Option Name	Description
Net Diameter	Determines the maximum number of hops for which routes will be created. The valid range of values is from 3 to 100. The default value is 10.
Node Traversal Time	Estimate of time required to traverse a node. This value is used to form an estimate of the time it takes for a route discovery packet (RREQ) to traverse the network and return a reply (RREP). The node generating the request uses this estimate to determine when to give up and send another request. The valid range of value is from 10 to 1000 milliseconds. The default value is 40 milliseconds.
RREQ Retries	The number of times a node will retransmit an RREQ in an attempt to discover a route. The valid range of values is from 1 to 10. The default value is 2.
Apply	Applies changes made to the AODV configuration page.

ARP Tab

The ARP (Address Resolution Protocol) tab allows you to insert and view static ARP entries. ARP entries consist of an IP address and its associated MAC address.

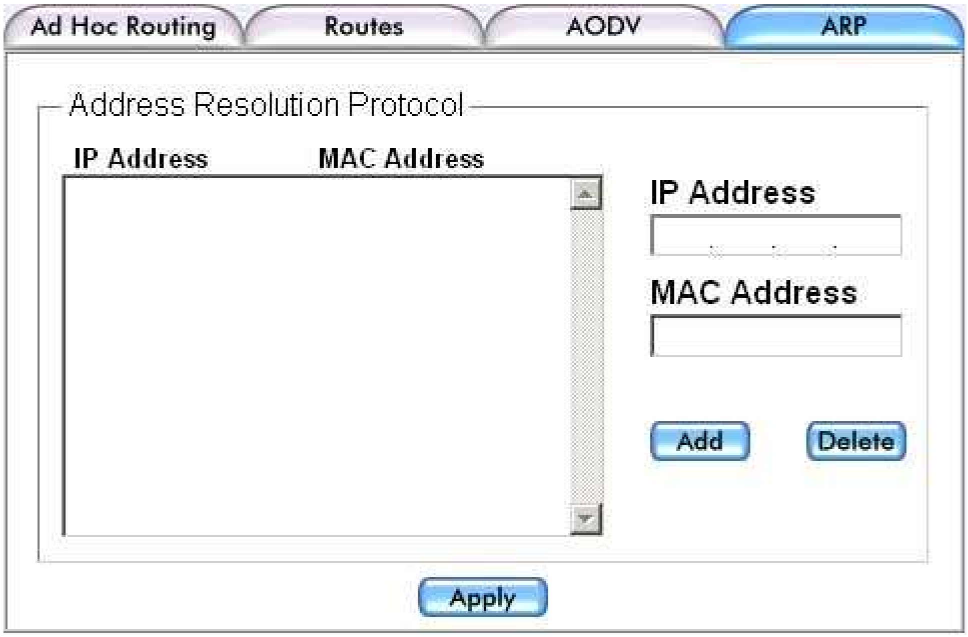
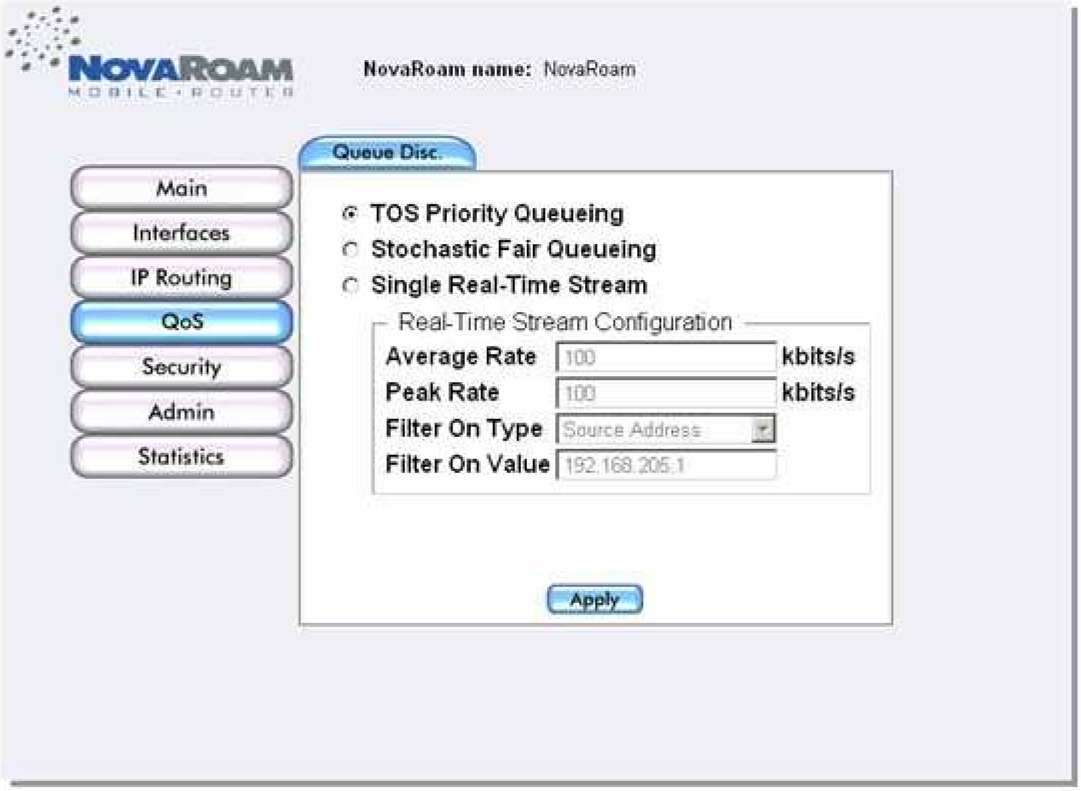

Ad Hoc Routing
Routes
AODV
ARP
Address Resolution Protocol
IP Address
MAC Address
IP Address
MAC Address
Add
Delete
Apply

Figure 22: *NovaRoam* Configuration ARP Tab

Option Name	Description
IP Address	Specifies the IP address of the ARP entry that is being created
MAC Address	Specifies the MAC address of the ARP entry that is being created
Add	Adds the ARP entry to the ARP table
Delete	Deletes an ARP entry from the ARP table. To delete an ARP entry, select it from the ARP table then press the delete button
Apply	Applies changes to the ARP configuration page

QoS Configuration Page

The QoS page allows you to configure Quality of Service (QoS) settings.


NovaRoam
MOBILE • ROUTER
Queue Disc.
Main
Interfaces
IP Routing
QoS
Security
Admin
Statistics
Apply

NovaRoam name: NovaRoam

● TOS Priority Queueing
○ Stochastic Fair Queueing
○ Single Real-Time Stream

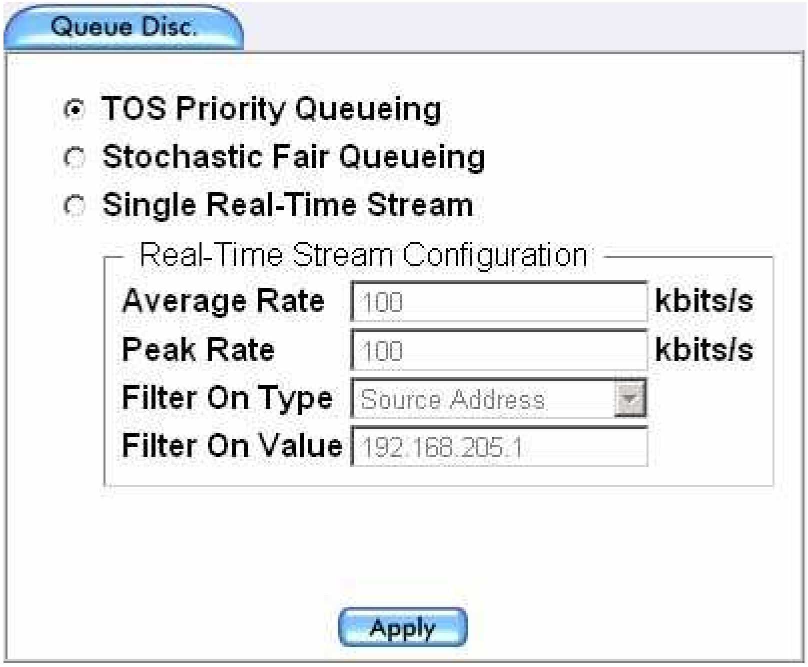
Real-Time Stream Configuration

Average Rate	100	kbits/s
Peak Rate	100	kbits/s
Filter On Type	Source Address	
Filter On Value	192.168.205.1	

Figure 23: *NovaRoam* Configuration QoS Page

Queue Disc. Tab

The Queue Disc. Tab allows you to select and configure the Queue Discipline options.



