standards to which Conformity is declared: FCC Part 15

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

Responsible Party's name: Hughes Network Systems, LLC

Address: 11717 Exploration Lane, Germantown, MD 20876

Telephone: 1-866-DIRECWAY (347-3292)

Trade Name: HUGHES, DIRECWAY

Type of Equipment: Two-Way DIRECWAY System

Model Numbers: DW7000 and DW7700 (1035660-xxxx)

The Two-Way DIRECWAY System (DW7700 and DW7000) complies with the Canadian ICES-003, Class B standard.

For DW7700

Standards to which Conformity is declared: FCC Part 68

Part 68 Compliance -- This equipment (Two-Way DIRECWAY System: Model Numbers: DW7700) complies with Part 68 of the FCC rules and requirements adopted by the ACTA. On the rear panel of this equipment is a label that contains, among other inforrmation, the product Part Number (P/N) in the format XXXXXXX-XXXX and an eight digit Electronic Serial Number (ESN). If requested, this information must be provided to the Telephone Company.

The Two-Way DIRECWAY system needs to be installed according to the instructions. Coaxial cables (Rx and Tx) need to be grounded at the point of entry. A plug and jack used to connect this equipment to the premises wiring and telephone network must comply with the applicable FCC Part 68 rules and requirements adopted by the ACTA. A compliant **26 Gauge** telephone cord and modular plug is provided with this product. It is required to be terminated with a plug type 605 or a FCC plug type 6 position for Australia.

CAUTION: To reduce the risk of fire, use only No. 26 AWG or larger UL Listed or CSA Certified Telecommunication Line Cord.

The REN is used to determine the number of devices that may be connected to a telephone line. Excessive RENs on the telephone line may result in the devices not ringing in response to an incoming call. In most, but not all areas, the sum of RENs should not exceed five (5.0). To be certain of the number of devices that may be connected to the line, as determined by the total RENs, contact the local Telephone Company. For products approved after July 23, 2001, the REN for this product is part of the product identifier that has the format US:5L4DT##B1032021.

The digits represented by the ## are the REN without the decimal point (e.g., 00 is a REN of 0.0). For earlier products, the REN is separately shown on the label.

If the Two-Way DIRECWAY System causes harm to the telephone network, the Telephone Company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn’t practical, the Telephone Company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

If you have been told to discontinue phone service and you believe it is due to the DW7000 or DW7700, please contact DIRECWAY Customer Support. If you purchased your DW7000 or DW7700 from one of our value added resellers (VARs), please do not contact DIRECWAY. Contact your VAR according to the procedure supplied by them for technical support. They are trained to help you with your technical problem. If you are a user outside the United States, please contact your service provider.

The Telephone Company may make changes in its facilities, equipment, operations, or procedures that could affect the operation of the equipment. If this happens, the Telephone Company will provide advance notice in order for you to make the necessary modifications to maintain uninterrupted service.

If trouble is experienced with the Two-Way DIRECWAY System equipment, for repair or warranty information, contact your service provider.

If the equipment is causing harm to the telephone network, the Telephone Company may request that you disconnect the equipment until the problem is resolved.

Hughes Network Systems must make any necessary repairs to the modem portion of this equipment in order to maintain valid FCC registration. Do not attempt to repair or service your modem. Return it to Hughes Network Systems.

No repairs can be made by customers. All repairs must be done by Hughes Network Systems Authorized Service Centers (ASCs). This equipment cannot be used on public coin service provided by the Telephone Company. Connection to Party Line Service is subject to state tariffs. Contact the state public utility commission, public service commission or corporate commission for information.

Acronyms and abbreviations

D

DHCP – Dynamic host control protocol

DNS – domain name server

DVADB – DIRECWAY virtual private network dial backup

F

FCC – Federal Communications Commission

I

IP – Internet protocol

L

LAN – local area network

N

NAT – network address translation

NIC – network interface card

NOC – Network Operations Center

R

RF – radio frequency

Rx – receive

S

SAN – site account number

T

TCP – transmission control protocol

Tx – transmit

V

VAR – value added reseller

VPN – virtual private network

Index

T

W