



**WaveRider<sup>®</sup>**  
*The World's Wireless Web Company*

***NCL1135/55***  
***Configuration Utility***  
***User Guide***

Version 1.1

# WaveRider Communications Inc.

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*Version 1.0, November, 2000*

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In the following warranty text, "WaveRider®" shall mean WaveRider Communications Inc.

This WaveRider product is warranted against defects in material and workmanship for a period of **one (1) year** from the date of purchase. During this warranty period WaveRider will, at its option, either repair or replace products that prove to be defective.

For warranty service or repair, the product must be returned to a service facility designated by WaveRider. Authorization to return products must be obtained prior to shipment. The WaveRider RMA number must be on the shipping documentation so that the service facility will accept the product. The buyer shall pay all shipping charges to WaveRider and WaveRider shall pay shipping charges to return the product to the buyer within Canada or the USA. For all other countries, the buyer shall pay shipping charges as well as duties and taxes incurred in shipping products to or from WaveRider.

WaveRider warrants that the firmware designed by it for use with the unit will execute its programming instructions when properly installed on the unit. WaveRider does not warrant that the operation of the unit or firmware will be uninterrupted or error-free.

## Limitation of Warranty

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To the maximum extent permitted by applicable law, in no event shall WaveRider or its suppliers be liable for any damages whatsoever (including, without limitation, damages for loss of business profits, business interruption, loss of business information, or any other pecuniary loss) arising from the use of or inability to use the product, even if WaveRider has been advised of the possibility of such damages, or for any claim by any other party.

Because some states/jurisdictions do not allow the exclusion or limitation of liability for consequential or incidental damages, the above limitation may not apply to you.

In no event will WaveRider's liability exceed the amount paid for the product.

## Regulatory Notices

This equipment has been tested and found to comply with the limits for a Class A Intentional Radiator, pursuant to Part 15 of the FCC Regulations. These limits are intended to provide protection against harmful interference when the equipment is operated in a commercial/business/industrial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

## Notice to User

Any changes or modifications to equipment that are not expressly approved by the manufacturer may void the user's authority to operate the equipment.

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# Preface

## About this Guide

The NCL1135/55 Configuration Utility User Guide shows you how to use the Configuration Utility software to prepare an NCL for use on the network.

WaveRider recommends that you read the following sections before you install and operate the NCL1135/55:

- *Software License Agreement* on page ii
- *Warranty* on page iii
- *Warnings and Advisories* on page vi
- *Regulatory Notices* on page iv

**NOTE:** The information contained in this manual is subject to change without notice.

## Regulatory Notices

### Industry Canada

This 2.4 GHz product complies with IC RSS–210.

Operators must be familiar with IC RSS–210 and RSS–102.

The IC certification numbers for the NCL1135/55 are 32251021662A/32251032130.

### Federal Communications Commission

The NCL1135/55 complies with FCC Part 15 Regulations.

The FCC IDs for the NCL1135/55 are OOX-NCL1100/00X-WRM1151.

The transmitter of this device complies with Part 15.247 of the FCC Rules.



### **WARNING!**

**Operators must be familiar with the requirements of the FCC Part 15 Regulations prior to operating any link using this equipment. For installations outside the United States, contact local authorities for applicable regulations.**





## WARNING!

This system must be professionally installed.

### Operational Conditions

Three conditions pertaining to the operation, in the USA, of spread-spectrum devices employing high-gain, directional antennas are:

1. The applications must be fixed, point-to-point; they cannot be roaming.
2. Point-to-multipoint systems, omni-directional applications, and multiple co-located transmitters transmitting the same information are prohibited (that is, you cannot sum the bandwidth of each unit).
3. The operator of a spread-spectrum system is responsible for ensuring that the system is operated in the manner outlined in *Operational Conditions* on page v and *Operational Requirements* on page v.

### Operational Requirements

In accordance with the FCC Part 15 regulations:

1. The maximum peak power output of the intentional radiator shall not exceed one (1) watt for all spread-spectrum systems operating in the 2.4000-2.4835 GHz band.
2. Systems operating in the 2.4000-2.4835 GHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi, provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.
3. Stations operating in the 2.4000-2.4835 GHz band that are used for fixed, point-to-multipoint operations may use transmitting antennas of directional gain greater than 6 dBi, provided the peak output power from the intentional radiator is reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
4. Fixed, point-to-point operation, as used in Point 2, excludes the use of point-to-multipoint systems, omni-directional applications, and multiple co-located intentional radiators transmitting the same information. The operator of the spread-spectrum intentional radiator or, if the equipment is professionally installed, the installer is responsible for ensuring that the system is used exclusively for fixed, point-to-point operations.
5. The operator of a spread-spectrum system is responsible for ensuring that the system is operated in the manner outlined in *Operational Conditions* on page v and *Operational Requirements* on page v.

## Interference Environment

Manufacturers and operators of spread-spectrum devices are reminded that the operation of these devices is subject to the conditions that:

- any received interference, including interference from industrial, scientific, and medical (ISM) operations, must be accepted; and
- these devices are not permitted to cause harmful interference to other radio services.

If the operation of these systems does cause harmful interference, the operator of the spread-spectrum system must correct the interference problem, even if such correction requires the Part 15 transmitter to cease operation. The FCC does not exempt spread-spectrum devices from this latter requirement regardless of the application. The FCC strongly recommends that utilities, cellular stations, public safety services, government agencies, and others that provide critical communication services exercise due caution to determine if there are any nearby radio services that can be affected by their communications.

## Warnings and Advisories

### General Advisory

Operator and maintenance personnel must be familiar with the related safety requirements before they attempt to install or operate the NCL1135/55 equipment.

It is the responsibility of the operator to ensure that the public is not exposed to excessive Radio Frequency (RF) levels. The applicable regulations can be obtained from local authorities.



### WARNING!

**This system must be professionally installed. Antennas and associated transmission cable must be installed by qualified personnel. WaveRider assumes no liability for failure to adhere to this recommendation or to recognized general safety precautions.**



### WARNING!

**Do not operate the NCL1135/55 without connecting a 50-ohm termination to the antenna port. This termination can be a 50-ohm antenna or a 50-ohm resistive load capable of absorbing the full RF output power of the transceiver. Failure to terminate the antenna port properly may cause permanent damage to the device.**



## **WARNING!**

To comply with FCC RF exposure limits, the antenna for this transmitter must be fix-mounted on outdoor permanent structures to provide a separation distance of 32cm (12 inches) / 2 metres (6.6 feet) or more from all persons to satisfy RF exposure requirements. The distance is measured from the front of the antenna and the human body. It is recommended that the antenna be installed in a location with minimal pathway disruption by nearby personnel.

# Customer Support

If you have any problems with the hardware or software, please contact WaveRider Communications Inc. Please provide your NCL1135/55 Model number and software version when you request support.

Telephone: +1 416-502-3161

Fax: +1 416-502-2968

Email: **Product Assistance:**  
techsupport@waverider.com

URL: [www.waverider.com](http://www.waverider.com)

WaveRider offers a complete training program. Please contact your sales representative for training information.

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# 1

## Getting Started

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The *WaveRider Configuration Utility* provides a convenient, friendly, graphical user interface (GUI) for installing, configuring, monitoring, and managing your NCL1135/55 Network Communications Link. With this tool, you can view and modify the following device parameters without entering individual instructions via the command line interface (CLI).

- Password
- Ethernet/Radio IP
- Routing Tables
- Routing Options (RIP, DHCP)
- Monitoring Options (SNMP, DNS)
- Real-time Diagnostics

Before using the *WaveRider Configuration Utility*, we recommend you read your NCL1135/55 *User Guide* to familiarize yourself with the features, functions, and capabilities of this device.

### 1.1 System Requirements

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To run the *WaveRider Configuration Utility*, your system must meet the following standards.

- Windows 95 or 98
- Pentium Class 133 MHz
- 32 MB RAM
- 5 MB of available Hard-Drive space
- Ethernet or Serial Communication Port

## 1.2 Connecting the NCL

1. Attach the antenna or a 50-ohm load to the antenna connection on the back of the NCL. Do **NOT** plug the NCL to the power outlet until you have the antenna or load connected.