● TOS Priority Queueing
○ Stochastic Fair Queueing
○ Single Real-Time Stream

Real-Time Stream Configuration

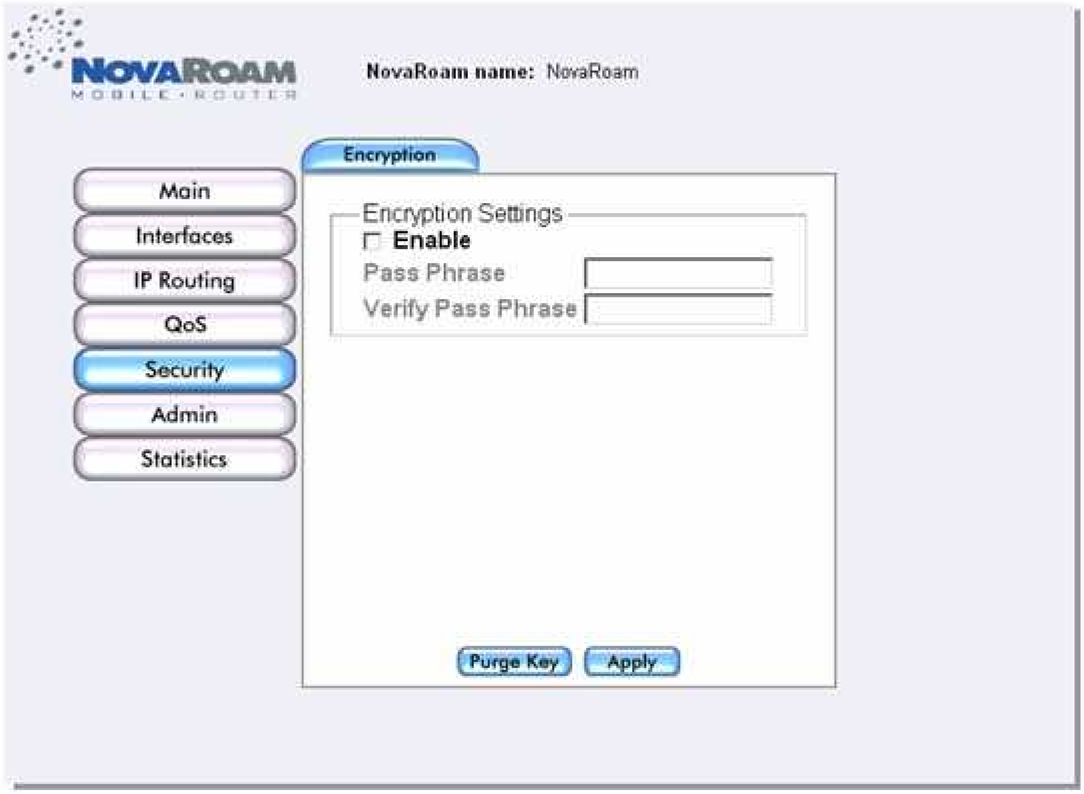
Average Rate	100	kbits/s
Peak Rate	100	kbits/s
Filter On Type	Source Address	
Filter On Value	192.168.205.1	

Figure 24: *NovaRoam* Configuration QoS Tab

Note: Descriptions of the QoS functionality will be available soon in the next version of this user manual.

Security Page

The security page displays the current NovaRoam security settings. Encryption can be enabled and configured from this page. The NovaRoam provides 128-bit AES encryption for data security.


Main
Interfaces
IP Routing
QoS
Security
Admin
Statistics
Encryption
Purge Key
Apply

NovaRoam name: NovaRoam

Encryption Settings

☐ Enable

Pass Phrase

Verify Pass Phrase

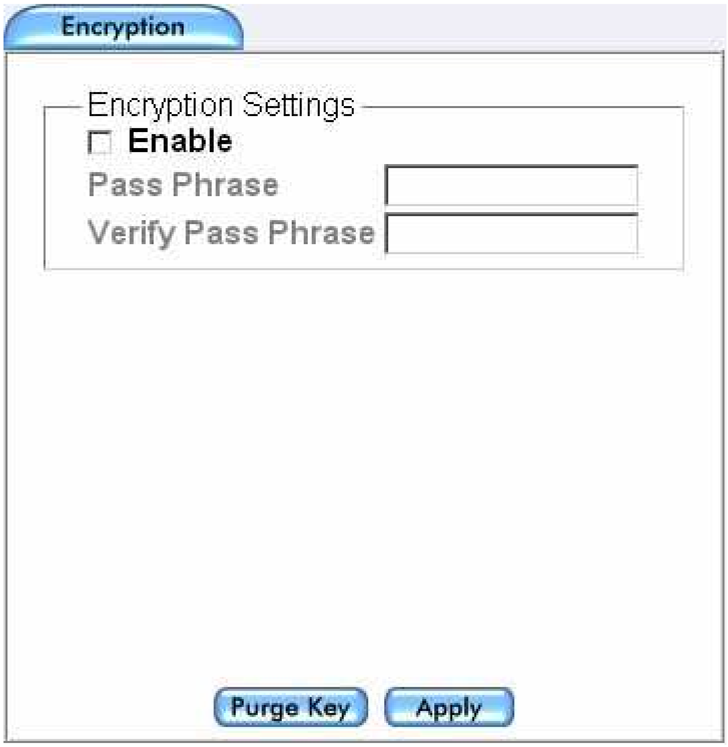
Figure 25: *NovaRoam* Configuration Security Page

Option Name	Description
Main	Opens the Main configuration page
Interfaces	Opens the Interfaces configuration page
IP Routing	Opens the IP Routing configuration page
QoS	Opens the QoS (Quality of Service) configuration page
Security	Opens the Security configuration page
Admin	Opens the Admin configuration page

Option Name	Description
Statistics	Opens the Statistics page
Encryption	Opens the Encryption Configuration page
NovaRoam Name	Displays the NovaRoam Name. The NovaRoam Name can be assigned to best suit your application.

Encryption Tab

The Encryption Tab allows you to enable or disable encryption. The encryption pass phrase can be entered or purged from this tab.



