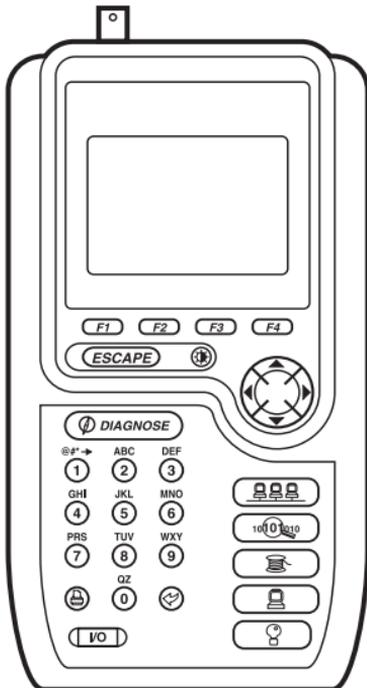




# NetRanger



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## CUSTOMER SUPPORT INFORMATION

Order **toll-free** in the U.S. 24 hours, 7 A.M. Monday to midnight Friday: **877-877-BBOX**  
FREE technical support, 24 hours a day, 7 days a week: Call **724-746-5500** or fax **724-746-0746**  
Mail order: **Black Box Corporation**, 1000 Park Drive, Lawrence, PA 15055-1018  
Web site: [www.blackbox.com](http://www.blackbox.com) • E-mail: [info@blackbox.com](mailto:info@blackbox.com)

**FEDERAL COMMUNICATIONS COMMISSION  
AND  
INDUSTRY CANADA  
RADIO FREQUENCY INTERFERENCE STATEMENTS**

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

*This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.*

*Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.*

This unit is  certified.

## **NORMAS OFICIALES MEXICANAS (NOM) ELECTRICAL SAFETY STATEMENT**

### **INSTRUCCIONES DE SEGURIDAD**

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc..
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.

10. El equipo eléctrico debe ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser conectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
12. Precaución debe ser tomada de tal manera que la tierra física y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las líneas de energía.
16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objetos líquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:
  - A: El cable de poder o el contacto ha sido dañado; u
  - B: Objetos han caído o líquido ha sido derramado dentro del aparato; o
  - C: El aparato ha sido expuesto a la lluvia; o
  - D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
  - E: El aparato ha sido tirado o su cubierta ha sido dañada.



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## **IMPORTANT!**

Read the Release Notes for the latest information about NetRanger. They include any corrections to this manual and any other information that was too recent to be included here.

# 1. Introducing NetRanger

## 1.1 What is NetRanger?

NetRanger is an easy-to-use Ethernet network diagnostic tool.

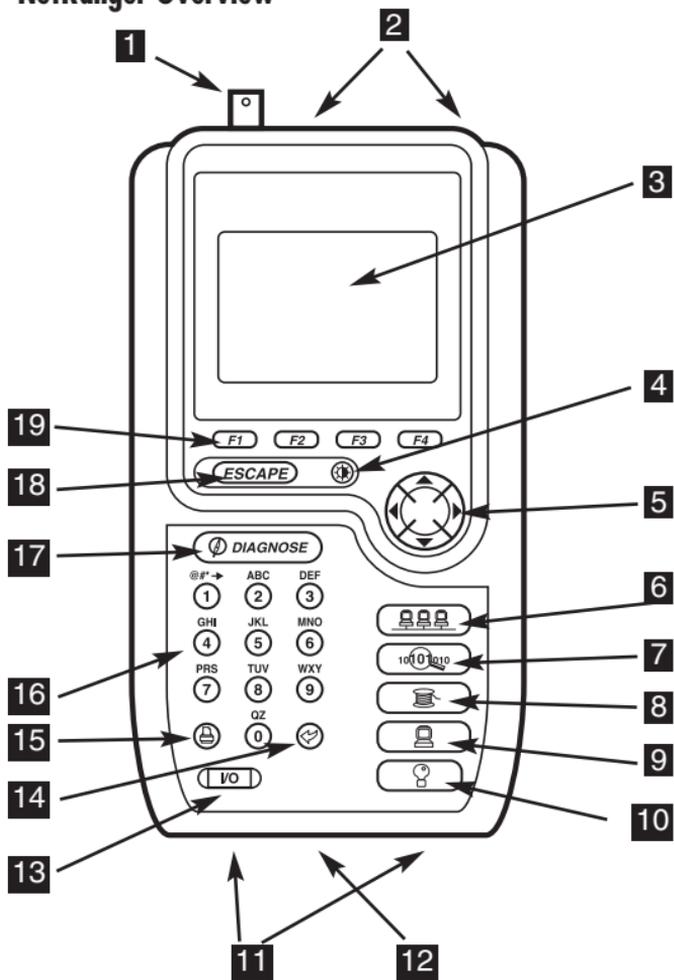
**NetRanger is smart** — it can diagnose and solve common network problems.

**NetRanger is unique** — it has just the right combination of functions found in more expensive test equipment.

**NetRanger is simple** — it is easy to learn and its format is easy to understand.

**NetRanger is portable** — you can carry this handheld unit anywhere in your building, from workstations to wiring closets.

## 1.2 NetRanger Overview



1. BNC connector attaches to coaxial cable.
2. Twisted-pair cable attaches to RJ-45 connectors A (next to BNC connector) and B.
3. Results are shown on this graphical LCD display.
4. Press  to light the display.
5. Press the arrow keys to move around the screen or to scroll through a list.
6. Press  to test your Novell network.
7. Press  to monitor activity on your local area network (LAN).
8. Press  to test your cabling, connections, and hub ports.
9. Press  to test serial communications.
10. Press  for online assistance.
11. DB-9 serial connectors attach to serial cable.
12. AC connector attaches to AC adapter.
13. Press **I/O** to power NetRanger on and off.
14. Press  to select a highlighted menu item, or after entering a list item to direct-dial that item.
15. Press  to print test results to a system printer.
16. Use the Alphanumeric keys to type letters, numbers, and symbols.
17. Press  **DIAGNOSE** to answer the most common questions about your network.
18. Press **ESCAPE** to return to the previous screen.
19. Press a **FUNCTION** key to perform the action displayed directly above the key.

### 1.3 NetRanger Functions

Press  **DIAGNOSE** to answer the most commonly asked network questions: Are the servers running as they should be? Why is the network slow? Why can't I log in? Why does my connection drop? Is this cable wired properly? NetRanger runs a series of tests to answer these questions.

Press  (Assist) for data-sensitive interpretations of test results, suggested solutions to problems, and an onscreen glossary and index of glossary terms.

Press  (Network Analysis) for detailed summary information on the state of your Novell network. This feature allows you to determine the health of your network's servers, emulate a workstation or fileserver, send sample print jobs to print queues, and perform many other network related functions.

Press  (LAN Monitor) to monitor the traffic on your network. Along with other packet related functions, this feature pinpoints excessive use of LAN resources by showing segment utilization, errors, top users, and top protocols used on your network.

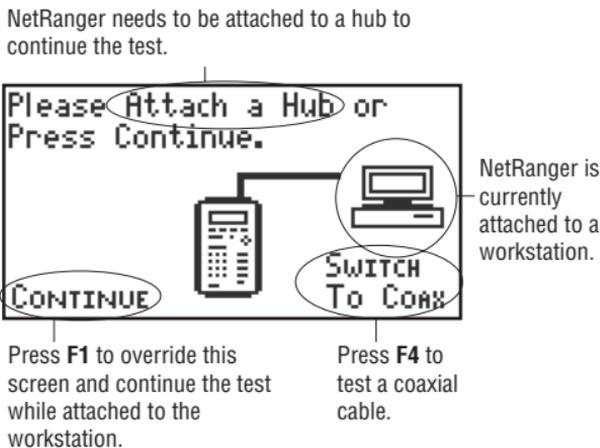
Press  (Cabling Analysis) to run a series of tests that will give you information about the physical infrastructure of your network, such as cabling, connectors, adapters, and hub ports.

Press  (Serial Communications Analysis) to test RS-232 serial links. Data line monitoring, throughput testing, and printer testing are all available functions.

## 1.4 Connecting NetRanger

The best way to connect NetRanger to your network will depend on which tests you are going to run, and on how your network is configured. If you are not sure which connection to use, start by connecting NetRanger directly to the hub.

When you run a test, NetRanger will display a message if it needs for you to connect it differently:



### 1.4.1 NETTAP

You can “tap in” to your 10BASE-T network with NetRanger’s unique NetTap feature. NetTap allows you to connect NetRanger between any two types of network devices. For example, you can test connections and communications between a workstation and a hub.

#### NetTap Warning:

If you connect NetRanger between a hub and a fileserver, running some NetRanger tests can cause workstations on the network to lose communication with the fileserver. These tests are:

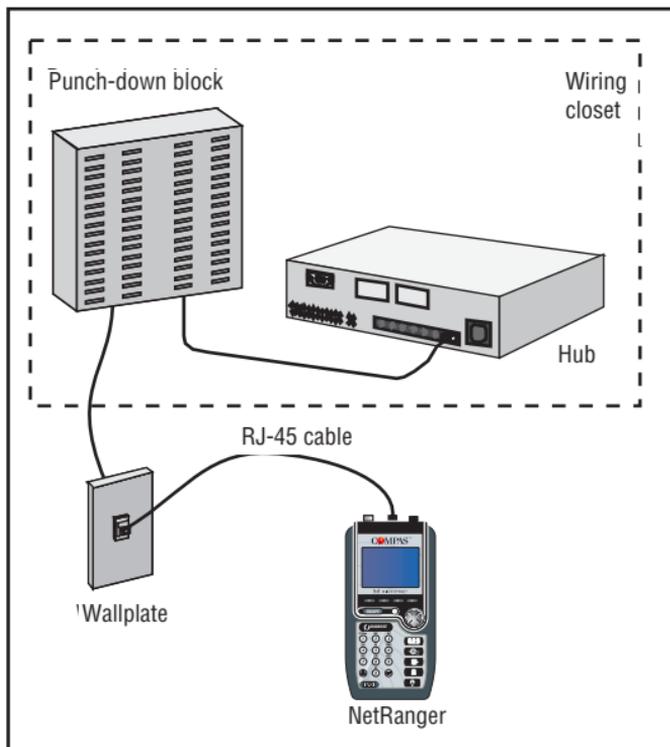
- Emulate Server (under the  key)
- Any test under the  key
- Any test under the  key
- Any  *DIAGNOSE* test

You will also lose communication if you power NetRanger off or if NetRanger automatically powers off while in NetTap mode.

Should communication loss occur, reboot the workstation(s) in question and log in again after completing the NetRanger tests.

### 1.4.2 CONNECTING NETRANGER DIRECTLY TO A HUB

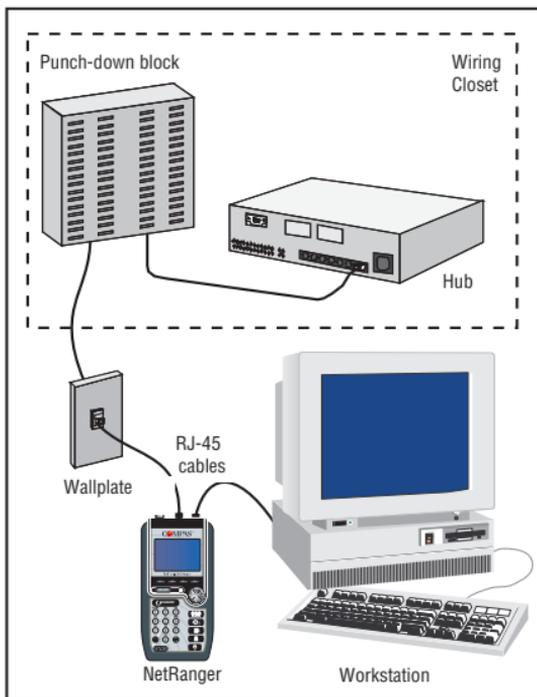
For most tests, connect NetRanger to the network's hub, via the wallplate.



### 1.4.3 CONNECTING NETRANGER BETWEEN A HUB AND WORKSTATION

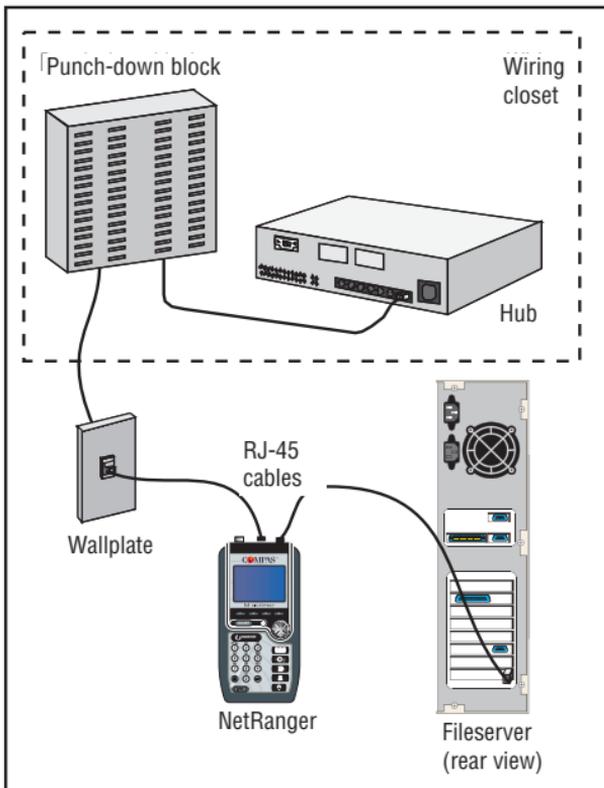
Connect NetRanger between the network's hub and a workstation if a spare hub port is not available for NetRanger.

