HUGHES
NETWORK SYSTEMS

DIRECWAY®

DW7700 Supplemental User Guide

Supplements the ***Remote Terminal User Guide, Models: DW7000, DW7700 (1035978-0001)***

1036332-0001
Revision A
June 03, 2005

Important safety information

For your safety and protection, read this entire manual before using the DW7700. 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 manual 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.

Contents

Figures

Tables

About this document

Scope and audience

This manual describes components and features that are unique to the DIRECWAY DW7700 remote terminal. This manual supplements the *Remote Terminal User Guide, Models: DW7000, DW7700* (1035978-0001).

This manual is addressed to users in both the United States and International countries. 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 and updates

This manual is organized into the following chapters:

Chapter 1 – *Introduction* gives an overview of the DW7700.

Chapter 2 – *DW7700 component and feature descriptions* describes the components and features that distinguish the DW7700 from the DW7000.

Chapter 3 – *DW7700 LEDs* describes the DW7700 LEDs.

Chapter 4 – *DW7700 System Control Center* describes the DW7700 System Control Center used to access important DW7700 system information.

There is also a list of acronyms and abbreviations and index at the end of the manual.

Contact information

If you need warranty or repair support, contact your service provider.

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_r6`*	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

Related publications

Refer to the *Remote Terminal User Guide, Models: DW7000, DW7700 (1035978-0001)* for additional information.

Revision record

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

Chapter 1
Introduction

This chapter discusses the following general DW7700 topics:

Overview

The DIRECWAY DW7700 shown in Figure 1 can provide satellite Internet or Intranet connectivity to a single host or multiple hosts on a local area network (LAN) when connected to a properly aligned antenna assembly. A host may be a Point of Sale (POS) terminal, credit verification device, or a computer operating with a Windows, Unix, Mac, or Linux operating system. The software required to operate the DW7700 resides in the DW7700, which eliminates the need to install client software on the host(s).

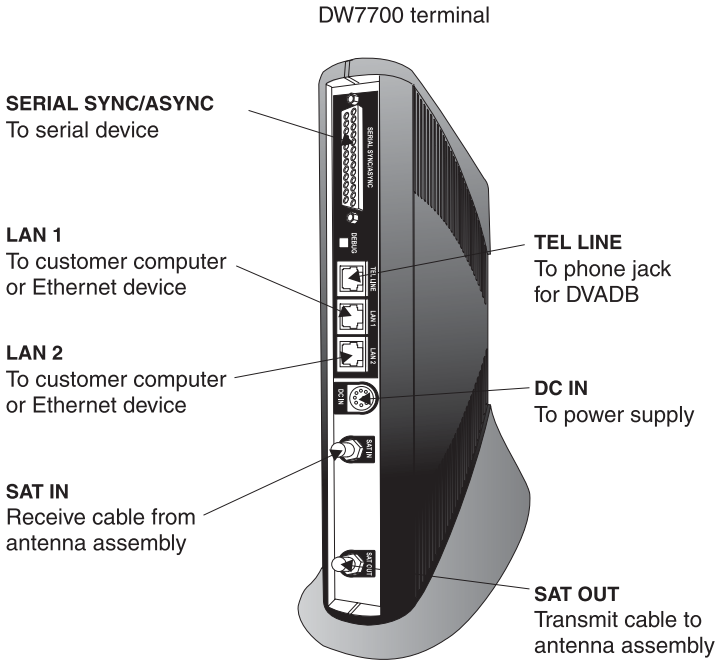


Figure 1: DW7700 remote terminal

The DW7700 contains unique components and supports features that make it an ideal broadband communications solution for enterprise-class customers. The components and features are introduced in the following section, *DW7700 components and supported features*, and are discussed in more detail in Chapter 2 – *DW7700 component and feature descriptions*.

DW7700 components and supported features

The DW7700 contains the following components and supports the listed features:

- Internal modem

  Supports the DIRECWAY Virtual Private Network Automatic Dial Backup (DVADB) feature. This feature enables the DW7700 to send and receive data over a terrestrial phone line should the satellite link between the DW7700 and Network Operations Center (NOC) fail or degrade below an acceptable threshold. A telephone cable is connected to the TEL LINE port on the DW7700 and a phone jack.

- Port forwarding

  Allows servers on your LAN to receive specific transmission control protocol (TCP) and user datagram protocol (UDP) traffic from the Internet.

- Serial port

  Enables you to connect a serial device, such as a POS terminal, credit verification device, or Automated Teller Machine (ATM) to the DW7700.

- Dual Ethernet ports

  Allows you to connect two Ethernet devices to the DW7700. Supported devices include PCs equipped with Network Interface Cards (NICs), hubs, routers, switches, the DIRECWAY Voice Appliance, and DIRECWAY Serial Appliances. A DIRECWAY Serial Appliance can support up to four serial devices.

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.**

Preventive maintenance

To maintain your DW7700:

- 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 DW7700.