Encryption

Encryption Settings

☐ **Enable**

Pass Phrase	
Verify Pass Phrase	

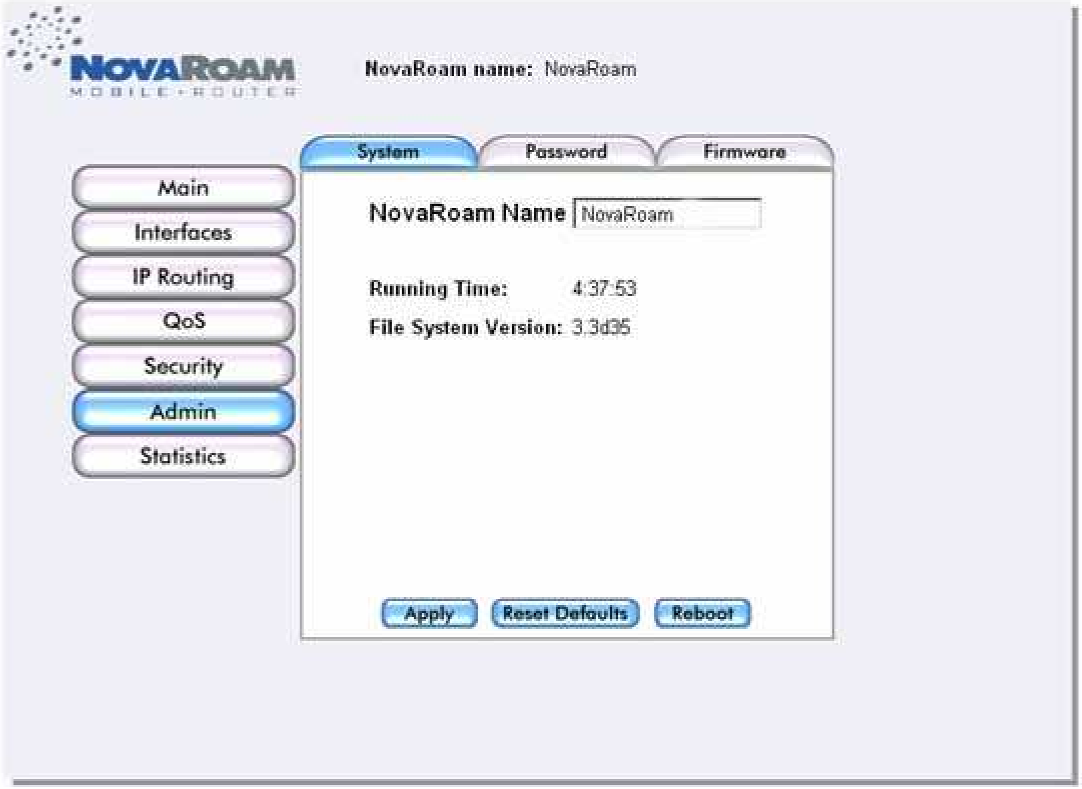
Figure 26: *NovaRoam* Configuration Encryption Tab

Option Name	Description
Enable	Enables 128-bit data encryption
Pass Phrase	Used to assign encryption pass phrase. In order for NovaRoams to communicate using encryption, each NovaRoam must use the same pass phrase
Verify Pass Phrase	Used to verify that encryption pass phrase has been entered properly
Purge Key	Purges the encryption key. Pressing this button will remove the encryption key from the system
Apply	Applies changes made to the Encryption configuration page

* 128-bit encryption provided using AES encryption algorithm. Not FIPS certified.

Admin Page

The Admin configuration allows you to configure the NovaRoam Name and change the system password. This page also allows the NovaRoam to be rebooted or reset to factory default settings. Firmware upgrades can be initiated from the Admin page.


NovaRoam name: NovaRoam
Main
Interfaces
IP Routing
QoS
Security
Admin
Statistics
System
Password
Firmware
Apply
Reset Defaults
Reboot

NovaRoam Name: NovaRoam

Running Time: 4:37:53

File System Version: 3.3d35

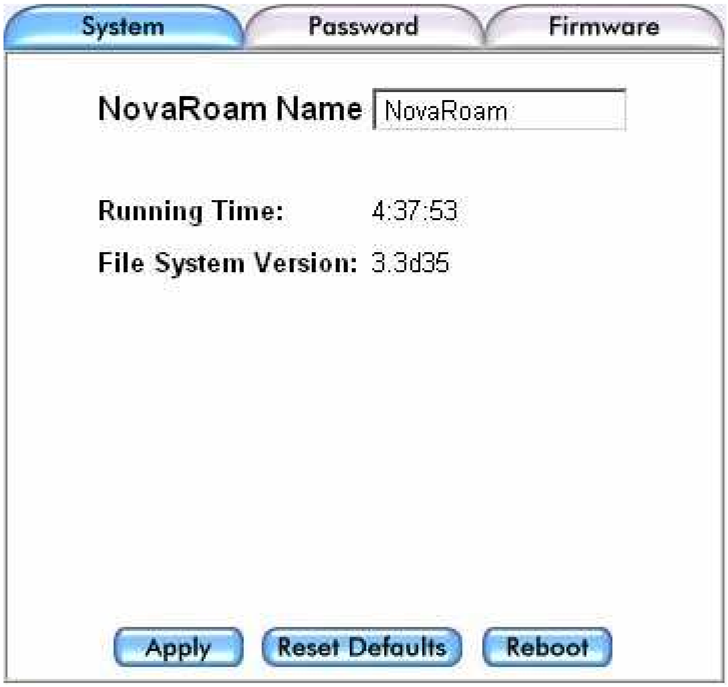
Figure 27: ***NovaRoam*** **Configuration Admin Page**

Option Name	Description
Main	Opens the Main configuration page
Interfaces	Opens the Interfaces configuration page
IP Routing	Opens the IP Routing configuration page
QoS	Opens the QoS (Quality of Service) configuration page
Security	Opens the Security configuration page
Admin	Opens the Admin configuration page

Option Name	Description
Statistics	Opens the Statistics page
System	Opens the System Configuration page
Password	Opens the Password Configuration page
Firmware	Opens the Firmware Configuration page
NovaRoam Name	Displays the NovaRoam Name. The NovaRoam Name can be assigned to best suit your application.

System Tab

The NovaRoam can be rebooted or to reset to factory default settings from the System tab. The System tab also allows you to assign a name to NovaRoam unit.



NovaRoam Name NovaRoam

Running Time: 4:37:53

File System Version: 3.3d35

Figure 28: ***NovaRoam*** **Configuration System Tab**

Option Name	Description
NovaRoam Name	Specifies the unique NovaRoam Name. Using an easy to remember NovaRoam Name, instead of trying to remember its IP address, can be very helpful while planning your network. To change the NovaRoam Name, enter the new name in the NovaRoam Name field then press the Apply button. The NovaRoam Name can contain any ASCII value except '=' and '&'.
Running Time	Displays the amount of time that has elapsed since the last system boot.
File System Version	Displays the version of the file system that is currently installed.
Apply	Applies changes made to the System configuration page.
Reset Defaults	Resets all NovaRoam settings to their original factory default settings.
Reboot	Reboots the NovaRoam.

Password Tab

The Password tab allows the user to change the current password for accessing the configuration web pages.