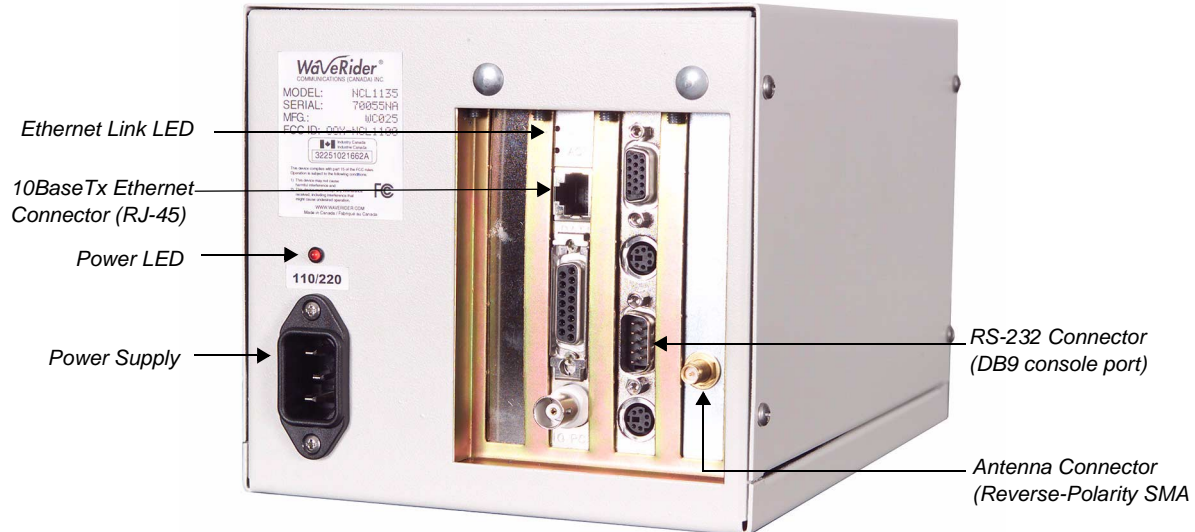


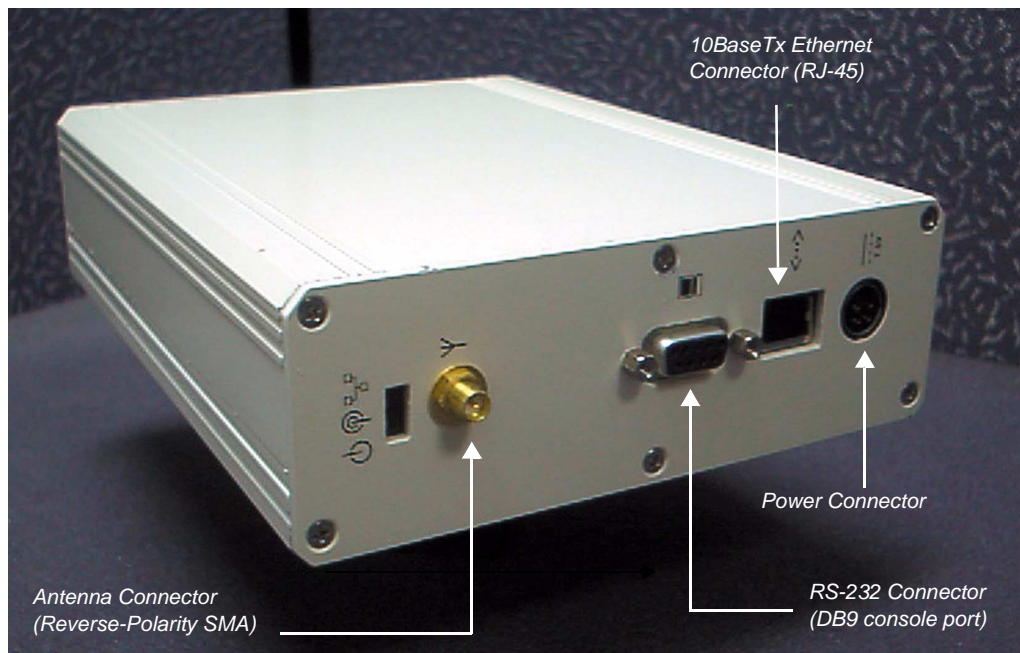
### WARNING!

Antennas and associated transmission cable must be installed by qualified personnel. Failure to terminate the antenna port correctly can permanently damage the NCL. WaveRider assumes no liability for failure to adhere to this recommendation or to recognized general safety precautions.

2. Power up your computer.
3. Use an RS-232 crossover cable to connect the computer that you will be using to configure the NCL to the DB9 console port on the NCL.
4. Plug the NCL into a 110- or 220- V AC power source using the power cord provided with the unit.

Figure 1 NCL1135 Connections





**Figure 2 NCL1155 Connections**

**NOTE:** The NCL radio transmission capabilities are disabled prior to shipment to prevent equipment damage. However, as a general precaution, WaveRider recommends that you always connect the antenna or load before connecting to a power source.

The NCL is now ready for configuration to your network.



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# 2

## Using the WaveRider Configuration Utility

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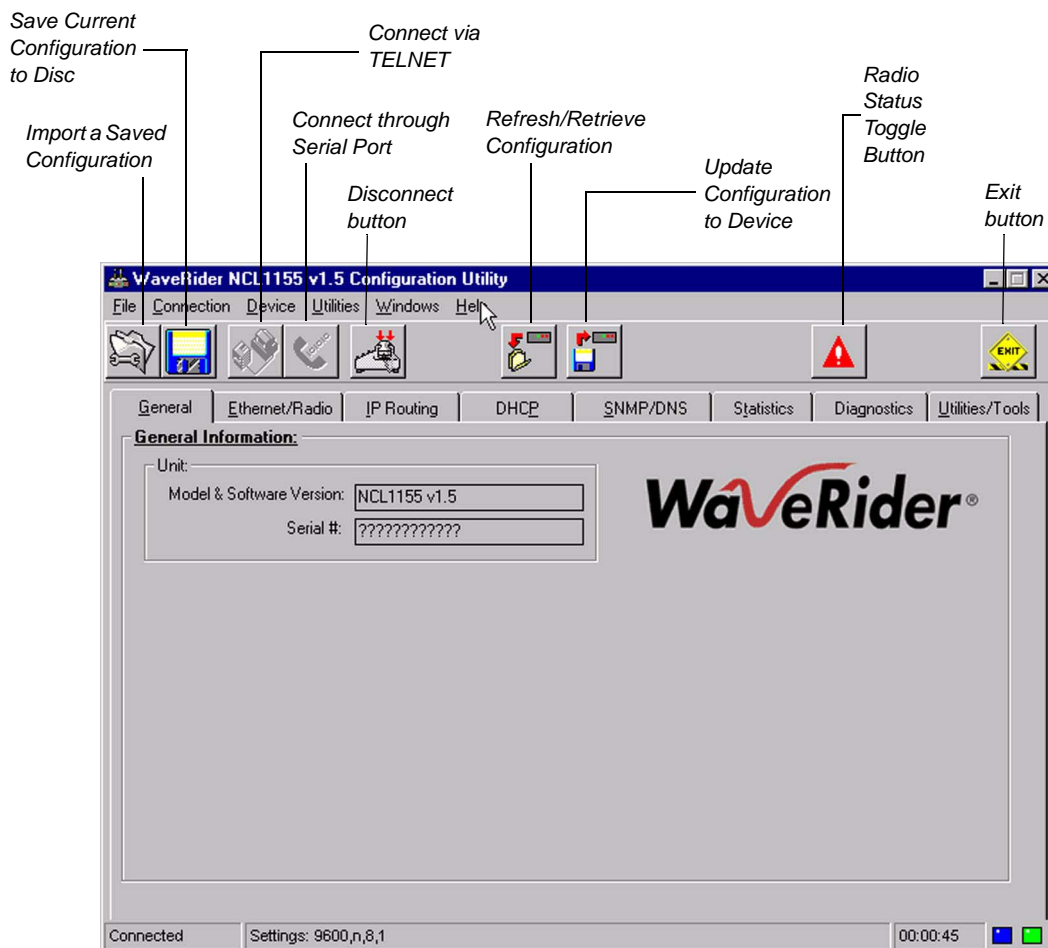
### 2.1 Uploading the NCL Configuration

---

Before you can begin configuring your NCL, you must retrieve the default configuration from the device.

1. From your Windows desktop, select **Start | Programs | WaveRider**, then **WaveRider Configuration Utility**.

When launched, the **WaveRider Configuration Utility** displays the **General** tab view, with the following active icons:



**Figure 3 Launch View of General Tab with Active Icons**

2. Click the  button to open a connection to the NCL.

**NOTE:** A factory-configured NCL has no defined IP address. Before you can establish a Telnet session, you must set the IP address for the NCL through a serial connection.

3. Select  to upload from the current NCL settings.

**NOTE:** You must complete step 3 before attempting to download any configuration changes to the NCL.

4. On the General tab, verify that the **Model & Software Version** field displays the correct information, and verify that the number listed in the **Serial #** field matches the serial number on the NCL label.

**NOTE:** The Configuration Utility retrieves the information displayed on the **General** tab from the NCL device. You cannot modify this information.

## 2.2 Setting the NCL Password

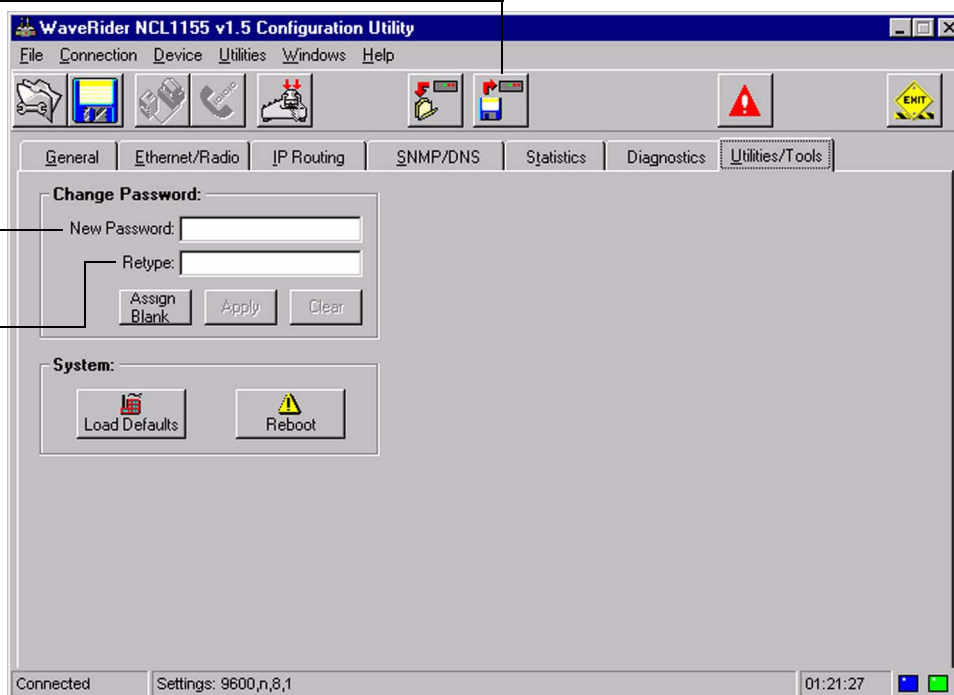
WaveRider factory-configures the NCL without a password, so you must assign one. To protect your system, we recommend that you choose a different password for each device on your network.

1. Click the **Utilities/Tools** tab in the **WaveRider Configuration Utility** dialog box.

Update this  
configuration to  
device

Type your new  
password

Verify your  
password




**Figure 4** Utilities/Tools Tab

2. Type your new password in the **New Password** box in the **Change Password** group.



**TIP:** Use a maximum of sixteen (16) alphanumeric, ASCII characters. Passwords are case-sensitive. For example, “abc” is not the same as “aBc”.

3. Verify your password in the **Retype** box.
4. Click **Apply** to accept the new password.
5. Click  to save your changes to the NCL.