⚠ 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 DW7700.**

CAUTION

- **Keep the DW7700 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 DW7700 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 DW7700 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 DW7700 that uses a DC/DC power supply, always unplug the DC input cable connector from the power supply.**
- **Do not place the DW7700 near equipment that produces dust. Certain copiers or computer printers produce carbon dust which can cause malfunctions.**
- **Position the DW7700 on a stable surface where it will not be bumped or dropped.**
- **Prevent moisture from getting inside the DW7700.**

Chapter 2

DW7700 component and feature descriptions

This section describes the components and features introduced in Chapter 1. The following topics are discussed:

DVADB

The DVADB feature enables the DW7700 to send and receive data over a terrestrial phone line should the DW7700's satellite link fail or degrade below an acceptable threshold.

An RJ-11 telephone cable connects the DW7700 to a phone jack. The DW7700 configuration in Figure 2 shows a sample DVADB connection. The graphic is intended for illustrative purposes only and may not reflect the DW7700 configuration at your site.

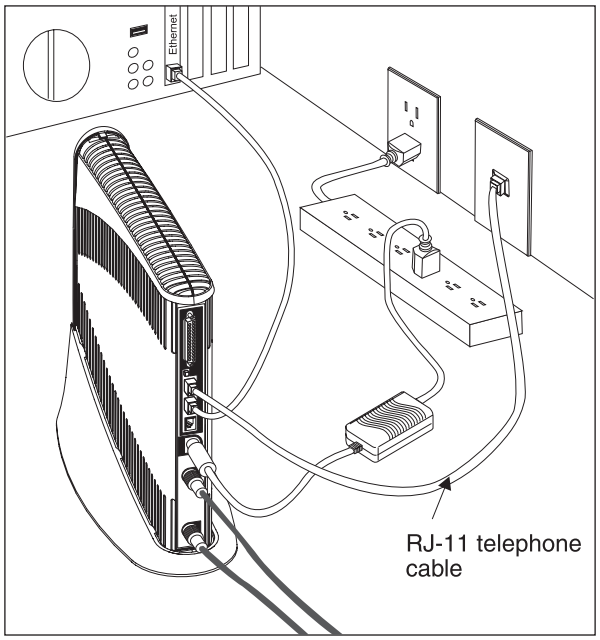


Figure 2: DW7700 DVADB connection

If the satellite link between the DW7700 and DIRECWAY NOC fails or degrades below a certain threshold, the DW7700 automatically switches to DVADB mode. The DW7700's internal modem establishes a connection to a national network of dial access numbers, which are known as a Points of Presence (POP). Each POP acts as a Virtual Private Network (VPN) entry point into your network or the Internet. Packets are sent from the DW7700 through the POP to the DIRECWAY NOC, which forwards the packets to the destination server. If necessary, packets are routed from the destination server to the DIRECWAY NOC and back to the DW7700

DVADB introduces no additional load on the DW7700 and does not affect any existing DW7700 features, but it does cause the DW7700 to send and receive data at a slower rate.

Troubleshooting DVADB

You can follow these steps if you suspect the DW7700 is not working properly in DVADB mode:

1. Verify at least one of the LEDs on the front of the DW7700 is illuminated.

   If none of the LEDs are illuminated:

   a. Verify the DC power cord is securely connected to the remote terminal.

   b. Verify the power cord is securely connected to the power source.

   c. If the power cord is connected to a surge protector, verify the surge protector is connected to a wall outlet and turned on.
2. Verify the phone cable is securely attached to the TEL LINE port on the DW7700 and the wall telephone jack.
3. Connect an analog telephone to the wall telephone jack. Dial the DVADB access number used by the DW7700. If you hear modem tones (high-pitched noises), the telephone line and DVADB access number are working properly.

Note: You may need to contact your network administrator or Helpdesk to obtain your DVADB access number.

4. Verify the phone cable is not defective by swapping it with another cable.
5. Contact your Helpdesk if completing steps 1 - 4 does not resolve the issue.

Note: It is normal for the TCP Acceleration status to be shown as disabled when in DVADB mode.

Port forwarding

The port forwarding feature allows a user to configure the DW7700 to forward specific TCP and UDP traffic from the Internet to servers on a LAN. The user accesses the Port Forwarding Configuration page on the System Control Center to define the rules for allowing the traffic to reach the servers. For details, see *Port Forwarding Configuration page* on page 26.

Serial devices

The DW7700 remote terminal has one DCE/DTE RS-232 serial port that supports any type of serial device. Common serial devices that may be connected to the DW7700 include:

- Point of Sale (POS) devices
- Credit card readers
- Automatic Teller Machines (ATMs)

The serial port is programmable for synchronous or asynchronous operation. A single serial device can be connected to the port. A DIRECWAY Serial Appliance connected to a remote terminal Ethernet port can support multiple serial devices.

The serial port supports a variety of protocols. See the service provider for a list of supported protocols.

Note: HNS recommends the installer work with a point of sale (POS) technician to verify the physical connection between the POS device and the serial appliance port. There are many serial port parameters that must be verified to ensure the POS device and the serial appliance port are communicating properly. At a minimum, baud rate, parity, character bits, and stop bits need to be matched. HNS suggests using a break-out box with 25-pin ribbon cables to verify the POS device and the serial appliance are communicating through the physical leads RTS, CTS, CD, DSR, and DTR.

Figure 3 illustrates a typical serial device connection to the DW7700. The figure is for illustrative purposes only and may not reflect the DW7700 configuration at your site.