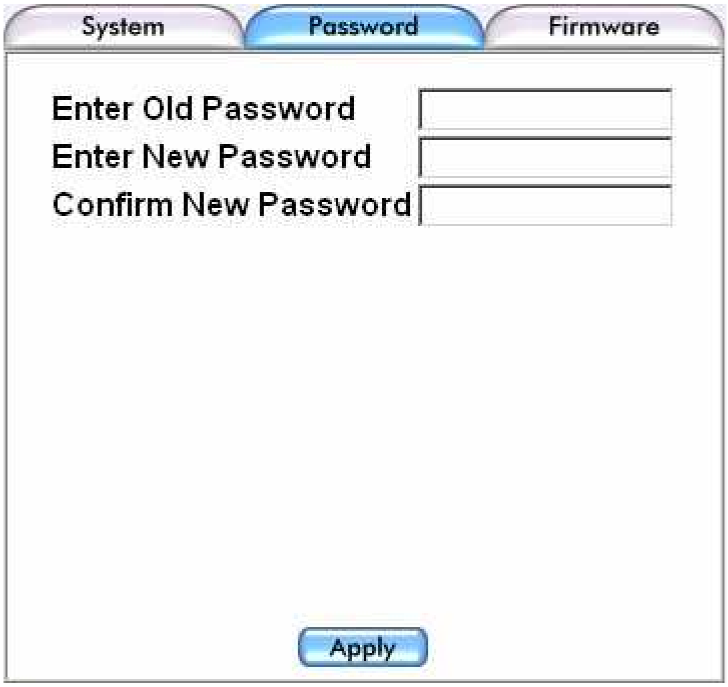

System
Password
Firmware
Enter Old Password
Enter New Password
Confirm New Password
Apply

Figure 29: ***NovaRoam*** **Configuration Password Tab**

Option Name	Description
Enter Old Password	Enter the old system password. The default system password is **novaroam**. It is strongly recommended that you change the system password
Enter New Password	Enter the new system password.
Confirm New Password	Re-enter the new system password.

Option Name	Description
Apply	Applies password changes.

Firmware Tab

The Firmware tab allows you to update the NovaRoam firmware. It is important not to disturb the NovaRoam during the update process. Doing so may require the NovaRoam to be returned to the factory to be repaired

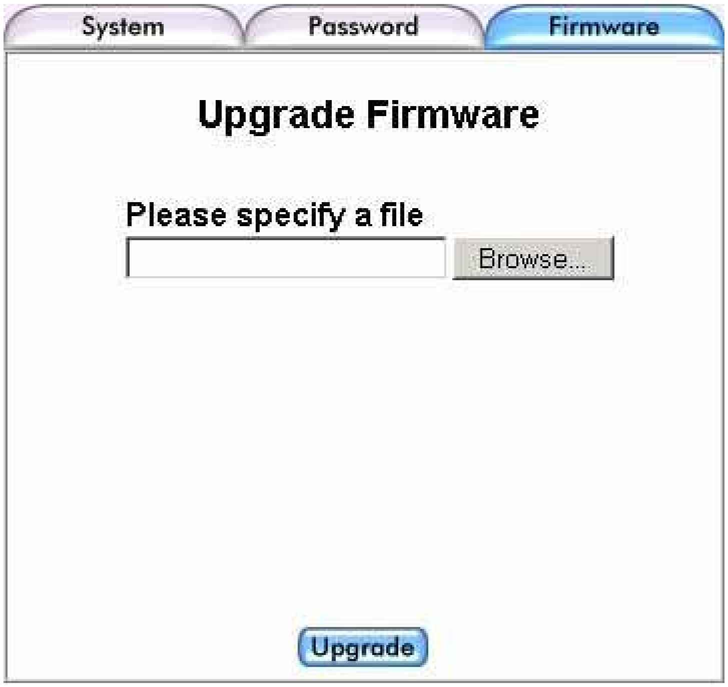

System
Password
Firmware
Upgrade Firmware
Please specify a file
Browse...
Upgrade

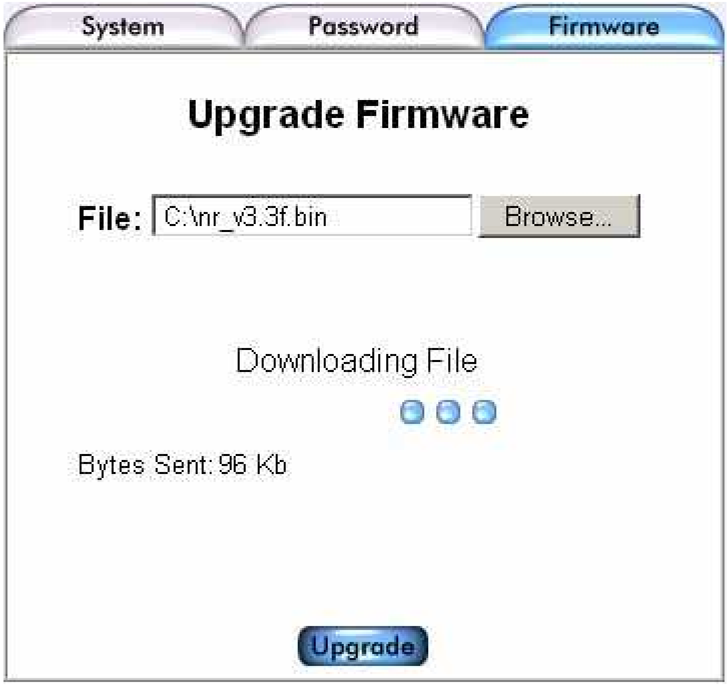
Figure 30: *NovaRoam* Configuration Firmware Tab

Option Name	Description
Please Specify a File	Use the Browse button to specify the location of the firmware file to be uploaded.
Upgrade	After specifying the location of the firmware file, press the Upgrade button to start the firmware upgrade process. **DO NOT** disturb the NovaRoam during the process, as doing so may require the NovaRoam to be returned to the factory to be repaired.

Firmware Upgrade Process

Use the Browse button to specify the location of the firmware file. After specifying the file, press the Upgrade button to begin the upgrade process.

After pressing the Upgrade button, the progress meter displays the file download progress.



Upgrade Firmware

File: C:\nr_v3.3f.bin

Downloading File

Bytes Sent: 96 Kb

Figure 31: File download progress

Upon completing the file download, an integrity check is performed on the firmware file. This is to insure that the firmware file is not corrupt.

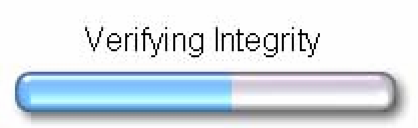

Verifying Integrity

Figure 32: Firmware file integrity check

Once file integrity has been verified, the current file system will be erased.

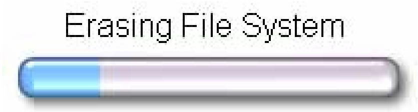

Erasing File System

Figure 33: Erasing current file system

Finally, the new file system will be written to the NovaRoam.

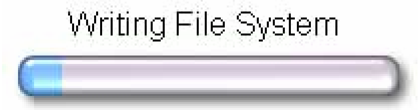
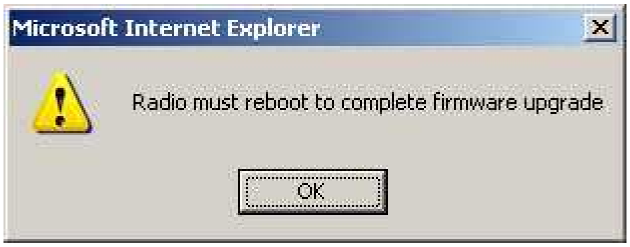

Writing File System

Figure 34: Writing new file system

To complete the upgrade, you will be prompted to reboot the NovaRoam.



