- **WLAN SSID** – The SSID being used by the wireless interface.
- **WLAN Channel** – The current wireless LAN channel being used.
- **WLAN MAC** – The MAC address of the WLAN interface.
- **WAN Link Status** – The state of the WAN link. If there is a WAN connection then this will show "Connected".
- **WAN Link Idle Time** – The time that the WAN link was idle i.e. total time PPP connection was idle.
- **WAN Link Up Time** – The time that the WAN link was in a connected state i.e. total time PPP connection is established.
- **WAN Link Signal Strength** – The last read signal strength for the WAN (CDMA) module obtained when the WAN module was not in data mode.
- **WAN Module ESN** – The ESN of the WAN module.
- **WAN Firmware Version** – The version of the WAN firmware currently running on the gateway.
- **WAN IP Address** – The IP address of the WAN interface.
- **WAN Default Gateway** – The IP address of the default Gateway for the current WAN connection.
- **WAN Subnet Mask** – The WAN Subnet Mask.

> If WAN IP Settings are **statically** configured, the **WAN IP Address**, **WAN Default Gateway** and **WAN Subnet Mask** fields display the values configured on the WAN->IP Settings page. For **dynamic** WAN IP settings, the **WAN IP Address**, **WAN Default Gateway** and **WAN Subnet Mask** fields will only get set once the **WAN Link** is in the **Connected s**tate.

- **WAN DNS Server 1** – The first DNS server IP address.
- **WAN DNS Server 2** – The second DNS server IP address.
- **WAN DNS Server 3** – The third DNS server IP address.
- **DHCP Server Status** – The status of the DHCP server (Enabled / Disabled).

**Special Buttons**:

| Summary | Displays the Summarized status Information. |

Administration-> Support Server Registration

This function allows the Motorola Cellular Gateway NC800 to register itself with a remote support server. If an acknowledgement to the HTTP Post message is not received, the Motorola Cellular Gateway NC800 periodically re-sends the message until the acknowledgement is received.
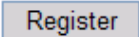
> The support server registration URL will be provided to you by the Cellular Carrier or ISP if it has not been configured by default on the Motorola Cellular Gateway NC800.
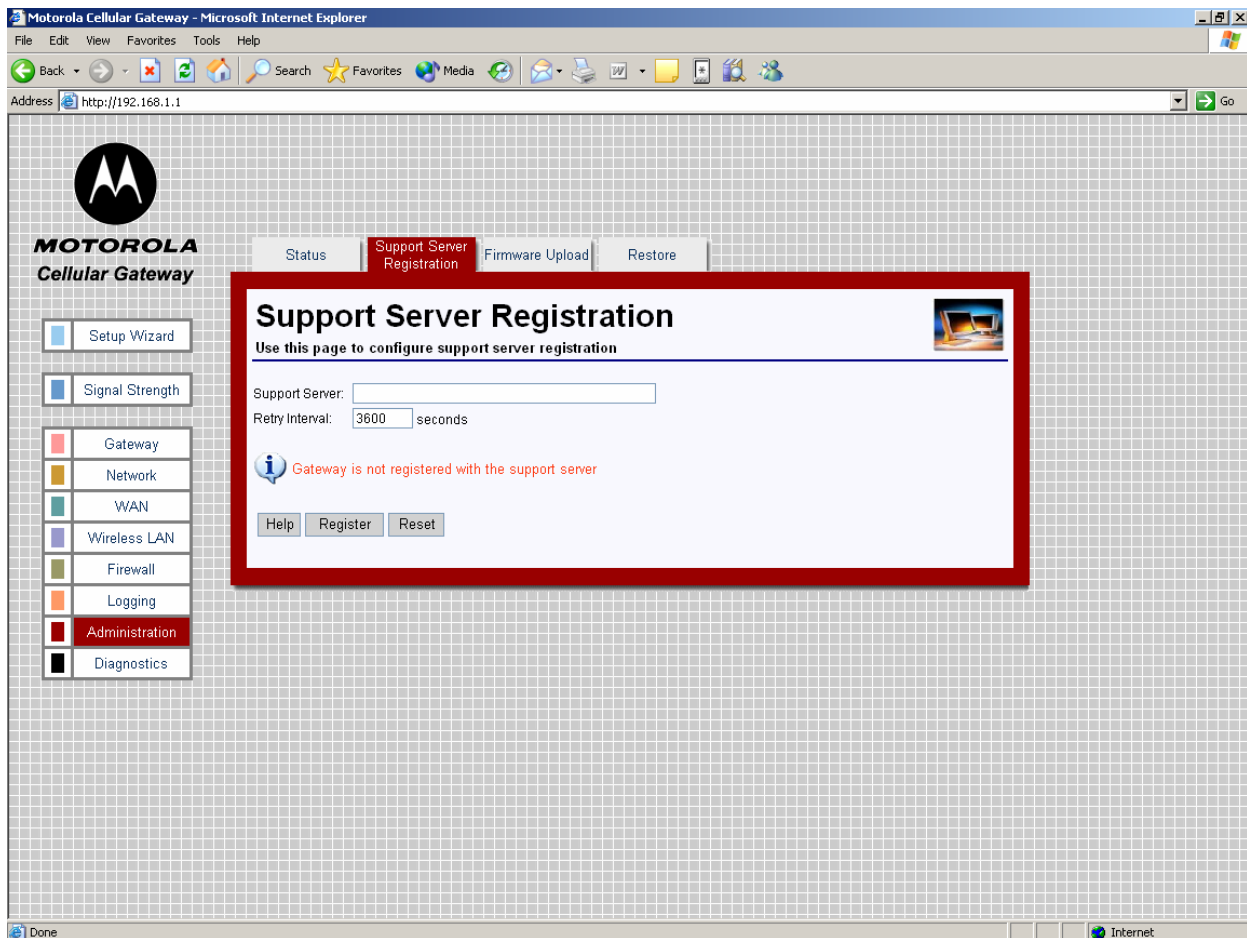
- **Support Server** – The URL of the support server registration script. You should set this to be: http://<IP>/Moto3G/gateway_register.asp where <IP> is the IP address of the server that is running the statistics logging script and **Moto3G** is the name of the directory on the web server where the script is stored. Maximum of 4095 characters beginning with the string "http://". The Registration Server can be located anywhere on the Internet.
- **Retry Interval** – Period between 60 and 65535 seconds at which the Post message is resent in case of failure.

Special Buttons:

   Initiates the contact with the Support Server

Administration-> Firmware Upload

You have two options to upgrade the firmware of the Motorola Cellular Gateway NC800:

- Use Firmware Upgrade screen in the web-based configuration utility.
- Use a TFTP client.

See Appendix D for more information on using a TFTP client to upgrade the Motorola Cellular Gateway NC800 firmware.
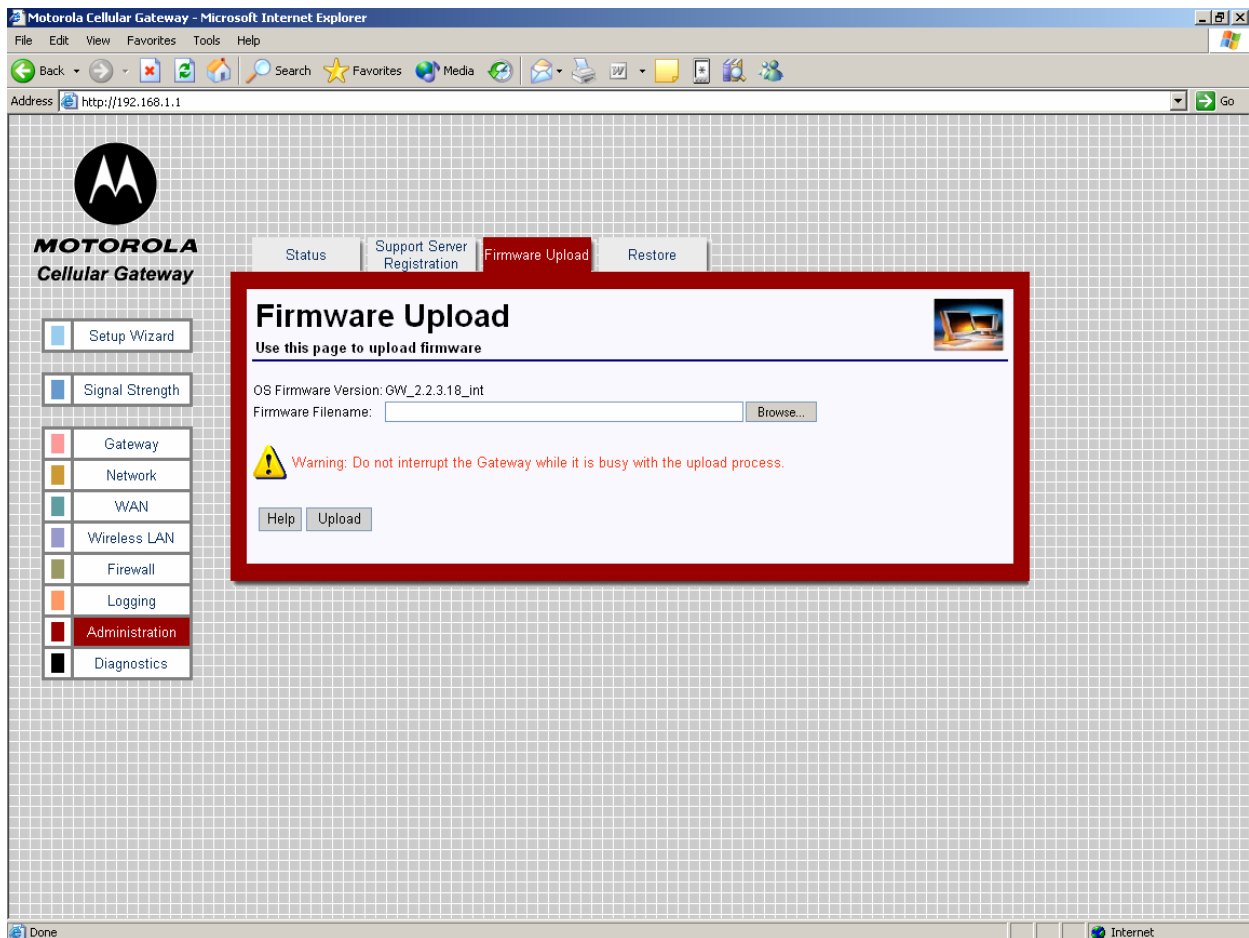

Web-based firmware upload:

- **OS Firmware Version** – Current version of operating system in the Motorola Cellular Gateway NC800.
- **Firmware Filename** – URL of the new firmware image file. Click on the "Browse" button to browse to the image file on your machine. Firmware files are files having a **.trx** extension – for example **linux.trx** is a valid firmware filename. Typically, firmware files are roughly 2.5 MB in size, however, this may differ for newer versions of the firmware.
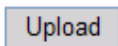
⚠️ **Warning:** Do NOT interrupt the upload process. Doing so may cause the firmware in the Motorola Cellular Gateway NC800 to become corrupted. If this happens your only option is to use a TFTP client to repair the firmware. See Appendix D for more information on using a TFTP client to upgrade the Motorola Cellular Gateway NC800's firmware.