**CAUTION:** Remember to record the password in your Data Configuration Record for the NCL group. Unlocking the NCL is a complicated process. If you have forgotten the password, contact the **WaveRider Customer Support Centre** for assistance.

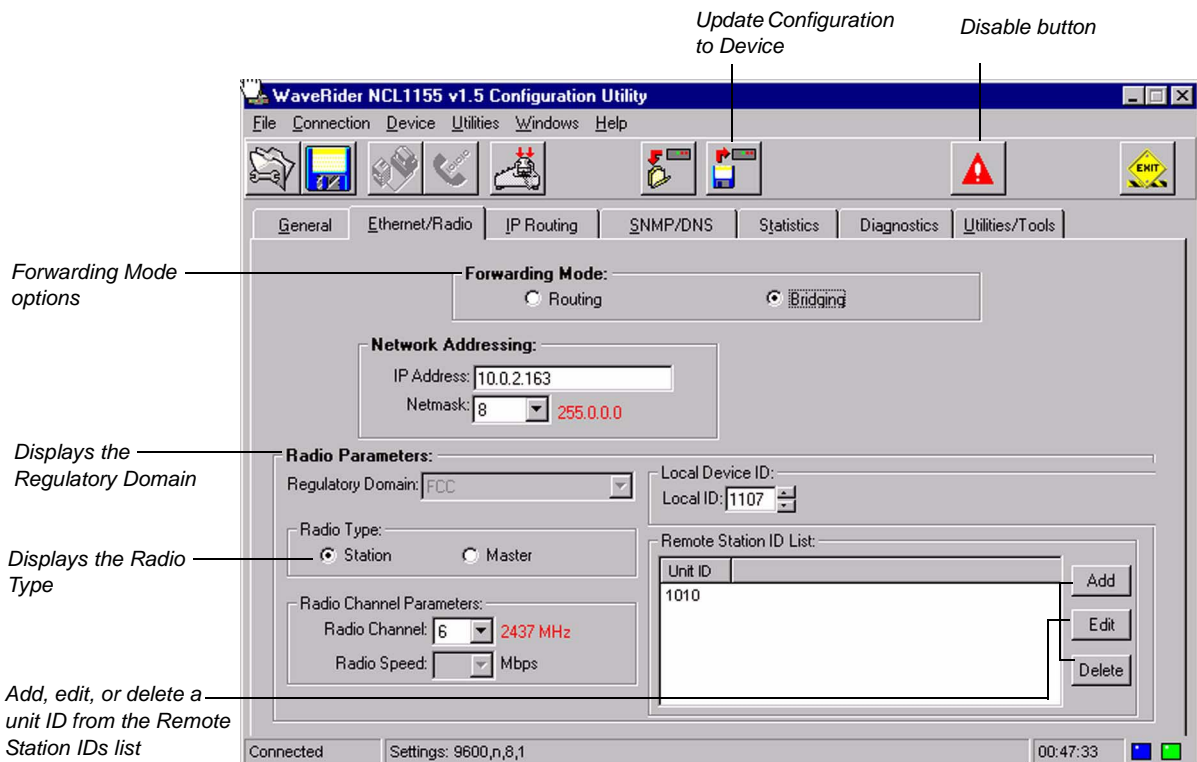
## 2.3 Configuring the Ethernet and Radio Parameters

The network IP address is set in the **Ethernet/Radio** tab. If you are using Routing as the forwarding mode, you will need to assign a radio IP address. For every NCL in the network, the Local Device ID for a factory-configured device is set to 100. The device ID must be unique for each device in your network.



**CAUTION:** You will lose your connection to the NCL if you change the radio or network IP address during a Telnet session. To save your changes to the NCL, reconnect to the NCL using the new IP address. No disconnection occurs if you connect to the NCL through a local serial connection.

1. Click the **Ethernet/Radio** tab to display the Ethernet and radio options.



**Figure 5 Ethernet/Radio Tab**

2. Select **Routing** or **Bridging** in the Forwarding Mode group box to set the operational mode.
3. Type the **IP Address** for the Ethernet port in the **Network Addressing** group. Select the **Netmask** from the drop-down box.


4. If you set the mode to **Routing**, type the **IP Address** for the radio in the **Radio Addressing** group.
5. Select **Station** or **Master** in the Radio Type group box to set the functional mode of the NCL. These modes are not interchangeable, and you must configure the NCL each time you switch radio modes.



**CAUTION:** When changing the NCL from a fully configured **Master** to a **Station**, select **Load Defaults** on the **Utilities/Tools** tab, which will reboot the system, then re-configure/reload your new settings and update the device. Your NCL must be serially connected when performing these tasks.

6. Add the ID of the Master with which the NCL communicates. You can associate an NCL with only one Master. See *Adding a Remote Unit to the Remote Station IDs List* on page 12.
7. Select the NCL unit ID from the **Local Device ID** box in your network. The NCL unit ID is any number from 1 to 16383 and must be unique in your network.
8. If the NCL is a Master, add the remote Stations with which the Master communicates to the **Remote Station IDs** list. See *Adding a Remote Unit to the Remote Station IDs List* on page 12.

**NOTE:** A Master can have up to 20 Remote Station IDs associated with it. Remember to update the Master Remote Station IDs list if you add or remove Stations from its network group.

9. If the NCL is a Station, add the Master unit ID with which the Station communicates. A Station is associated with only one Master ID. See *Adding a Remote Unit to the Remote Station IDs List* on page 12.
10. When you finish configuring the NCL, click  to enable a radio transmission in the device.



Click to Enable Radio

**NOTE:** The symbol is red when the radio is disabled.



Click to Disable Radio

**NOTE:** The symbol is green when the radio is enabled.

**Figure 6 Radio Status Toggle Buttons**



**CAUTION:** Ensure that the antenna or load is connected to the NCL before you enable the radio transmission in the NCL.

11. Click  to save your changes to the NCL.

You can also modify the following configuration parameters in the NCL:

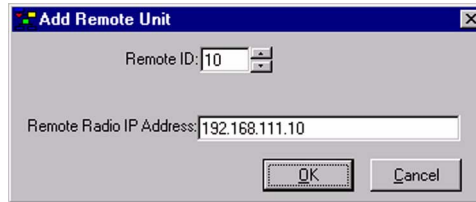
- IP Routing—see *Configuring the Static Routing Table* on page 14
- SNMP—see *Configuring the SNMP Parameters* on page 17
- DNS—see *Configuring the DNS Server Parameters* on page 20



### 2.3.1 Adding a Remote Unit to the Remote Station IDs List

For a Master device, follow steps 1 to 4 for each Station you want to add to the **Remote Station IDs** list. You can associate up to 20 Remote Station IDs with one Master. For a Station, you can add only one device to the list.


1. Click **Add** in the **Remote Station IDs** group. The **Add Remote Unit** dialog box appears.



**Figure 7 Add Remote Unit**

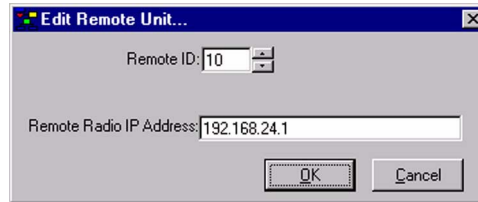
2. In the **Add Remote Unit** dialog box, type the unit **Remote ID** for the device that you want to add to the Remote Station IDs list. You can also use the spin-control arrows to select the unit ID.
3. Type the radio IP address in the **Remote Radio IP Address** box.
4. Click **OK**.

The **Unit ID** and **IP Address** are added to the **Remote Station IDs** list.


5. Click  to update your changes to the NCL.

### 2.3.2 Editing a Remote Unit in the Remote Station IDs List

1. Select a device from the **Remote Station IDs** list and click **Edit**.
2. The **Edit Remote Unit** dialog box displays the remote device information.



**Figure 8 Edit Remote Unit**


3. Change the **Remote ID** or the **Remote Radio IP Address** as required.
4. Click **OK**. The new information is updated in the Remote Station IDs list.
5. Click  to update your changes to the NCL.

### 2.3.3 Deleting a Remote Unit from the Remote Station IDs List

1. Select a device from the Remote Station IDs list and click **Delete**.

A dialog box will ask you to confirm the deletion. Click **OK** to delete the device from the list.

The remote device is removed from the Remote Station IDs list.

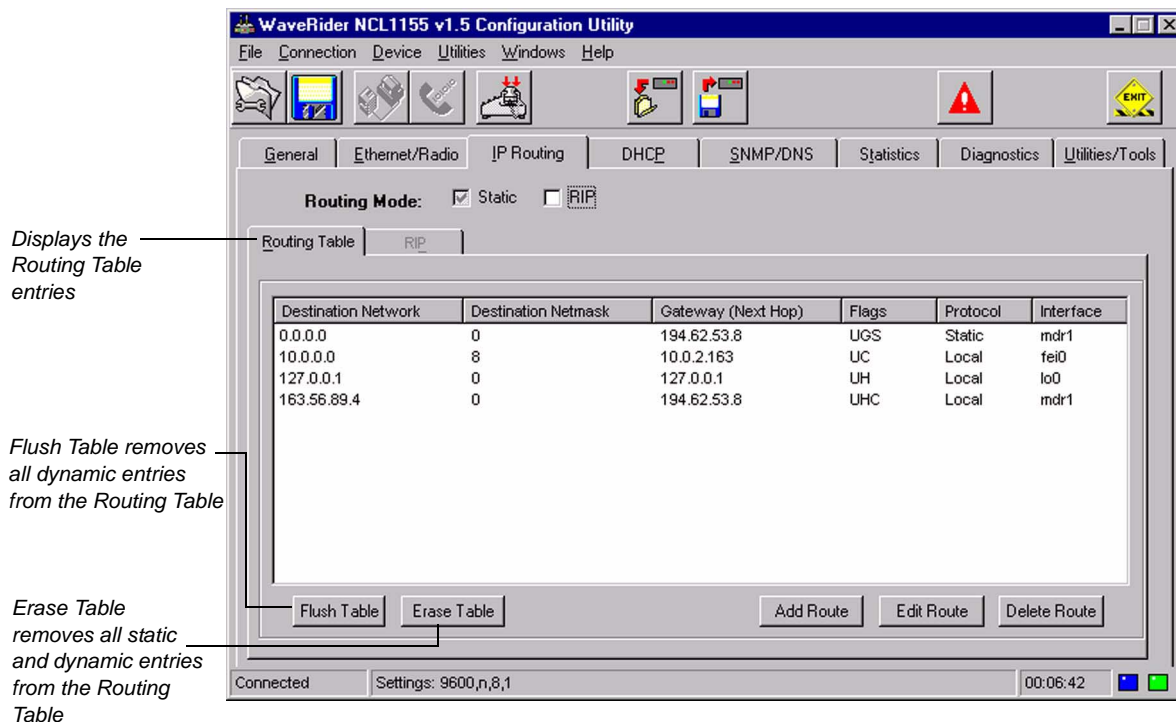
2. Click  to update your changes to the NCL.