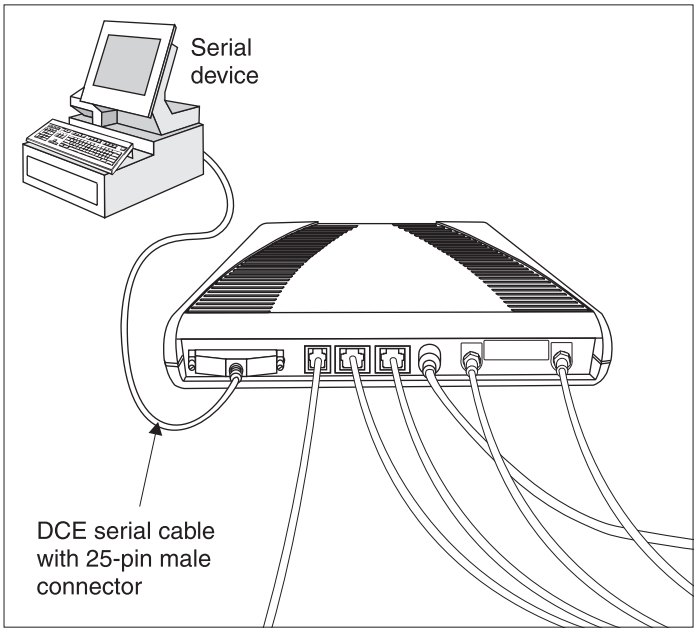


Figure 3: Connecting a serial device to the DW7700

Some considerations for connecting devices to the DW7700 are:

- You do not need to power off the DW7700 remote terminal to connect devices or change devices.
- Most serial devices are **not** "plug and play." A telecommunications technician may be required to configure devices.

Dual Ethernet ports

The DW7700 has two RJ-45, 10/100BaseT Ethernet ports as shown in Figure 4. Each port has a green and a yellow LED. A flashing green LED indicates a valid link between the DW7700 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.

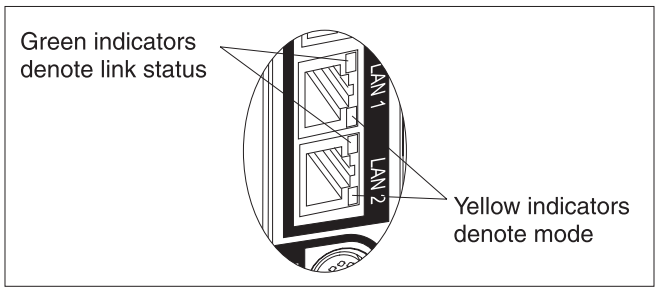


Figure 4: Dual Ethernet ports

The ports support a wide range of devices, including:

- PCs equipped with Network Interface Cards (NICs)
- DIRECWAY Serial Appliance, which can support up to four serial devices
- Hubs
- Routers
- Switches

Ethernet port configurations

The Ethernet ports support the following configurations:

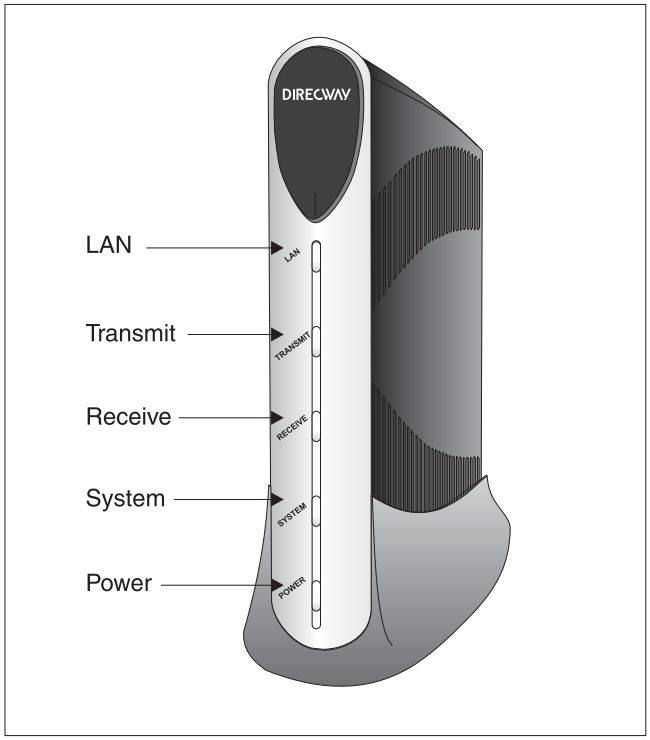
- Dual port, single subnet
  Only one Ethernet port is configured with an IP address at the NOC, which means the terminal supports one subnet and functions as a hub.
- Dual port, independent subnet
  Each Ethernet port is configured with a separate IP address at the NOC, which means the terminal supports independent subnets and functions as a router.

Chapter 3
DW7700 LEDs

This chapter discusses the LEDs on the front of the DW7700. The following topics are discussed:

LED overview

The LEDs on the front of the DW7700 may be used as an observational tool to determine if the DW7700 is working properly. The LEDs are shown in Figure 5.



G-27578 C
03/16/05

Figure 5: DW7700 LEDs

An understanding of LED appearance is vital in order to gauge the status of your DW7700. At any given time, an LED is in one of the following states:

- On
  Continuously illuminated.
- Off
  Continuously dim.
- Blinking
  Predominately illuminated but brief periods of dimness may occur.
- Flashing
  Alternating periods of illumination and dimness. The duration of each period is approximately 1/2 - 1 second.