Special Buttons:
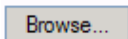
Browse...	Allows the user to browse the local computer file system for a file to upload.
Upload	Once you have selected a new firmware file to download to the Motorola Cellular Gateway NC800, click on the **Upload** button. The upload process takes a few minutes to complete. The Motorola Cellular Gateway NC800 will let you know when the upload has completed. After the upload, the Motorola Cellular Gateway NC800 automatically reboots using the new firmware.

Administration-> Restore

If you want to restore the Motorola Cellular Gateway NC800's factory default settings you can do this via the Web Configuration utility.

- • **Restore Defaults** – When **Enabled** the Motorola Cellular Gateway NC800 will restart with the Default Settings when the **Restart** button is pressed.

    Special Buttons:

    Restart   Click on the button to restart the Motorola Cellular Gateway NC800. If the Restore Defaults parameter is **Enabled,** the Motorola Cellular Gateway NC800's defaults are restored. The process will take approximately 10 seconds to complete.

    ⚠   **Warning:** Any settings you have saved will be lost if the default settings are restored.
    Please note – the Motorola Cellular Gateway NC800's IP address reverts back to the default of **192.168.1.1** so you will need to point your browser to that address after the restore

Diagnostics

There are two pages in the Diagnostics category:

Diagnostics-> Internet Access   This page is used to troubleshoot problems related to Internet Access.

Diagnostics-> LAN Access   This page is used to troubleshoot problems related to LAN Access.

Diagnostics-> Internet Access

This page allows the user to debug errors related to CDMA coverage, CDMA network registration and status, establishment of a PPP connection, IP routing, and DNS lookup.
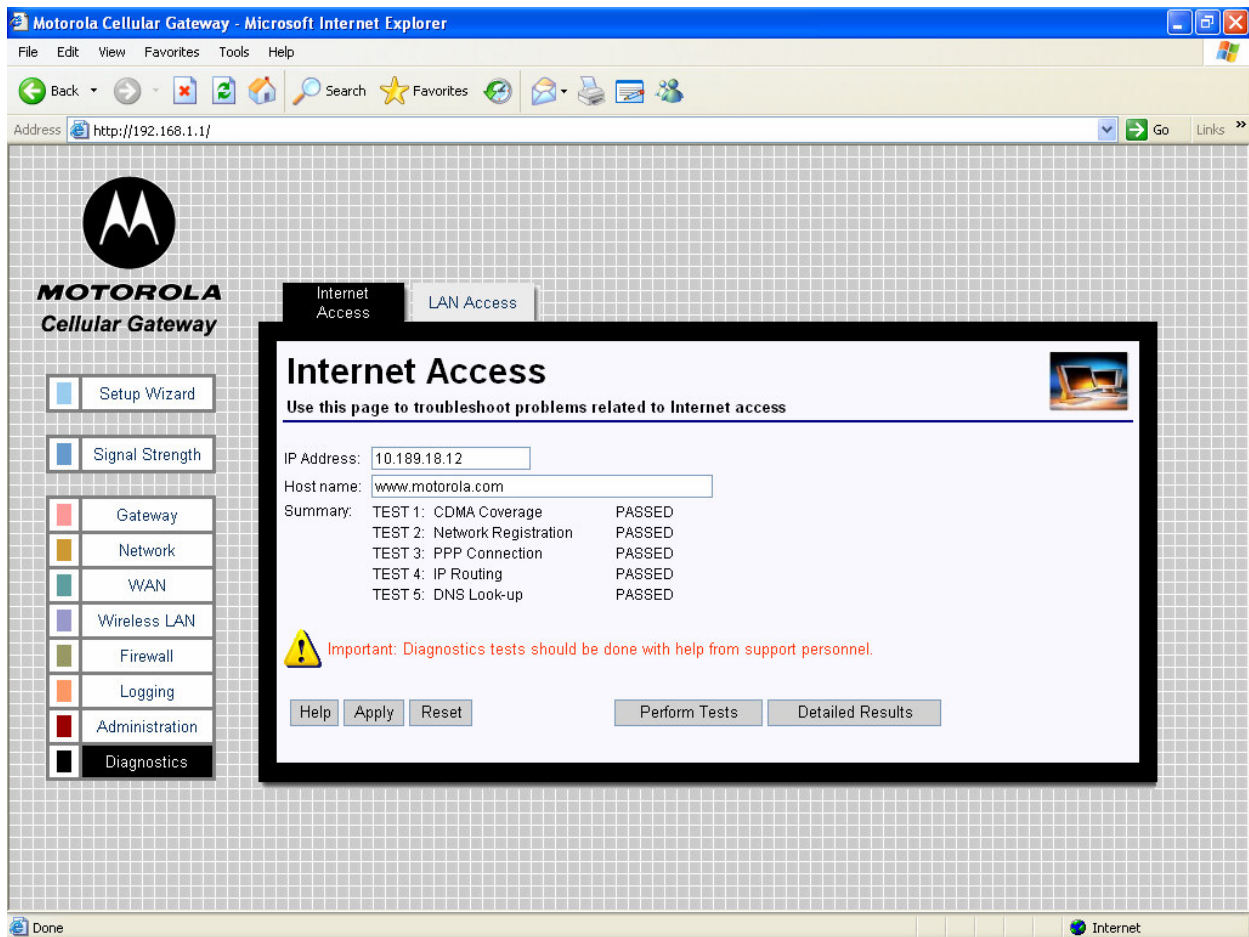
- **IP Address** – Sets the IP address to use for the IP routing diagnostics test.
- **Host name** – The name of the target server that is used to verify the DNS lookup during the diagnostics test.

  Special Buttons:

  Perform Tests   Let the Motorola Cellular Gateway NC800 perform the tests
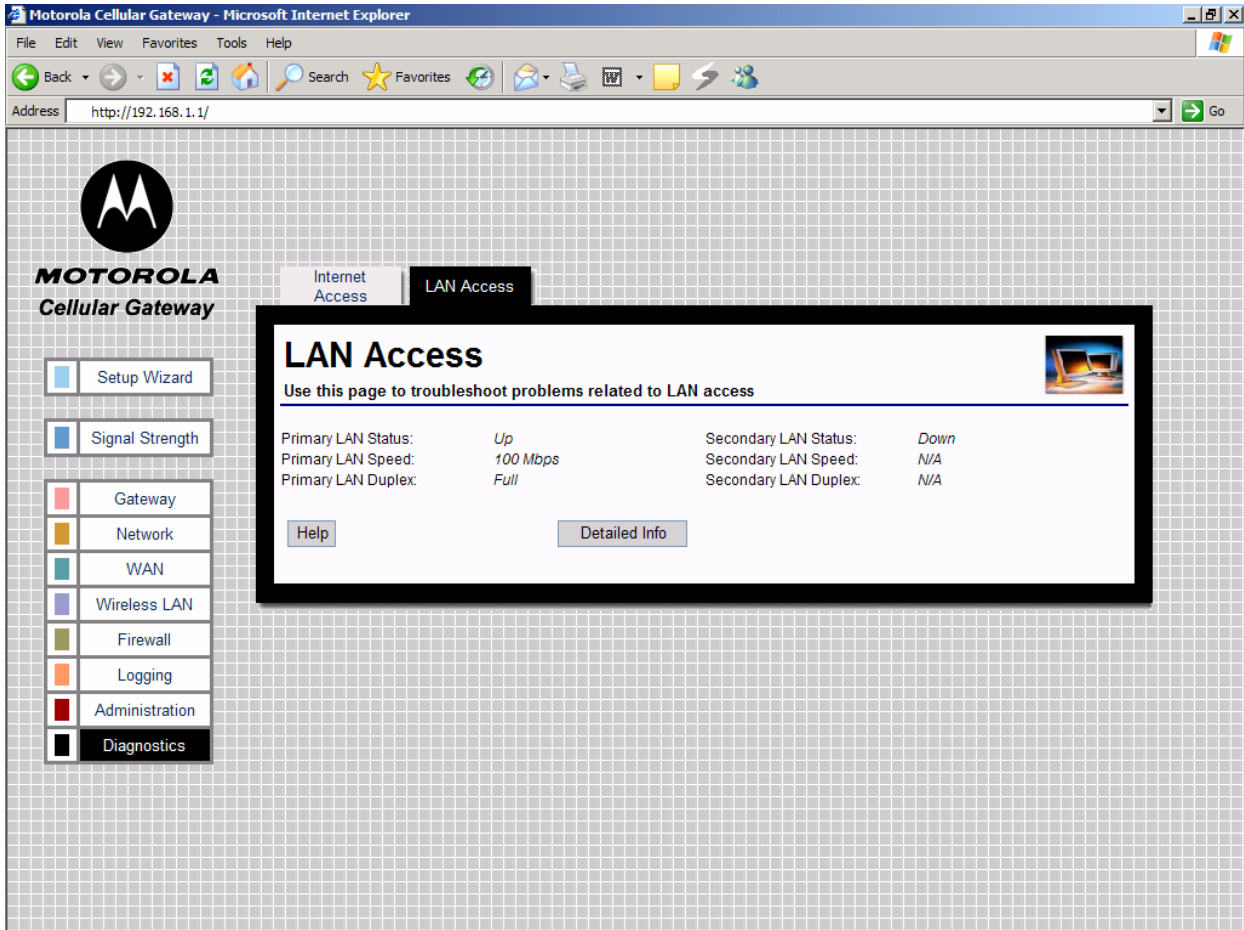
  Detailed Results   Display the results of the tests

Important: Diagnostics tests should be done with help from support personnel. The detailed results page is not intended for the home user.

Diagnostics-> LAN Access

This page allows the user to debug errors related to LAN access.

This screen displays the summarized info of the LAN status.

Special Buttons:
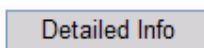
   Display the detailed information about the LAN.

Important: Diagnostics tests should be done with help from support personnel. The detailed information page is not intended for the home user.

Appendix A: Motorola Limited Warranty

What Does this Warranty Cover?

Subject to the exclusions contained below, Motorola, Inc. warrants its Cellular Gateway NC800s, Motorola-branded or certified accessories sold for use with these Products ("Accessories") and Motorola software contained on CD-ROMs or other tangible media and sold for use with these Products ("Software") to be free from defects in materials and workmanship under normal consumer usage for the period(s) outlined below.