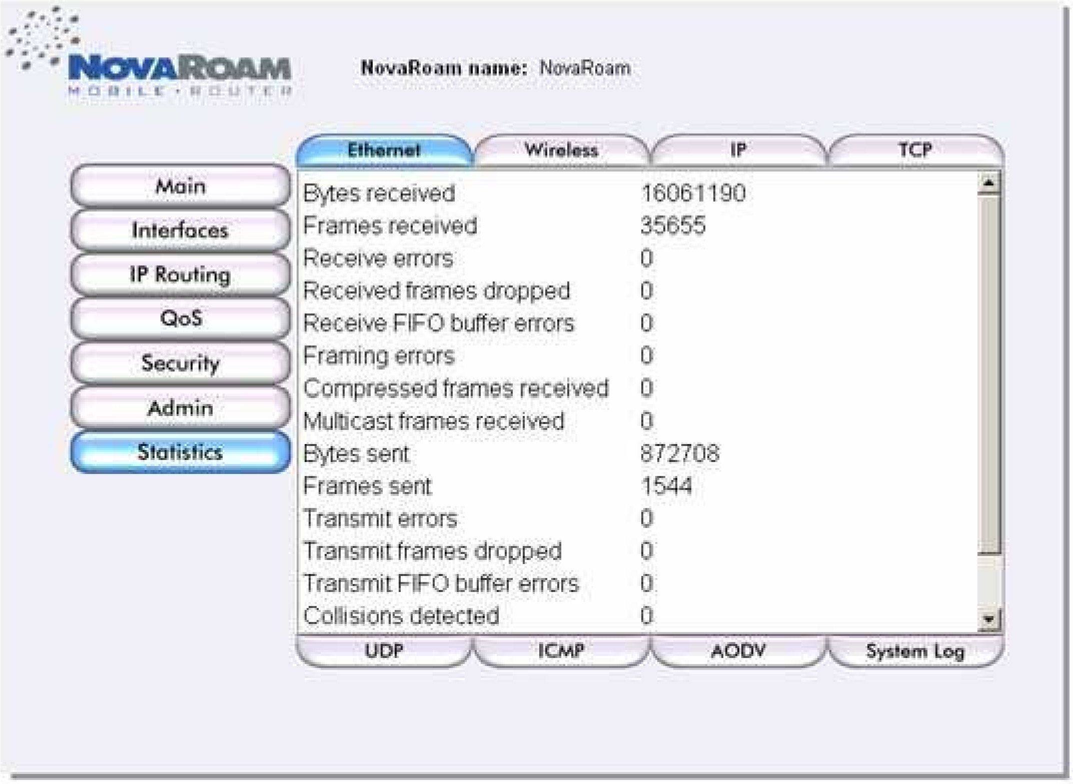
Radio must reboot to complete firmware upgrade

Figure 35: Prompt to reboot NovaRoam

After the NovaRoam reboots, the firmware upgrade process will be complete.

Statistics Page

The Statistics page displays *NovaRoam* statistics. Statistics are available for the wireless and Ethernet interfaces, as well as UDP, TCP, IP, ICMP and AODV statistics. The system log can be viewed from the Statistics page.


Main
Interfaces
IP Routing
QoS
Security
Admin
Statistics
Ethernet
Wireless
IP
TCP
UDP
ICMP
AODV
System Log

NovaRoam name: NovaRoam

Bytes received	16061190
Frames received	35655
Receive errors	0
Received frames dropped	0
Receive FIFO buffer errors	0
Framing errors	0
Compressed frames received	0
Multicast frames received	0
Bytes sent	872708
Frames sent	1544
Transmit errors	0
Transmit frames dropped	0
Transmit FIFO buffer errors	0
Collisions detected	0

Figure 36: *NovaRoam* Configuration Statistics Page

Option Name	Description
Main	Opens the Main configuration page
Interfaces	Opens the Interfaces configuration page
IP Routing	Opens the IP Routing configuration page
QoS	Opens the QoS (Quality of Service) configuration page
Security	Opens the Security configuration page
Admin	Opens the Admin configuration page

Option Name	Description
Statistics	Opens the Statistics page
Ethernet	Displays the Ethernet Interface statistics page
Wireless	Displays the Wireless Interface statistics page
IP	Displays the IP statistics page
TCP	Displays the TCP statistics page
UDP	Displays the UDP statistics page
ICMP	Displays the ICMP statistics page
AODV	Displays the AODV statistics page
System Log	Displays the System Log
NovaRoam Name	Displays the NovaRoam Name. The NovaRoam Name can be assigned to best suit your application.

Getting Help

NovaRoam Technical Support

World Wide Web:	http://www.novaroam.com
E-mail:	support@novaroam.com
FTP Server:	ftp://nova-eng.com
Voice:	+1-513-642-3020
Fax:	+1-513-642-3300

Before calling Nova Engineering, please have the following information ready:

- A description of the problem
- A description of any action(s) already taken to resolve the issue
- The hardware serial number and software version number
- A description of your network environment (IP addresses, route tables, layout, etc.)
- Application of network or products
- Network load at the time of trouble (if known)

Regulatory Information

FCC Warning

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

Any changes or modifications to this device without the express written consent of Nova Engineering, Inc. may void the user's authority to operate the device.

This device must be professionally installed. It is the responsibility of the installer to ensure that proper antenna and cable combinations are used in order to remain within FCC Part 15 limits.

The NovaRoam EH900 is specifically designed to close the longest possible links. This goal is accomplished in part by delivering the highest permissible RF output power to the antenna per the FCC Part 15 Rules. In August 1996, the FCC adopted RF exposure guidelines that established safety levels for various categories of wireless transceivers. Those limits are consistent with safety standards previously published by the National Council on Radiation Protection (NCRP) Report 86, §17.4.1, §17.4.1.1, §17.4.2, and §17.4.3 as well as the American National Standards Institute (ANSI) in §4.1 of "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3kHz to 300GHz," ANSI/IEEE C95.1-1992.

The NovaRoam EH900 complies with these FCC exposure guidelines when the following precautions are obeyed:

- Only install the exact antennas recommended in this User Manual.

- The cable run for the selected antenna must exceed the minimum length quoted in this User Manual.
- All persons must maintain a minimum separation of 12" (30.48cm) from any NovaRoam EH900 antenna.

You should disconnect the AC/DC input power source from the NovaRoam EH900 whenever repositioning the antenna. You are responsible for taking the necessary steps to ensure that these guidelines are communicated to all persons that may come near the NovaRoam EH900 antennas.

Class A digital devices

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device , pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial 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. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Table 3: Approved Antennas

Description	Part Number
+2.2 dBi flexible antenna	NR-AA-2900-T
Low profile magnetic mount mobile antenna	NR-AA-3900-T
+5.2 dBi magnetic mount collinear whip	NR-AA-5901M-T
+8.2 dBi omni, 60' LMR-400 cable	NR-AA-8900B-TN
+10.2 dBi Yagi, 105' LMR-400 cable	NR-AA-10900B-TN
+11.2 dBi Yagi, 130' LMR-400 cable	NR-AA-11900B-TN

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Appendix A: Example Network Plan

The use of private IP addresses is strongly recommended when configuring a *NovaRoam* network. The following example of a *NovaRoam* network uses several private IP subnets from the 192.168.0.0 block of private addresses.

The *NovaRoam* network depicted in Figure 37 contains three Ethernet segments. The first segment uses the 192.168.200.0 Class C subnet, encompassing a range of addresses from 192.168.200.1 to 192.168.200.254. The second segment uses the 192.168.201.0 Class C subnet, encompassing a range of addresses from 192.168.201.1 to 192.168.201.254. The third segment uses the 192.168.202.0 Class C subnet, encompassing a range of addresses from 192.168.202.1 to 192.168.202.254. All three segments share the 192.168.203.0 Class C subnet for their wireless interfaces. It is over this common subnet that traffic is routed between Ethernet segments.