**NOTE:** To communicate on the network, you must associate an NCL with a remote Master unit ID.

## 2.4 Configuring the Static Routing Table

If the NCL Forwarding Mode is set for Routing, you can manually add static routes to the Routing Table to define the forwarding mode for the device. If the Forwarding Mode is set to Bridging, static routes are optional and only used for management of the NCL.

1. Click the **IP Routing** tab to display the routing options and table.




**Figure 9 IP Routing Tab**

2. Select **Static** in the Routing Mode group.

**NOTE:** Selecting **Static** disables all RIP options in the device.

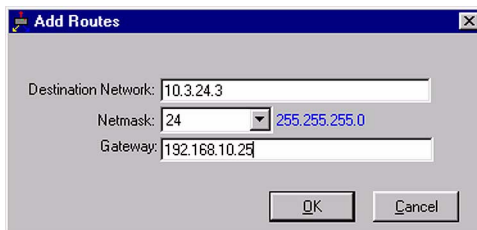
3. Use the buttons at the bottom of the Routing Table to help you manage the entries in the table:
  - **Flush Table** removes all dynamic entries from the Routing Table.
  - **Erase Table** removes all static and dynamic entries from the Routing Table. This command cannot be undone.
  - **Delete** removes a selected entry from the Routing Table.
  - **Add** adds a static route to the Routing Table. See *Adding a Static Route to the Routing Table* on page 15.
  - **Edit** displays the current IP address, subnet, and Gateway IP address and lets you modify the information for that static route entry.

4. Click  to update your changes to the NCL..

### 2.4.1 Adding a Static Route to the Routing Table

1. Click **Add** in the **Routing Table** group.


The **Add Routes** dialog box appears.



**Figure 10 Add Routes**

2. In the **Add Routes** dialog box, type an IP address in the **Destination Network** box to define a static route.
3. Select the **Netmask** for the destination network from the drop-down list.
4. Type an IP address for the Gateway in the **Gateway** box.
5. Click **OK**.

The Configuration Utility adds the static route to the **Routing Table**.

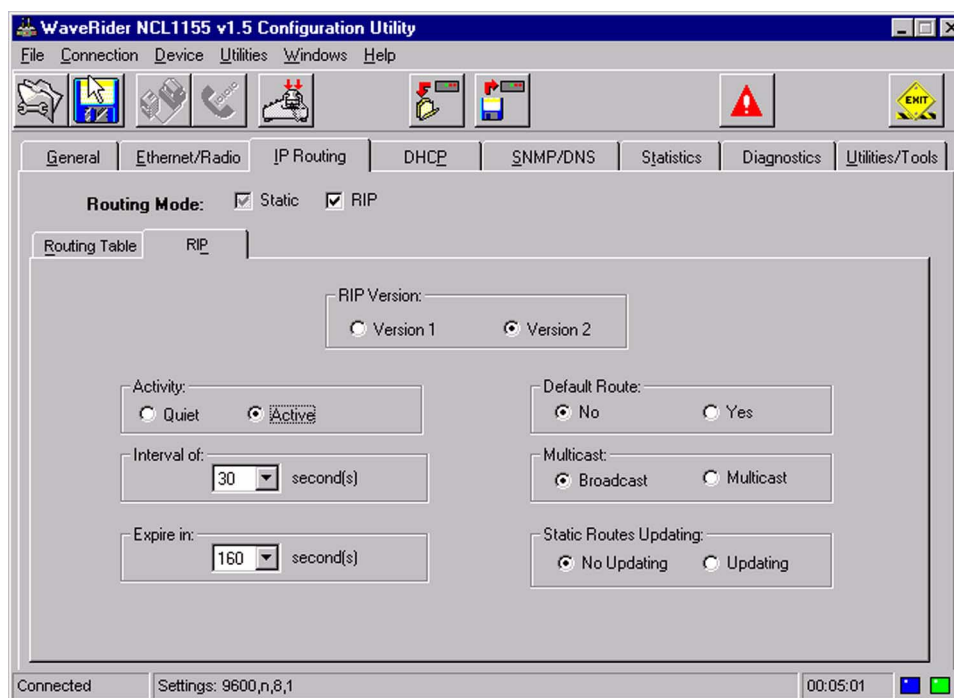
6. Click  to update your changes to the NCL..

## 2.5 Configuring the NCL for RIP

Routing Information Protocol (RIP) is an alternative method of configuring routing for the NCLs. By using RIP, network nodes and routers continuously exchange information to establish the most efficient route for sending data to each point on the network.

1. Select the **IP routing** tab.
2. Select **RIP** for the Routing Mode.

The **RIP** options are now enabled.



**Figure 11 IP Routing Tab—RIP View**

3. In the **Activity** group of the RIP tab, select **Active** to enable RIP to transmit packets to other interfaces. If you set **Activity** to **Quiet**, the NCL receives and process RIP packets, but it will not transmit them.
  4. In the **RIP Version** group, select the version of RIP your network is using.
  5. In the Default Route group, select **Yes** or **No** to indicate whether a default route exists for the sub-network.
  6. In the Multicast group, select **Broadcast** if you want the NCL to send routing information packets to everyone on the sub-network or **Multicast** to send packets to select devices on the sub-network.
- NOTE:** The Multicast option is only available if you are using RIP Version 2.
7. In the Static Routes Updating group, select **Updating** to allow automatic updates to the manually defined static routes or **No Updating** to prevent automatic updates.

## 2.6 Configuring the SNMP Parameters

You have the option of configuring the SNMP parameters in the NCL.

1. Select the **SNMP/DNS** tab to display the SNMP options.

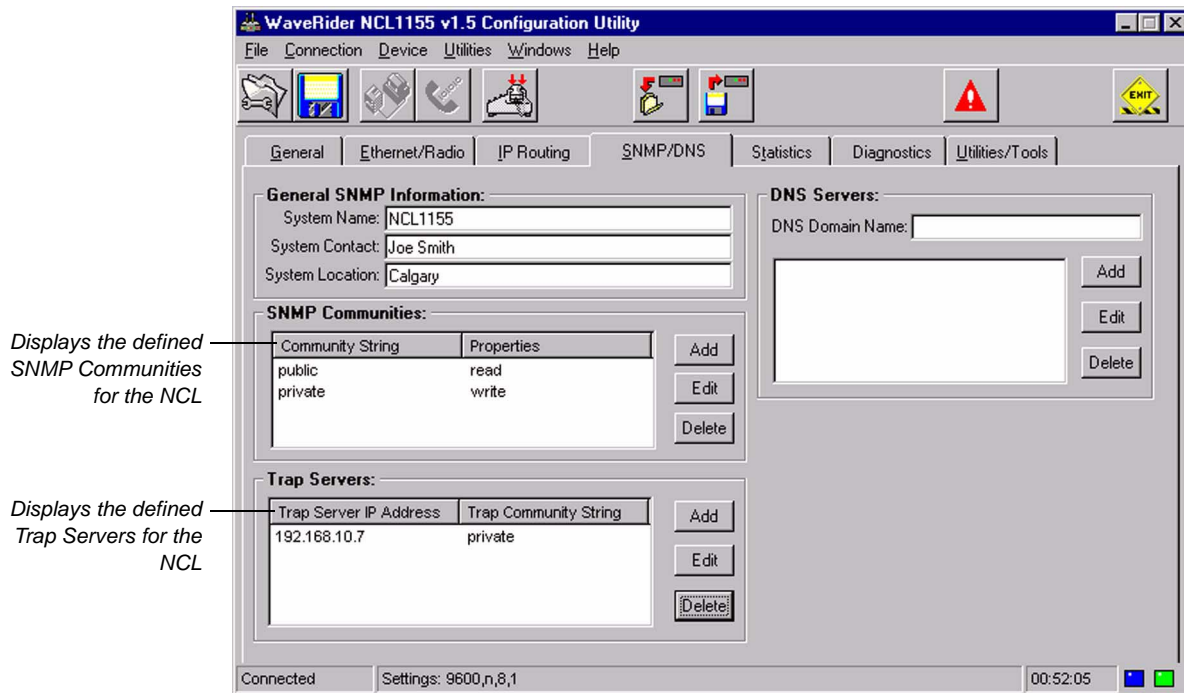


Figure 12 SNMP Parameters


2. Enter a name for the NCL in the **System Name** box (maximum 64 ASCII characters).
3. Enter a contact name, or contact information, in the **System Contact** box. You can enter the name of a person, a phone number, a URL, or an e-mail address in this field.
4. Type the location of the NCL in the **System Location** box (for example: Toronto, Ontario).
5. To add a new SNMP Community to the NCL, select **Add** in the SNMP Communities group. You can include up to five SNMP communities in each device. For more information, refer to *Adding an SNMP Community* on page 18.
6. To edit or remove an SNMP Community, select the chosen community from the list and click **Edit** or **Delete**.

The Configuration Utility asks you to confirm the deletion.

7. To add a new Trap Server to the NCL, select **Add** in the Trap Servers group. You can include up to five Trap Servers in each device. For more information, refer to *Adding an SNMP Trap Server* on page 19.

- To edit or remove an SNMP Trap Server, select that server from the list and click **Edit** or **Delete**.