This limited warranty is a consumer's exclusive remedy, and applies as follows to new Motorola Products, Accessories and Software purchased by consumers, which are accompanied by this written warranty:

Products and Accessories
Products Covered Length of Coverage Products and Accessories as defined above, unless otherwise provided below.

One (1) year from the date of purchase by the first consumer purchaser of the product unless otherwise provided for below.

Exclusions
Normal Wear and Tear. Periodic maintenance, repair and replacement of parts due to normal wear and tear are excluded from coverage.

Abuse & Misuse. Defects or damage that result from: (a) improper operation, storage, misuse or abuse, accident or neglect, such as physical damage (cracks, scratches, etc.) to the surface of the product resulting from misuse; (b) contact with liquid, water, rain, extreme humidity or heavy perspiration, sand, dirt or the like, extreme heat, or food; (c) use of the Products or Accessories for commercial purposes or subjecting the Product or Accessory to abnormal usage or conditions; or (d) other acts which are not the fault of Motorola, are excluded from coverage.

Use of Non-Motorola Products and Accessories. Defects or damage that result from the use of Non-Motorola branded or certified Products, Accessories, Software or other peripheral equipment are excluded from coverage.

Products and Accessories that are Repaired or Replaced. The balance of the original warranty or for ninety (90) days from the date returned to the consumer, whichever is longer.

Products Covered Length of Coverage Unauthorized Service or Modification. Defects or damages resulting from service, testing, adjustment, installation, maintenance, alteration, or modification in any way by someone other than Motorola, or its authorized service centers, are excluded from coverage.

Altered Products. Products or Accessories with (a) serial numbers or date tags that have been removed, altered or obliterated; (b) broken seals or that show evidence of tampering; (c) mismatched board serial numbers; or (d) nonconforming or non-Motorola housings, or parts, are excluded from coverage.

Communication Services. Defects, damages, or the failure of Products, Accessories or Software due to any communication service or signal you may subscribe to or use with the Products Accessories or Software is excluded from coverage.

Software Exclusions
Software Embodied in Physical Media. No warranty is made that the software will meet your requirements or will work in combination with any hardware or software applications provided by third parties, that the operation of the software products will be uninterrupted or error free, or that all defects in the software products will be corrected.

Software NOT Embodied in Physical Media. Software that is not embodied in physical media (e.g. software that is downloaded from the internet), is provided "as is" and without warranty.

Products Covered Length of Coverage Software. Applies only to physical defects in the media that embodies the copy of the software (e.g. CD-ROM, or floppy disk). **Ninety (90) days** from the date of purchase.

Who Is Covered?

This warranty extends only to the first consumer purchaser, and is not transferable.

What Will Motorola Do?

Motorola, at its option, will at no charge repair, replace or refund the purchase price of any Products, Accessories or Software that does not conform to this warranty. We may use functionally equivalent reconditioned/refurbished/pre-owned or new Products, Accessories or parts. No data, software or applications added to your Product, Accessory or Software will be reinstalled.

How to Obtain Warranty Service or Other Information

Please review the website and/or phone numbers listed below for the product with which they are used. You will receive instructions on how to ship the Products, Accessories or Software, at your expense, to a Motorola Authorized Repair Center. To obtain service, you must include: (a) a copy of your receipt, bill of sale or other comparable proof of purchase; (b) a written description of the problem; (c) the name of your service provider, if applicable; (d) the name and location of the installation facility (if applicable) and, most importantly; (e) your address and telephone number.

www.hellomoto.com
Select "Services"

Latin America:
Centro de Atencion Motorola
Argentina: 0800-666-8676
Chile: 0800-201-442
Columbia: 01-800-700-1504
Mexico: 01-800-021-0000
Peru: 0-800-52-470
Venezuela: 0800-100-4289

Brazil:
Motorola Industrial Ltda.
Rodovia SP-340 - km 128,7 - Bairro Tanquinho
CEP 13820-000 - JaguariŽ na - SP
Central de Relacionamento Motorola
Capitais e Regiões Metropolitanas: 4002-1244
Demais Localidades: 0800-773-1244

North America
Canada: 800-461-4575
US: 800-331-6456

Hong Kong
(852) 2506-3888

China
800-810-5050

For **Accessories** and **Software**, please review the website and/or phone numbers listed above for the product with which they are used. You will receive instructions on how to ship the Products, Accessories or Software, at your expense, to a Motorola Authorized Repair Center. To obtain service, you must include: (a) a copy of your receipt, bill of sale or other comparable proof of purchase; (b) a written description of the problem; (c) the name of your service provider, if applicable; (d) the name and location of the installation facility (if applicable) and, most importantly; (e) your address and telephone number.

What Other Limitations Are There?

ANY IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATION THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, SHALL BE LIMITED TO THE DURATION OF THIS LIMITED WARRANTY, OTHERWISE THE REPAIR, REPLACEMENT, OR REFUND AS PROVIDED UNDER THIS EXPRESS LIMITED WARRANTY IS THE EXCLUSIVE REMEDY OF THE CONSUMER, AND IS PROVIDED IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED. IN NO EVENT SHALL MOTOROLA BE LIABLE, WHETHER IN CONTRACT OR TORT (INCLUDING NEGLIGENCE) FOR DAMAGES IN EXCESS OF THE PURCHASE PRICE OF THE PRODUCT, ACCESSORY OR SOFTWARE, OR FOR ANY INDIRECT, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES OF ANY KIND, OR LOSS OF REVENUE OR PROFITS, LOSS OF BUSINESS, LOSS OF INFORMATION OR DATA, SOFTWARE OR APPLICATIONS OR OTHER FINANCIAL LOSS ARISING OUT OF OR IN CONNECTION WITH THE ABILITY OR INABILITY TO USE THE PRODUCTS, ACCESSORIES OR SOFTWARE TO THE FULL EXTENT THESE DAMAGES MAY BE DISCLAIMED BY LAW.

Some states and jurisdictions do not allow the limitation or exclusion of incidental or consequential damages, or limitation on the length of an implied warranty, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights that vary from state to state or from one jurisdiction to another.

Laws in the United States and other countries preserve for Motorola certain exclusive rights for copyrighted Motorola software such as the exclusive rights to reproduce and distribute copies of the Motorola software. Motorola software may only be copied into, used in, and redistributed with, the Products associated with such Motorola software. No other use, including without limitation disassembly of such Motorola software or exercise of the exclusive rights reserved for Motorola, is permitted.

Information from the World Health Organization

Present scientific information does not indicate the need for any special precautions for the use of mobile phones. If you are concerned, you may want to limit your own or your children's RF exposure by limiting the length of calls or by using handsfree devices to keep mobile phones away from your head and body.
Source: WHO Fact Sheet 193
Further information: http://www.who.int./peh-emf

Product Registration

Online Product Registration: http://www.motorola.com/warranty
Product registration is an important step toward enjoying your new Motorola product. Registering helps us facilitate warranty service, and permits us to contact you should your product require an update or other
service. Registration is for U.S. residents only and is not required for warranty coverage. Please retain your original dated sales receipt for your records. For warranty service of your Motorola Product you will need to provide a copy of your dated sales receipt to confirm warranty status. Thank you for choosing a Motorola product.

Appendix B: Troubleshooting

This section discusses possible problems and outlines possible solutions.

1. I cannot access the Motorola Cellular Gateway NC800's web-based Configuration utility.
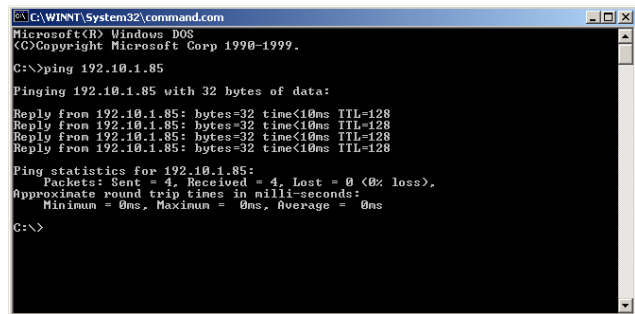
It is recommended, but not required, that you configure the Motorola Cellular Gateway NC800 via a computer that is directly connected to the Motorola Cellular Gateway NC800's LAN interface.

- Check that the Motorola Cellular Gateway NC800 is properly installed and is powered ON.
- Check that there is a network connection between the Motorola Cellular Gateway NC800 and the computer that is being used to configure the Motorola Cellular Gateway NC800.
  - o Check that the computer is connected to the Motorola Cellular Gateway NC800, either directly or via another network path for example via a hub or a switch.
  - o Check that the computer's Ethernet adapter is working correctly.
    - ▪ Ensure that the drivers for the network adapters are installed correctly.
    - ▪ Check the status of the network connection. It should say "connected" or indicate the speed of the connection e.g. 10 Mbps or 100 Mbps.
  - o Check that the PC's IP address is in the same range and subnet as that of the Motorola Cellular Gateway NC800.
  - o Try to ping the Motorola Cellular Gateway NC800 to make sure that it is responding. Open a command console window (Go to **Start -> Run.** Type in **cmd** (if you are using Windows 98 / ME type in **command**). When the console window opens, type in **ping 192.168.1.1**. If you have changed the IP address of the Motorola Cellular Gateway NC800 then use that address instead. The Motorola Cellular Gateway NC800 should respond with four replies.
- Check the Security Level set on the Browser. Depending on the browser, a High Security Level might prevent Javascripts from being executed on the PC. On the browser configuration, set the Internet Security to Low and ensure that Javascripting is enabled.

A quick way to check a network connection is to use the **ping** command. Type in **ping xxx.xxx.xxx.xxx** where xxx is the IP Address that you want to test. The command then sends test packets to the destination address. If there exists a network connection to the address, you should see four replies.
Be sure to use the correct IP address.

2. How do I check that my LAN Ethernet adapter is working correctly?

- Select **Control Panel** from **My Computer**. Go to **Network Connections** and double-click on the Ethernet Adapter.
- If your network card is working correctly:
  - o The Status will be **Connected.**
  - o The Sent and Received byte counter will increase as data is sent and received via the network adapter.

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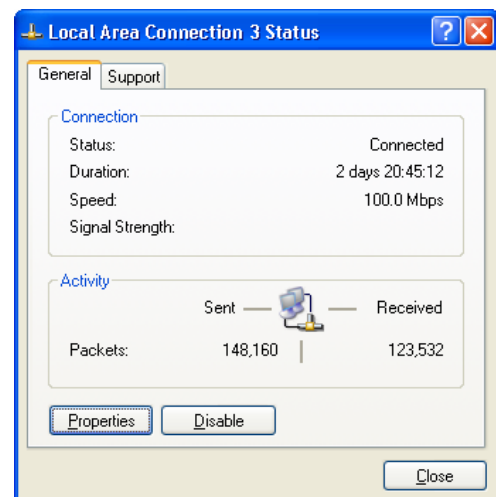
3. I cannot establish a wireless connection to the Motorola Cellular Gateway NC800.