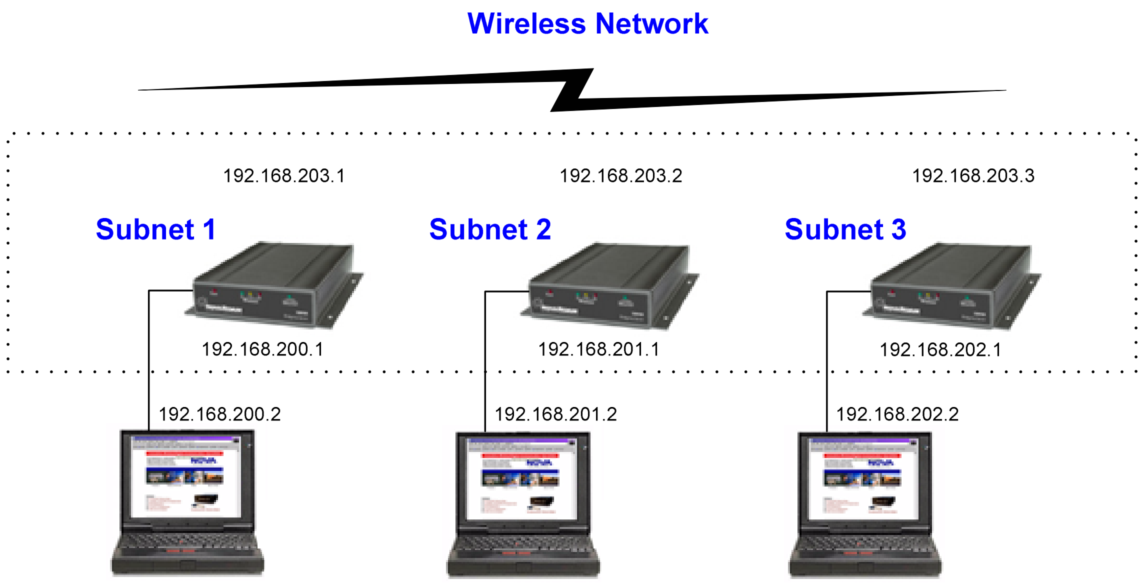
Wireless Network
192.168.203.1
192.168.203.2
192.168.203.3
Subnet 1
Subnet 2
Subnet 3
192.168.200.1
192.168.201.1
192.168.202.1
192.168.200.2
192.168.201.2
192.168.202.2

Figure 37: Multi-Network NovaRoam Example

Once the individual networks are established, it is recommended that you plan an IP addressing scheme. In the example from Figure 37, each *NovaRoam* host ID is 1, while the computer's host ID is 2. Following a numbering scheme such as this will make it easier to keep track of which IP addresses are used for each device.

The wireless network in the example uses the 192.168.203.0 subnet. This subnet is different than the subnets used for the Ethernet segments. The wireless interface of the *NovaRoam* from Subnet 1 is assigned an address of 192.168.203.1. The wireless interface of the *NovaRoam* from Subnet 2 is assigned an address of 192.168.203.2. The wireless interface of the *NovaRoam* from Subnet 3 is assigned an address of 192.168.203.3.

You may find it helpful to draw a diagram as a planning aid when designing your wireless network. Such a diagram will not only help in planning the networks, it will act as a handy reference guide.

Appendix B: Routing Options

The *NovaRoam Mobile Router* provides a wireless connection between two or more separate Ethernet subnets. Data is then routed between the Ethernet subnets. Route information can be entered manually, or can be handled automatically by AODV, the *NovaRoam's* Mobile Ad hoc Networking (MANET) algorithm.

Choosing Routing Mode

As a router, the *NovaRoam* provides a wireless connection between two or more separate Ethernet subnets. Data is then routed between the Ethernet subnets. Route information can be entered manually, or can be processed automatically by AODV, the *NovaRoam's* Mobile Ad hoc Networking (MANET) algorithm.

The type of network you are designing will help determine the best routing mode to use. If the network consists of stationary *NovaRoams* that are communicating either point-to-point or point-to-multipoint, choose “Off” for Ad Hoc Routing mode. This allows you to insert static routes for each NovaRoam and its connected network. If routes are not required to change dynamically, “Off” is likely the best Ad Hoc Routing mode to choose.

If the network consists of mobile *NovaRoams*, choose “AODV” for Ad Hoc Routing mode. This mode allows the *NovaRoams* to automatically find their neighbors and update their route tables to reflect this. AODV allows *NovaRoams* to quickly and dynamically update their route tables as the network topology changes. For environments in which routes are required to change dynamically, such as in a mobile environment, AODV is typically the best Ad Hoc Routing mode to choose.

A third option is Multihop mode. In Multihop mode, all packets originating from the *NovaRoam* are designated as multihop packets. Any *NovaRoam* receiving a multihop packet will automatically repeat the packet. Multihop mode can be used in conjunction with other routing modes.

Using Static Routes

Figure 38 is an example of a point-to-point *NovaRoam* network. In this example, Subnet 1 has been assigned the 192.168.1.0 Class C subnet, while Subnet 2 has been assigned the 192.168.2.0 Class C subnet. For the wireless network the 192.168.3.0 Class C subnet has been assigned.

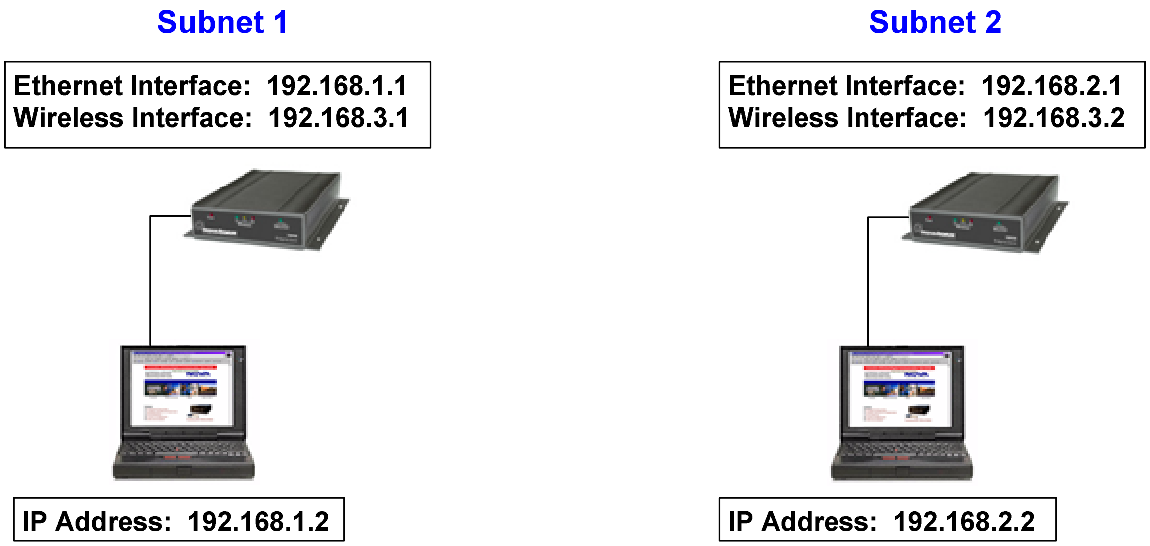
Subnet 1
Ethernet Interface: 192.168.1.1
Wireless Interface: 192.168.3.1
IP Address: 192.168.1.2
Subnet 2
Ethernet Interface: 192.168.2.1
Wireless Interface: 192.168.3.2
IP Address: 192.168.2.2

Figure 38: Example wireless network using *NovaRoams* with static routes

In order to route traffic between subnets, several things must happen. First, it is recommended that all hosts on a given subnet use the attached *NovaRoam* as their default gateway. As an alternative, manual routes can be entered within each host's routing table. Hosts from Subnet 1 will list 192.168.1.1 as their default gateway. It is also necessary to add static routes within each *NovaRoam*. The *NovaRoam* from Subnet 1 must have a static route to Subnet 2, using the wireless interface of the *NovaRoam* from Subnet 2 as the gateway. The route should be set up like this:

```
192.168.2.0     255.255.255.0     192.168.3.2    1
Network         Netmask           Gateway        Metric
```

It is recommended that all hosts from Subnet 2 use 192.168.2.1 as their default gateway. As an alternative, manual routes can be entered within each host's routing table. The *NovaRoam* from Subnet 2 must have a static route to Subnet 1, using the wireless interface of the *NovaRoam* from Subnet 1 as the gateway. This route should be set up like this:

```
192.168.1.0     255.255.255.0     192.168.3.1    1
Network         Netmask           Gateway        Metric
```

Note: It is important to understand that there are actually three subnets in this example: Subnet 1, Subnet 2, and the wireless network.