Use this NetTap connection to diagnose “Why is the Network Slow?” and “Why Can't I Log In?”



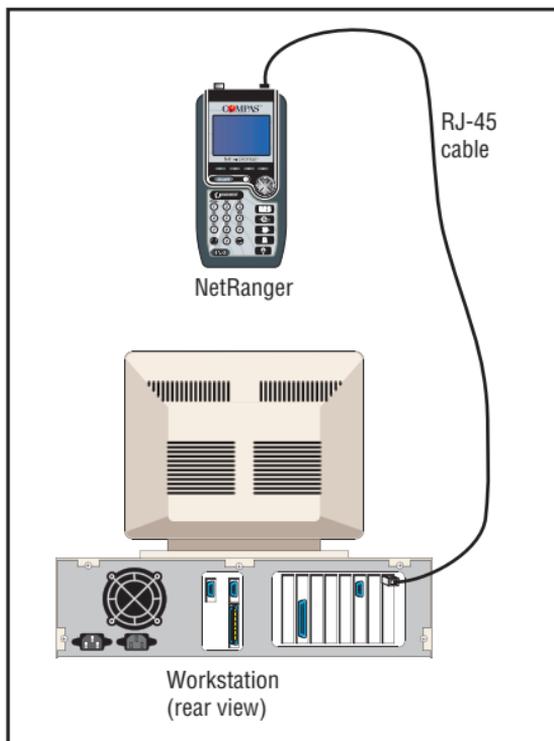
## 1.4.4 CONNECTING NETRANGER BETWEEN A HUB AND FILESERVER

If your network uses a switching hub, use this NetTap connection to perform LAN Monitor tests.



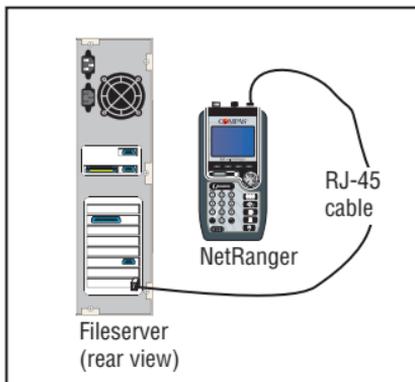
### 1.4.5 CONNECTING NETRANGER DIRECTLY TO A WORKSTATION

Connect NetRanger directly to a workstation when you want to use NetRanger to emulate a fileserver and accept logins from the workstation.



## 1.4.6 CONNECTING NETRANGER DIRECTLY TO A FILESERVER

Connect NetRanger directly to a fileserver to perform Novell server tests when no hub is available, such as during fileserver setup and installation.



### 1.4.7 NETRANGER'S RJ-45 CONNECTORS

NetRanger's two RJ-45 connectors allow you to tap in to your network between any two types of devices. It doesn't matter which device you connect to which of NetRanger's two connectors.

NetRanger detects the type of device that is at the other end of the cable, and runs its tests accordingly.

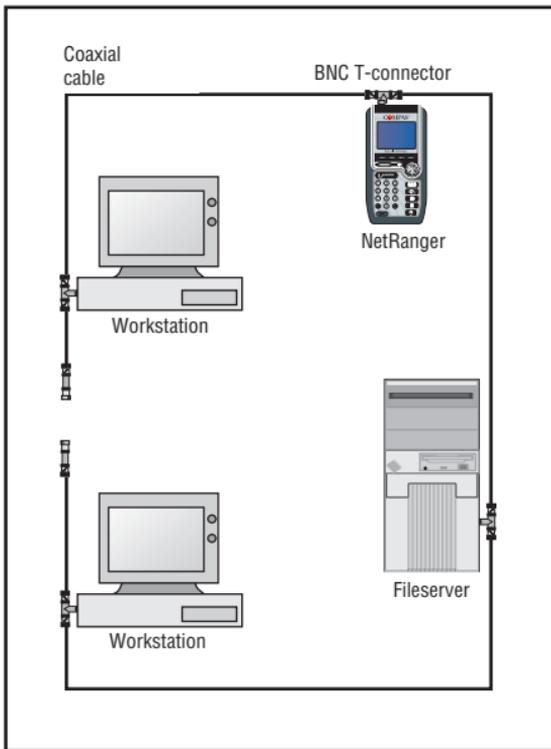
When you connect NetRanger to only one device, for example directly to a workstation, it doesn't matter which of NetRanger's two RJ-45 connectors you use. NetRanger detects the RJ-45 connector you have used, and runs its tests accordingly.

#### **High Voltage Warning**

**Never attach your NetRanger to a high voltage source (greater than + 15 volts). While NetRanger does have some high voltage protection, we recommend that you do not regularly test live telephone cable with NetRanger as serious damage could occur, voiding your warranty.**

## 1.4.8 CONNECTING NETRANGER DIRECTLY TO THIN ETHERNET

If your network is based on thin Ethernet, you can attach NetRanger directly to the backbone:



**Note:** To test a coaxial cable itself, connect the cable directly to NetRanger, with no BNC-T connector.

## **1.5 Getting Started**

To run NetRanger on battery power, first charge the battery. See Appendix B: Power Management and Battery, for instructions.

If you have questions about operating NetRanger, call for technical support. We'll be glad to help.

## 2. Using NetRanger

The best way to learn about NetRanger is to use it! Chapter 2 presents some examples designed to demonstrate NetRanger's features and functions. We encourage you to work through these examples to learn the basics of operating NetRanger.

We also encourage you to actively explore NetRanger by selecting menu and list items and by pressing function keys—let your curiosity be your guide! For detailed information on any test, refer to **Chapter 4: NetRanger Tests**.

In Example 1, you will learn how to connect NetRanger to your network, and you will see a list of your Novell network's servers.

In Example 2, you will learn how to customize NetRanger to your preferences.

In Example 3, you will learn how to use NetRanger to emulate a fileserver and accept logins from a workstation. You will also learn how to use NetRanger's online context- and data-sensitive  **ASSIST** feature.

In Example 4, you will learn how to use NetRanger's  **DIAGNOSE** feature.

In Example 5, you will learn how to use NetRanger to observe traffic on your local area network.

In Example 6, you will learn how to perform Autotest and Wire Map tests on your cables.

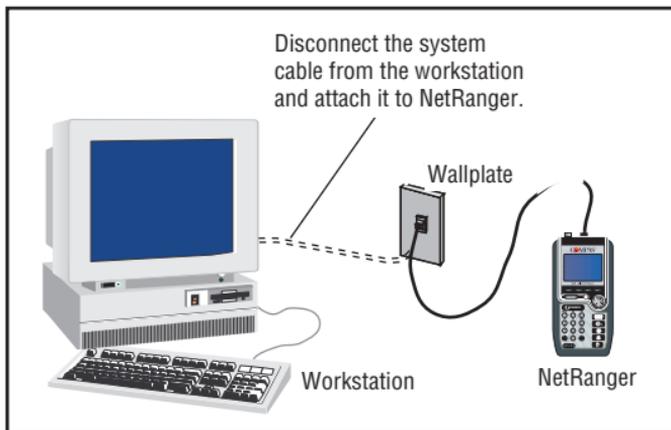
## Example 1: Exploring Your Network I

In Example 1, we begin by demonstrating the simplest way to connect NetRanger to your network.

We then show you NetRanger's Server Summary screen (which lists your network's file servers) how to navigate this list, and how to get more information about a particular file server.

Example 1 also demonstrates the use of NetRanger's function keys and the **ESCAPE** key.

1. Plug NetRanger into your network. The simplest way to do this is to unplug the RJ-45 or coaxial network cable from a workstation and plug it in to NetRanger. You can use either of NetRanger's RJ-45 connectors—NetRanger can detect which connector you are using.



2. Press **I/O** to power on NetRanger.
3. Press **↑↑↑**. You will see a summary list of the servers on your network, the frame type(s) supported, the number of hops each server is from NetRanger, and the relative speed of each server.
4. To navigate the server list, use the arrow keys to scroll the list. Press **▲** and **▼** to move up and down one item at a time. Press **▶** to Page Down, and **◀** to Page Up.

Or, direct-dial an item by pressing the numerical key for that item, then pressing **↵**. For example, press 5, then **↵** to see the fifth server on a list.

There are nine servers on this Novell network. The first one (Eagle) is currently selected.

Eagle is accessible using frame types 802.2 (2), 802.3 (3), Ethernet II (E), and Ethernet SNAP (S).

Eagle is one hop away from NetRanger. Cosmo is on the next segment (two hops away).

Server Summary			
SERVER	FRAME	HOPS	SPEED
<b>Eagle</b>	23ES	1	██████████
Cosmo	3	2	██████████
Joe	23ES	2	██████████
MENU	DETAIL	SORT	FRAMES

Eagle is accepting packets faster than Cosmo.

Press **F1** to see a menu of Network tests.

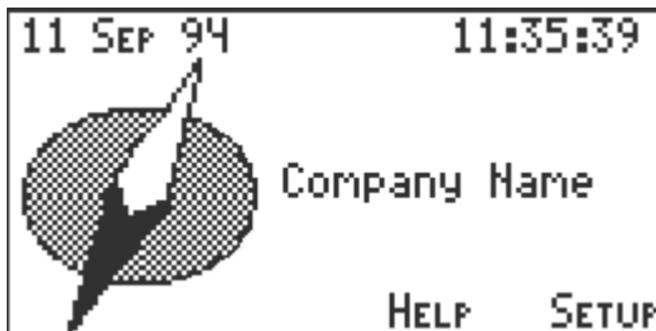
Press **F2** to run additional tests on Eagle.

Press **F3** to sort the list alphabetically. Press again to sort by # of hops.

Press **F4** for detailed information on Eagle's Frame types.

- Experiment with the function keys. For example, press **DETAIL (F2)** for a menu of detailed tests that you can perform on the highlighted server.

6. You can always press **ESCAPE** to return to the previous screen. Press **ESCAPE** now until you return to the NetRanger logo screen:



### Example 2: Customizing NetRanger

In Example 2, we begin by showing you how to set the time and date on NetRanger. Setting the correct time and date is important, because many NetRanger tests report the time that an event occurred.

Next, we show how to identify your NetRanger as your own, by entering your name, company name, and telephone number into NetRanger's memory. This example demonstrates how to type alphanumeric characters with NetRanger.

Finally, we show you how to reset NetRanger settings to the factory defaults.

### TIME/DATE SETUP

1. From the NetRanger logo screen, press **SETUP (F4)**.
2. Select **User Options**.
3. Select **Time/Date** from the User Options menu.
4. Use **CHANGE (F2)** to set the date, month, year, hours, and minutes. Press **▶** and **◀** to move between fields. When finished, press **SAVE (F1)**.

You can **NETRANGER** menu item by pressing that item's number, moving to the item and pressing **SELECT (F1)**, or moving to the item and pressing **↩**.

### OWNER INFORMATION SETUP

1. Select **Owner Information** from the **User Options Setup** menu.
2. Type your name in the name field. In this example, we'll type "Pat Moore". Press **DEL (F2)** if you need to delete the character at the cursor. Press **F3** to toggle between capital letters (**CAPS**), lower case letters (**caps**), and numerals (**NUM**).
  1. Type "P" by pressing 7.
  2. Type "A" by pressing 2.
  3. Type "T" by pressing 8.
  4. Type a space by pressing 0 two times (because "space" is the second "character" on this key).
  5. Type "M" by pressing 6.
  6. Press ► to move the cursor to the right. You need to do this because "O" uses the same keystroke as "M".
  7. Type "O" by pressing 6 three times.
  8. Move the cursor to the right and type the second "O".
  9. Press 7 three times (for "R"), then 3 three times (for "E").
3. Now delete "Pat Moore" and enter your own name.
4. Press ▼ to move to the Company and phone number fields, and enter this information. Press **SAVE (F1)** to save.

Set **F3** to **CAPS** or **caps** and press 1 to type these

special typographic symbols:

Number of Keypresses	Symbol	Name
1	.	Period
2	-	Dash
3	_	Underscore
4	,	Comma
5	*	Asterisk
6	(	Left Parenthesis
7	)	Right Parenthesis
8	/	Slash
9	#	Number Sign

### RESETTING TO FACTORY DEFAULTS

From the **User Options Setup** menu, select **Factory Defaults**. In the **Factory Defaults** screen, you will be asked if you want to reset all settings. If you do, press **OK (F1)** to confirm. All of your settings except those for **Time/Date** and **Owner Information** will be returned to the factory defaults.

### Example 3: Exploring Your Network II

The station is attempting to log in to this NetRanger, but is having difficulty receiving packets.

In Example 3, we demonstrate how to use NetRanger to emulate a fileserver and accept logins from a workstation. Use this procedure when you want to test a workstation's ability to log in to a server.

As we go through the example, we will describe what you will see in the online ASSIST for some of the screens that we visit.

Finally, we will show you examples of DATA-sensitive Assist, SOLVE Assist, and GLOSSARY Assist.