LED appearance during normal operation

Use the LED descriptions in Table 1 to determine if your DW7700 is working properly. If the appearance of the LEDs on your DW7700 is not consistent with the descriptions in Table 1, refer to the Troubleshooting section in the *Remote Terminal User Guide, Models: DW7000, DW7700* (1035978-0001) for detailed troubleshooting procedures.

Table 1: DW7700 LED appearance during normal operation

LED	LED appearance	Description
LAN	On	An Ethernet device is connected to a DW7700 Ethernet port and the port is usable.
	Blinking	• Data is being received or transmitted on the LAN.
Transmit	On	OK
	Blinking	The DW7700 is transmitting data.
Receive	On	OK
	Blinking	The DW7700 is receiving data.
System	On	The DW7700 is operating normally in satellite link mode
	Flashing	The DW7700 is operating normally in DVADB mode. **Note:** If you suspect the DW7700 is not working properly in DVADB mode, refer to the general DVADB troubleshooting procedures on page 6. May also indicate a hard fault.

Table 1: DW7700 LED appearance during normal operation

LED	LED appearance	Description
Power	On	Power is on and DW7700 is operating normally.
	Flashing	The DW7700 is operating with the fallback.bin (backup) version of software.
LAN Transmit Receive System Power	Blink in unison Off	Indicates unrecoverable key error.

Chapter 4

DW7700 System Control Center

This chapter discusses the DW7700's System Control Center. The following topics are discussed:

Overview

The DW7700 has an internal web interface that is referred to as the System Control Center. The System Control Center provides access to important DW7700 system information, configuration parameters, documentation, and help topics.

A computer must be connected to the DW7700 in order to access its System Control Center. A computer connected to a hub or router that is connected to the DW7700 may also be used to access the System Control Center.

Note: Each DW7700'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 DW7700 software.

Accessing the System Control Center

Follow these steps to access the System Control Center:

1. Open a web browser on a computer connected to the DW7700.
2. Type **`www.systemcontrolcenter.com`** in the address bar.
3. Press **ENTER**. The System Control Center home page appears. A sample home page is shown in Figure 6.

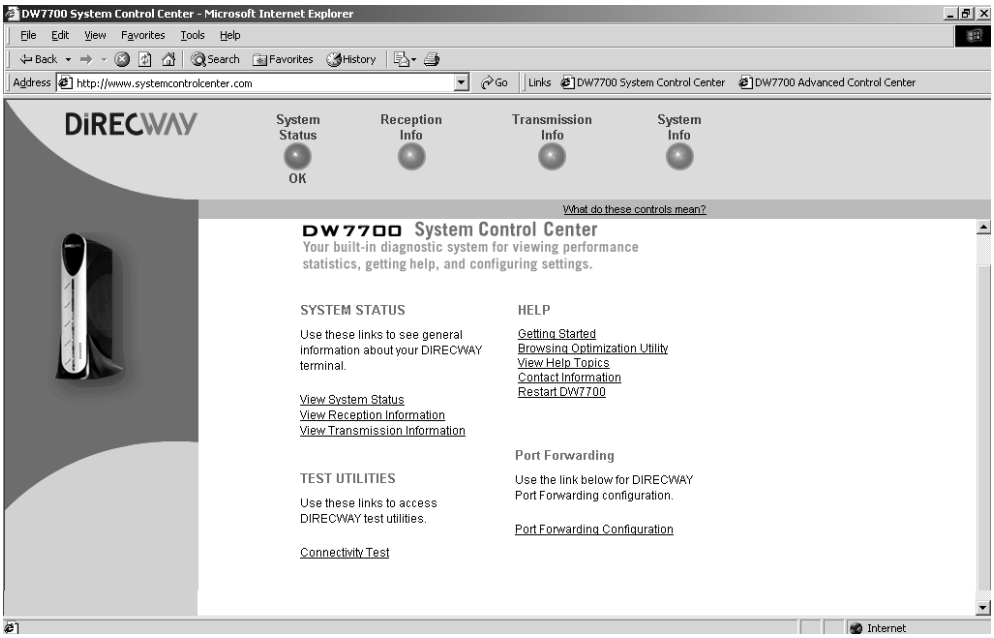


Figure 6: Accessing the System Control Center

If the home page does not appear, type the customer-specific IP address or LAN IP address in the address field and press **ENTER**. You may need to obtain your LAN IP address from your network administrator.

Refer to the Troubleshooting section in the *Remote Terminal User Guide, Models: DW7000, DW7700* (1035978-0001) if you are unable to access the System Control Center.

Home page

The System Control Center home page has system indicators and links to DW7700 features and important information regarding the operation of your DW7700.

System indicators

The system indicators appear at the top of the home page. The system indicators are described below and are shown in Figure 7.

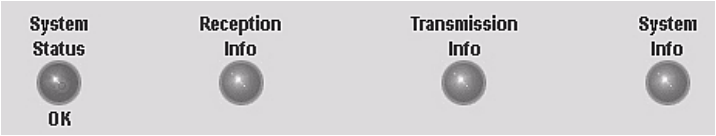


Figure 7: System indicators

Note: The System Status indicator may be red, green, or yellow, 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 19.