Please consult the user guide of your computer's WLAN adaptor when configuring any of the settings discussed below.

- Check that you are using the same SSID and channel number as the Motorola Cellular Gateway NC800. If either one is not the same then the wireless data packets will be ignored by the Motorola Cellular Gateway NC800.
- If the Motorola Cellular Gateway NC800 is set to use WEP encryption then ensure that the wireless adapter on the client is also set accordingly. Make sure the encryption level (i.e. whether a 64-bit or 128-bit key is used) is set to the same level on both the client and the Motorola Cellular Gateway NC800. Also check that the encryption keys are the same.

4. My wireless LAN connection is being dropped intermittently.

- Please refer to the **Installation Considerations** section for more information on how to optimally position wireless network devices.
- Check the antenna orientation on the Motorola Cellular Gateway NC800.
- Check to see if other electronic equipment is not interfering with the wireless data transmissions.
- Use the laptop or workstation's signal strength indicator to see what the signal strength is at the current location. It could be that the signal strength is just too low for a reliable connection. In this case you need to move the wireless adapter closer to the Motorola Cellular Gateway NC800 for increased signal strength.

5. The network is configured correctly, but the Motorola Cellular Gateway NC800 is not responding

- Check to see if any of the lights (LEDs) on the Motorola Cellular Gateway NC800 are flickering at all.
- If the is no flickering for an extended period of time then you can try to reset the Motorola Cellular Gateway NC800 by pressing the **Reset** button at the back of the Motorola Cellular Gateway NC800. Do not hold the Reset button in, only press it once and release it again. This will reset the Motorola Cellular Gateway NC800.

6. I do not know the IP address / User name / Password of the Motorola Cellular Gateway NC800 anymore.

In some cases, the IP address / User Name / Password of the Motorola Cellular Gateway NC800 may not be known anymore, making it impossible to connect to the web-based Configuration Utility.

- After you have tried all other methods of trouble shooting, you can restore the Motorola Cellular Gateway NC800's factory default settings.
  - o Locate the Reset button on the back of the Motorola Cellular Gateway NC800.
  - o Press the Reset button and hold it down for 10 seconds.
  - o Release the Reset button.
  - o The Motorola Cellular Gateway NC800 will reboot and all the settings will be set according to the factory default settings.
  - o You will have to redirect any open web browser to the Motorola Cellular Gateway NC800's default IP address: 192.168.1.1, using the default user name (admin) and password (admin).

7. When using DHCP on the LAN interface, the IP address that my computer receives is not correct.

- Ensure that there is no other DHCP server active on the same LAN segment that the Motorola Cellular Gateway NC800 is located on. If more than one DHCP server is active on your network you could see that some computers receive IP addresses from the first DHCP server and the rest of the computers from the next. This will cause major network problems and should be avoided by only having ONE DHCP server active on a network.
- Check that the Motorola Cellular Gateway NC800's DHCP starting and ending DHCP IP address ranges are correct.

8. I cannot connect to the Internet via the Motorola Cellular Gateway NC800.

- If your Cellular Carrier or ISP is using PPP, then check that the **WAN-> PPP Config** settings are configured correctly.
- Try to ping the WAN Interface port IP address.
- Try to ping your ISP's default Motorola Cellular Gateway NC800 – check to see if the modem's activity lights are flickering when you do this.
- Try to ping a well-known Internet IP address such as www.motorola.com.

9. I need to access the Motorola Cellular Gateway NC800's configuration remotely.

To access the Motorola Cellular Gateway NC800's web-based configuration utility from the Internet you need to:
- Under **Gateway-> Login Settings** specify a Gateway WAN Port.
- A good value to use is 8080.
- To open the web-based utility, open a browser to http://<IP>:8080 where <IP> is the IP address of the Motorola Cellular Gateway NC800's WAN Interface.
- You get the WAN Interface IP address from the **WAN->IP Settings** pages.
- When prompted, type in the same username and password that you would normally use when opening the web-based configuration utility.

10. I do not see the full 54 Mbps throughput when using the wireless interface.

As with any wireless protocol, 802.11g has overhead associated with it that limits performance. While signaling data rates of up to 54 Mbps may be achieved, like most shared media (e.g. Ethernet) throughput will be significantly less.

There are two scenarios for 802.11g performance. In an environment with only 802.11g clients, throughput of up to 23 Mbps is expected. This performance is equal to that of 802.11a, although 802.11g is usually available over a greater range - distance - from the Motorola Cellular Gateway NC800. The second scenario is when 802.11b clients are present. RTS/CTS flow control (a signaling technique used by the 802.11 standard) must be used to allow 802.11b clients to recognize and establish communications with 802.11g access points. This leads to delays in transmission and drops peak throughput to about 10 Mbps. 802.11g performance is still well in excess of the maximum measured speeds of 4-5 Mbps for 802.11b.

The use of RTS/CTS is important because it provides determinism to the wireless network, ensuring a minimum bandwidth for each user. Like Ethernet, 802.11 LANs normally use a "carrier sense media access" mechanism to signal transmission without asking for permission from the network. As the network becomes highly loaded, collisions occur more frequently, and the network can become saturated with packet retransmission attempts that eventually make it impossible for any data to get through. RTS/CTS provide a more formalized flow-control mechanism that avoids this problem.

For optimal throughput keep the following in mind:
- Refer to the section on "Installation Considerations" for information on how to optimally position the Motorola Cellular Gateway NC800.
- Do not connect more than 32 wireless clients to the Motorola Cellular Gateway NC800. Rather spread the wireless clients over more than one Motorola Cellular Gateway NC800.
- Try to keep the number of 802.11b wireless clients to a minimum. The Motorola Cellular Gateway NC800 is compatible with 802.11b clients, but this degrades the overall wireless performance of the network. If at all possible, try to use only 802.11g wireless adapters in your network.

---

11. I need to set a static IP address on a PC.

The Motorola Cellular Gateway NC800 provides a DHCP server that automatically assigns IP numbers to PCs on the network. Sometimes, you need to assign a specific IP address to a computer e.g. when you want to configure a DMZ Host.

To assign a static IP address to a PC:

For Windows 98 and ME:

1. Click on the [Start] button. Select **Settings**->**Control Panel**.

2. Double click on the Network icon.

3. In the Network dialog box, select the TCP/IP for the applicable Ethernet adapter. Click on the **Properties** button.

4. Select the **IP Address** tab. Select **Specify an IP address.**
5. Choose an IP address that is in the same subnet as the Motorola Cellular Gateway NC800. If you are using the Motorola Cellular Gateway NC800's default IP address of 192.168.1.1 then you have to choose an IP address in the **192.168.1.x** range.
6. Type in a subnet mask. In most cases this will be **255.255.255.0**.
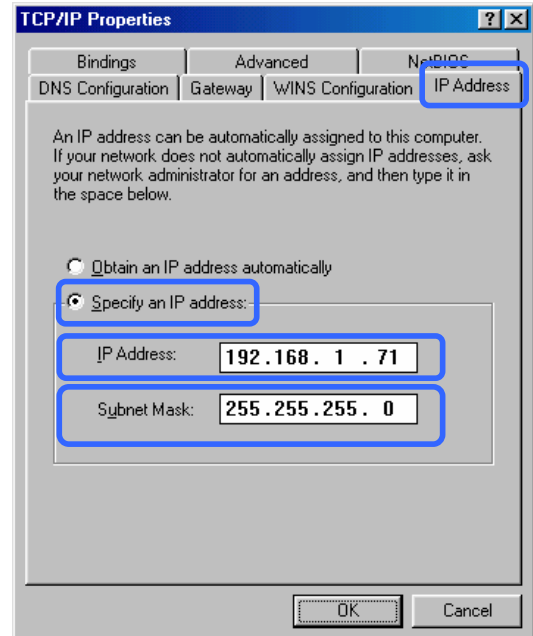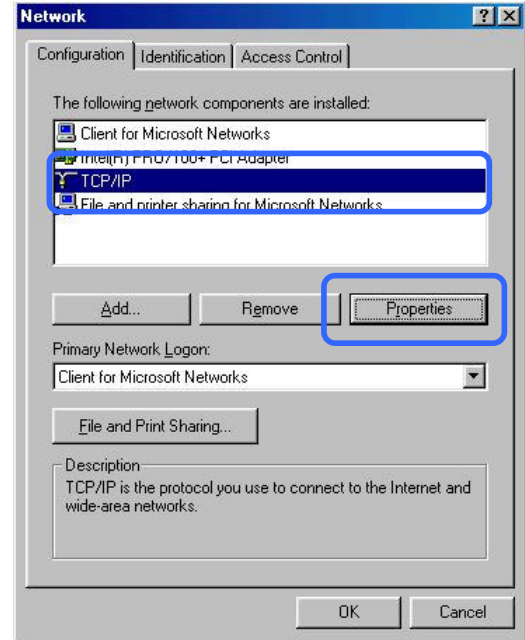
7. Click on the **Gateway** tab.
8. Type in the Motorola Cellular Gateway NC800's IP address in the **New Gateway** field and click on **Add**.
9. Click on **OK** to apply your changes and to close the dialog box.
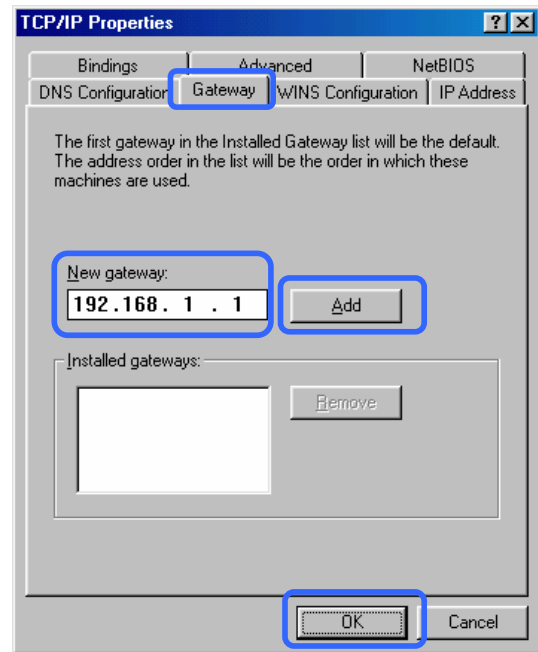
For Windows 2000 and XP:

1. Click on the **Start** button. Select **Settings->Control Panel**. Double click on **Network and Dial-up Connections**.
2. Double click on the **Local Area Connection** for the applicable Ethernet adapter.
3. The **Local Area Connection Status** dialog box are displayed:
4. Click on the **Properties** button.
5. Ensure that the check box next to **Internet Protocol (TCP/IP)** is selected. Select **Internet Protocol (TCP/IP)** and click on the **Properties** button.
6. Select "**Use the following IP address**". Type in a unique IP address that is not used by any other computer on the network.
7. Type in a **subnet mask**, e.g. 255.255.255.0.
8. Type in the **Default Gateway** for this computer. In most cases this should be the IP address of the Motorola Cellular Gateway NC800. If you are using the Motorola Cellular Gateway NC800's default IP address this will be **192.168.1.1**.
9. Select "**Use the following DNS server addresses**". Type in the IP addresses of the Preferred and Alternate DNS servers.
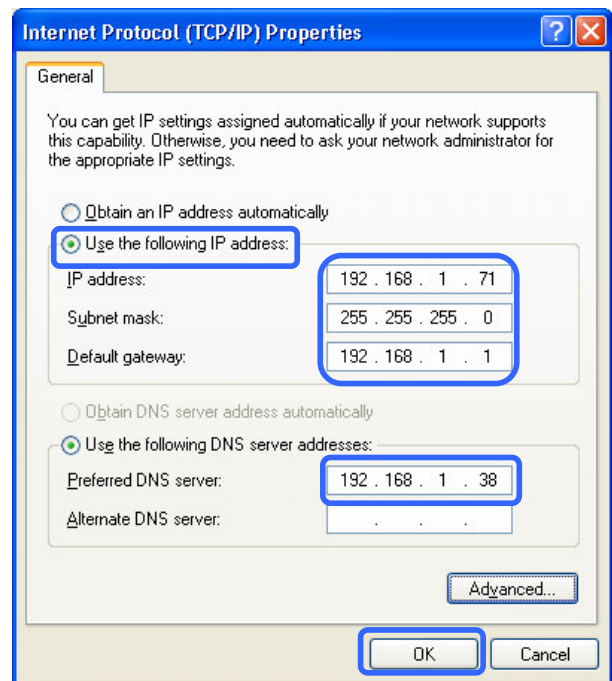
12. How do I determine a computer's MAC address?

- Open a command console window (Go to **Start -> Run.** Type in **cmd** (if you are using Windows 98 / ME type in **command**). When the console window opens, type in **ipconfig /all**.
- The following information will be displayed:
  - IP address
  - Subnet mask
  - Default Gateway
  - Host Name
  - **MAC Address** (Physical Address)

```
C:\WINDOWS\System32\cmd.exe                                              _□×

Ethernet adapter Local Area Connection 2:

        Connection-specific DNS Suffix  . :
        Description . . . . . . . . . . . : National Semiconductor Corp. DP83820
 Gigabit Network Controller
        Physical Address. . . . . . . . . : 00-30-F1-29-A3-9B
        Dhcp Enabled. . . . . . . . . . . : Yes
        Autoconfiguration Enabled . . . . : Yes
        IP Address. . . . . . . . . . . . : 192.168.1.100
        Subnet Mask . . . . . . . . . . . : 255.255.255.0
        Default Gateway . . . . . . . . . : 192.168.1.1
        DHCP Server . . . . . . . . . . . : 192.168.1.1
        DNS Servers . . . . . . . . . . . : 192.168.1.1
        Lease Obtained. . . . . . . . . . : 02 June 2005 02:22:25 PM
        Lease Expires . . . . . . . . . . : 03 June 2005 02:22:25 PM

C:\>
```

Appendix C: Glossary

This section provides more background information on some of the terms and acronyms that are encountered when dealing with wireless gateways.

10/100 Ethernet Card	A card that is installed in a computer to facilitate the connection to an Ethernet based LAN. It will support up to 100 megabits per second of data transmitted over a UTP cable. This is also called a Network Interface Card (NIC).
54g™	Broadcom's 54 Mbps implementation of the draft specification for IEEE 802.11g wireless networks. It is 802.11b-compliant and provides laptops, handheld computers and other devices with wireless connectivity at nearly five times the speed of existing technologies operating in the 2.4 GHz radio frequency range, while providing backwards compatibility to the base of more than 30 million installed 802.11b devices.

A

AP	A device that provides wireless LAN connectivity to wireless clients (stations). The Motorola Cellular Gateway NC800 acts as a wireless access point.
Adapter	A device or card that connects a computer, printer, or other peripheral device to the network or to some other device. A *wireless adapter* connects a computer to the wireless LAN.
Address translation	See *NAT*.
AH	Authentication Header.
ALG	Application level gateway triggers are required by some file transfer (for example, FTP), game, and video conferencing applications to open one or more ports to enable the application to operate properly.
ANSI	The American National Standards Institute is a non-profit, independent organization supported by trade organizations, industry, and professional societies for standards development in the United States. This organization defined ASCII and represents the United States to the International Organization for Standardization.
ARP	Address Resolution Protocol broadcasts a datagram to obtain a response containing a MAC address corresponding to the host IP address. When it is first connected to the network, a client sends an ARP message. The Motorola Cellular Gateway NC800 responds with a message containing its MAC address. Subsequently, data sent by the computer uses the Motorola Cellular Gateway NC800 MAC address as its destination.
ASCII	The American Standard Code for Information Interchange refers to alphanumeric data for processing and communication compatibility among various devices; normally used for asynchronous transmission.
authentication	The process a station uses to announce its identity to another station. IEEE 802.11 specifies two forms of authentication: Open System and Shared Key.
Auto-MDIX	Automatic medium-dependent interface crossover detects and corrects cabling errors by automatically reversing the send and receive pins on any port. It enables the use of straight-through wiring between the Motorola Cellular Gateway NC800 Ethernet ports and any computer, printer, or hub.

AWG   American Wire Gauge - A standard system used to designate the size of electrical conductors; gauge numbers are inverse to size.

B

bandwidth   The amount of data that can be transferred in a given amount of time. It is usually measured in bits per second (bps).

beacon   Small packets that are sent at regular intervals by a wireless gateway to synchronize the wireless network.

binary   A numbering system that uses two digits, 0 and 1.

Bit rate   The number of bits (digital 0s and 1s) transmitted per second in a communications channel. It is usually measured in bits per second bps.

bps   Bits per second.

bridge   An OSI layer 2 networking device that connects two LANs using similar protocols. It filters frames based on the MAC address to reduce the amount of traffic. A bridge can be placed between two groups of hosts that communicate frequently together, but not so much with the hosts in the other group. The bridge examines the destination of each packet to determine whether to transmit it to the other side. See also *switch*.

broadband   High bandwidth network technology that multiplexes multiple, independent carriers to carry voice, video, data, and other interactive services over a single cable. A communications medium that can transmit a relatively large amount of data in a given time period.

broadcast   Simultaneous transmission to multiple network devices; a protocol mechanism supporting group and universal addressing. See also *multicast* and *unicast*.

C

CDMA   Code Division Multiple Access.

Circuit-switched   Network-connection scheme used in the traditional PSTN telephone network where each connection requires a dedicated path for its duration. An alternative is packet-switched.

Class C network   An IP network containing up to 253 hosts. Class C IP addresses are in the form network.network.network.host.

client   In a client/server architecture, a client is a computer that requests files or services such as file transfer, remote login, or printing from the server. On an IEEE 802.11b wireless LAN, a client is any host that can communicate with the access point. Also called a CPE. A wireless client is also called a station.

CNR   Carrier to Noise Ratio.

CPE   Customer premise equipment, typically computers, printers, etc., are connected to the gateway at the subscriber location. CPE can be provided by the subscriber or the service provider. Also called a client.

Crossover cable   A cable in which the receive and transmit lines (input and output) are crossed. Crossover cables are often used to connect hubs together.

crosstalk   Undesired signal interfering with the desired signal.

CSMA/CD   Carrier Sense Multiple Access with Collision Detection.

D

datagram   In RFC 1594, a datagram is defined as a self-contained, independent entity of data carrying sufficient information to be routed from the source to the destination computer without reliance on earlier exchanges between the source and destination computer and the transporting network. For the most part, it has been replaced by the term packet.

Default gateway   The gateway used to forward all traffic that is not addressed to a station within the local subnet.

Default route   The route by which packets are forwarded when other routes in the routing table do not apply.

DHCP   Dynamic Host Configuration Protocol - A protocol that lets network administrators manage centrally and automate the assignment of Internet Protocol (IP) addresses in an organization's network. Each machine that can connect to the Internet needs a unique IP address. When an organization sets up its computer users with a connection to the Internet, an IP address must be assigned to each machine. Without DHCP, the IP address must be entered manually at each computer and if computers move to another location in another part of the network, a new IP address must be entered. DHCP lets a network administrator supervise and distribute IP addresses from a central point and automatically sends a new IP address when a computer is plugged into a different place in the network. DHCP uses the concept of a "lease" or amount of time that a given IP address will be valid for a computer. The lease time can vary depending on how long a user is likely to require the Internet connection at a particular location. It's especially useful in education and other environments where users change frequently. Using very short leases, DHCP can dynamically reconfigure networks in which there are more computers than there are available IP addresses. DHCP supports static addresses for computers containing Web servers that need a permanent IP address. DHCP enables the automatic reuse of unused IP addresses. The Motorola Cellular Gateway NC800 contains a built-in DHCP server that assigns private IP addresses to clients.

Directional antenna   An antenna that concentrates transmission power into a direction, thereby increasing coverage distance at the expense of coverage angle. Directional antenna types include yagi, patch and parabolic dish.

Diversity antennas   Two identical antennas located a small distance apart to reduce multipath distortion and improve wireless reception. Properly placed diversity antennas improve Motorola Cellular Gateway NC800 wireless reception.

DNS   The Domain Name System is the Internet system for converting domain names to IP addresses. A domain name is a meaningful and easy-to-remember "handle" for an Internet address. A DNS server contains a table matching domain names such as Internetname.com to IP addresses such as 192.169.9.1. When you access the world-wide web, a DNS server translates the URL displayed on the browser to the destination website IP address. The DNS lookup table is a distributed Internet database; no one DNS server lists all domain name to IP address matches.

Domain name   A unique name, such as motorola.com, that maps to an IP address. Domain names are typically much easier to remember than are IP addresses.