#### USING NETRANGER TO EMULATE A FILESERVER

1. Disconnect your workstation from the network, and connect it directly to NetRanger's RJ-45 or BNC connector.
2. Press . NetRanger will tell you that you need to attach to a hub (for most Network Tests, NetRanger does need to be attached to the hub). In this case, you can ignore this message because you are testing the workstation.
3. Press **CONTINUE (F1)** to override the message screen and proceed to the Network Tests menu.

If you press  now, you will see a screen

describing each item on the **Network Tests** menu. Press **ESCAPE** to return to the **Network Tests** menu.

4. Press **1** to proceed to the NetWare Test menu.
5. Press **2** or scroll to item two and press **SELECT (F1)** to select **Emulate Server**. NetRanger displays the **Server Accounts** screen.

1/5 Server Accounts	
SERVER NAME	USER NAME
COMPAS	<Any User>
<Any Server>	<Any User>
<Any Server>	<Any User>
EMULATE	SETUP

If you press  now, you will see a screen that describes the **Server Accounts** list. Press **GLOSS** for definitions of **EMULATE** and **SETUP**, the **Server Accounts** list's two function keys. Press **ESCAPE** to return to the **Server Accounts** list.

6. From the Server Accounts list, highlight NetRanger/<ANY USER>. When you use the NetRanger/ANY USER combination, NetRanger will accept logins from any user name and password.
7. Press **EMULATE (F1)**. This prepares NetRanger to accept a login from the workstation.

NetRanger displays a “WAITING FOR LOGIN” message.

8. Reboot the workstation and log in with a user name and password. A message will appear on the NetRanger screen, telling you whether the login attempt was successful, and the frame type used.

#### DATA-SENSITIVE ASSISTANCE AND SOLUTIONS

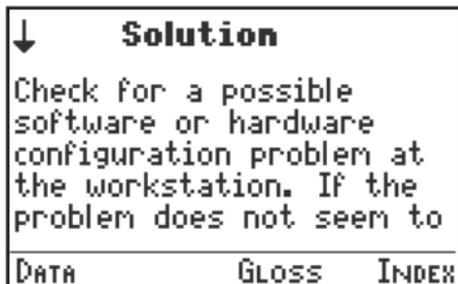
1. Press **?**. If the login failed, NetRanger will display a message describing the failure.

A login attempt might fail for any of several reasons. One reason is shown in this **Data Assist** screen:

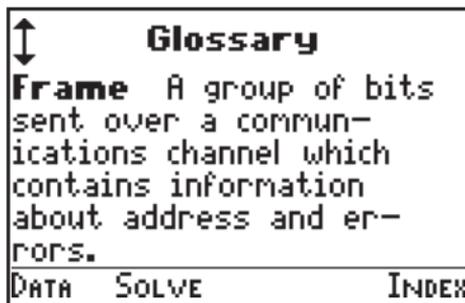
```

↓          Data
The station is attempt-
ing to log in to this
Compas, but is having
difficulty receiving
packets.
-----
SOLVE GLOSS INDEX
  
```

2. Press **SOLVE (F2)** for suggested solutions to the problem. For the current example, NetRanger suggests this solution:



3. Press **GLOSS (F3)** for definitions of items that appear on the test screen or items used in Assist screens:



The first part of most **Glossary** screens contain definitions of any function keys for the test screen. Scroll past these definitions to reach definitions for terms used in the test screens or in other Assist screens.

If you can't find a glossary term under **GLOSS**, try the **INDEX (F4)**.

4. In any Assist screen, press ▲ and ▼ to scroll up and down one line at a time. Press ► to page up, and ◀ to page down.

The arrow at the top left-hand side of the screen indicates that there is more text above, below, or above and below the current screen.

**Tip:**

In a scrollable list screen, such as *Server Summary*, you can highlight a list item and press  for **DATA** and **SOLVE** assistance relevant to the highlighted item.

#### **Example 4:** **Diagnosing a Network**

In Example 4, we demonstrate NetRanger's  **DIAGNOSE** feature, by asking NetRanger a common network question: “Why is the network slow?”

First, we describe the display screens that you will see as NetRanger completes its series of tests.

Next, we show you how to use **ASSIST** to help interpret NetRanger's diagnosis, and we tell you how to find more detailed information on the results of the diagnosis.

### WHY IS THE NETWORK SLOW?

1. Connect NetRanger to the network between your workstation and the hub.
2. Press **0** **DIAGNOSE**. The **Diagnose** menu appears.
3. Press **2** to select **Why is Net Slow?** As NetRanger runs its series of tests, you will see the “Why is Network Slow?” testing screen:

Why is Network Slow?	
TESTING	RESULT
For Cable...	PASS
Cable to Hub...	MARGINAL
Hub...	PASS
Network...	PASS

For this diagnosis, NetRanger:

- Verifies that there is a cable attached.
- Performs an **Autotest**, checking the cable that is attached to the hub.
- Performs a **Link Test Pulse (LTP)** measurement to test the hub.
- Runs the **LAN Monitor** for a few seconds to check network utilization and error rate.

- Runs a **Server Test** on your chosen server. NetRanger presents you with a list of the servers that it has detected on your network, and prompts you to choose one. Choose the server to which the workstation at the network tap that you are using normally attaches. (You may want to run “Why is the network slow?” several times, to test several servers.)

*For a full diagnosis, the NetRanger NLM must be loaded on the server you wish to test. See **Appendix A: Installing the NetRanger NLM** for more information.*

When these tests are complete, NetRanger displays the “Why is Network Slow?” Results screen. The Results screen displays any tests that had results other than PASS. In this example, the length measurement for the cable to the hub was MARGINAL:

Why is Network Slow?	
TEST	RESULT
Length...	MARGINAL

4. From this **Results** screen, highlight any test on the list and press  for a data-sensitive interpretation of the test.

5. From the DATA Assist screen, press **SOLVE (F2)**

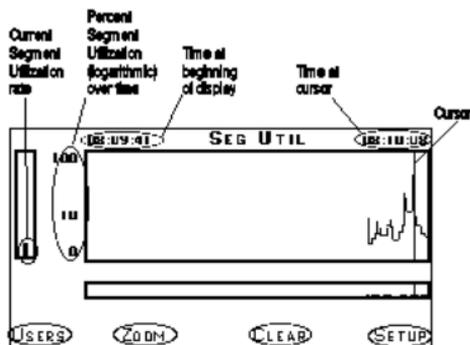
for suggested solutions to the problem. To check a definition, use the online **INDEX** from any Assist screen, press **ESCAPE** to return to the “Why is Network Slow?” Results screen.

If you want more information on a particular test, re-run that test by pressing the appropriate feature key, and selecting that test from the menu.

For example, if you want to determine the exact length of the marginal cable, make sure NetRanger is attached to that cable and press  to run an **Autotest**.

### Example 5: Looking at Network Traffic

In Example 5, we show you how to use NetRanger’s LAN Monitor to monitor traffic on a local network



segment. We demonstrate how to determine current **Segment Utilization** and **Error Rate**, and how to monitor this information over time.

Next, we demonstrate NetRanger's **Resolve Station Names** feature, in which NetRanger determines the familiar user name associated with a station's network interface card (NIC) address.

Finally, we show you how to interpret NetRanger's list-style screens, in this case the **Top Talkers** screen.

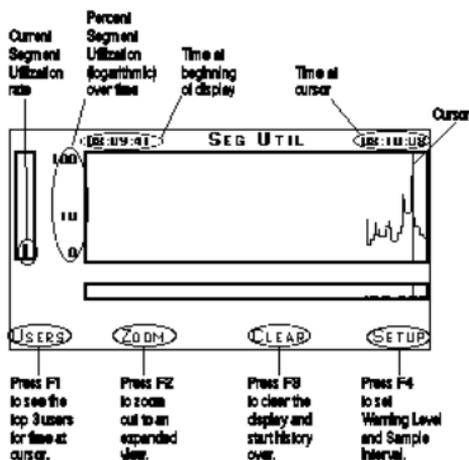
1. Press  $\text{10101010}$ . NetRanger displays utilization and error rate for the current segment:



2. Press **STOP (F3)** at any time to stop LAN Monitor data collection. To restart LAN Monitor data collection, press **START (F3)**. The LAN Monitor will begin collecting new data (previously collected data will be discarded).

While LAN Monitor data collection is stopped, you will be able to print any LAN Monitor measurement to a network printer queue.

- Press **DETAIL (F2)** and then select 1 from the Monitor Details menu for a Segment History:



- Press and hold **◀** to move the cursor to the left. As you do this, watch the time on the top right of the screen. You are moving the cursor backward through the utilization history. Notice that when you stop the cursor, the display freezes (new data is being gathered, but

is not being displayed).

If you want to move the cursor to the beginning of the captured data, press ▲.

5. Press ▼. The cursor jumps back to the “current time” location at the far right of the screen. The screen resumes displaying new data.
6. Press **ZOOM (F2)** to zoom out to a larger view of segment history. The history from the previous screen is compressed on the **ZOOM** screen.
7. Move the cursor to any point in the history. Press **VIEW (F2)** to get a close up view of this part of the segment history.
8. Press **ESCAPE** to return to the Monitor Details screen. Press **ESCAPE** once more to return to the initial **Segment Utilization** screen. Press **MENU (F1)** to go to the LAN Monitor menu.
9. Select **Resolve Station Names**. NetRanger will search for NIC addresses for all nodes on a Novell network, and determine the station or login name for each fileserver and each station at which a user is currently logged in. (The **Resolve Station Names** function resolves names for stations that are currently active (generating traffic). If a user is logged in but generating no traffic, NetRanger will not resolve this user’s Name and Address.)

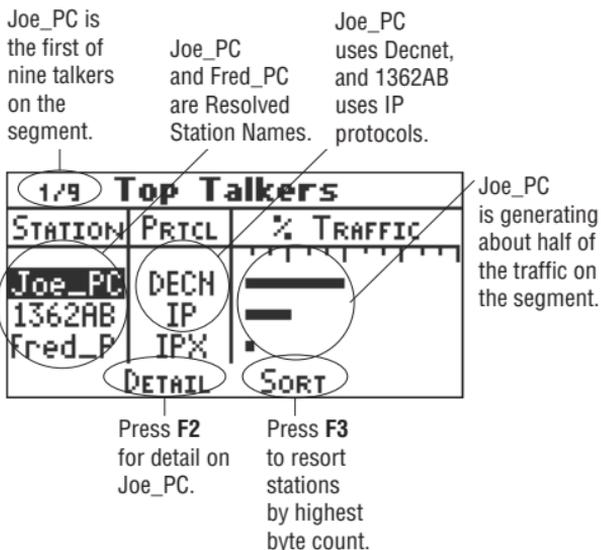
NetRanger screens which identify network

workstations (such as **Top Talkers**, below) will now display these stations by their familiar login names instead of the NIC address.

Press **ESCAPE** or **(F1)** to return to the LAN Monitor menu.

10. Select **Segment Utilization** to return to the initial **Segment Utilization** screen. Press **DETAIL (F2)** and then select **2** from the **Monitor Details** menu to select **Top Talkers**. The **Top Talkers** screen shows the users on a segment, based on highest byte count.

The % Traffic bar indicates the percentage of segment utilization that is attributable to that user. In this example, Joe\_PC is generating about half of the total segment traffic.



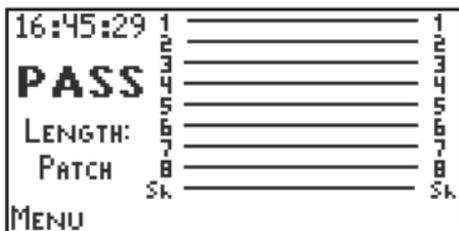
For more information on **Segment Utilization**, **Top Talkers**, and other LAN Monitor tests, see the **LAN Monitor Tests** section of **Chapter 4: NetRanger Tests**.

## Example 6: Testing a Cable

In Example 6, we show you how to perform a Wire Map on a length of cable, and an Autotest on your network cabling and connections.

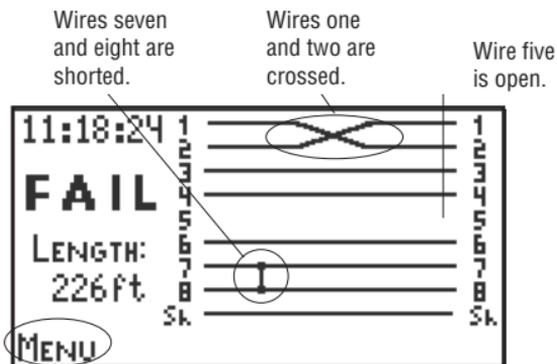
### WIRE MAP

1. Attach the two ends of an RJ-45 patch cable (included) to NetRanger's two RJ-45 connectors.
2. Press  to display a wire map of the cable. The map illustrated here shows a shielded cable with no faults (opens, shorts, or breaks) in the wires.



3. If you detach one end of the cable and attach it to the Far End Adapter, you will see the same wire map. Use the Far End Adapter when it is not possible or convenient to attach both ends of a cable to NetRanger.