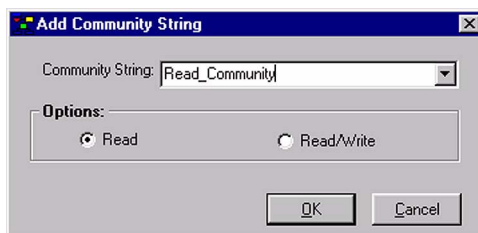
The Configuration Utility asks you to confirm the deletion.

- Select **OK**.
- Select  to update your changes to the NCL.


### 2.6.1 Adding an SNMP Community

- To add an SNMP Community, select **Add** in the **SNMP Communities** group.

The **Add Community String** dialog box appears.



**Figure 13 Add Community String Dialog Box**

- Type the name of the new community in the **Community String** box. The maximum length of the name is 32 ASCII characters (with no spaces allowed).
- Select **Read** or **Read/Write** to define the type of community.
- Select **OK**. The Configuration Utility adds the community to the **SNMP Communities** list.
- Select  to update your changes to the NCL

## 2.6.2 Adding an SNMP Trap Server

1. To add an SNMP Trap Server, select **Add** in the Trap Servers group.


The Add Trap Server dialog box appears.



**Figure 14 Add Trap Server Dialog Box**

2. In the **Add Trap Server** dialog box, type a new IP Address in the **Trap Server IP Address** box.
3. Enter a new name for the Trap Server community in the **Trap Community String** box. The maximum length of the name is 16 ASCII characters long with no spaces.
4. Select **OK**.

The Configuration Utility adds the Trap Server to the Trap Servers list.

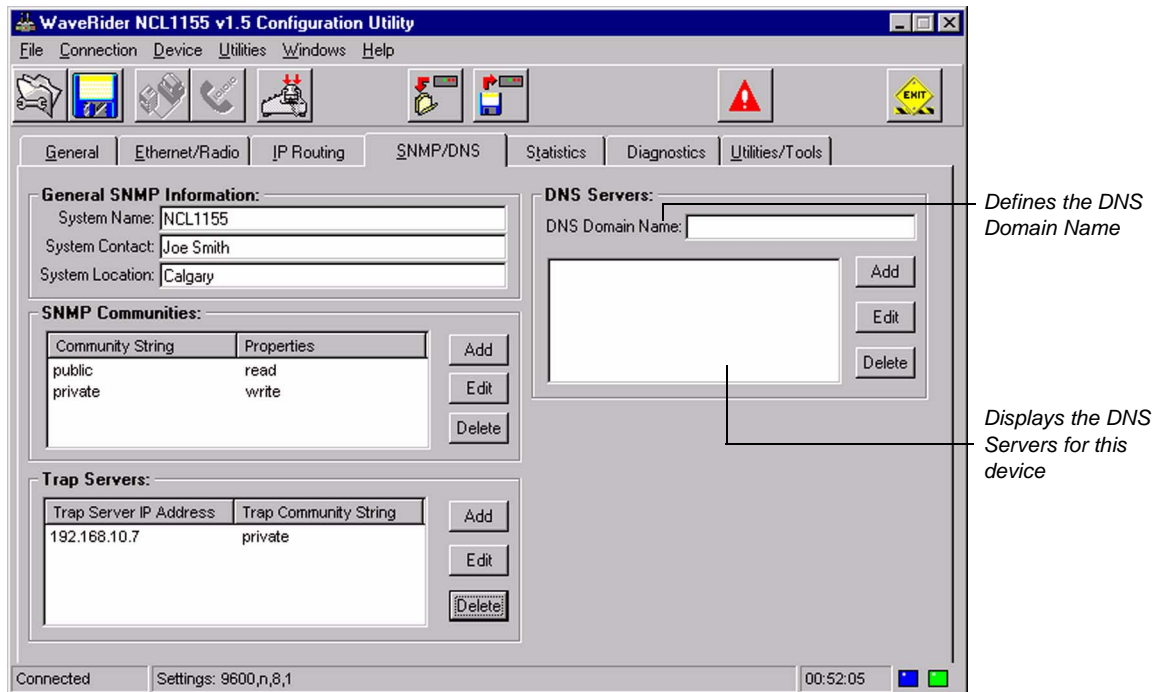
5. Select  to update your changes to the NCL



## 2.7 Configuring the DNS Server Parameters

Setting the DNS server configuration is optional.


1. Click the **SNMP/DNS** tab to display the DNS Server options.



**Figure 15 DNS Server Options**

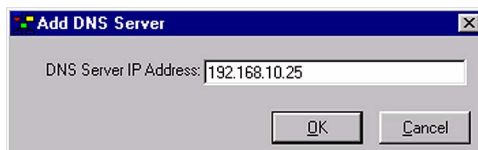
2. Type a name in the **DNS Domain Name** box for the local IP network. A domain name can be a maximum of 256 ASCII characters.
3. To add a DNS Server to the configuration, click **Add** in the DNS Servers group. See Adding a DNS Server below for more details.

You can have a maximum of five DNS servers on each NCL.


4. Select  to update your changes to the NCL

### 2.7.1 Adding a DNS Server

1. To add a DNS Server, click **Add** in the DNS Servers group.  
The Add DNS Server dialog box appears.






**Figure 16 Add DNS Server**

2. In the **Add DNS Server** dialog box, type an IP address in the **DNS Server IP Address** box to define the server in the device.
3. Click **OK**. The IP address is added to the **DNS Servers** list.
4. Select  to update your changes to the NCL

## 2.8 Logging out of the NCL

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1. When you are done configuring the device, click  to update your changes to the NCL.
2. Click  to close your connection to the NCL.

**NOTE:** Always remember to select  (the Disconnect button) before exiting the WaveRider Configuration Utility or connecting to another device.

3. Disconnect the cables from the device. The NCL is now ready for testing and deployment in your network. Refer to the *NCL User Manual* for details.



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# 3


## System Reporting and Diagnostics

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With the Configuration Utility, you can view operational statistics for the NCL Loopback, Ethernet, and Radio interfaces, as well as a number of real-time diagnostics that will help you monitor NCL performance. These diagnostics include a graphical display of the Radio Packet Error Rate (PER), a Received Signal Strength Indicator (RSSI), and a tab for viewing the performance history of the NCL over a set period of time.

### 3.1 Displaying the Operational Statistics

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1. Log into the NCL on the **Utilities/Tools** tab and click  to load the current device settings.
2. Click the **Statistics** tab in the **WaveRider Configuration Utility** dialog box.

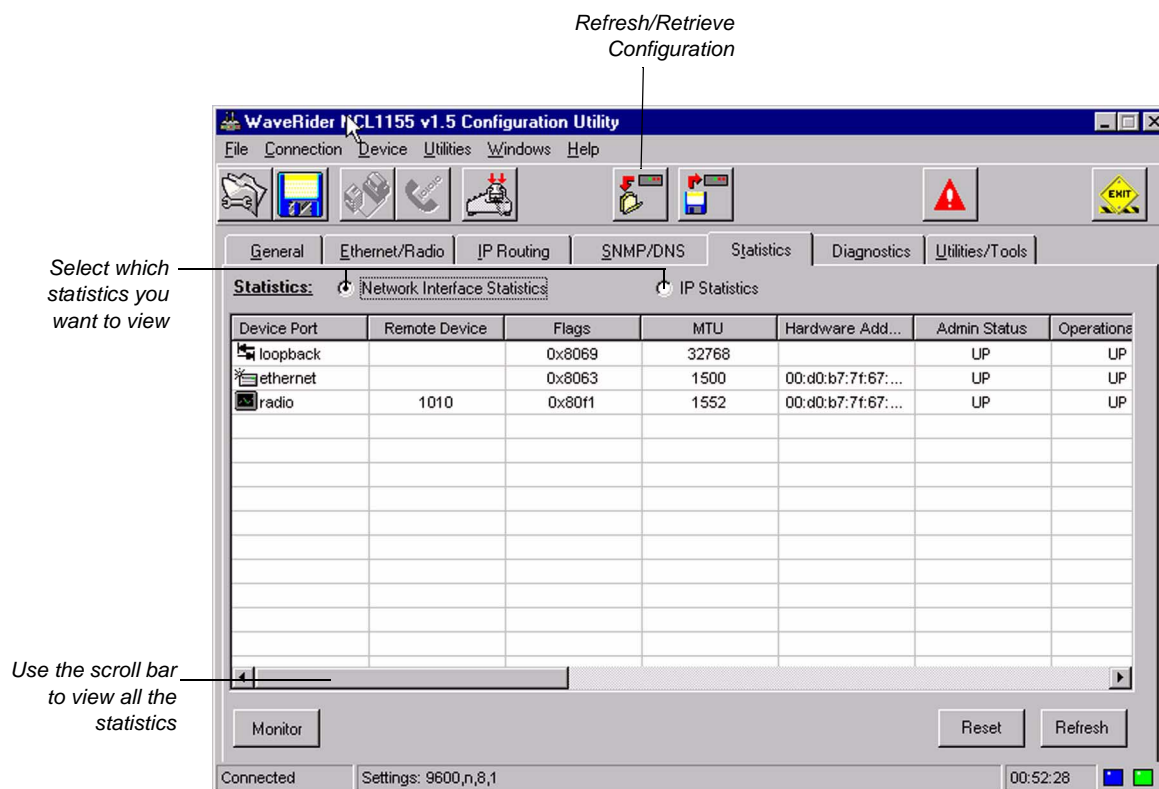


Figure 17 Statistics Tab

3. Select one of the following for the statistics you want to view.
  - **Network Interface Statistics** displays the radio, Ethernet and loopback statistics for the NCL interface. See *Network Interface Statistics* on page 25 for a description of each type of statistic.
  - **IP Statistics** displays the IP device statistics. See *IP Statistics* on page 26 for a description of each type of statistic in this category.
4. Select the **Monitoring Rate** from the **Utilities** menu.
5. Select **Monitor** to generate and display the statistics at the selected **Monitoring Rate** interval.

The Configuration Utility continually updates the statistics in the table at the defined interval until you click **STOP**.
6. If you are not monitoring the statistics at intervals, you can click **Reset** to clear the statistics. Click **Refresh** to retrieve the current statistics and re-display them to the table.