  If the indicator is green and `OK` appears below it as shown in Figure 7, the satellite connection is operating properly.

  If the indicator is red and `Problem` appears below it as shown in Figure 8, there is a problem with satellite connectivity. Click on the indicator to access the System Status page to view problem details.

  If the indicator is yellow, the unit is operating in DVADB mode, or Web Acceleration is being bypassed.

Figure 8: System Status indicator reporting a problem

- **Reception Info** provides access to the Reception Information page, which displays DW7700 receive data. For more information, see *Reception Info page* on page 20.
- **Transmission Info** provides access to the Transmission Information page, which displays DW7700 transmit data. For more information, see *Transmission Info page* on page 21.
- **System Info** provides access to the System Information page, which displays system information such as the DW7700 IP address, site account number (SAN), and the site ID. For more information, see *System Information page* on page 22.

Links

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

- System Status
- Test Utilities
- Help
- Port Forwarding

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. For more information, see *System Status page* on page 19.
- **View Receive Information** provides access to the Reception Information page, which displays DW7700 receive data. For more information, see *Reception Info page* on page 20.
- **View Transmission Information** provides access to the Transmission Information page, which displays DW7700 transmit data. For more information, see *Transmission Info page* on page 21.

Test Utilities

The **Connectivity Test** link provides access to the Connectivity Test page, which can be used to test the connection between your DW7700 and the NOC. For more information, see *Connectivity Test page* on page 24.

Help

The following links provide access to help-related information:

- **Getting Started** explains how the DW7700 works and provides access to DW7700 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, which covers topics ranging from an overview of the DW7700 to answers to frequently asked questions. For more information, see *Help page* on page 25.
- **Contact Information** provides access to technical support contact information. The contact information displayed may vary by service plan.
- **Restart DW7700** allows you to restart the terminal.

Port Forwarding

The **Port Forwarding Configuration** link appears if that feature is enabled. It links to the Port Forwarding Configuration page, which may be used to define rules for allowing TCP and UDP Internet traffic to access servers on your network. For more information, see *Port Forwarding Configuration page* on page 26.

System Status page

The System Status page is shown in Figure 9. The fields displayed on the page are described below the figure.

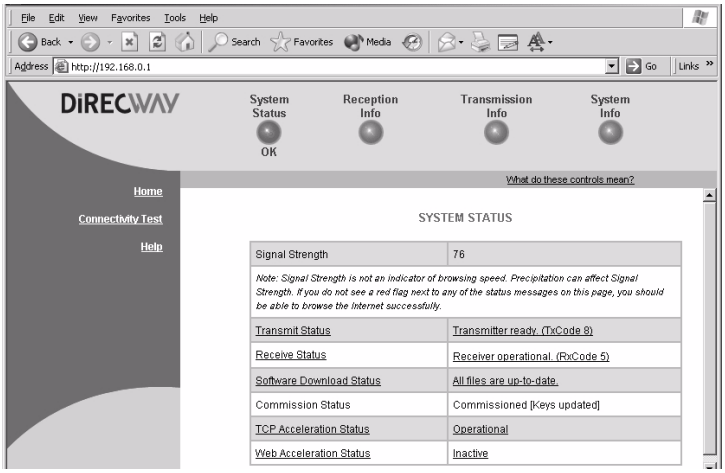


Figure 9: System Status page

- Signal Strength - displays the receive signal strength. A value of 30 or less indicates an appropriate signal is not being received. Refer to the Weather and Signal Strength section in the *Remote Terminal User Guide, Models: DW7000, DW7700* (1035978-0001) 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 DW7700 software and configuration is up-to-date.
- Commission Status - indicates whether or not the DW7700 is commissioned.
- TCP Acceleration Status - indicates whether or not TCP Acceleration is operational. TCP acceleration must be operational for optimal performance on a DW7700.
- Web Acceleration Status - if this feature is enabled, indicates whether or not Web Acceleration is operational. Web Acceleration is operational if you are browsing HTTP-based web sites. Web Acceleration may be inactive if you are browsing on a secure HTTP site (https).
- Serial Port Status - indicates whether or not the serial port connection is active or inactive.

Reception Info page

The Reception Information page is shown in Figure 10. The fields displayed on the page are described below the figure.