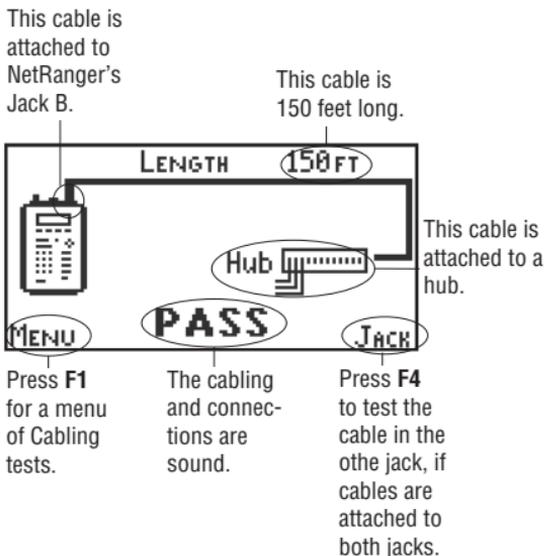
4. If there were any faults in the cable, the wire map would show them graphically:



Press **F1**  
for a menu  
of Cable  
tests.

### AUTOTEST

1. Attach one end of a cable to NetRanger, and the other end to a wallplate for a network connection.
2. Press  to display an Autotest showing the cable's length, the device that NetRanger is attached to, and the cable's status (pass or fail).



If an Autotest fails due to a fault in the cabling, NetRanger describes the fault and the distance at which the fault occurs.

## 3. Configuring Your NetRanger

NetRanger includes the Internet NetRanger, an optional module that gives you the tools you need to troubleshoot problems with Internet routing and connectivity, as well as problems with your local IP network. NetRanger can be easily customized to your needs.

### Selecting Network Preferences

If your network runs primarily on TCP/IP, select IP as your Network Preference. When you select IP as the Network Preference, NetRanger will default to the **IP Summary** screen under the Network Tests key. The NetWare versions of these tests will remain accessible as menu items. If you leave NetWare as your Network Preference, NetRanger will default to the **NetWare Summary** screen.

To select the Network Preference, press **SETUP (F4)** from the NetRanger startup screen, select **Networks** from the **Setup** menu, then **Network Preference** from the **Network Setup** menu. Use the left and right arrow keys to select the network type (NetWare or IP), then press **SAVE (F1)** to save this setting and return to the **Network Setup** menu.

## Assigning an IP Address to NetRanger

On 10BASE2 networks, attach NetRanger to any available T-connector. NetRanger becomes an additional host to your network.

To use NetRanger to troubleshoot your Internet connections and IP network, you will need to assign an IP address for NetRanger. If you try to run an IP test before you have assigned an IP address for NetRanger, NetRanger will display a warning message asking you to specify a valid IP address.

NetRanger's **IP Address Setup** feature allows you to create and maintain a list of NetRanger IP addresses for up to fifty IP networks. You can assign an IP address to your NetRanger unit for every IP network that you want to troubleshoot, and save those addresses in NetRanger memory. Thereafter, NetRanger will detect the network address wherever it is attached, and will use the appropriate IP address when running its tests.

To set up IP addresses for NetRanger, press **SETUP (F4)** from the NetRanger startup screen. Select **Networks** from the **Setup** menu, then **IP Setup** from the **Network Setup** menu, then **IP Source Addresses** from the **IP Setup** menu. The **IP Source Address** screen displays a list of fifty IP address “accounts.”

The first time you enter this screen, all of these accounts will be empty—indicated by zeroes in all fields: 000.000.000.000. To enter an IP address for NetRanger, highlight a blank account and press **EDIT (F4)**. In the **IP Address Setup** screen, use the alphanumeric keypad to enter a valid host address for your network in the IP ADDRESS field. For address segments with fewer than three digits, you will need to enter leading zeroes—for example, enter a “3” as “003.” Enter your network’s subnet mask in the SUBNET MASK field, and your network’s router in the DEFAULT ROUTER field. Press **SAVE (F1)** to save the IP address, subnet mask, and default router and return to the **IP Source Address** screen.

**TIP**

If you don’t know the IP network address for the network you are attached to, you can find this out before you assign NetRanger an IP address. Press the **Network Tests** key, and then rapidly (before a message is displayed) press **MENU (F1)**. Select **IP/Internet Tests** from the **Network Tests** menu, then select **IP Segment Info**. NetRanger displays the local network’s IP address, subnet mask, and frame type.

## Manual Selection of IP Address

For NetRanger to be able to automatically use the correct IP address from the **IP Source Address** account list, it needs the current IP network's subnet mask information. If NetRanger does not receive a response to its subnet mask request, it cannot automatically select the appropriate address. NetRanger will inform you if this happens, and will prompt you to manually select the appropriate IP address and enter a subnet mask if necessary.

You can set the **IP Address Selection** mode default to **MANUAL** address selection. If you set the default to **MANUAL**, NetRanger will not attempt to automatically select the IP network to which it is attached, but will always prompt you for an IP address. To set the **IP Address Selection** mode, select **IP Setup** from the **Network Setup** screen, then select **Address Select Mode**. In the **Address Select Mode** screen, press **CHANGE (F2)** to toggle between **AUTOMATIC** and **MANUAL** selection. Press **SAVE (F1)** to save the setting.

## Using Resolved Station Names on an IP Network

NetRanger's **Resolve Station Names** function (located in the **LAN Monitor** main menu) searches by Network Interface Card (NIC) address for IP hosts that are NetWare clients, and determines the user name for each station at which a user is currently generating traffic. Thereafter, NetRanger displays test results using the familiar user names instead of the NIC addresses. NetRanger's **Host Details** and **Duplicate IP List** screens will also display user names if these names exist in the **Resolved Names** list.

If any hosts on your IP network are also stations on a Novell network, NetRanger will resolve those IP host's user names. If there are hosts on your IP network that are not part of a Novell network, you can edit NetRanger's **Resolved Names** list to add those hosts.

## Using the Domain Name System (DNS)

The Internet Domain Name System (DNS) is a distributed network of servers that contains IP-Address-to-DNS name mappings. If you set up a default DNS server for NetRanger, you can use DNS names instead of IP addresses in the **IP Summary**, **Host Details**, **Duplicate IP Address**, **IP Trace Route**, and **IP Ping** tests.

## Setting Up a Default DNS Server

To set up a DNS server list and to select a default DNS server for NetRanger to use, make the following selections, starting at the NetRanger startup screen: Press **SETUP (F4)**, select **Networks**, select **IP Setup**, then select **Default DNS Server**.

You can save IP addresses for up to ten DNS servers. Once you have entered and saved an IP address for a DNS server (see “Editing the Name List,” below), set this server as NetRanger default DNS server by highlighting the IP address and pressing **SELECT (F1)**. If you attach NetRanger to different IP networks and use different IP addresses, you may want to keep a list of several DNS servers and select the appropriate default server for each network.

## Editing the DNS Server List

From the **DNS Server** list, highlight an existing or a blank (000.000.000.000) IP address to edit, and press **EDIT (F4)**. In the **Edit DNS Entry** screen, use the alphanumeric keypad to enter the IP address of the DNS server. For address segments with fewer than three digits, enter leading zeroes—for example, enter a “3” as “003.” Press **SAVE (F1)** to save the address and return to the **DNS Server** list.

## Editing the Internet Name List

You can save up to ten Internet names in NetRanger’s **Internet Name List**. You can then select items from this list as destinations in an **IP Ping** or **IP Trace Route** test. To edit the **Internet Name List**, select **Internet Name List** from the **IP Setup** menu. Highlight an existing or “<UNUSED>” Internet name, and press **EDIT (F4)**. Use the alphanumeric keypad to enter the Internet name. See **Chapter 2, Owner Information Setup**, for detailed instructions on editing with the alphanumeric keypad. Press **SAVE (F1)** to save the name and return to the **Internet Name List**.

## 4. NetRanger Tests

You can use NetRanger to run tests on your Novell network, to monitor LAN activity, to test network cabling and connections, and to test serial communications. As an option, NetRanger includes the **Internet NetRanger**, a separate module that gives you the tools you need to troubleshoot problems with Internet routing and connectivity as well as problems with your local IP network.

Press  **DIAGNOSE** and select from a list with five items what test you want to run. Or, choose the tests you want to run by pressing , , , or  and selecting the desired test from a menu of choices.

When you press a test key( , , , or  ) NetRanger displays the results for the first test on

that key's main menu. From this screen, press **MENU (F1)** to see the main menu. Choose additional tests from this menu.

You can customize NetRanger for your network by using NetRanger's Setup procedures. Just press **SETUP (F4)** from any main menu to access a **Setup Menu**.

In **Chapter 4**, we describe each test that NetRanger can run. We begin with an overview of the

 **DIAGNOSE** feature. Next, we describe the  Network Analysis,  LAN Monitor,  Cabling, and 

Serial Communications tests. Finally, we present methods for printing test results and testing network and serial printers.

From any NetRanger screen, press  for context- and data-sensitive assistance, solutions, and glossary definitions.

## **DIAGNOSE**

NetRanger can find the source of many common network problems with the push of one button. NetRanger runs all the necessary tests and tells you the results of each. Simply select a test and

NetRanger will figure out how to interpret the results.

When you press  **DIAGNOSE**, NetRanger displays five commonly asked questions:

1. Are the servers OK?
2. Why is the network slow?
3. Why can't I log in?
4. Why does my connection drop?
5. Is this cable OK?

Select the question that you want NetRanger to answer. NetRanger will run a series of tests, displaying brief results of each test as it completes it. (See the table of status definitions on the next page.)

Sometimes, NetRanger will need you to perform some action, such as rebooting your PC or connecting NetRanger a different way. Just follow the instructions that NetRanger displays on the screen.

When NetRanger has finished its tests, it will display a **Results** screen, listing the tests that failed or had marginal results.

You can highlight a test result and press  for test interpretations.

Finally, you can note any tests whose results you would like to examine, and re-run those tests by choosing them in the appropriate menus.

### Test Status Types

PASS	The test has passed with no problems
FAIL	The test has failed for some reason, or NetRanger is unable to perform the test for some reason.
WARNING	A significant problem has been noted.
MARGINAL	The test has passed, but the result is close to the failure borderline. You may be able to improve your network's performance by finding a way to adjust the level of the entity tested.
HIGH	The test has passed, but the result is higher than optimal. You can improve your network's performance by finding a way to lower the level of the entity tested.
LOW	The test has passed, but the result is lower than optimal. You can improve your network's performance by finding a way to raise the level of the entity tested
NO NLM	The NetRanger NLM must be installed on a server in order to perform a Server Test.

## Network Analysis Tests

Run Network Analysis tests for detailed information on your Novell network and file servers. You can also use NetRanger to emulate a file server or a workstation, to test a print queue, or to perform a PING test.

### NOTE

When pressing  the screen that appears will vary depending on the way you configured the unit in Setup. (See Chapter 3: Configuring Your NetRanger). If NetWare is selected as Network Preference, the initial screen will read Server Summary. If IP is selected as Network Preference, the initial screen will show IP Summary.

### SERVER SUMMARY

Press  to see a **Server Summary** or **IP Summary** list. The **Server/IP Summary** gives information on all detected servers. For each server, NetRanger tells you the server's name, frame types, number of hops to that server, and speed.

**Frame** is the standardized format or formats, dependent on protocol, with which the server sends and receives information. Look at **Frame** when you want to know which frame type to use to access the server from the local segment.

NetRanger detects frame types IEEE 802.2 (abbreviated “2”), IEEE 802.3 (“3”), Ethernet II (“E”), and Ethernet SNAP (“S”).

A server may support more frame types than are shown in the **Server Summary** screen, if that server is “seen” through an intervening server that supports fewer frame types.

For example, suppose Server A supports all four frame types, and Server B supports only IEEE 802.3. A NetRanger connected to the network on Server B’s segment will show all servers, including Server A, with frame type 802.3 only. This is because Server B must communicate with those servers using 802.3.

Press **FRAMES (F4)** from the Server Summary screen to see the hops and speed for each Frame Type on the highlighted server.

**Hops** are a measure of the number of servers a packet passes through on its way to the destination server, from NetRanger. Look at the number of hops before you connect a new workstation to your network, to determine how far the destination server is from the workstation.

Each intervening server represents a hop. The destination server is counted as one hop. A server on the same segment as NetRanger is one hop away. A server on an adjacent segment is two hops away (i.e., the packet makes two “hops” to get there).

To limit the scope of your network tests, change the hop limit. Limiting the scope of your network reduces the number of servers and workstations that NetRanger will detect, simplifying test results.

You can limit NetRanger to see servers on the local segment only (one hop), or up to 15 hops away. Change the hop limit by pressing **SETUP (F4)** while in the **Network Tests** main menu, and selecting **Network Hop Limit** from the **Network Setup** menu.

The **speed** of the server is a measure of the rate at which the server is responding to NetRanger. Speed is a function of the number of hops, router types, and other factors.

## SERVER DETAIL

The **Server Summary** screen serves as the starting point from which to get information on specific servers. Highlight a server and press **DETAIL (F2)** for more information on that server:

### *1. Server Test*

Run the **Server Test** when you want diagnostic information about a specific server. The NetRanger NLM must be loaded on a server in order to get complete information from a Server Test (see **Appendix A: The NetRanger NLM** for more information).

If there is no NLM loaded onto a server, and NetRanger is unable to log in to that server, the **Server Test** will fail.

If there is no NLM loaded onto a server, and NetRanger is able to log in, the **Server Test** will produce partial information.

A **Server Test** will fail if one or more of the tested parameters fail. The failed parameter will be displayed on the **Server Test** screen.

*Server Test Detail*

For each **Server Test** parameter, NetRanger displays a value and status level. You can find more information on these tests in Novell documentation such as the Novell System Administrator Guide, NetWare® Application Notes, CNE Study Course, and the NetWare Support Encyclopedia.