### 3.1.1 Network Interface Statistics

The network interface statistics include the configuration information and statistics for the three interfaces associated with the NCL: radio, Ethernet, and loopback.

The loopback interface is an interface on a logical network that returns all output packets as input packets. The address for this logical network is 127.0.0.0 and the address for the loopback interface is usually 127.0.0.1. This means that any packets sent to the IP address 127.0.0.1 will be turned around and queued as input packets to the same interface. The values of the input and output statistics for the loopback interface should be the same.

**Table 1 Network Interface Statistics**


Label	Description
Flags	Specifies the operational state and properties of the interface. There are a number of possible flags. <ul style="list-style-type: none"> <li>• BROADCAST: interface is for a broadcast network</li> <li>• MULTICAST: interface supports multicasting</li> <li>• POINT-TO-POINT: interface is for a point-to-point network</li> <li>• LOOPBACK: interface is for a loopback network</li> <li>• RUNNING: resources are allocated for this interface</li> <li>• SIMPLEX: interface cannot receive its own transmissions</li> <li>• ALLMULTI: interface is receiving all multicast packets</li> <li>• DEBUG: debugging is enabled for the interface</li> <li>• NOARP: do not use ARP on this interface</li> <li>• NOTRAILERS: avoid using trailer encapsulation</li> <li>• PROMISCUOUS: interface receives all network packets</li> <li>• TX: a transmission is in progress</li> <li>• UP: interface is operating</li> </ul>
MTU	Maximum transmission unit or the size of the largest packet the interface can handle.
Hardware Address	MAC address of the interface.
Administrative Status	Desired state of the interface. The NCL supports UP and DOWN states.
Operational Status	Current operational state of the interface.
Input Octets	Number of bytes that arrived on this interface since the last interface reset or device reboot.
Input Unicast Packets	Number of unicast packets that arrived on this interface since the last interface reset or device reboot.
Input Non-Unicast Packets	Number of non-unicast packets that arrived on this interface since the last interface reset or device reboot.
Input Discards	Number of packets that arrived on this interface and were discarded since the last interface reset or device reboot.
Input Errors	Number of packets that arrived on this interface with errors since the last interface reset or device reboot.

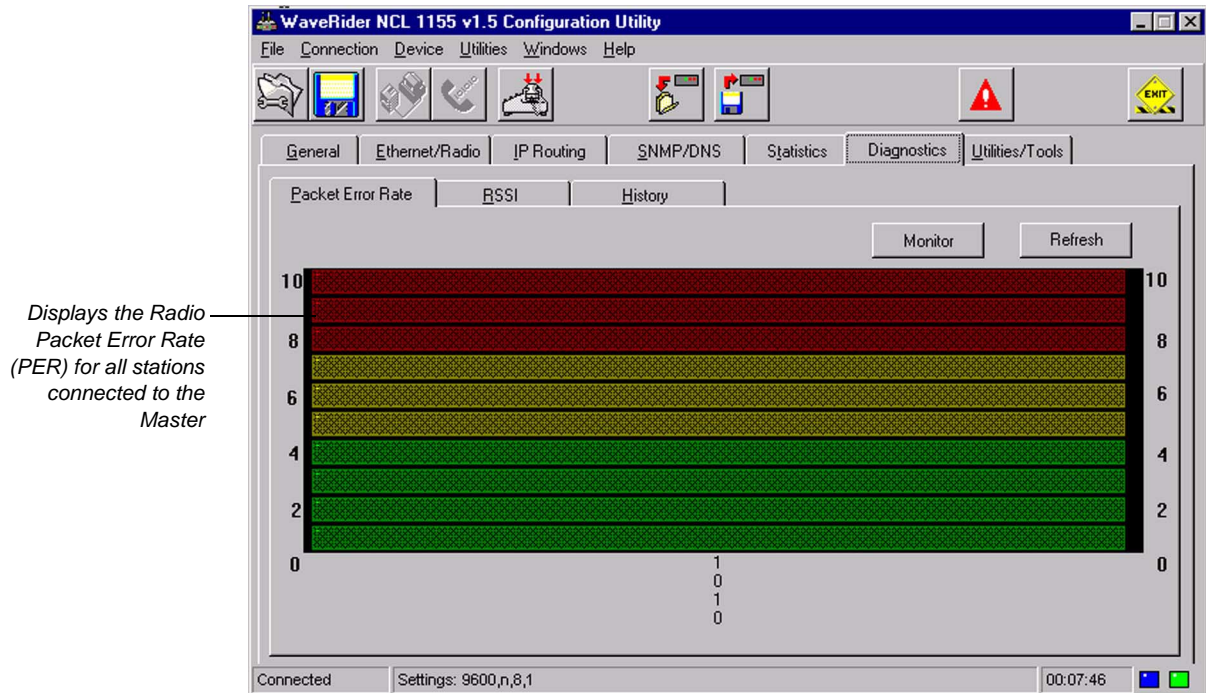
<b>Label</b>	<b>Description</b>
Output Octets	Number of bytes that were sent from this interface since the last interface reset or device reboot.
Output Unicast Packets	Number of unicast packets that were sent from this interface since the last interface reset or device reboot.
Output Non-Unicast Packets	Number of non-unicast packets that were sent from this interface since the last interface reset or device reboot.
Output Discards	Number of outbound packets that were dropped because of implementation limits since the last interface reset or device reboot.
Output Errors	Number of outbound packets dropped because of errors since the last interface reset or device reboot.

**Table 2 IP Statistics**

<b>Label</b>	<b>Descriptions</b>
Packets received	Number of packets sent to the IP layer.
Bad checksum discards	Number of packets discarded due to a bad checksum.
Packet too short discards	Number of packets dropped due to an invalid data length.
Not enough data discards	Number of packets dropped because they did not contain enough data to be an IP packet.
Bad header length discards	Number of packets discarded because of inconsistent IP header and IP data lengths.
Fragment received	Number of packet fragments received.
Fragments dropped	Number of fragments dropped due to lack of space or duplicates.
Fragments timed out	Number of fragments that were timed-out.
Packets forwarded	Number of packets forwarded at the IP layer.
Couldn't forward discards	Number of packets received for unreachable destinations.
Redirected forwards	Number of redirect messages that were sent.
Unknown protocol discards	Number of packets of unknown or unsupported protocol received and discarded.
No space discards	Number of packets dropped because of resource shortages.
Packets reassembled	Number of packets that needed to be reassembled.
Fragments sent	Number of fragments successfully sent.
No route discards	Number of packets discarded because there was no route to the destination given.

## 3.2 Displaying the Radio Packet Error Rate

1. Log into the NCL and click  to load the current device settings.
2. Click the **Diagnostics** tab in the WaveRider Configuration Utility dialog box.
3. Select the **Packet Error Rate** tab within the Diagnostics tab.



**Figure 18 Packet Error Rate Tab**

4. Select the **Refresh** button above the Radio Packet Loss graph to reset the statistics. Table 3 is a guideline for interpreting the Radio PER output.
5. Select the **Monitoring Rate** from the Utilities menu.
6. Click **Packet Error Rate Tab** to display the Radio PER at the selected Monitoring Rate interval.

The Configuration Utility continually updates the statistics in the graph and is updated every interval until you click **STOP**.



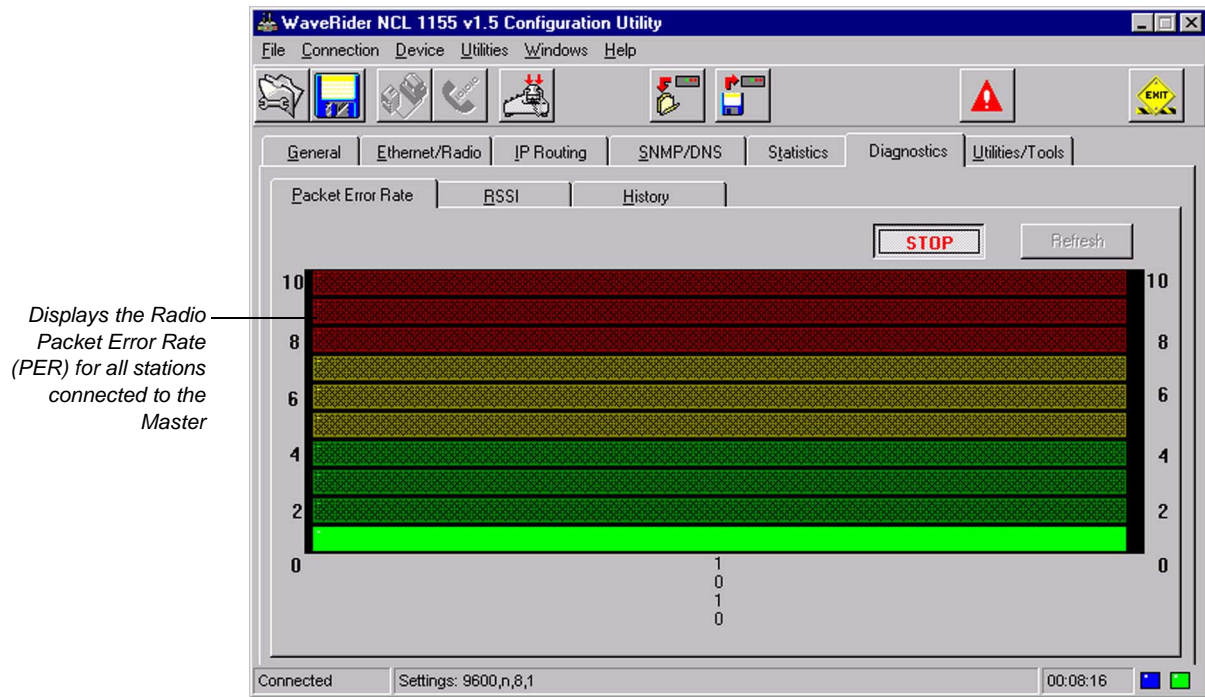


Figure 19 Packet Error Rate Tab—Monitoring Mode


Table 3 Radio Packet Error Rate Assessment

Radio PER Ratio	Transmission Quality
less than 1%	excellent
1% to 4%	good
5% to 7%	marginal
greater than 7%	poor

### 3.3 Displaying the Received Signal Strength Indicator (RSSI)

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This function is available in the **NCL1155** model only.