AODV

The *NovaRoam* uses a routing algorithm called AODV (Ad hoc On-demand Distance Vector) that works dynamically to establish and maintain routes. AODV is an "on demand" routing algorithm, meaning that it builds routes between nodes only as requested by source nodes. These routes are maintained only as long as required by the source nodes.

AODV creates routes using a route request / route reply query cycle. When a source node requires a route to a destination for which it does not already have a route, it broadcasts a route request (RREQ) packet across the wireless network. Nodes receiving this packet update their information for the source node and create reverse pointers to the source node in their route tables. A node that receives the RREQ will send a route reply (RREP) if it is either the destination or if it has a route to the destination with a corresponding sequence number greater than or equal to that contained in the RREQ. If this is the case, the node sends a

RREP back to the source node. Otherwise, it rebroadcasts the RREQ. Nodes keep track of the RREQ's source IP address and broadcast ID. If they receive a RREQ that has already been processed, they discard the RREQ and do not forward the packet.

As the RREP propagates back to the source, nodes create forward pointers to the destination. Upon receiving the RREP, the source node will begin forwarding data to the destination. If the source node later receives a RREP containing a greater sequence number or the same sequence number with a smaller hop count, it may update its routing information for that destination to use the better route.

Routes are maintained as long as they remain active. A route is considered active when data periodically travels from the source to the destination using the route. When the source stops sending data packets, the route will time out and eventually be deleted from the destination and intermediate node routing tables. If a link breakage occurs while the route is active, the node upstream of the break propagates a route error (RERR) message to the source node to inform it of the now unreachable destination(s). After receiving the RERR, the source node can reinitiate route discovery if the route is still required.

Figure 39 depicts an example of a simple network using AODV Routing. Subnets 1 and 2 are mobile subnets, while Subnet 3 is a fixed subnet on a wired network. With AODV Routing enabled, all subnets are able to communicate with each other. If Subnet 1 leaves the communications range of the Subnet 3, Subnet 1 automatically attempts to reach the fixed Subnet by routing packets through the Subnet 2.

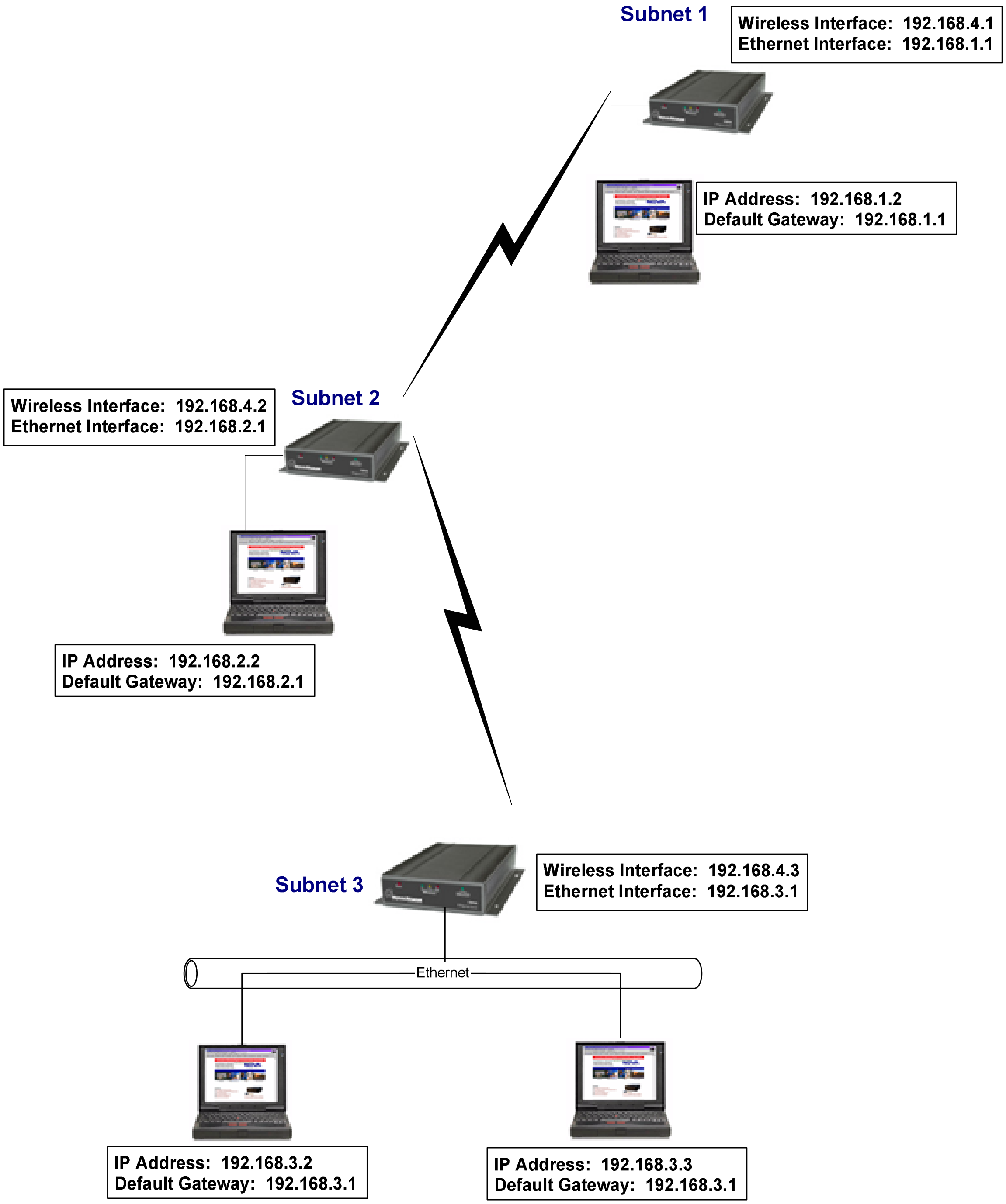
Subnet 1
Wireless Interface: 192.168.4.1
Ethernet Interface: 192.168.1.1
IP Address: 192.168.1.2
Default Gateway: 192.168.1.1
Wireless Interface: 192.168.4.2
Ethernet Interface: 192.168.2.1
Subnet 2
IP Address: 192.168.2.2
Default Gateway: 192.168.2.1
Subnet 3
Wireless Interface: 192.168.4.3
Ethernet Interface: 192.168.3.1
Ethernet
IP Address: 192.168.3.2
Default Gateway: 192.168.3.1
IP Address: 192.168.3.3
Default Gateway: 192.168.3.1

Figure 39: Example of Wireless Network using *NovaRoams* with AODV

Appendix C: Using NovaFind

NovaFind is a utility designed to discover *NovaRoams* on a network. After a *NovaRoam* has been located, you can obtain or change a *NovaRoam's* IP address or Netmask.

NovaFind does not require installation. Simply locate the NovaFind folder on the *NovaRoam* CD. Copy the file named NovaFind.exe to your local hard drive. NovaFind can also be run directly from the *NovaRoam* CD.

To Start NovaFind, double-click on NovaFind.exe. The NovaFind dialog box is displayed.