Possible status levels for the **Server Test** parameters include: OK, FAIL, HIGH, LOW, and MARGinal. For more information on the status of a particular parameter, highlight that parameter and press  .

**Server Test Detail Parameters**

Processor Utilization	The percentage utilization of the fileserver's internal processor.
Connections in Use	The number of uses currently logged in to the server.
Connection Allowed	The maximum number of connections licensed for the server.
Dirty Cache Buffers	The number of cache buffers containing new or changed information that has not been written to disk.
Disk Requests	The number of pending requests to access the fileserver's disk.
Redirected Disk Blocks	Blocks of data which have been moved by the processor to another physical location on the hard disk.

Server Memory	The amount, in megabytes, of total server memory.
Cache Buffers	The number of allocated cache buffers.
Cache Ratio	The ratio of cache buffers to server memory.
Packet Receive Buffers	The number of buffers allocated for NIC communications.
Maximum Receive Buffers	The maximum allowed number of buffers allocated for NIC communication.
Major Version	The major NetWare version used by the server.
Minor Version	The minor NetWare version used by the server.
NetWare Revision	The NetWare revision number, if any.

## 2. *Top Server Users*

Select **Top Server Users** to see the selected server's heaviest users. For example, if the server is slow, look at **Top Server Users** to see if a particular user is responsible for an unusual amount of server activity.

Users are identified by User Name, station connection number, and the percentage of the server's traffic that is attributable to that user.

The NetRanger NLM must be loaded on a server to run **Top Server Users** (see **Appendix A: The NetRanger NLM**).

### 3. *Log in to Server*

If you want to test a server's ability to receive a login, or a new workstation's cabling and connections before you connect the workstation to the network, select **Log in to Server**. NetRanger will emulate the workstation and test the login procedure. NetRanger will attempt to log in to the selected server, using a User Name that you set up in the **Login Accounts** screen. If you have not set up a User Name for the server, NetRanger will attempt to log in as "Guest".

Press **SETUP (F4)** from the **Log in to Novell** screen if you want to set up a User Name. In the **Login Account Setup** screen, type in a User ID and password. Passwords entered into NetRanger's **Login Accounts** are protected—it is not possible for someone to find out a password by looking at NetRanger's **Login Accounts**.

The **Log in To Novell** screen will tell you if you have successfully logged in, and the frame type used. If the login is unsuccessful, NetRanger will display a brief message describing the failure.

#### *4. Server User List*

The **Server User List** screen tells you the User Name, station connection number, and date and time of login for all users currently connected to the selected server.

#### *5. Server Address Information*

The *Server Address Information* screen tells you the internal network number and the node address of the selected server.

For servers running on NetWare 2.x, the internal network number is the network segment address and the node address is the server's NIC number. For servers running on NetWare 3.x and higher, the internal network number is unique to each server, and the node address is always 000000000001.

#### *6. Print to Queue*

To test new printers and PostScript® cartridges, select **Print to Queue** and send a test page to any print queue on your network.

See **Printing with NetRanger: Print to Queue Test** in this chapter for details.

## I. NETWORK TESTS MENU

From the Server Summary screen, press **MENU (F1)** for a menu of general Network tests:

### 1. *Server Summary*

The **Server Summary** screen gives information on all detected servers.

### 2. *IPX Ping*

Run the **IPX Ping Test** to determine whether another node on the network will respond to NetRanger and to your protocol. In an IPX Ping test, NetRanger sends an “echo packet” to the destination NIC address and network addresses that you specify.

For an IPX Ping test, specify the source and destination addresses in IPX format.

Press **PING (F1)** to see the **Ping Summary** screen. Displayed is the number of packets sent, received, and the percentage that were lost. It also displays the maximum, minimum, and average turnaround time (time for a packet to get to the destination node and return to the source node) for all packets.

Press **DETAIL (F2)** to see the **Ping Detail** screen. It displays the source node address, and information

on the last 20 packets sent. The screen displays the packet number (SEQ), number of bytes in that packet, frame type on which the packet returned, and turnaround time for that packet.

### *3. IPX Segment Information*

Look at the **Local Segment Information** screen to see the frame types and network addresses (network #) of the local segment.

### *4. Emulate Server*

If you want to test a new workstation's setup and installation, you can use NetRanger to emulate a Novell server and test a login from the workstation. If you have two NetRanger units, you can use one to emulate a server, and the other to emulate a workstation. This way, you can test the wiring and hub ports for a new network before you connect the equipment.

To emulate a server, connect NetRanger directly to the workstation. (You can connect NetRanger to the network segment, but if you choose to do this you must make sure that no file servers or routers are available from the hub, or NetRanger will not receive the login.)

From the **Server Accounts** screen, select the server that you want to emulate, and the user ID that you want to log in under.

To test a workstation's ability to log in to any server, choose **<Any server>** and **<Any user>**. To perform error detection on logins to a particular server or from a particular user, set up those accounts in the **Server Accounts Setup** screen.

You can set up and save a list of up to five server/user combinations. Press **SETUP (F4)** in the **Server Accounts** screen, and enter the server name, user ID, and password. Passwords entered into NetRanger's Server Accounts are protected—it is not possible for someone to find out a password by looking at NetRanger's **Server Accounts**.

When you have selected a server/user pair, use a PC or another NetRanger to log in to the specified server as the specified user. NetRanger will tell you if you have successfully logged into the server.

See **Example 3: Exploring Your Network II** for an example of using NetRanger to emulate a server.

See **Example 2: Customizing NetRanger** for instructions on typing alphanumeric characters.

## II. IP Internet Tests Menu

### NOTE

IP/Internet Tests will only be available if the *Internet NetRanger* module has been installed.

To determine whether the Internet NetRanger software has been loaded onto the NetRanger, press **HELP (F3)** from the NetRanger startup screen, then **VERSION (F4)**, then **OPTIONS (F4)**.. The Options List will tell you whether the Internet (TCP/IP) option is active. If Internet NetRanger is not installed, the message “IP option not currently installed” will appear if you select an item from the menu.

The IP/Internet Tests submenu contains the IP Summary, Duplicate IP Addresses, IP Ping Test, IP Trace Route, and IP Segment Information items.

### 1. IP Summary

If your Network Preference is set to IP (See Selecting Network Preferences, Chapter 3-1), you will see the **IP Summary** screen when you press the **Network Tests** key. You can also select **IP Summary** from the **Network Tests** main menu.

The **IP Summary** screen shows the hosts on the

current IP network, the frame type (Ethernet II or SNAP) under which the host can be reached, and whether that host acts as a router to another IP network.

The **IP Summary** makes one “pass” in its search for hosts. If you want to update the list, exit the IP Summary screen and run the test again.

#### **NOTE**

**Running NetRanger’s IP Summary may increase the traffic level on your network.**

### *Host Details*

From the **IP Summary** screen, you can highlight a host and press **DETAIL (F2)** to access the **Host Details** screen. The **Host Details** screen displays the IP address and the Media Access Control layer address (NIC address) for the selected IP host. If NetRanger’s Resolved Name List includes IP stations (for a local network) or if you have set up NetRanger’s DNS capability (for the Internet), this screen also displays the name associated with this host.

## *2. Duplicate IP Addresses*

When you select **Duplicate IP Addresses** from the **IP/Internet Tests** menu, NetRanger will determine if one or more stations on your IP network have been assigned the same IP address. When a duplicate IP address is detected, NetRanger returns a **DUPLICATE DETECTED** message. Press **DETAIL (F2)** to see the **Duplicate IP** list. This list shows the duplicate IP address, and the two (or more) stations that share the IP address. The stations are identified by MAC address and by user name if you have access to a DNS server or if NetRanger's **Resolved Names** list includes IP stations. From the **Duplicate IP List** screen, press **NEXT (F2)** to see additional duplicate addresses, if any exist.

#### NOTE

The Duplicate IP Address function runs every minute until a duplicate address is detected or you exit from the function. Because NetRanger detects only the stations that are currently active, you may want to run this function for several hours.

### *3. IP Ping Test*

To run an IP Ping test, select **IP Ping Test** from the **IP/Internet Tests** menu. Use the **IP Ping** test to determine whether a host on the network will respond to NetRanger on the IP protocol. If you have set up valid IP and router addresses for NetRanger and for your IP network, NetRanger will enter these addresses in the **IP Ping SRC ADR** (source address) and **DFLT RTR** (default router) fields when in **Automatic Mode**. See “Assigning an IP Address to NetRanger” for more information.

To Ping an IP device on the current network, enter the IP address of the device that you want to Ping in the **DST ADR** (destination address) field. If you want to enter a name instead of the IP address in the destination address field, highlight the **DST ADR** field and press **NAME (F4)**. See “Editing the DNS Name List” for information on selecting and editing Internet DNS names.

To use NetRanger to receive an IP Ping from another host, run any IP test under the **Network Tests** key (except **Local Segment Information**). Leave the NetRanger test running, and send a Ping to NetRanger via the IP address that you have assigned for NetRanger on the current network.

#### *4. IP Trace Route*

To run an IP Trace Route test, select **IP Trace Route** from the **IP/Internet Tests** menu. Use the **IP Trace Route** test to trace the router path to a specified destination host.

If you have set up valid IP and router addresses for NetRanger and for your IP network, NetRanger will automatically enter these addresses in the **IP Trace Route SRC ADR** (source address) and **DFLT RTR** fields. See “Assigning an IP Address to NetRanger” for more information.

To trace the route to an IP host, enter the IP address of the destination host in the destination address (**DST ADR**) field. If you want to enter a name instead of the IP address in the destination address field, highlight the **DST ADR** field and press **NAME (F4)**. See “Editing the DNS Name List” for information on selecting and editing Internet DNS names.

### *5. IP Segment Info*

When you select **IP Segment Info** from the **IP Internet Tests** menu, NetRanger displays the subnet mask, the IP address, and the frame types (Ethernet II or SNAP) running on the local IP network.

From the **IP Segment Info** screen, press **MASKS (F3)** to verify that each router running on the local network reports the same subnet mask. If a router reports a different subnet mask than the rest of the routers on the network, it is likely that the router has been misconfigured, and may be causing problems on the network.

### III. Detect MAC Address

The **Detect MAC Address** function detects the Media Access Control (MAC) address of an attached workstation, or any other device with a Network Interface Card (NIC). NetRanger gets this information from the station's NIC address, transmitted with each packet the station sends. Use this function if you want to determine the MAC address and vendor of the NIC card in any network, because it allows you to determine the station's address without using a network utility.

To determine a station's address, attach the station's cable to a NetRanger RJ-45 or BNC connector, and select **Detect MAC Address** from the

**Network Tests** menu. Reboot the station, or otherwise cause it to transmit a packet on the network.

If you select **Detect MAC Address** with NetRanger in NetTap™ mode, connected inline between a hub and workstation, NetRanger will detect which of the two cables leads to the workstation and display the station's address. In NetTap mode, NetRanger allows the workstation to continue communication with the fileserver after the Ethernet address has been determined.

### **LAN Monitor Tests**

Use NetRanger's local area network (LAN) Monitor to observe traffic on your local segment. The LAN Monitor displays segment traffic in real time—you can watch for peaks in utilization or errors as they happen, or you can look at a history of segment traffic. You can also use the LAN Monitor to determine the top users, top error generators, and top protocols on your local segment, among other functions.

## **SEGMENT UTILIZATION MENU**

From the **Segment Utilization** screen, press *MENU (F1)* for a menu with 3 items: **Segment Utilization**, **ICMP Monitor**, and **Resolve Station Names**.

### I. SEGMENT UTILIZATION

Press  $10^{101010}$  to look at your local segment's **Segment Utilization**. The Segment Utilization screen shows traffic and error rates for the local segment.

The **Segment Utilization** screen is a dynamic display showing activity on the segment, as a percentage (on a logarithmic scale) of full utilization. The outlined bar shows the highest level of utilization since the test began, and the shaded bar shows current utilization. The default display scale for utilization data is logarithmic. To view the data on a linear scale, press **SETUP (F4)**, and then **3** from the LAN Monitor Setup screen to select **Utilization Scale**, and use the **CHANGE (F2)** to toggle the selection to "LINEAR." Press **SAVE (F1)** to save the change, and press **ESCAPE** to return to the **Segment Utilization** screen. Changing the logarithmic/linear scale selection while viewing a **Segment Utilization** screen does not disrupt data collection. The Logarithmic scale compresses the display for segment utilization rates greater than 30%.

The **Error Rate** display shows the percentage of data packets detected by NetRanger that are in error. NetRanger considers a packet to be in error if it is a

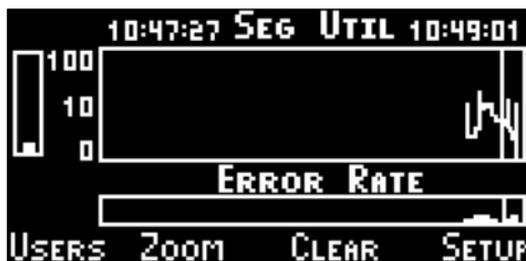
run, if it is too long, or if it caused a framing error or a cyclic redundancy check (CRC) error.

NetRanger alerts you with an alarm if **Segment Utilization** or **Error Rate** exceeds the user-specified value. The default values are 60% Segment Utilization and 0.1% Errors. To change these values, press **SETUP (F4)** from the Segment Utilization/Error Rate screen, select **Warning Levels** from the **LAN Monitor Setup** screen, and use **CHANGE (F2)** to toggle through the choices.