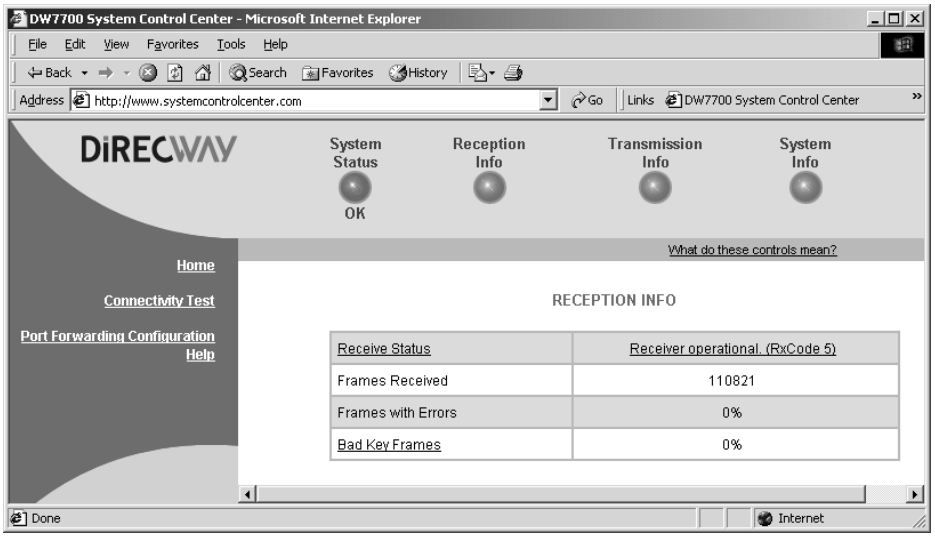


Figure 10: Reception Info page

- 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 DW7700 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 DW7700 is not commissioned. Click on **System Status** and check the Commission Status field on the page that appears. If it indicates the DW7700 is not commissioned, contact customer support.

Transmission Info page

The Transmission Information page is shown in Figure 11. The fields displayed on the page are described below the figure.

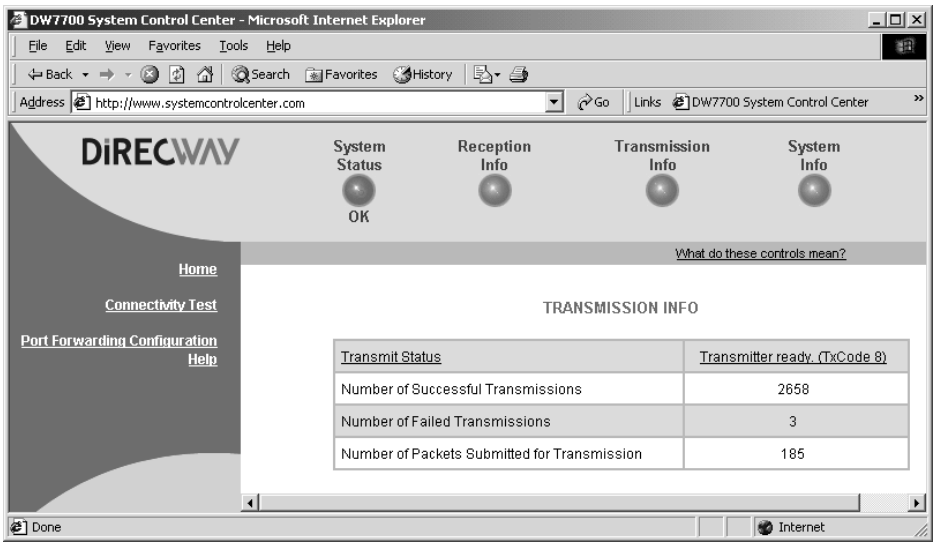


Figure 11: Transmission Info page

- 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 frames transmitted 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 do any troubleshooting or contact customer support.
- Number of Packets submitted for transmission - indicates the total number of data packets queued for transmission to the satellite.

System Information page

The System Information page is shown in Figure 12. The page has four sections: DW7700 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, only the most important fields are discussed.

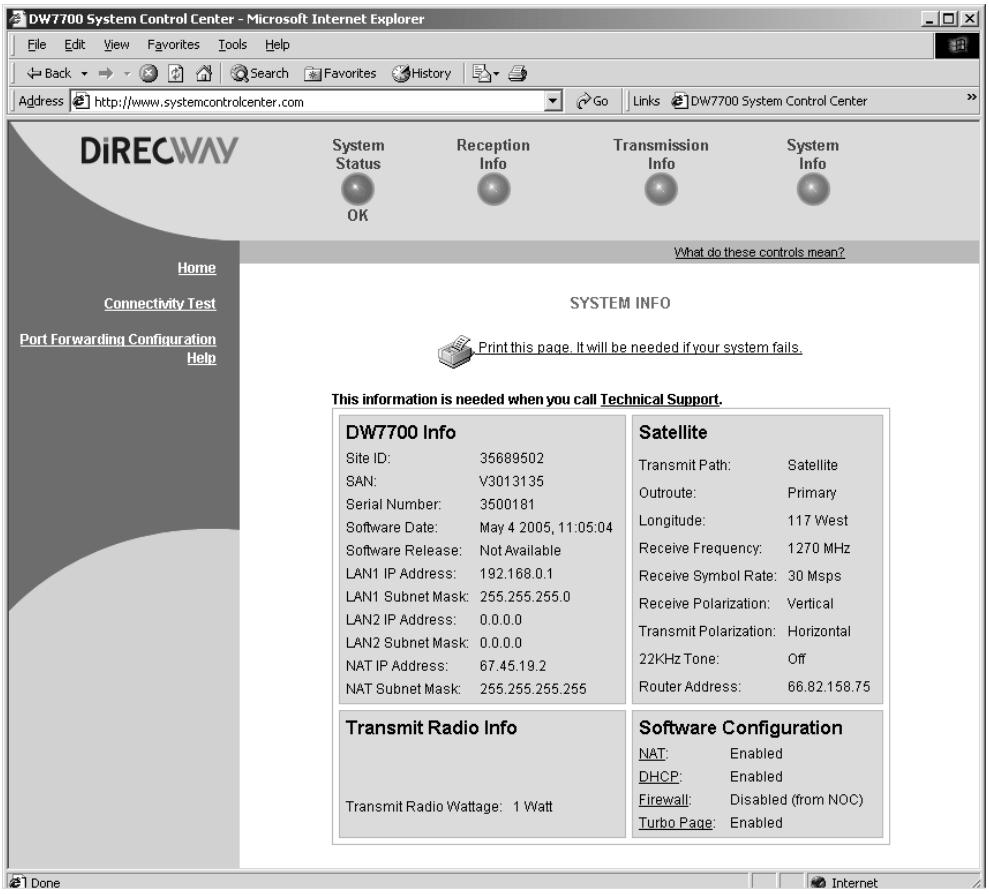


Figure 12: System Information page

Note: If possible, print the System Information page and save it. If the System Information page is not accessible, the printed copy of the System Information page is useful if you need to contact your service provider for assistance.