Dotted-decimal notation   Method of representing an IP address or subnet mask using four decimal numbers called octets. Each octet represents eight bits. In a class C IP address, the octets are network.network.network.host. The first three octets together represent the network address and the final octet is the host address. In the Motorola Cellular Gateway NC800 LAN default

configuration, 192.168.100 represents the network address. In the final octet, the host address can be from 2 to 254. See *IP Addresses*.

download   To copy a file from one computer to another. You can use the Internet to download files from a server to a computer.

downstream   In a CDMA network, the direction of data received by the computer from the Internet.

driver   A software program that allows a computer to use and communicate with equipment or peripherals installed on the computer. For example, network interface cards (NICs) require drivers to allow the computer to communicate with the network through the NIC.

DSSS   Direct Sequence Spread Spectrum is an IEEE 802.11b RF modulation protocol. It combines a data signal at the sending station with a higher data rate bit sequence, which many refer to as a chip sequence (also known as processing gain). A high processing gain increases the signal's resistance to interference. The minimum processing gain that the FCC allows is 10, and most products operate under 20.

DTIM   Delivery Traffic Indication Message.
Dynamic IP address   An IP address that is automatically assigned to a client station in a TCP/IP network, typically by a DHCP server. Network devices that serve multiple users, such as servers and printers, are usually assigned static IP addresses.

E

encapsulate   To include data into some other data unit to hide the format of the included data.

encode   To alter an electronic signal so that only an authorized user can unscramble it to view the information.

encrypt   To encode data.

endpoint   A VPN endpoint terminates the VPN at the gateway so that computers on the Motorola Cellular Gateway NC800 LAN do not need VPN client software to tunnel through the Internet to the VPN server.

ESP   Encapsulating Security Payload.

Ethernet   The most widely used LAN type, also known as IEEE 802.3. The most common Ethernet networks are 10Base-T, which provide transmission speeds up to 10 Mbps, usually over unshielded, twisted-pair wire terminated with RJ-45 connectors. Fast Ethernet (100Base-T) provides speeds up to 100 Mbps. Base means baseband technology and T means twisted pair cable. Each Ethernet port has a physical address called the MAC address.
Token Ring is another method to access a LAN, but not widely used. Ethernet can be used on a shared network, where all clients share the bandwidth or on a switched network where each sender and receiver pair has the full bandwidth. Ethernet uses a technology that broadcasts each frame onto a medium such as wire or fiber. All computers, on the network, are listening. The computer with the matching destination address accepts the frame and checks for errors. Ethernet was invented in 1973 by Robert Metcalfe and David Boggs of Xerox. It ran at 2.93 megabits per second (Mbps). Today Ethernet devices are available that communicate at 1 gigabits per second (Gbps).

F

Fast Ethernet   An Ethernet Network that will support up to 100 megabits per second of data transfer.

FCS   Frame Check Sequence.

FHSS   Frequency Hopping Spread Spectrum - Takes the data signal and modulates it with a carrier signal that hops from frequency to frequency as a function of time over a wide band of frequencies.

firewall   A security software system on the Motorola Cellular Gateway NC800 that enforces an access control policy between the Internet and the Motorola Cellular Gateway NC800 LAN. A firewall determines which information passes in and out of a network.

firmware   Code that is written onto programmable read-only memory (PROM) or more recently FLASH memory. Once firmware has been written onto the PROM or FLASH memory, it is retained even when the device is turned off.

frequency   Number of times an electromagnetic signal repeats an identical cycle in a unit of time, usually one second, measured in Hz, kHz, mHz, or GHz.

FTP   File Transfer Protocol - A member of the TCP/IP suite of protocols, used to copy files between two computers on the Internet. Both computers must support their respective FTP roles: one must be an FTP client and the other an FTP server. See also TCP/IP.

Full duplex   The ability to simultaneously transmit and receive data. See also *half-duplex*.

G

gateway   A device that enables communication between networks using different protocols. The Motorola Cellular Gateway NC800 enables multiple computers supporting IEEE 802.11b/g and/or Ethernet to share a single Internet connection. A gateway is often included as part of a network switch. A gateway can also be implemented as software on a computer.

GHz   Gigahertz, which equals 1 billion cycles per second.

GUI   Graphical User Interface.

H

Half duplex   Network where only one device at a time can transmit data. See also *full-duplex*.

header   The data at the beginning of a packet that identifies what is in the packet.

hexadecimal   A base-sixteen numbering system that uses sixteen sequential numbers (0 to 9 and the letters A to F) as base units before adding a new position. On computers, hexadecimal is a convenient way to express binary numbers.

hub   A hub offers a single collision domain among multiple wired users. When one user's Ethernet NIC sends data, all other stations connected to the LAN will hold off sending data until the medium is idle. A traditional wireless access point (AP) most closely resembles a hub. A hub performs no data filtering. See also *bridge* and *gateway*.

hop   The interval between two gateways on an IP network. The number of hops a packet traverses toward its destination (called the hop count) is saved in the packet header. For example, a hop count of six means the packet has traversed six gateways. The packet hop count increases as the time-to-live (TTL) value decreases.

host   In IP, a host is any computer supporting end-user applications or services with full two-way network access. Each host has a unique host number that combined with the network number forms its IP address. Host also can mean:

- A computer running a web server that serves pages for one or more web sites belonging to organization(s) or individuals
- A company that provides this service
- In IBM environments, a mainframe computer

html   Hyper Text Markup Language

http   Hypertext Transfer Protocol - the standard computer programming language computers linked to the World Wide Web use to communicate with each other.

Hz   Hertz - one cycle per second. The unit to measure the frequency that an alternating electromagnetic signal cycles through its highest and lowest states. Used to define the bands of the electromagnetic spectrum used in voice and data communications, or to define the bandwidth of a transmission medium.

I

IANA   The Internet Numbering Address Authority (IANA) is an organization under the Internet Architecture Board (IAB) of the Internet Society that oversees IP address allocation. It is under a contract from the U.S. government.

IEEE   The Institute of Electrical and Electronics Engineers. The IEEE describes itself as "the world's largest technical professional society, promoting the development and application of electro technology and allied sciences for the benefit of humanity, the advancement of the profession, and the well-being of our members." The IEEE fosters the development of standards that often become national and international standards. The organization publishes a number of journals, has many local chapters, and several large societies in special areas, such as the IEEE Computer Society. The IEEE (http://www.ieee.org) is accredited by ANSI.

IEEE 802.3   See *Ethernet*.

IEEE 802.11b   One of the IEEE standards for wireless networking hardware. Products that adhere to a specific IEEE standard will work with each other, even if they are manufactured by different companies. The 802.11b standard specifies a maximum data transfer rate of 11Mbps, an operating frequency of 2.4GHz, and WEP encryption for security.
It uses Direct Sequence Spread Spectrum modulation in the unlicensed 2.4 GHz frequency band also used by cordless phones and microwave ovens, therefore range and throughput are affected by 2.4 GHz phones and microwave ovens operating in the vicinity. 802.11b networks are also referred to as WLAN networks.

IEEE 802.11g   Refers to the extension of the IEEE 802.11 standard for wireless networking. The 802.11g specification used by the Motorola Cellular Gateway NC800 specifies a maximum data transfer rate of 54Mbps using OFDM modulation, an operating frequency of 2.4GHz, backward compatibility with IEEE 802.11b devices and WEP encryption as well as WPA-PSK for security.
The higher speed comes from using Orthogonal Frequency Division Multiplexing (OFDM) modulation. It is backwards compatible with 802.11b because it also uses the 2.4 GHz frequency and is therefore also affected by 2.4 GHz phones and microwave ovens operating in the vicinity.

IETF   The Internet Engineering Task Force (http://www.ietf.org) is an open international community of network designers, operators, vendors, and researchers to develop and maintain Internet architecture. Technical working groups issue working documents called Internet-Drafts. The IETF publishes review versions of the drafts called requests for comments (RFCs).

Internet   A worldwide collection of interconnected networks using TCP/IP.

internetwork   A collection of interconnected networks allowing communication between all devices connected to any network in the collection.

IP   Internet Protocol is a set of standards that enable different types of computers to communicate with one another and exchange data through the Internet. IP provides the appearance of a single, seamless communication system and makes the Internet a virtual network.

IP address   In the most widely installed level of the Internet Protocol (IP) today, an IP address is a 32-binary digit number that identifies each sender or receiver of information that is sent in packets across the Internet. When you request an HTML page or send e-mail, the Internet Protocol part of TCP/IP includes your IP address in the message (actually, in each of the packets if more than one is required) and sends it to the IP address that is obtained by looking up the domain name in the Uniform Resource Locator you requested or in the e-mail address you're sending a note to. At the other end, the recipient can see the IP address of the Web page requester or the e-mail sender and can respond by sending another message using the IP address it received.

TCP/IP networks therefore route messages based on the destination IP address. An IP address has two parts:
- The network address is assigned by IANA.
- A host address.

The Motorola Cellular Gateway NC800 network administrator assigns a host address to each host connected to the Motorola Cellular Gateway NC800. This is done either via a static IP address or automatically using its DHCP server. For a Class C network, the first 24 bits are the network address and the final 8 bits are the host address; in dotted-decimal format it appears as network.network.network.host.

IPSec   The Internet Protocol Security protocols are described in IETF authentication and encryption standards for secure packet exchange over the Internet. IPSec consists of a suite of protocols used to implement secure exchange of packets at the IP layer (i.e. OSI layer 3). IPSec supports two basic modes: Transport and Tunnel. Transport encrypts the payload of each packet, leaving the header untouched, while Tunnel mode encrypts both the header and the payload and is therefore more secure.

ISM Bands   Industrial, scientific, and medicine bands - Radio frequency bands that the Federal Communications Commission (FCC) authorized for wireless LANs. The ISM bands are located at 902 MHz, 2.400 GHz, and 5.7 GHz.

ISO   The International Organization for Standardization (http://www.iso.ch) is a worldwide federation of national standards bodies from approximately 140 countries. ISO is a non-governmental organization established in 1947 to promote the development of standardization and related activities in the world with a view to facilitating the international exchange of goods and services, and to developing cooperation in the spheres of intellectual, scientific, technological, and economic activity.

ISP   An ISP (Internet Service Provider) is a *company* that provides individuals and companies access to the Internet and other related services such as Web site building and virtual hosting. An ISP can serve IP addresses dynamically, or assign static (fixed) IP addresses to individual computers.

ITU   International Telecommunications Union

J

Javascript   A scripting language designed by Netscape to enable Web designers to add dynamic

content to their sites. Contrary to its name, it was developed separately from Java. It is an open source language.

K, L

LAN A LAN (Local Area Network) is a 2 – 1000 Mbps communications network that extends no more than a few hundred meters, usually using Ethernet as the physical layer.

layer In networks, layers are software protocol levels. Each layer performs functions for the layers above it. OSI is a reference model having seven functional layers.

LED Light Emitting Diode - Small lights that are typically used to indicate status on electronic equipment. They come in almost any color with the most common being red, green, yellow and recently, blue.

loopback A test that loops the transmit signal to the receive signal. Usually the loopback test is initiated on a network device. The test is used to verify a path or to measure the quality of a signal on that path.