1. Log into the NCL and click  to load the current device settings.
2. Click the **Diagnostics** tab in the WaveRider Configuration Utility dialog box.
3. Select the **RSSI** tab within the Diagnostics tab.
4. Select the **Monitor** button within the RSSI tab to display the received signal strength in real-time.

The Maximum Signal Strength Indicator displays the maximum received signal strength during the current monitoring session. This indicator appears as a small, green arrow on the inside of the RSSI Progress bar.

5. Select the **Reset Max.** Indicator button to reset the Maximum Signal Strength Indicator to the position of the Current Signal Strength Indicator.
6. Select the **Audible Signal Indicator** button to activate a tone generator that beeps faster as the signal becomes stronger.

An audible signal indicator is useful when attempting to find the best location for the antenna.

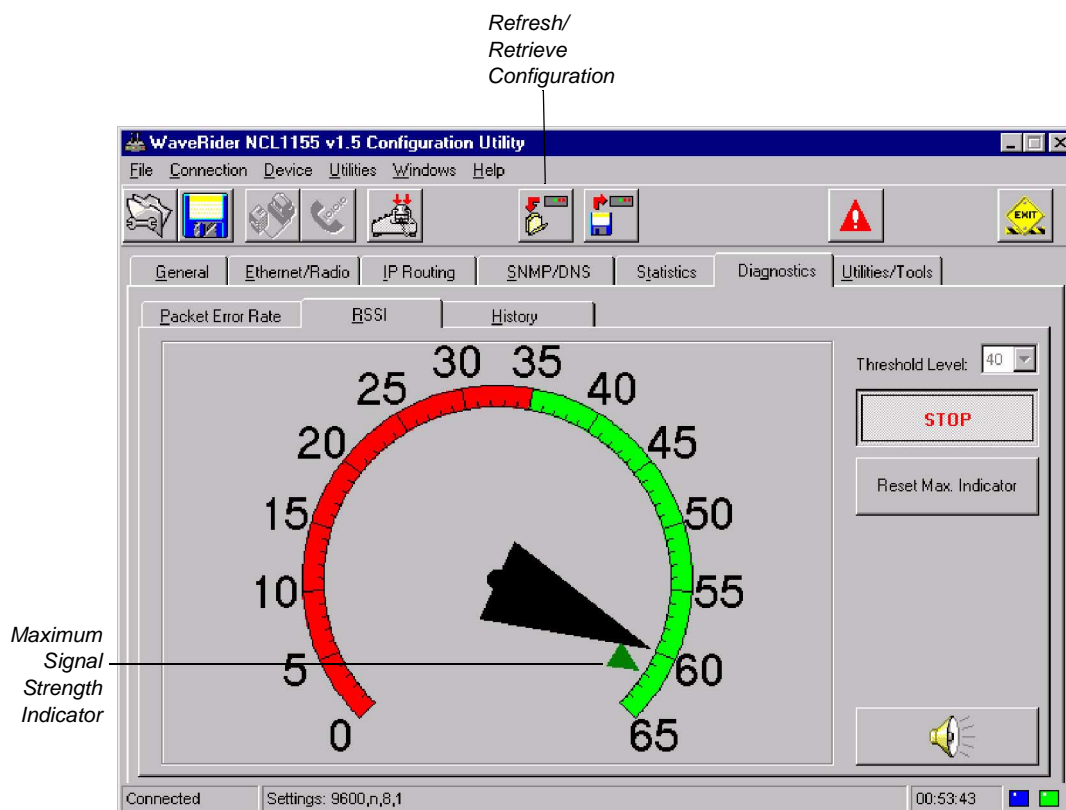



Figure 20 RSSI Tab

### 3.4 Viewing the History

1. Log into the NCL and click  to load the current device settings.
2. Click the **Diagnostics** tab in the WaveRider Configuration Utility dialog box.
3. Select the **History** tab within the Diagnostics tab.
4. In the **Time Window** group, designate the time period to display in the PER and RSSI charts.  
 You can set the number of hours and minutes to display. For example, to view the PER and RSSI trends over the past hour and a half, select 1 in the **Hours** drop-down list, and 30 in the **Minutes** dropdown list.
5. Select the **Monitor PER** button to chart the PER history in the Packet Error Rate chart.
6. Select the **Monitor RSSI** button to chart the RSSI history in the RSSI chart.
7. Select **Data Logging Off** to disable data logging.
8. Select **Automatic Data Logging** to log the PER and RSSI history data to a text file.

9. Designate the data logging interval.
10. Enter a name and directory path for the log file, or select the **Browse** button to choose a directory and enter a filename in the **Open Automatic Data Logging File** window that appears.

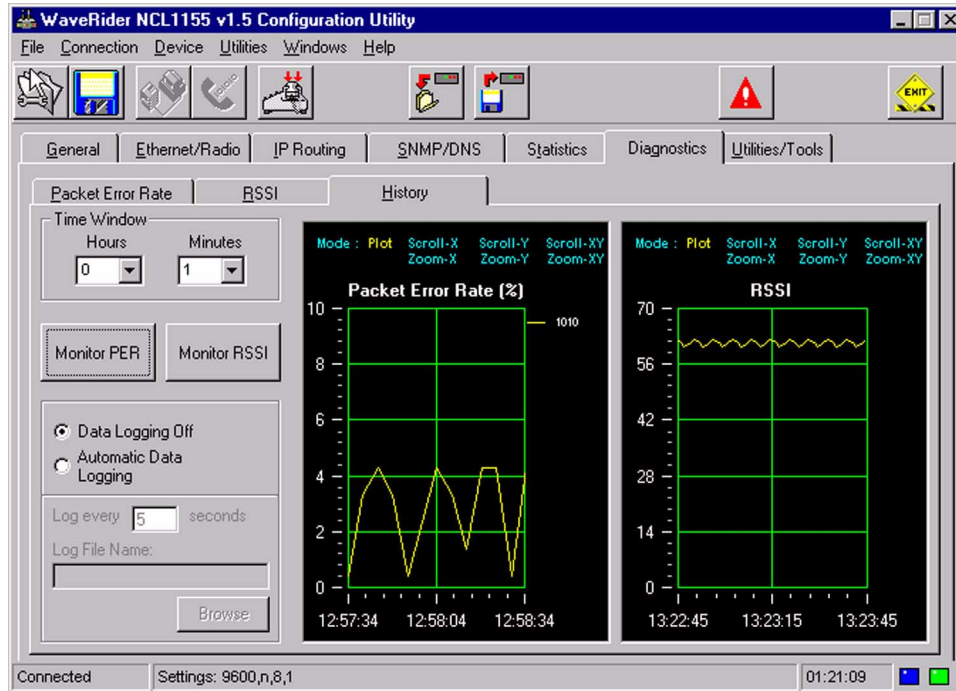


Figure 21 History Tab

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# 4


## Special Features and Functions

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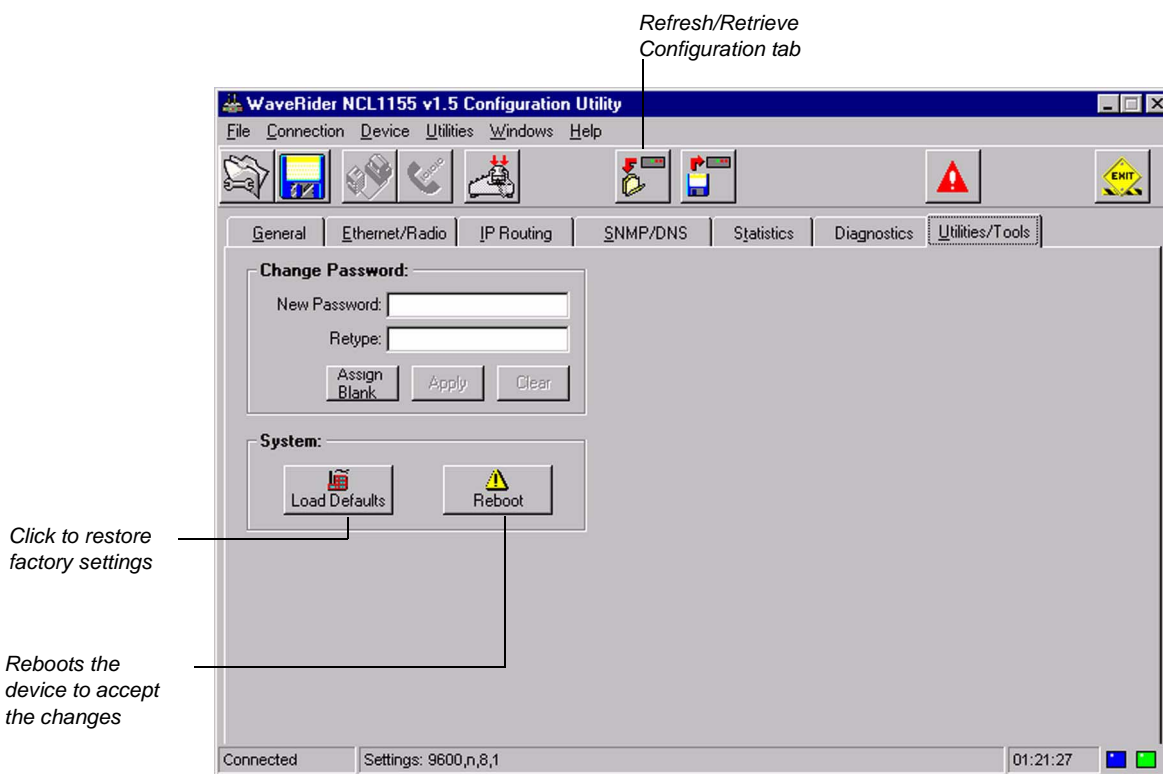
The WaveRider Configuration Utility is designed to allow you to quickly and easily configure an NCL. This section provides instructions to for restoring a device to its default factory configuration, saving a configuration to a file, and restoring a saved configuration to a device.