- DW7700 Info section
  - Serial Number - DW7700 serial number. You must provide the serial number if you contact technical support for assistance.
  - SAN - your site account number (SAN).
  - Software Creation Date - software build date.

  - Software Release Number - version of the software on the DW7700. Typically, this is the factory-installed software version. If the NOC downloads a newer version of software to your DW7700, the newer software version is displayed.
  - IP Address - the IP address of computers connected to the DW7700. If only one IP address is configured, the terminal is operating in hub mode. If two addresses are configured, it is operating in router mode.
  - Subnet Mask - defines the range of addresses assigned to the DW7700.
  - Site ID - site identification number.
- Satellite section
  - Longitude - satellite's longitude.
  - Receive Frequency - transponder frequency configured for the DW7700.
  - Receive Polarization - polarization orientation, horizontal or vertical.
  - Router Address - IP address of the primary router at the NOC used to route data sent by the DW7700.
- Software Configuration section - network address translation (NAT), dynamic host control protocol (DHCP), Firewall, and Turbo Page 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 just need to be set up to "Obtain IP address automatically."
  - Firewall - enabled or disabled at the NOC.
  - Turbo Page - if enabled, speeds web browsing.
- Transmit Radio Info
  - Transmit Radio Wattage - transmit radio wattage, 1 Watt or 2 Watt. The transmit radio part number may be displayed here if the part number was selected during the commissioning process.

Connectivity Test page

The Connectivity Test page shown in Figure 13 has a link that can be used to test the DW7700's connectivity to the NOC. You might lose connectivity to a server on the Internet due to congestion on the Internet or satellite network, or the server you are trying to access might be off-line. If possible, browse to another web site on the Internet to ensure it is not a server-specific problem.

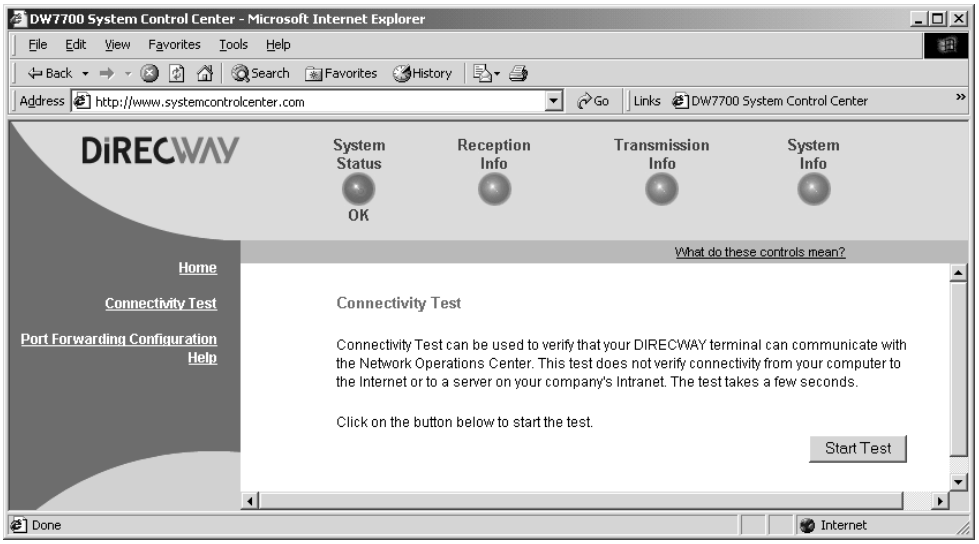


Figure 13: Connectivity Test page

Using the Connectivity Test as a troubleshooting tool is discussed in the *Remote Terminal User Guide, Models: DW7000, DW7700* (1035978-0001).

Help page

The Help page shown in Figure 14 provides access to a wide range of information, ranging from frequently asked questions (FAQs) to advanced troubleshooting statistics. Review it to become familiar with the System Control Center and DW7700. Access the Help page by clicking **View Help Topics** on the System Control Center home page or clicking **Help** in the left pane of the page you are currently on.