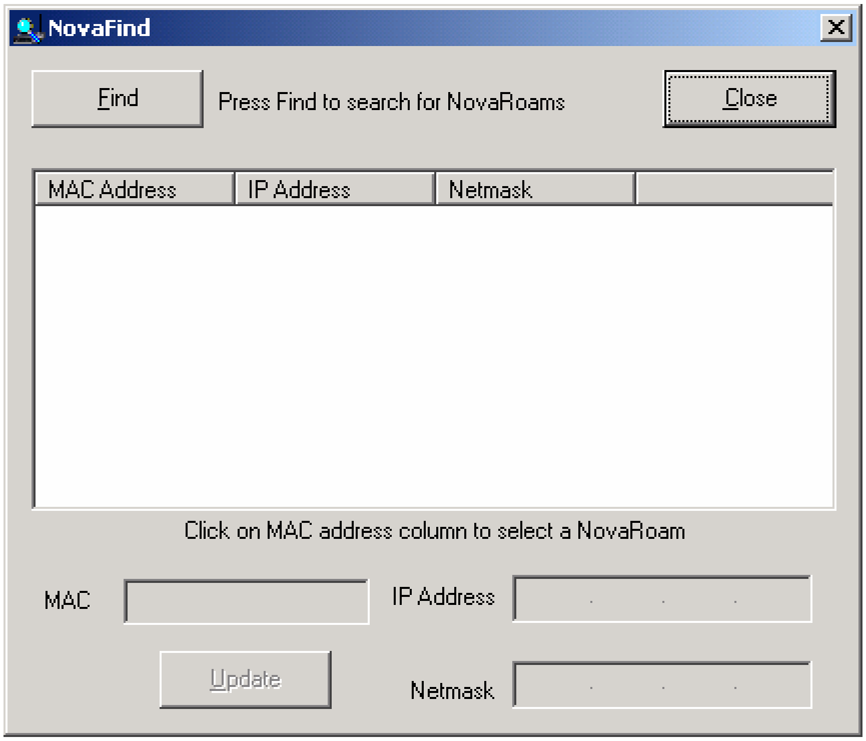
NovaFind
Find
Press Find to search for NovaRoams
Close
MAC Address
IP Address
Netmask
Click on MAC address column to select a NovaRoam
MAC
IP Address
Update
Netmask

Figure 40: NovaFind Dialog Box

Press the Find button. Any *NovaRoams* on the wired network will be displayed. *NovaRoams* will be listed by MAC address, current IP address, and Netmask. To select a *NovaRoam* from the list, click on the *NovaRoam* in the MAC address column. After selecting a *NovaRoam* from the list, the IP address or Netmask can be changed. Once selected, change the current IP address or Netmask to the desired address or Netmask in the appropriate fields. Pressing the Update button will commit the changes to the *NovaRoam*. After pressing the Update button, the *NovaRoam* will reboot. Press the Close button to close NovaFind.

Note: In order to connect to a *NovaRoam*, the *NovaRoam* and computer must have IP addresses that are from the same network. If you use NovaFind to change the IP address of a *NovaRoam*, you still will not be able to connect if both the *NovaRoam* and computer are not on the same network.

Note: NovaFind may not work on computers with more than one network interface card. NovaFind can be made to work in this situation by temporarily disabling the network card that is not connected to the *NovaRoam.*

Appendix D: Antenna/Cable Requirements

The NovaRoam EH900 must be installed by a professional in order to comply with FCC Part 15 radiated power limits. Furthermore, only antennas supplied by Nova Engineering may be used with the NovaRoam EH900.

The FCC mandates that the Effective Radiated Power (ERP) may not exceed +36 dBm. This is equivalent to a NovaRoam EH900 running at full output power (1 watt/+30 dBm) with a +6 dBi antenna. The antenna cable must have sufficient loss to push the ERP to below +36 dBm if a higher gain antenna is used. For example, using a +8 dBi antenna with the NovaRoam at full power would result in an ERP of +38 dBm. In this situation, the antenna cable must provide at least 2 dB of loss in order to bring the ERP into compliance.

The NovaRoam EH900 also features the ability to decrease the transmit power. Any decrease in output power should be considered when calculating ERP.

The following table provides the amount of loss incurred by several common types of antenna cable.

Table 4: Antenna Cable Loss

Type of Antenna Cable	Loss per 100’ of cable
LMR-400	3.9 dB
LMR-600	2.5 dB
LMR-900	1.7 dB

Table 5: Antenna/cable loss examples with LMR-400 cable

The following table assumes 1 watt output power from NovaRoam.

Antenna Gain	Cable Type/length/loss	ERP
+8.2 dBi	60’ LMR-400, 2.3 dB loss	+35.9 dBm
+10.2 dBi	110’ LMR-400, 4.3 dB loss	+35.9 dBm
+11.2 dBi	135’ LMR-400, 5.3 dB loss	+35.9 dBm

Table 6: Antenna/cable loss examples with LMR-600 cable

The following table assumes 1 watt output power from NovaRoam.

Antenna Gain	**Cable Type/length/loss**	**ERP**
+8.2 dBi	90’ LMR-600, 2.3 dB loss	+36.0 dBm
+10.2 dBi	170’ LMR-600, 4.3 dB loss	+36.0 dBm
+11.2 dBi	210’ LMR-600, 5.3 dB loss	+36.0 dBm

Table 5: Antenna/cable loss examples with LMR-900 cable

The following table assumes 1 watt output power from NovaRoam.

Antenna Gain	Cable Type/length/loss	ERP
+8.2 dBi	135’ LMR-900, 2.3 dB loss	+35.9 dBm
+10.2 dBi	250’ LMR-900, 4.3 dB loss	+36.0 dBm
+11.2 dBi	310’ LMR-900, 5.3 dB loss	+35.9 dBm

If using alternate cable types, always verify the cable loss prior to installation.

Warranty Information

Limited Warranty, Disclaimer, Limitation of Liability

For a period of one (1) year from the date of purchase by the retail customer, Nova Engineering warrants the *NovaRoam EH900* against defects in materials and workmanship. Nova Engineering will not honor this warranty if there has been any attempt to tamper with, modify, or repair the unit. This warranty does not cover and Nova Engineering will not be liable for any damage or failure caused by misuse, abuse, acts of God, accidents, or other causes beyond Nova Engineering's control, or claim by other than the original purchaser. If, after inspection, Nova Engineering determines there is a defect, Nova Engineering will repair or replace the NovaRoam at no cost to you. To return defective merchandise to Nova Engineering please call Technical Support 1-513-642-3020 to obtain a Return Merchandise Authorization (RMA) Number.

In no event shall Nova Engineering, Incorporated be responsible or liable for any damages arising:

- From the use of the product
- From the loss of use, revenue or profit of the product
- Because of any event, circumstance, action, or abuse beyond the control of Nova Engineering

Whether such damages be direct, indirect, consequential, special or otherwise and whether such damages are incurred by the person to whom this warranty extends or a third party.

Warranty Return Policy

If you have difficulty with your *NovaRoam* product, please call Nova Engineering Technical Support at 1-513-642-3020. Nova Engineering Technical Support will assist with resolving any technical difficulties you may have with your product. If after calling Nova Engineering Technical Support it is determined that your product is defective, you may return the product to Nova Engineering after obtaining an RMA (Return Materials Authorization) number. The product must be returned in its original packaging. The RMA number should be clearly marked on the outside of the box. Nova Engineering will not be held responsible for any product returned without an RMA number. No product will be accepted without an RMA number.

CAUTION

Changes or modifications to the *NovaRoam EH900* not expressly approved by Nova Engineering could void your authority to operate this equipment.

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