If you do not want an alarm to sound when these values are exceeded, you can disable the **Alarms** feature in the **User Options/Sound Setup** menu.

### 1. SEGMENT HISTORY

Look at Segment Utilization History to determine whether a segment shows a consistent level of activity over time, or whether there are peaks in activity.



The **Segment Utilization/Error Rate History** display shows the percentage of segment utilization and error rate over time. The vertical bar at the left-hand side of the display represents the current segment utilization level.

The time (HH:MM:SS) at the upper left-hand side of the display refers to the time at which the history display begins. The time at the upper right-hand side of the display refers to the time at the cursor. As a default, the cursor will be at the right-hand side of the display (this location reflects the current time). Use the arrow keys to move it across the display.

Press **USERS (F1)** to display the **Top Three Users** of the current segment, for the current cursor position. (The top three users will change every Sample Interval.) The users, identified by **Resolved Station Name** or NIC address, are selected based on the percentage of total segment utilization for which that user is responsible.

There are two views, or time frames, of Segment Utilization and Error Rate history. When you enter the History screen, you will see the shorter time frame. If you set the Sample Interval to 1 second (the default), NetRanger displays the last 100 seconds of Segment Utilization history. From this view, you can zoom out to the longer view, and see the entire history since you started the test, up to 24 minutes.

From the long view, you can move the cursor to any point in the history, and zoom in to a closer, 100-second window surrounding that point.

The amount of time covered by the two views will vary depending on the Sample Interval that you have set, as follows:

Sample Interval	Short View	Long View
1 second	100 seconds	24 minutes
5 seconds	500 seconds	120 minutes
1 minute	100 minutes	24 hours

The default Sample Interval is one second. To change it, press **SETUP (F4)** from any **Segment Utilization** screen, and select **Sample Interval**. Press **CHANGE (F2)** to toggle through the three choices.

At Sample Intervals of five seconds and one minute, NetRanger displays the average value from that time interval. The advantage of selecting a longer Sample Interval is that it allows you to look at Segment Utilization history over a longer period of time.

## 2. TOP TALKERS

The **Top Talkers** display shows the current users on a

segment, based on the byte count that each user has accumulated since the **Top Talkers** test began. You can expect the talkers with highest byte counts to be your file servers.

1/9 Top Talkers

STATION	PRCTL	% TRAFFIC
Joe_PC	DECH	██████████
1362AB	IP	████
Fred_P	IPX	█

DETAIL    SORT

**Top Talkers** are identified by **Resolved Station Name** or NIC address suffix, and protocol.

The **% Traffic** bar indicates the percentage of total segment utilization for that user.

Press **DETAIL (F2)** to display the Talker Details selection list. Highlight a talker on the **Top Talkers** display to get more detail on that user. NetRanger gives you three choices. You can view the Ethernet address (full NIC address and vendor of that card, if known), the protocols used and percentage of traffic generated with that protocol, and the other users to whom the selected user is talking (“conversations”).

Press **SORT (F3)** to sort the list by highest byte count. The Top Talkers buffer can hold information for up to 255 users. For networks with fewer than 255 users,

all users are displayed. For networks with more than 255 users, the first 255 users that NetRanger detects are displayed.

### 3. TOP PROTOCOLS

The **Top Protocols** display shows the protocols in use on the segment, and the cumulative percentage of segment utilization that the protocol is responsible for. Protocols detected by NetRanger include: Novell IPX, IP, DEC LAVC (LAVC), DECnet (DECN), DEC LAT (LAT), AppleTalk (APPI), AppleTalk II (APP2), Xerox XNS, Banyan VINES (VINS), ISO, and ARP. NetRanger will designate any other protocol as OTHER.

### 4. TOP ERROR SOURCES

The **Top Error Sources** display shows the station, identified by Station Name (see **Resolve Station Names**, below) or NIC address suffix, and the percentage of total network errors attributable to that station.

### 5. TOP BROADCASTERS

The **Top Broadcasters** display shows the users on a segment, based on broadcast byte count. Broadcasts, as opposed to conversations, are data transmissions directed to everyone on the network. (Compare to **Top Talkers** display, which is based on the user's individual conversations.)

**Top Broadcasters** are identified by Station Name (see **Resolve Station Names**, below) or NIC address suffix, and protocol. The % **Traffic** bar shows the user's cumulative percentage of total broadcast traffic. The percentage of network traffic attributable to broadcast traffic is indicated by the % **Brdcst Traffic** bar at the top of the display.

## 6. ERROR SUMMARY

The **Error Sources** display shows a breakdown of detected errors by type and the % displays each error type as a percentage of total error types. Error types reported by NetRanger are: Local Collision, Remote Collisions, Cyclic Redundancy Checks (CRC), Framing errors, Long Frames, Short Frames, and error type Unknown. For a description of each error type, use the cursor to highlight the error and press **ASSIST**.

## II. ICMP MONITOR

NetRanger's Internet Control Message Protocol (ICMP) Monitor keeps track of error and control messages on your IP network.

Select **ICMP Monitor** from the LAN Monitor menu for information on the following ICMP parameters.

Message

Definition

Destination unreachable (Error)	Indicates that the packet was not delivered because the destination network or host was unreachable, the correct protocol was not used, or the packet needed to be fragmented.
Redirect (Occasional redirects are normal)	Indicates that there exists a more direct route to a destination host than the one indicated in the packet's original addressing.
Source Quench (Error)	Indicates that packets are being discarded by a network device because that device lacks the resources to process them.
Time Exceeded (Error unless caused by Ping packages)	Indicates that a packet was discarded because it did not reach its destination in the allotted time. May be caused by some Ping packages such as Trace route.
Parameter Problem (Error)	Indicates an error in an IP header.
Echo Request (Normal)	Indicates that a Ping request has been detected.
Echo Reply (Normal)	Indicates that a Ping response has been detected.

### III. RESOLVE STATION NAMES

If you want NetRanger to display test results with familiar user names instead of station addresses, select **Resolve Station Names**.

When you select **Resolve Station Names**, NetRanger searches for station addresses (NIC addresses) for all nodes on the local segment of a Novell network. Then, NetRanger determines the station name for

each server and for each station at which a user is currently logged in. The **Resolve Station Names** function resolves names for stations that are currently active. If a user is logged in but generating no traffic, NetRanger will not resolve this user's Name and Address.

You can clear the resolved station names from NetRanger's memory by selecting **Clear Resolved Name** in the **LAN Monitor Setup** Menu.

You can upload the list of names to a Novell server. Press **SETUP (F4)**, and then **4** from the LAN Monitor Setup screen to select **Save Names to File**. Select a server and choose a Volume. You can create a new file name by pressing **CREATE (F2)**. The names listed on the screen can be edited. Press **SETUP (F4)**, and then **5** from the LAN Monitor Setup screen to select **Read Names From File** to download the names back into NetRanger.

## **Cabling Analysis Tests**

### **CABLE SETUP**

Some cable tests, such as **Length** (in **Autotest**) will be more accurate if you tell NetRanger the type of cable you are using. (Press **SETUP (F4)** in the Cable Tests menu and select your cable type from the list provided.) However, using the default cable type will give you an accuracy of +10%, which is usually

adequate.

If you want NetRanger to display results in meters, change **Measurement Units** in the **User Options Setup** menu to METERS.

### RJ-45 AUTOTEST

Press  while connected to a hub or workstation to see NetRanger's Autotest. Choose Autotest when you want to determine what is attached to the far end of a cable, the cable's length, and whether it is wired correctly.

When you run an **RJ-45 Autotest**, NetRanger detects the device that is connected at the other end of a cable. NetRanger also tells you if it detects nothing or if it detects an unknown object.

**Autotest** also displays any opens or shorts in the wire pairs, and the distance to these faults or to the end of the cable.

If you have cables in both of NetRanger's RJ-45 connectors, NetRanger will test the cable in jack A (the jack next to the BNC connector) by default. If you want to test the cable in jack B, press **JACK (F4)**. The NetRanger icon will indicate which jack is

currently used.

### WIRE MAP

Press  with both ends of a cable attached to NetRanger's two jacks (patch cable test), or using the Far End Adapter, when you want NetRanger to perform a wire map test on a length of cable. See **Example 6: Testing a Cable** for instructions.

### BNC AUTOTEST

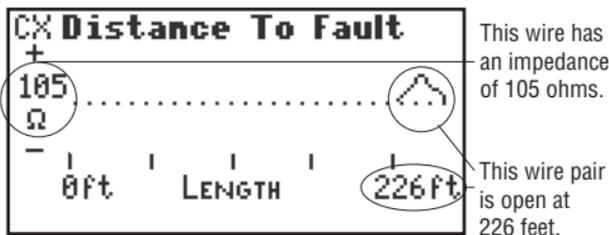
When you run a **BNC Autotest**, NetRanger displays the length, fault state (open, short, or terminated properly), and impedance of the cable.

### DISTANCE TO FAULT (COAXIAL ONLY)

Select the **Distance to Fault** test for a graphical display of the distance to shorted or open wires.

A fault is displayed as a “bump” in the graph. (A faultless wire is displayed as a straight line.) The size of the bump indicates the magnitude of the fault. (If there are minor faults along the cable, these are displayed as small bumps in the graph.)

If the bump is positive, the fault is an open wire. If the bump is negative, the fault is a shorted wire.



### CROSSTALK/SIGNAL LEVEL (RJ-45 ONLY)

**Note:** NetRanger must be connected to a 10BASE-T device in order to perform a Crosstalk/Signal Level test.

Crosstalk occurs when the signal on the transmitting wire pair “leaks” onto the receiving pair in a twisted-pair cable, causing the transmitting device to detect a collision. To determine if a cable generates sufficiently small amounts of crosstalk or a sufficiently high signal to be usable, select **Crosstalk/Signal Level**.

The **Crosstalk** test measures the amount of crosstalk on the cable, and compares it to 10BASE-T standards to determine PASS/FAIL.

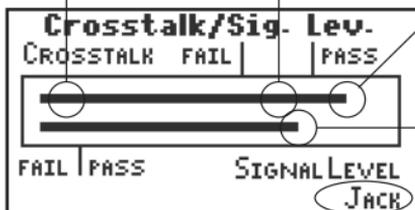
The **Signal Level** test measures the amplitude of the signal on the cable, against a minimum allowable

standard.

If the crosstalk bar had ended here, it would mean that there is an extremely high level of crosstalk on this cable.

If the crosstalk bar had ended here, it would mean that crosstalk is in the marginal range—your cable is probably functional, but you might have a few problems due to crosstalk.

The crosstalk level is low enough that it should not cause problems.



The signal level on this cable is well above the minimum standard.

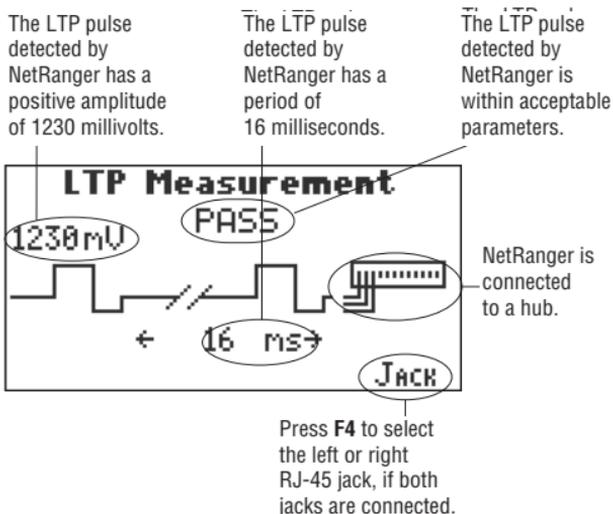
Press **F4** to select the left or right RJ-45 jack, if both jacks are connected.

## LTP MEASUREMENT (RJ-45 ONLY)

Run a **Link Test Pulse (LTP) Measurement** test to verify that NetRanger is connected to the hub and can send data to and receive data from the hub. A Link Test Pulse (LTP) is a pulse transmitted back and forth between a station and a hub at regular

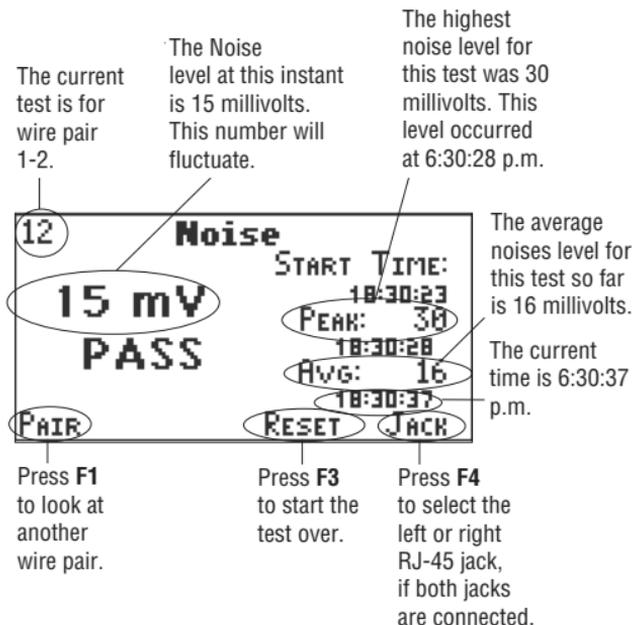
intervals.

The 10BASE-T specification gives acceptable values for the amplitude and period of a link test pulse. If NetRanger detects a pulse within the range of these values, the LTP Measurement will pass.