## 4.1 Restoring an NCL to Factory Settings

Follow the steps in this section to prepare a previously configured NCL for use elsewhere on your network. To do this, you will restore the factory-default settings for the NCL. Once you have reset the NCL to its factory-default settings, you can then configure the device as described in *Configuring the Ethernet and Radio Parameters* on page 9.

1. Log into the NCL and click  to load the current device settings.
2. Click the **Utilities/Tools** tab.

**NOTE:** You must retrieve the current configuration from the NCL before you can make any configuration changes to the device.



**Figure 22 Utilities/Tools Tab**


3. Click the **Load Defaults** button to restore the NCL to the factory-default configuration. This process takes a few minutes to complete, and the Configuration Utility automatically reboots the NCL.

The Configuration Utility does not overwrite the following settings during the process of restoring the factory-default configuration.

- Software Version
- Serial Number

## 4.2 Saving an NCL Configuration to a File

When you finish configuring the NCL, you can save the configuration settings to a file. In the event that the device fails and needs replacement, you can use the saved configuration file to rebuild another NCL with identical settings.

1. Log into the NCL using the WaveRider Configuration Utility.
2. Click  to load the current settings in the WaveRider Configuration Utility. General Tab

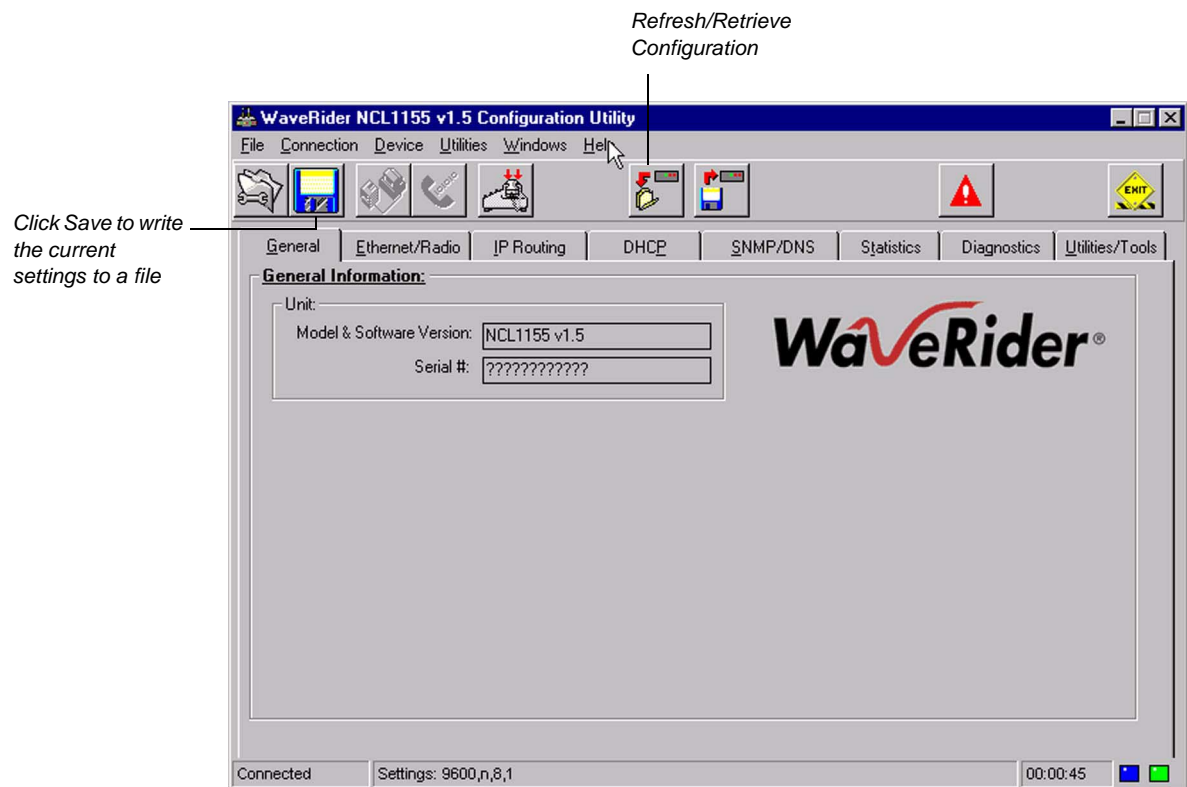
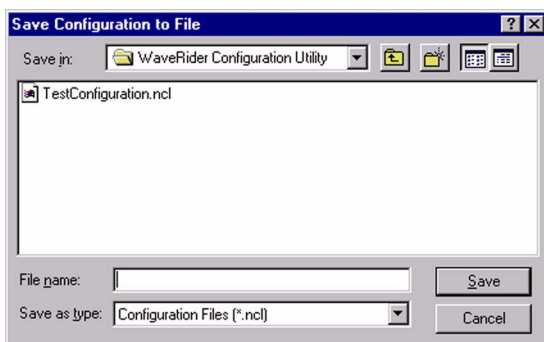


Figure 23 General Tab—Saving

3. Select .

The **Save Configuration to File** dialog box appears.





**Figure 24 Save Configuration to File Dialog Box**

4. Enter a name for the configuration settings file.

5. Select  to **Save**.

The Configuration Utility automatically adds an \*.NCL extension to the file name during the save process.

### 4.3 Importing an NCL Configuration from a File

If you need to replace a failed NCL or use an existing configuration as the starting point for configuring a new NCL, you can easily import the previous configuration settings from a saved configuration file.

**NOTE:** Before you begin the following procedure, ensure that a copy of the saved NCL configuration file resides on your computer or on a floppy disk in the disk drive.

1. Connect a factory-configured NCL to your computer. Refer to *Connecting the NCL* on page 2 for detailed instructions.
2. Start the WaveRider Configuration Utility.

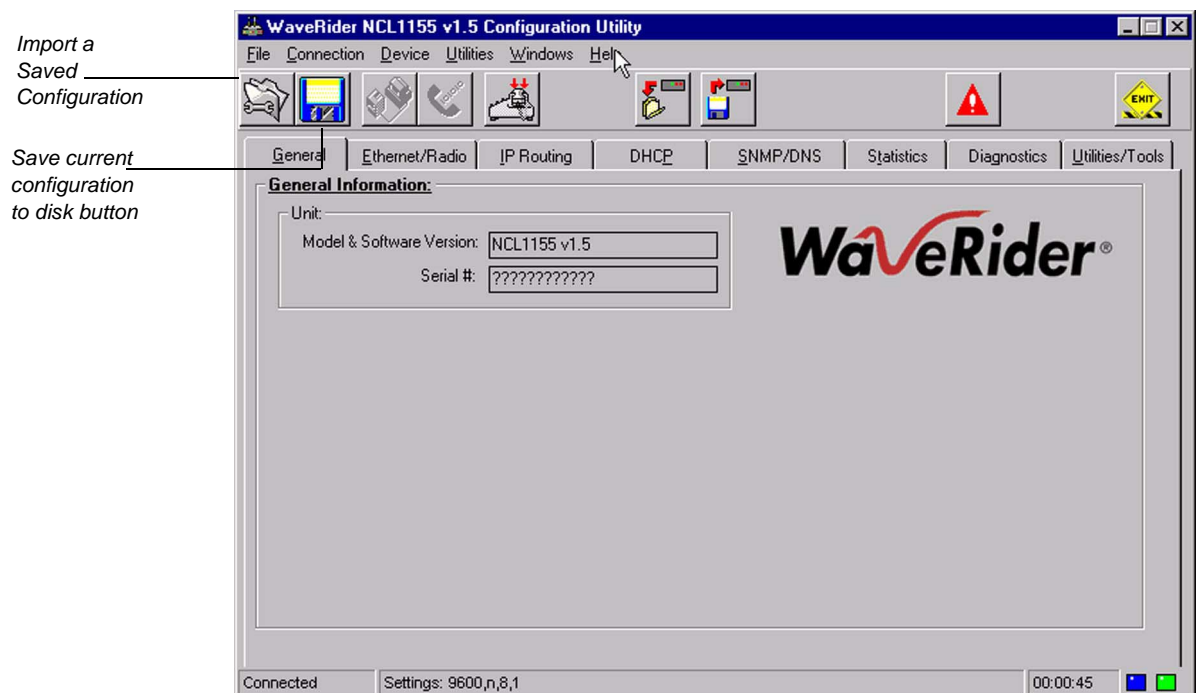




Figure 25 General Tab—Importing

3. Select  to load the current device settings.
4. Select the **General** tab to view the NCL identification information. This information indicates that the device settings have loaded correctly. The Model & Software Version or Serial # boxes remain blank if the load was unsuccessful.


**NOTE:** You must retrieve the current configuration from the NCL before you can import a saved configuration file to the device.

5. Select  to import the configuration from a file on your computer.

The **Import Configuration From File** dialog box appears.



**Figure 26 Import Configuration from File Dialog Box**

6. Select the configuration file to import by navigating to the appropriate file directory.
7. Select **Open**.
8. Click  to update your changes to the NCL.
9. Check the settings in each tab screen to ensure that you have imported the correct file.






The NCL is now ready to be tested and deployed in your network. Refer to the *NCL User Manual* for details.






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# Appendix A Toolbar Buttons

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Table 4 Button Names and Descriptions

Button Icon	Name and Description
	<b>Import a Saved Configuration</b> —Select this button to import a saved NCL configuration from a directory file.
	<b>Save Current Configuration to Disk</b> —Select to save the current NCL configuration to a directory file.
	<b>Connect Via Telnet</b> —Select to connect to the NCL through a Telnet session.
	<b>Connect Through Serial Port</b> —Select to connect to the NCL through a Serial Port.
	<b>Disconnect</b> —Select to disconnect from the NCL.

	<p><b>Refresh/Retrieve Configuration</b>—Select to upload the current configuration settings from the NCL.</p>
	<p><b>Update This Configuration to Device</b>—Select to save the current configuration settings to the NCL memory.</p>
	<p><b>Radio Status Toggle (Disable)</b>—Select to enable radio transmission.</p>
	<p><b>Radio Status Toggle (Enable)</b>—Select to disable radio transmission.</p>
	<p><b>Exit</b>—Select to exit the application.</p>

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