M

MAC The Media Access Control address is a unique, 48-bit value permanently saved in ROM at the factory to identify each Ethernet network device. It is expressed as a sequence of 12 hexadecimal digits. Also called an Ethernet address, physical address, hardware address, or NIC address.

MB One megabyte; equals 1,024 x 1,024 bytes, 1,024 kilobytes, or about 8 million bits.

Mbps Million bits per second (megabits per second). A rate of data transfer.

media The various physical environments through which signals pass; for example, coaxial, unshielded twisted-pair (UTP), or fiber-optic cable.

MHz Megahertz. One million cycles per second. A measure of radio frequency.

MRU The MRU (Maximum Receive Unit) sets the maximum number of bytes that PPP is capable of receiving in one PPP packet. Generally, the bigger the better.

MTU The Maximum Transmission Unit is the largest amount of data that can be transmitted in one discrete message on a given physical network. The MTU places an upper bound on the size of a message that can be transferred by the network in a single frame. Messages exceeding the MTU must be fragmented before transmission, and reassembled at the destination.

multicast A data transmission sent from one sender to multiple receivers. See also *broadcast* and *unicast*.

N

NAT Network Address Translation - An Internet standard that enables a local-area network (LAN) to use one set of IP addresses for internal traffic and a second set of IP addresses for external traffic. A NAT box located where the LAN meets the Internet makes all necessary IP address translations. NAT provides some security
because the IP addresses of the LAN computers are invisible on the Internet.

NAPT Network Address Port Translation is the most common form of address translation between

public and private IP addresses. NAPT is a mapping of one public IP address to many private IP addresses.

NEC National Electrical Code (United States) . The regulations for construction and installation of electrical wiring and apparatus, suitable for mandatory application by a wide range of state and local authorities.

network Two or more computers connected to communicate with each other. Networks have traditionally been connected using some kind of wiring.

Network driver Software packaged with a NIC that enables the computer to communicate with the NIC.

Network layer Layer 3 in the OSI architecture that provides services to establish a path between open systems. The network layer knows the address of the neighboring nodes, packages output with the correct network address data, selects routes, and recognizes and forwards to the transport layer incoming messages for local host domains.

NIC A network interface card converts computer data to serial data in a packet format that it sends over the LAN. A NIC is installed in an expansion slot or can be built-in. Every Ethernet NIC has a MAC address permanently saved in its ROM.

node On a LAN, a generic term for any network device.

Network mask See *Subnet Mask*.

O

Omni-directional antenna An antenna that provides a 360-degree transmission pattern. These types of antennas are used when coverage in all directions is required.

OFDM Developed for wireless applications, Orthogonal Frequency Division Multiplexing technology offers superior performance increased data rates and more reliable transmissions than previous technologies, such as DSSS. OFDM is a scheme in which numerous signals of different frequencies are combined to form a single signal for transmission on the medium. OFDM works by breaking one high-speed data stream into a number of lower speed data streams, which are then transmitted in parallel. Each lower speed stream is used to modulate a sub carrier. Essentially, this creates a multi-carrier transmission by dividing a wide frequency band or channel into a number of narrower frequency bands or sub-channels. OFDM is also used for other applications, including power line networking.

Open Systems Authentication The IEEE 802.11 default authentication method is a two-step process. First, the station wanting to authenticate with another station sends an authentication management frame containing the sending station's identity. The receiving station then sends back a frame alerting whether it recognizes the identity of the authenticating station.

OSI The Open Systems Interconnection reference model is an illustrative model describing how data moves from an application on the source host through a network to an application on the destination host. It is a conceptual framework developed by ISO that is now the primary model for intercomputer communications. OSI is a model *only*; it does not define a specific networking interface.

P

packet The unit of data that is routed between the sender and destination on the Internet or other packet-switched network. When data such as an e-mail message or other file is sent over the Internet, IP on the sender divides the data into uniquely-numbered packets.The packet

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header contains the source and destination IP addresses. The individual packets may travel different routes. When all packets arrive at the destination, the IP at that end reassembles the packets. The header and the data can vary in length. Packet and datagram are similar in meaning.

Packet-switched	A scheme to handle transmissions on a connectionless network such as the Internet. An alternative is circuit-switched.

PCMCIA	The Personal Computer Memory Card International Association sets international standards for connecting peripherals to portable computers. Laptop computers typically have a PCMCIA slot that can hold one or two PC Cards to provide features such as Ethernet connectivity.

PDA	Personal Digital Assistant

Physical layer	Layer 1 in the OSI architecture. It provides services to transmit bits or groups of bits over a transmission link between open systems. It entails the electrical, mechanical, and handshaking procedures.

PING	A network utility that tests host reachability by sending a small packet to the host and waiting for a reply. If you PING a computer IP address and receive a reply, you know the computer is reachable over the network. It also stands for Packet InterNet Groper.

port	On a computer or other electronic device, a port is a socket or plug used to physically connect it to the network or to other devices. In TCP/IP, a port is a number from 0 to 65536 used logically by a client program to specify a server program. Ports 0 to 1024 are reserved

POTS	The plain old telephone service offered through the PSTN; basic analog telephone service. POTS uses the lowest 4 kHz of bandwidth on twisted pair wiring.

PPP	PPP (Point to Point Protocol) is a protocol for communication between computers using a serial interface, typically a personal computer connected by phone line to a server.

PPPoE	Point to Point Protocol over Ethernet.

PPTP	Point-to-Point Tunneling Protocol encapsulates other protocols. It is a protocol that allows corporations to extend their own corporate network through private "tunnels" over the public Internet. Effectively, a corporation uses the wide-area network to create a large virtual private network.

Private IP address	An IP address assigned to a computer on the Motorola Cellular Gateway NC800 LAN by the DHCP server on the Motorola Cellular Gateway NC800 for a specified lease time. Private IP addresses are used by the Motorola Cellular Gateway NC800 LAN only; they are invisible to devices on the Internet. See also *public IP address.*

protocol	A formal set of rules and conventions for exchanging data. Different computer types (for example PC, UNIX, or mainframe) can communicate if they support common protocols.

Proxy server	A piece of software that sits between a client application (such as a Web browser) and the Internet. It intercepts all traffic flowing between the two and analyzes them. This allows proxy servers to do two important things. One is to boost Internet access speeds for groups of users. Since the proxy server stores a "cache" of recently downloaded Web sites, any user that tries to access a Web site that has recently been accessed by another user is simply sent the cached version from the proxy server. The other important function is filtering. A proxy server can be set up to filter all attempts by users to access specific Web sites.

PSTN	The public switched telephone network is the traditional circuit-switched, voice-oriented telephone network. See also *POTS.*

![Motorola logo]

Q, R

RFC   Request for Comments published on the IETF or other websites. Many RFCs become international standards.

RIP   Routing Information Protocol - A common type of routing protocol. RIP bases its routing path on the distance (number of hops) to the destination. RIP maintains optimum routing paths by sending out routing update messages if the network topology changes. For example, if a gateway finds that a particular link is faulty, it will update its routing table, and then send a copy of the modified table to each of its neighbors.

RJ-11   The most common type of connector for household or office phones.

RJ-45   A connector for Cat 5 or Cat 5e cable, with 8 pins. It looks similar to a typical telephone wire connector that only has 4 or 6 pins, but it is larger in size.

roaming   A feature of some access points or gateways that allow users to move through a facility while maintaining an unbroken connection to the LAN.

routing table   A table listing available routes that is used by a gateway to determine the best route for a packet.

RTS   Request To Send.

S

scope   The set of IP addresses that a DHCP server can lease to clients.

server   A host computer that stores information and software programs used by other computers in a network (it "serves" the programs and information to other computers). Examples of services are file transfer, remote login and printing services.

Shared key authentication   A type of authentication that assumes each station has received a secret shared key through a secure channel independent from an 802.11 network. Stations authenticate through shared knowledge of the secret key. Use of Shared Key authentication requires implementation of the 802.11 Wireless Equivalent Privacy (WEP) algorithms.

SOHO   Small Office Home Office

spectrum   A specified range of frequencies used for transmission of electromagnetic signals.

spectrum allocation   An allocation of portions of the available electromagnetic spectrum for specific services, such as AM, FM, or personal communications.

SSID   Service Set Identifier - An identification name that wireless devices use to make connections. In order for wireless devices to communicate, they must all be set to the same channel and they all must use the same SSID. For instance, if you are using an access point to connect two computers using wireless devices, the access point and each of the wireless devices must use the same SSID. Even if they are set to the same channel, they cannot communicate unless the SSID is the same.

Stateful inspection   A type of firewall that tracks each connection traversing all firewall interfaces to ensure validity. In addition to examining the source and destination in the packet header based on static rules, a stateful inspection firewall:
- Examines packet headers on context established by previous packets that traversed the firewall
- Monitors the connection state and saves it in a table
- Closes ports until a connection to a specific port is requested
- May examine the packet contents up through the application layer to determine

more than just the source and destination
A stateful-inspection firewall is more advanced than a static filter firewall.

Static filter   A type of firewall that examines the source and destination in the packet header based on administrator-defined rules *only*.

Static IP Address   A permanent IP address that is assigned to a host in a TCP/IP network. Normally, a static IP address must be assigned manually. The opposite of dynamic IP address.

Static route   A manually-defined route.

station   IEEE 802.11b term for wireless client.

Subnet   A network segment connected by hubs or repeaters. Subnets can stand alone or can be connected to other subnetworks onto a larger network. When subnetting is used, the host portion of the IP address is divided into a subnet and host number. Hosts and gateways use the subnet mask to identify the bits used for the network and subnet number.

Subnet mask   The method used for splitting IP networks into a series of subgroups, or subnets. The mask is a binary pattern that is logically ANDed with the IP address to turn part of the host ID address field into a field for subnets. A gateway routes packets using the network prefix and the subnet number part of the IP address.

switch   A switch is more sophisticated than a hub and connects one user to another without blocking access of other users. The switch improves throughput because of the smaller resulting collision domains. Users don't have to wait until others are finished before sending data.

SYSLOG   A de-facto UNIX standard for logging system events.

T

TCP   Transmission Control Protocol - A method (protocol) used along with the IP (Internet Protocol) to send data in the form of message units (datagram) between network devices over a LAN or WAN. Transmission Control Protocol on OSI transport layer four, provides reliable transport over the network for data transmitted using IP (network layer three). It is an end-to-end protocol defining rules and procedures for data exchange between hosts on top of connectionless IP. TCP uses a timer to track outstanding packets, checks errors in incoming packets, and retransmits packets if requested.TCP is known as a "connection oriented" protocol due to requiring the receiver of a packet to return an acknowledgment of receipt to the sender of the packet resulting in transmission control.