## NOISE

NetRanger's Noise test measures the amount of interference on the cable due to environmental factors such as motors, lighting, etc. A Noise test will fail if noise levels exceed a minimum standard for 10BASE-T networks.



## TRACE CABLE

NetRanger's **Trace Cable** function allows you to use NetRanger and the Cable Tracer II™ to detect cabling in walls, ceilings, or under floors.

To trace a cable, attach the end of the cable to one

of NetRanger's Ethernet connectors. Make sure that the cable you are tracing is not grounded, as this weakens the trace signal generated by NetRanger. Select **Trace Cable** from the RJ-45 or Coaxial Cable Tests menu. NetRanger will generate a multi-tone trace signal and transmit this signal down the attached cable. NetRanger continues to transmit the signal until you press Escape.

While NetRanger is running Trace Cable, use the Cable Tracer II™ (sold separately) or most other toner receivers to trace the cable. The Cable Tracer II will receive NetRanger's trace signal as long as the device's antenna is less than twelve inches from the cable. You will hear the multi-tone trace signal emitting from Cable Tracer II. To determine the cable's path, trace along the cable with the Cable Tracer II, maintaining the multi-tone signal at its loudest level.



### **Serial Communications Tests**

Use NetRanger to monitor serial communications between two devices, measure a device's through-put rate, and send a test page to a serial printer.

#### **RS-232 MONITOR**

Press  to see NetRanger's **RS-232 Monitor**. The **RS-232 Monitor** observes serial data communications between two devices.

By default, NetRanger will monitor data transmitted at any baud rate up to 57,600 bps (AUTO), unless you set a specific baud rate in the **RS-232 Monitor Setup** screen. If you set a specific baud rate, NetRanger will monitor only data transmitted at that rate.

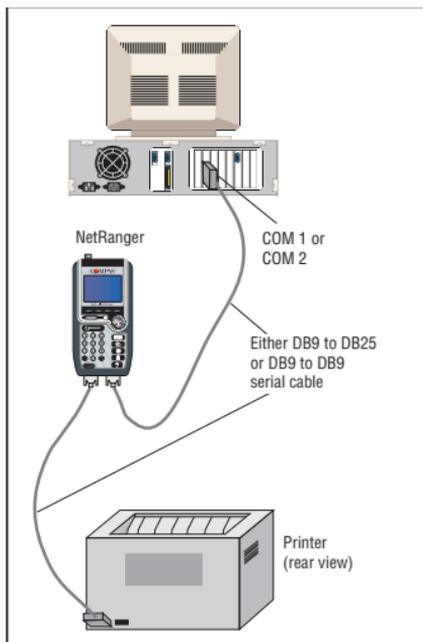
The **RS-232 Monitor** shows the actual data as it is being received (RD line) and transmitted (TD line). The Monitor also shows the status of the RTS (Request to Send), CTS (Clear to Send), CD (Carrier Detect), DTR (Data Terminal Ready), DSR (Data Set Ready), and RI (Ring Indicator) pin indicators.

Press  and  to move a cursor through the data stream and see the status of the pin indicators at any point in the data stream.

Press **DETAIL (F2)** to see the baud rate at which the devices have been set, the number of bytes received and transmitted per second (throughput), and the total number of bytes transmitted and received.

In this illustration, NetRanger is monitoring communications between a PC and a printer. You can

use the same type of connection for any two serial devices.



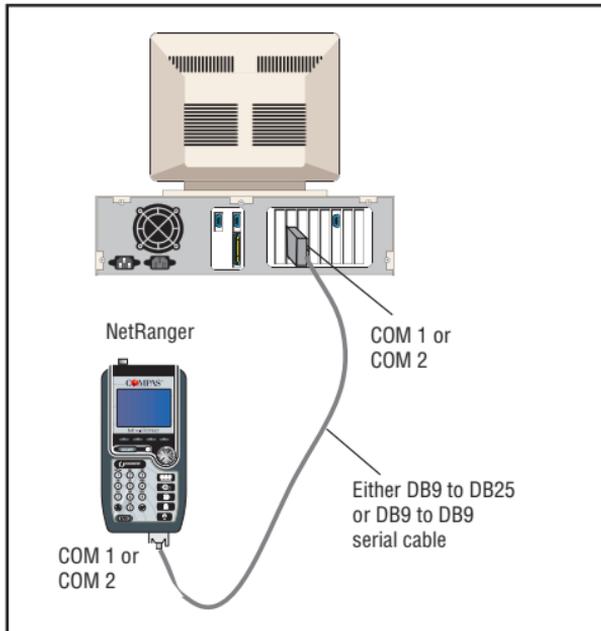
## 2. RS-232 THROUGHPUT

Use the **RS-232 Throughput** test to determine the extent to which your handshaking method slows down the receiving device's processing of data. The **RS-232 Throughput** test monitors the actual baud rate and number of bytes processed by a device as it receives data transmitted by NetRanger.

Press **SETUP (F4)** from the **RS-232 Throughput** screen to select the baud rate, data bits, parity, and handshake for the communications test.

The **RS-232 Throughput** screen shows the elapsed time of the test, the baud rate at which NetRanger is transmitting data (set this in the Setup Menu), the actual baud rate at which the device is receiving the data, and the total number of bytes that the device has received.

The RS-232 Throughput connection shown here is for a PC, but you can use the same type of connection for any serial device.



### 3. TEST PAGE

NetRanger can test a serial connection to a printer by sending a test page to the printer.

See the **Printing with NetRanger: Serial Test Page** section of this chapter for more information.

## Printing with NetRanger

You can print the information on any NetRanger screen by pressing the  key. You can also use NetRanger to send a test page to a network print queue or to a serial printer.

### PRINTING TEST RESULTS

To print screens and test results, set NetRanger to print to your desired destination printer. You can set NetRanger to print to a network print queue or to a serial printer.

From the NetRanger logo screen, press **SETUP (F4)**. Select **System Printer**. Press **CHANGE (F2)** to toggle the **System Printer Destination** between a network printer, a serial printer, or none.

**Note:** Because the LAN Monitor constantly gathers information on the state of the network, LAN Monitor test results must be printed to a serial printer to avoid interrupting the Monitor. To print LAN Monitor screens and tests, set NetRanger to print to a serial printer.

### *To Print to a Network Printer*

Set the **System Printer Destination** to Network.

Press **SETUP (F4)** to set the **System Printer Queue**. Type the server and print queue names, or press **BROWSE (F4)** to see lists of your servers and print queues. Press **CHANGE (F2)** to toggle the Printer Type between LaserJet®, PostScript®, Epson®, and Text.

**SAVE (F1)** the **System Printer Queue** and the **System Printer Destination**.

Your NetRanger System Printer is now set to print to the network print queue. To print a NetRanger screen or test result, connect NetRanger to your network and press  .

### *To Print to a Serial Printer*

Set the **System Printer Destination** to **Serial**.

Press **SETUP (F4)** for **Printer Setup**. Press **CHANGE (F2)** to toggle the printer type (LaserJet, PostScript, Epson, or Text), baud (up to 38400 bps), data bits (7 or 8), parity (even, odd, or none), and handshaking (XON/XOFF, RTS/CTS, DTR/DSR, or none).

**SAVE (F1)** the **Printer Setup** and the **System Printer**

## Destination.

Your NetRanger System Printer is now set to print to a serial printer. To print a NetRanger screen or test result, connect NetRanger to a printer with a serial cable, and press .

**Note:** The parameters that you set in the Printer Setup screen are shared with Serial Test Page Printer Setup. If you change any parameters in the Serial Test Page Printer Setup screen in order to send a test page to a serial printer, you must change them back if you want to print test results to NetRanger's serial System Printer.

## PRINT TO QUEUE TEST

NetRanger can test a network print queue by sending a printer test page to that queue.

Press . Select a server from the **Server Summary** screen, and press **DETAIL (F2)**.

Select **Print to Queue**. Press **BROWSE (F4)** to select the desired server name and print queue. Press **CHANGE (F2)** to select LaserJet, PostScript, Epson, or Test printer type.

When you have set the server, print queue, and printer type, press **PRINT (F1)** to perform the Print Queue Test.

NetRanger will log in to the appropriate server, and send a test page of the type specified. The exact appearance of the test page will depend on your printer, but expect to see a page that looks something like this:

LaserJet  
(or PostScript, Epson, ASCII)

Printer Test Page

#### **SERIAL TEST PAGE**

NetRanger can test a serial printer by sending a test page.

Connect NetRanger to a printer with a serial cable and press , then **MENU (F1)**.

If you have already set up the serial printer (see “To Print to a Serial Printer”, above), select **Test Page** from the **Serial Tests** menu.

If you need to set up the serial printer, press **SETUP**

**(F4)** from the **Serial Tests** menu, then select Printer. Set the printer parameters (see “To Print to a Serial Printer”, above), **SAVE (F1)** them, and **ESCAPE** to the **Serial Tests** menu. Select **Test Page**.

NetRanger will send a test page to the specified printer. The exact appearance of the test page will depend on your printer, but expect to see a page that looks something like the sample on the previous page.

## Appendix A: Installing the NetRanger NLM

To run a full Network Server Test and to see Top (Heaviest) Server Users, you will need to load the NetRanger NetWare Loadable Module (NLM) on each server that you wish to test.

If the NetRanger NLM is not loaded, the Network Server Test will produce information on only five of the parameters included in a full Server Test, and Top (Heaviest) Server Users will display an error message. For more information on these tests, see the **Network Tests** section in **Chapter 3: NetRanger Tests**. If you do not need NetRanger to run these tests, you will not need to install the NetRanger NLM.

The NetRanger NLM is compatible with NetWare versions 3.xx and above. Do not attempt to load the NetRanger NLM on a server running NetWare versions 2.xx, as the server will not accept the NLM.

**Note:** Version 3.11d (or greater) of the NetWare C NLM Runtime Library (CLIB.NLM) must be loaded on the fileservers (on which you will be installing the NetRanger NLM) *before* performing the NetRanger NLM installation.

The latest CLIB.NLM is included on the NetRanger NLM diskette. This diskette contains the latest NetWare NLM library update available via the NOVLIB forum on CompuServe. This file is provided as a service to our customers and no warranty is expressed or implied. All questions related to this update file should be directed to Novell via CompuServe or any other NetWare support source. We do not provide technical support related to this update file.

You can load and unload the NetRanger NLM as you need it, or you can leave it loaded on the server.

*To load the NetRanger NLM*, insert the NetRanger diskette into the floppy drive at the server console. At the console prompt, type:

```
LOAD X:RANGER
```

(where “X” is the floppy drive letter).

Copy the NetRanger NLM file to the fileserver’s subsystem directory to easily load and unload the NetRanger NLM at any time in the future. From a workstation attached to the fileserver, copy the file NetRanger.NLM from the diskette into the subsystem directory (SYS:SYSTEM).

To load the NetRanger NLM from the system directory, type:

```
LOAD RANGER
```

at the console prompt.

*To unload the NetRanger NLM, type:*

```
UNLOAD RANGER
```

at the console prompt.

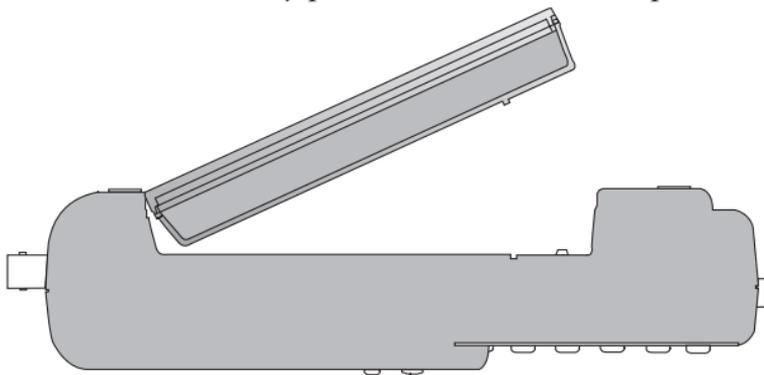
The console will display a message confirming that you have successfully loaded or unloaded the NetRanger NLM.

## Appendix B: Power Management and Battery

### Battery Pack Location and Installation

NetRanger's battery pack is located on the back of the unit. To remove or replace the battery pack, slide the arrow-shaped tab downward, and lift up the battery pack.

To install the battery pack, insert the two tabs on the top of the battery pack into NetRanger and press down on the battery pack until it clicks into place.



### Charging the Battery Pack

To recharge the battery pack, plug the AC adapter into NetRanger and turn the unit off. The screen will display:

Charging Battery.

When the battery is fully charged, NetRanger's screen (when powered off and plugged in to the AC adapter) will display:

Battery Charged.

### Battery Disposal



NetRanger is powered by a rechargeable, recyclable Ni-Cad battery pack. At the end of its useful life, under various state and local laws, it may be illegal to dispose of this battery pack into the municipal waste stream. Check with your local solid waste officials for details in your area for recycling options or proper disposal.