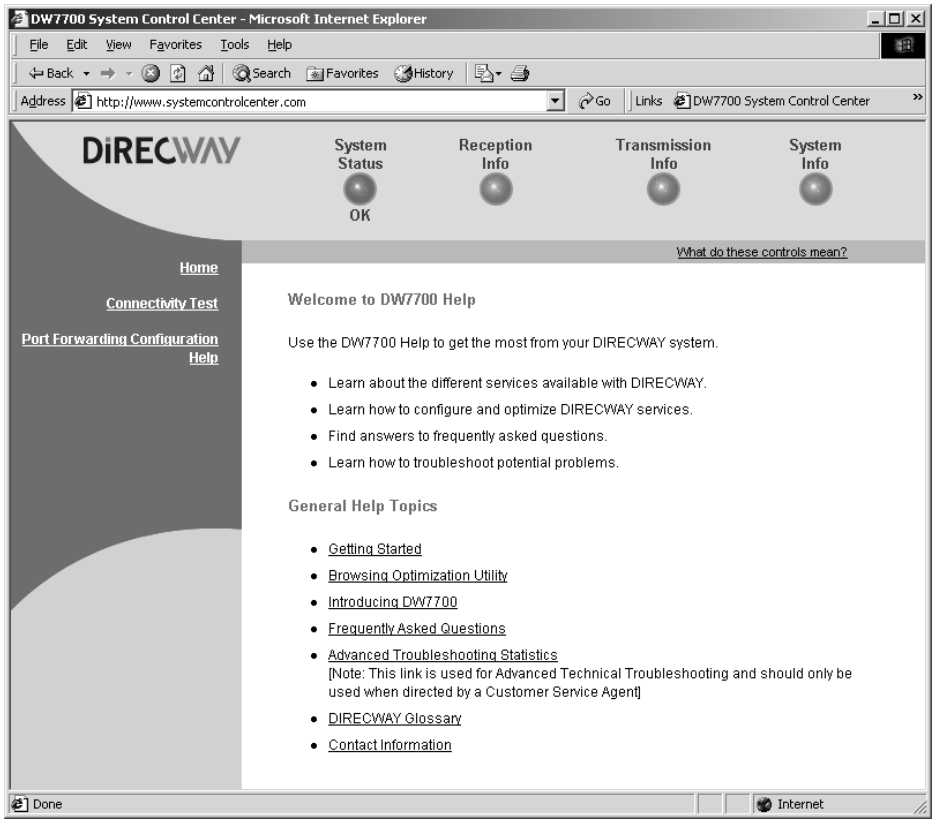


Figure 14: Help page

Port Forwarding Configuration page

The Port Forwarding page shown in Figure 15 may be used to define rules for allowing TCP and UDP traffic on the Internet to access servers on your network.

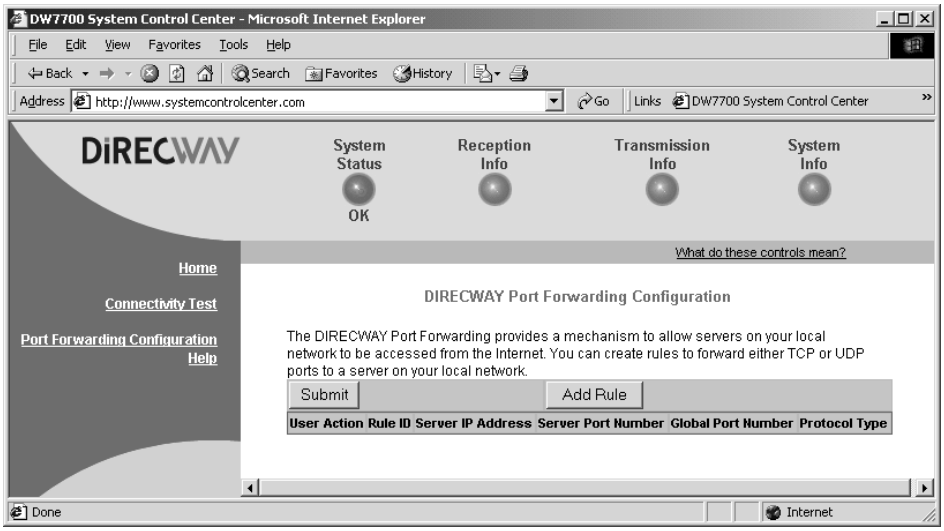


Figure 15: Port Forwarding Configuration page

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 15.
5. Enter the appropriate values in the following fields: Rule ID, Server IP Address, Server port, and Global port. See Figure 16.

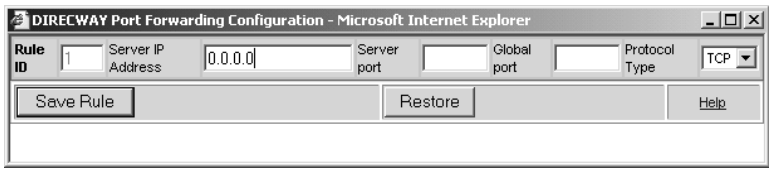


Figure 16: Entering port forwarding rules

6. Click the *Protocol Type* drop-down menu and select the appropriate protocol.
7. Click **Save Rule**.
   Repeat steps 1 - 7 to define additional rules.

Acronyms and abbreviations

A

ATM – automated teller machine

D

DHCP – dynamic host control protocol

DVADB – DIRECWAY virtual private network dial backup

F

FCC – Federal Communications Commission

L

LAN – local area network

N

NAT – network address translation

NIC – network interface card

NOC – Network Operations Center

P

PC – personal computer

POP – point of presence

POS – point of sale

R

RF – radio frequency

S

SAN – site account number

T

TCP – transmission control protocol

U

UDP – user datagram protocol

V

VPN – virtual private network

Index

S

T