TCP/IP   Transmission Control Protocol/Internet Protocol - The basic communication language or set of protocols for communications over a network (developed specifically for the Internet). TCP/IP defines a suite or group of protocols and not only TCP and IP.

TFTP   Trivial File Transfer Protocol is a scaled down version of the well known FTP protocol commonly used for file transfer over the Internet. Being a scaled down protocol, it is ideal for use in an embedded environment such as a wireless gateway. It is used to upload new firmware to the Motorola Cellular Gateway NC800.

Transparent bridging   A method to enable all hosts on the wired Ethernet LAN and IEEE 802.11b wireless LAN to communicate as if they were all connected to the same physical network.

Transport layer   Layer of the OSI concerned with protocols for error recognition and recovery. This layer also regulates information flow.

TTL   The time to live is the number of gateways (or hops) a packet can traverse before being

discarded. When a gateway processes a packet, it decreases the TTL by 1. When the TTL reaches zero, the packet is discarded.

tunnel To place packets inside other packets to send over a network. The protocol of the enclosing packet is understood by each endpoint, or tunnel interface, where the packet enters and exits the network. VPNs rely on tunneling to create a secure network.Tunneling requires the following protocol types:

- A carrier protocol, such as TCP, used by the network that the data travels over
- An encapsulating protocol, such as IPSec, L2F, L2TP, or PPTP, that is wrapped around the original data
- A passenger protocol, such as IP, for the original data.

U

UDP User Datagram Protocol - A method (protocol) used along with the IP (Internet Protocol) to send data in the form of message units (datagrams) between network devices over a LAN or WAN. UDP is an OSI layer four protocol, while IP is a layer three protocol. UDP is known as a "connection-less" protocol due to NOT requiring the receiver of a packet to return an acknowledgment of receipt to the sender of the packet (as opposed to TCP).

unicast A point-to-point data transmission sent from one sender to one receiver. This the normal way you access websites. See also *broadcast* and *multicast*.

URL Universal Resource Locator - URLs are the Internet equivalent of addresses. How do they work? Like other types of addresses, they move from the general to the specific (from zip code to recipient, so to speak). Take this URL, for example: www.motorola.com/CellularGateway/index.html. First you have the *protocol*: **http:/** then the *server address or domain*: /**www.motorola.com** and finally the *directory*: /**CellularGateway**/ in which the file **index.html** resides.

USB Universal Serial Bus is a computer interface for add-on devices such as printers, scanners, mice, modems, or keyboards. USB supports data transfer rates of 12 Mbps and plug-and-play installation. You can connect up to 127 devices to a single USB port.

UTP Unshielded Twisted Pair. Also referred to as 10BASE-T or 100BASE-T network cable.

V

VLAN A virtual local area network is group of devices on different LAN segments that are logically configured to communicate as if they are connected to the same wire.

VoIP Voice over Internet Protocol is a method to exchange voice, fax, and other information over the Internet. Voice and fax have traditionally been carried over traditional telephone lines of the PSTN using a dedicated circuit for each line. VoIP enables calls to travel as discrete data packets on shared lines. VoIP is an important part of the convergence of computers, telephones, and television into a single integrated information network.

VPN Virtual Private Network - Virtual Private Networks allows computers to use the public Internet backbone as a channel for private data communication. With encryption and encapsulation technology, a VPN creates a private passageway (tunnel) through the Internet. VPNs allow remote offices, company road warriors, and even businesses' customers to use the Internet, rather than pricey private lines, to reach company networks. A VPN connection provides security and performance similar to a dedicated link (for example, a leased line), but at much lower cost.

W

WAN   Wide Area Network. A wide-area network provides a connection over a large geographic area, such as a country or the whole world. The bandwidth depends on need and cost, but is usually much lower than for a LAN.

WAP   Wireless Access Point or Wireless Access Protocol. See also *access point*.

WECA   Wireless Ethernet Compatibility Alliance - An alliance of companies throughout the world that promote the use of the IEEE 802.11 standard in wireless technology. It is a trade organization that works to ensure that all wireless IEEE 802.11b Wi-Fi devices such as computer cards, laptops, air gateways, PDAs, etc. can communicate with each other.

WEP   Wired Equivalent Privacy encryption protects the privacy of data transmitted over a wireless LAN. WEP uses keys to encrypt and decrypt transmitted data. The access point must authenticate a client before it can transfer data to another client. WEP is part of IEEE 802.11b. It is based on a 64- or 128- bit shared key algorithm, as described in the IEEE 802.11b standard.

WEP network key   A network key is a key used for network encryption under the WEP algorithm. Under 802.11, a wireless station can be configured with up to four network keys, with the key index values being 1, 2, 3, and 4. When an access point or a wireless station transmits an encrypted message using a key that is stored in a specific key index, the transmitted message indicates the key index that was used to encrypt the message body. The receiving access point or wireless station can then retrieve the key that is stored at the key index and use it to decode the encrypted message body.

Wi-Fi   Wireless Fidelity - The IEEE 802.11 High Rate Standard used in wireless technology. The Wi-Fi (pronounced y-phi) seal of approval assures the end customer of interoperability with other network cards and access points which also bear the Wi-Fi logo. Wi-Fi is the brand name applied to products supporting IEEE 802.11 or WLAN.

WINS   Short for *Windows Internet Naming Service,* a system that determines the IP address http://www.webopedia.com/TERM/W/IP_address.html associated with a particular network computer. This is called *name resolution.* WINS supports network client and server computers running Windows and can provide name resolution for other computers with special arrangements. Determining the IP address for a computer is a complex process when DHCP servers assign IP addresses dynamically. For example, it is possible for DHCP to assign a different IP address to a client each time the machine logs on to the network.
WINS uses a distributed database that is automatically updated with the names of computers currently available and the IP address assigned to each one. DNS is an alternative system for name resolution suitable for network computers with fixed IP addresses.

Wireless network interface   Couples the digital signal from the end-user appliance to the wireless medium, which is air.

WLAN   Wireless Local Area Network - A group of computers and associated devices that communicate with each other wirelessly. Wireless LANs are used increasingly in both home and office environments.

WWW   World Wide Web - The Internet's multimedia service containing countless areas of information, documentation, entertainment, as well as business and personal home pages. It is an interface to the Internet that you use to navigate and hyperlink to information.

Appendix D: Upgrading the Motorola Cellular Gateway NC800 firmware using TFTP

Trivial File Transfer Protocol (TFTP) is a scaled down version of the well-known FTP protocol commonly used for file transfer over the Internet. Being a scaled down protocol, it is ideal for use in an embedded environment such as a wireless gateway. It offers an alternative method of firmware upgrading to the web-based method.

The Motorola Cellular Gateway NC800 accepts TFTP file transfers only during the **first three seconds after boot up**.

To upgrade the Motorola Cellular Gateway NC800's firmware using TFTP follow these steps:

- o Open a TFTP compatible client on a PC connected to the primary LAN of the Gateway. The PC must be configured with a static IP address on the same subnet as the Gateway (The user must be able to successfully ping the Gateway's primary LAN IP address from the PC).
- o Specify the Gateway's Primary LAN IP address in the TFTP client.
- o Specify binary mode for file transfer.
- o Type **PUT firmware.trx** where firmware.trx is the full path to the new firmware file.
- o Reset the Motorola Cellular Gateway NC800 by pressing the **Reset** button at the back of the Motorola Cellular Gateway NC800.
- o Hit the **Enter** button to issue the **PUT firmware.trx** command.
- o The TFTP client reports the progress / result of the file transfer.
- o If successful, the Motorola Cellular Gateway NC800 reboots using the new firmware image after approximately 30 seconds (it first writes the new image to FLASH once it has been transferred).

Appendix E: Technical Specifications

Standards

Standard	Description
IEEE 802.3	Ethernet MAC interface
IEEE 802.1D	MAC Bridging
IEEE 802.11b/g	Wireless LAN
RFC 0768	User Datagram Protocol
RFC 0791	Internet Protocol
RFC 0793	Transmission Control Protocol
RFC 1035	DNS, Domain Names – Implementation and Specification
RFC 1661	PPP
RFC 1812	IPv4 Routing
RFC 2131	DHCP
RFC 2453	RIP v2
RFC 2663	NAT/Masquerading
IS-95A	CDMA Protocol between Mobile and Base Station
J-STD-008	PCS protocol between Mobile and Base station
TIA/EIA/IS-98-D	CDMA2000 Mobile Devices Performance Standards
IS-707-A.5	CDMA Packet Data Service
FCC Class B	Complies with Part 15 of the FCC Rules

Connectors
- Internet   - One port for CDMA antenna
- LAN 1& 2   - Two 10/100 RJ-45 (UTP) Port
- Power   - 12VDC, 1.8A (from included power brick)
- DIAG 1   - Debug port (for maintenance only)
- DIAG 2   - Debug port (for maintenance only)

Button
- One Reset Button

Network Management
- Web-based Configuration Interface

Cabling Type
- Category 5 Ethernet Network Cabling or better

WLAN Transmit Power

- o 18 dBm

Modulation
- o 802.11b: CCK, DQPSK, DBPSK (Direct Sequence Spread Spectrum)
- o 802.11g: OFDM (Orthogonal Frequency Division Multiplexing)

WLAN Transmission Rates
- o 802.11b   1, 2, 5.5, 11 Mbps
- o 802.11g   6, 9, 12, 18, 24, 36, 48, 54 Mbps

WLAN Antenna Type
- o 2 dBi dipole antenna with diversity

CDMA Antenna
- o Dimensions   (170mm L x 20mm B x 15mm D)

CDMA
- o Dual Band 800/1900 MHz
- o CDMA 1xRTT / EV-DO

WLAN Frequency Range
- o 2.4 – 2.4835 GHz (ISM Band)

Wireless Range
- o **Indoors**   100 meters
- o **Outdoors**   300 meters

LED Indicators
- o Power
- o WLAN   Act, Link
- o LAN 1   Act, Full, 100
- o LAN 2   Act, Full, 100
- o WAN   Link, Act, Signal

Environmental
- o Dimensions   (240mm L x 160mm W x 70mm H)
- o Unit Weight   Approx. 450g (1 lb)
- o Certifications   FCC Class B, CE Mark
- o Operating Temp.   0°C to 40°C (32°F to 104°F)
- o Storage Temp.   -20°C to 70°C (-4°F to 158°F)
- o Operating Humidity   10% to 85%, Non-Condensing
- o Storage Humidity   5% to 90%, Non-Condensing

External power - Provided by an AC adapter

- o Input: 100-250Volts AC, 47-63Hz, 0.4Amps

- o Output: 12V DC, 1.8A

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