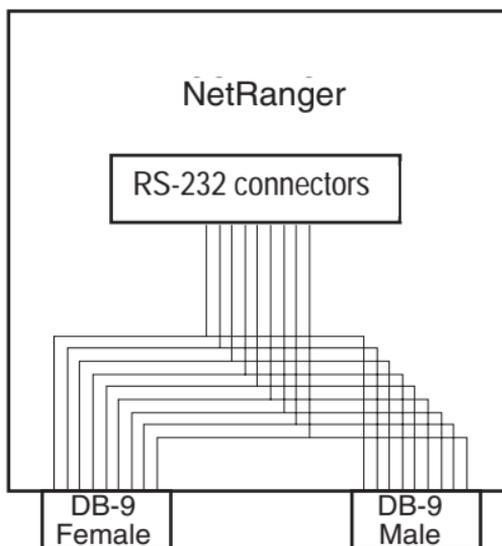
**Battery Tips**

- Average daily life of the Ni-Cad battery pack, when fully charged, is about five hours.
- The NetRanger battery pack has been pre-charged at the factory. However, you should re-charge the battery upon receipt of your NetRanger, to ensure a full charge.
- To maximize battery life, set Auto Shutoff to ten minutes and set Backlight Shutoff to 30 seconds. These items are in the User Options Setup menu. The backlight only decreases battery life by 5-10%.
- To maximize battery life, avoid extreme temperatures.
- Power off NetRanger before changing the battery pack. You must replace the battery pack within five minutes to avoid memory loss. If you fail to replace the battery pack within five minutes, Resolve Station Names, Workstation and Server Accounts, and other Setup information will be lost.
- Maximum time to re-charge the Ni-Cad battery pack is about 15 hours.

## Appendix C: Cable Pin-outs

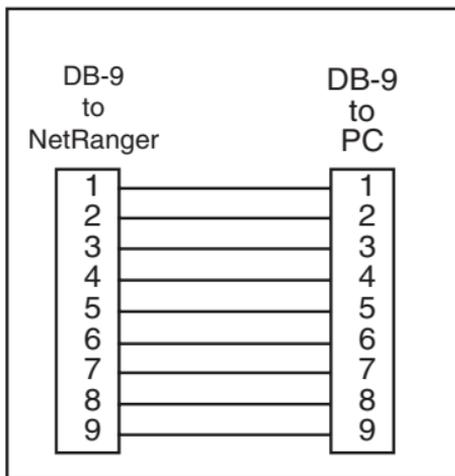
NetRanger is wired as Data Communication Equipment (DCE) and can be connected to a PC or most serial printers with a direct (no pin swaps) cable.

NetRanger's female (COM1) and male (COM2) ports are wired identically:

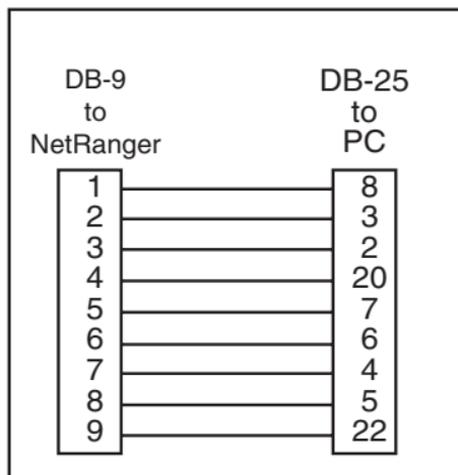


## NetRanger Pinout Signals

NetRanger Signal	DB-9 Male	DB-9 Female	Description
GND	5	5	Protective Ground
TXD	3	3	Transmitted Data
RXD	2	2	Received Data
RTS	7	7	Request to Send
CTS	8	8	Clear to Send
DTR	4	4	Data Term Ready
DSR	6	6	Data Set Ready
RLSD	1	1	Received Line Signal Detector
RI	9	9	Ring Indicator

Serial Cable  
DB-9 to DB-9  
Pin-outs

Serial Cable  
DB-9 to DB-25  
Pin-outs



## Appendix D: Updating NetRanger Software

To reflash, or update your NetRanger software, you will need to:

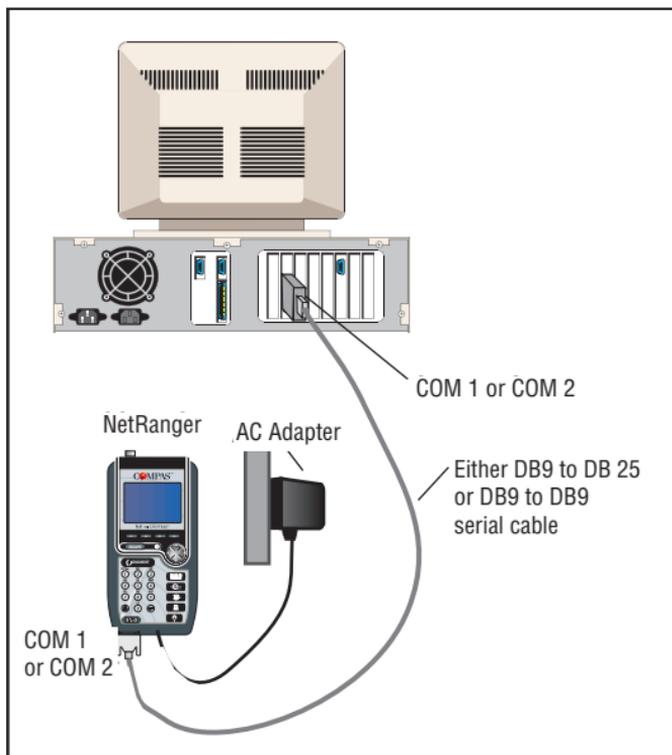
1. Get the update file. Updates will be available as special orders; call for details.
2. Prepare NetRanger for the software update.
3. Perform the update.
4. Verify that the update has been performed correctly.

### Preparing NetRanger for Software Update

1. Connect the DB-9 end of a communications cable to either serial port on NetRanger and the other end (DB-9 or DB-25) to the serial port on the PC.
2. Plug NetRanger in to the AC adapter. Make sure NetRanger is powered off.
3. Hold down NetRanger's  **DIAGNOSE** and    (Network

Tests) buttons and press the *I/O* button. The NetRanger screen will display: “Waiting for REFLASH”.

4. You are now ready to download the new software update from your PC to NetRanger.



## Updating NetRanger

1. From the DOS prompt, type **RANGER** and press the Enter key on the PC keyboard. The options and default screen will be displayed.
2. Type **RANGER**, followed by **-C1** or **-C2** (depending on whether you are using COM1 or COM2 on your PC), followed by the file-name. Press the Enter key on the PC keyboard.

The filename will vary depending on which language version of NetRanger you are using (see examples).

The extension of the file name is the software version to which you are updating. The first character of the extension refers to the major software version, and the second and third characters refer to the minor software version. For example, software version 1.03 would be entered as NetRanger.103. Look at a directory listing of the self-extracted files to determine the software version to which you are updating.

Examples:

*English (USA):*

RANGER -C1 RANGER.[ver.]

*English (international):*

RANGER -C1 RANGENG.[ver]

*French:*

```
RANGER -C1 RANGFRA.[ver]
```

*German:*

```
RANGER -C1 RANGDEU.[ver]
```

*Spanish:*

```
RANGER -C1 RANGESP.[ver]
```

These examples update NetRanger with the software stored in the RANGER.[ver] file using serial port COM 1, with NetRanger in “Waiting for REFLASH” mode.

While the software is being updated, the PC screen will show a progress graph. NetRanger will display: “Loading Image”. This process will take approximately one minute.

**Note:** The international version files (RANGENG.[ver], RANGFRA.[ver], RANGDEU.[ver], RANGESP.[ver]) require an international version of NetRanger. Attempts to update a non-international version of NetRanger with international versions of software will fail and an error message will be displayed.

3. When the update is complete, the PC displays: “Download of FLASH image file complete”.

## **Internet NetRanger Software**

For Internet NetRanger users, follow these steps to install the Internet NetRanger software onto your NetWare® NetRanger:

1. Copy the Internet NetRanger software from the diskette to your PC's hard disk.
2. Prepare NetRanger for the installation.
3. Perform the installation.
4. Verify that the installation has been performed correctly.

### **COPYING THE INTERNET NETRANGER SOFTWARE TO A PC'S HARD DISK**

You'll need to copy the Internet NetRanger software from the diskette to your PC's hard disk in order to install it onto your NetRanger. Insert the diskette into the PC's floppy disk drive. If you wish, create a NetRanger subdirectory to copy the Internet software into. Copy the entire contents of the diskette to this subdirectory.

### PREPARING NETRANGER FOR THE INTERNET MODULE INSTALLATION

1. Connect one end of the DB9 to DB9 serial communications cable (included with the Internet NetRanger kit) to either serial port on the NetRanger and the other end to the serial port on your PC.
2. Plug NetRanger into its AC adapter.
3. To put NetRanger in Reflash Mode, hold down the **DIAGNOSE** and **Network Tests** keys, then press the **I/O** key to turn the unit on. The NetRanger screen will display: “Waiting for REFLASH.”

You are now ready to install the Internet NetRanger software.

## Installing the NetRanger Internet Module

1. From the DOS prompt in the directory to which you have copied the Internet NetRanger software, type:

COMPAS -Cx COMPASIP.ver

Where:

x=1 if you are using your PC's COM1 or 2 if you are using your PC's COM 2.

ver is the NetRanger version number—this number is printed on the diskette label.

(For example, type COMPASIP.150 to install software version 1.50)

2. Press Enter. The NetRanger screen displays “Loading Image.” The installation will take about two minutes.

## Verifying the Update

1. Press **HELP (F3)** from the NetRanger logo screen.
2. Press **VERSION (F4)**. Verify that the software version number is the same as the one you just loaded.

If you have any problems updating NetRanger, call for technical support.

## Appendix E: Technical Specifications

### Physical:

- 10.2 cm x 20.3 cm x 5.5 cm (4" x 8" x 2.15")
- .79 kg (1lb 12oz)

### Power:

- Removable, rechargeable Ni-Cad battery provides approximately 6 hours of normal use per charge
- AC adapter, 9V, 1 amp (included)
- Optional external charger and additional batteries are available.

### User Interface:

- 128 x 64 graphic LCD with backlight
- Elastomeric keypad with dedicated major function keys
- Time of day clock
- Audio tone for alarm functions

### Environmental:

- Operating temperature: 0°C to 40°C  
32°F to 104°F
- Storage temperature: 10°C to 55°C  
14°F to 131°F

- Humidity: 10-95% non-condensing

### Memory:

- Flash program memory allows field upgrading via serial port

### NetWare:

- Versions 2.2, 3.1x, 4.0x
- Frames types: 802.2, 802.3, Ethernet II, SNAP

### Internet IP:

- Frame Type: Ethernet II, SNAP
- Type A, B, or C (Network)

### Connections:

- BNC, IEEE 802.3 (Ethernet) compatible
- (2) RJ45, 10BaseT (Ethernet) compatible
- Automatic selection of BNC and RJ45 connectors
- Automatic configuration of hub and workstation pairs (TX-RX)
- NetTap RJ45 circuitry allows insertion between hub and station
- NetTap yields max. 3dB signal drop between devices. Active tests (transmitting) in NetTap may result in additional error rates.

**RJ45 Measurements (either jack):**

- Length:  $\pm 4\%$ ,  $\pm 0.6\text{m}$  (2ft), 10 to 1000ft, 3 to 300m (pairs 12, 36)
- Diagnostic scan: max 1000ft, 300m (pairs 12, 36)
- Noise:
  - 10 to 500 mVp-p into 5K termination
  - 12, 36, 45, or 78 pair
  - LTP period measurement: period:  $\pm 1\text{mSec}$
- Crosstalk: Wide band,  $\pm 40\text{ mV}$
- Wire Map (Patch cable or to Far End Adapter):
  - Faults are displayed for all 8 wires and shield
  - Max length 1000ft, 300m
    - Cable Trace

**BNC Measurements (Coax):**

- Length
  - $\pm 4\%$ ,  $\pm 0.6\text{m}$  (2ft): 10 to 2000ft, 3 to 600m
  - Diagnostic scan - max 2000ft, 600m
- Impedance

**LAN Monitoring:**

- Statistics are updated continuously
- Total traffic

- Total errors
- Number of stations
- Protocols seen: IPX, IP, DEC, LAVC, DECnet, DEC LAT, Apple Talk, AppleTalk II, Xerox XNS, Banyan VINES, ISO, ARP, and others
- Top Talker
- Top Broadcaster
- Top Error Sources
- Error Summary

### Network Functions:

- Novell
- Local segment information
- Server statistics: Frame types, Speed, Hops to Access, User List, Top Users (by server)
- Diagnostic statistics (including but not limited to): Server Version, Licensed Connections, Utilization, etc.
- Server Emulation (all frame types)
- Workstation Emulation (all frame types)
- Login
- Server List
- List Print Queues
- Print to Print Queue

- Name-Address Resolution
- IPX Ping
- Internet
- Host Summary
- Duplicate IP Address detected
- IP Ping Test
- IP Trace Route
- IP Segment Info
- Automatic Address selection
- DNS Name resolution
- Internet Name resolution

### Serial Ports:

- One male, one female DB9 (pass-through)
- 300-57600 baud
- 8 bits, even, odd, no parity
- Flow control: RTS/CTS, Xon/Xoff

### Screen Print Support:

- PCL
- Epson
- Prints to serial port or network queue

Printer Test Support:

- PostScript
- HP PCL
- ASCII Text
- Epson
- Prints to serial port or network queue

NetRanger is a test instrument. The IEEE 802.3 specification for Ethernet makes no provision for test instruments, and as such, NetRanger cannot guarantee compliance with the specification. However, we attempt to comply with specifications in all our products.

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