

GPS Data Links

Global Positioning System (GPS) receivers can be used with NovaRoam Wireless IP Routers to provide real-time positioning information.

Requirements

To replicate the setup in this application note, you will need the following equipment:

- (1) GPS Receiver*
- (1) Computer
- (2) NovaRoam 900 Wireless IP Routers
- 9-pin null serial cable
- GPS tracking software

*For this setup, a Garmin GPS 35 GPS receiver was used.

Connecting the Hardware

Connecting the hardware is fairly simple. Start by plugging one NovaRoam directly into a computer using the included Ethernet cable. This setup will function as the stationary collection point for GPS data.

Connect a GPS receiver to the other NovaRoam using the 9-pin null serial cable. At one end of this cable, you will have to attach the 9-pin serial to mini-din (PS2) adapter that comes as part of the NovaRoam serial cable. This setup will be in the mobile asset that is being tracked by GPS.

Setting Up the NovaRoams

Figure 1 shows an example of a wireless GPS link using NovaRoam Wireless IP Routers. In this example, Node 1 represents the stationary data collection point while Node 2 represents the mobile asset that is sending the GPS data.

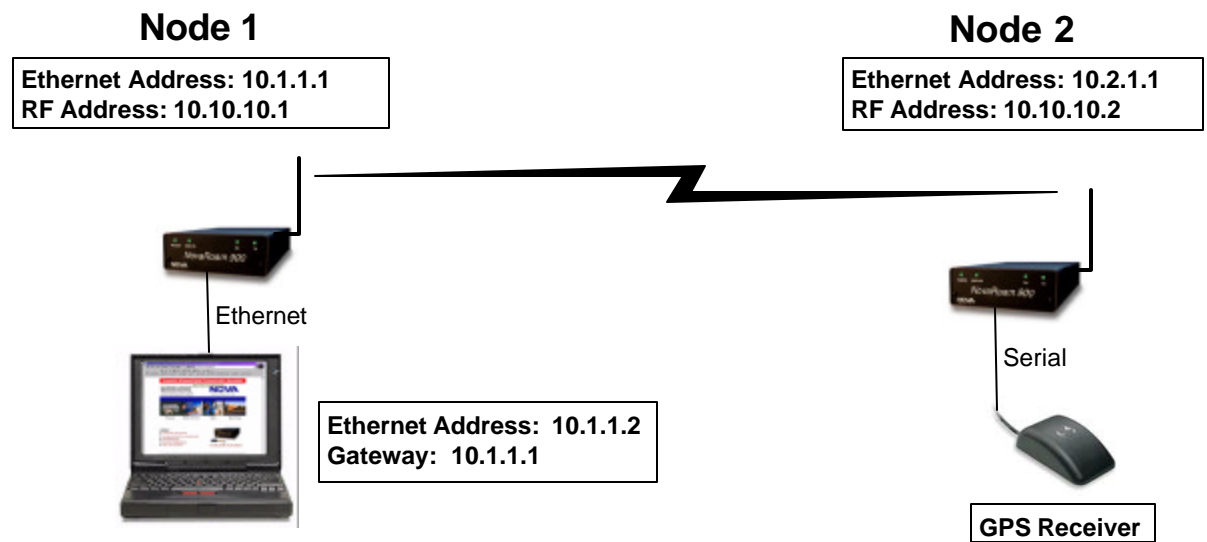


Figure 1: Example of a GPS link using NovaRoams

Assigning IP addresses

The first step in configuring the NovaRoams is to assign IP addresses to each NovaRoam. In this example, the NovaRoam from Node 1 uses the IP address of 10.1.1.1 for its Ethernet interface, and the IP address of 10.10.10.1 for its wireless interface. The NovaRoam from Node 2 uses the IP address of 10.2.1.1 for its Ethernet interface and the IP address of 10.10.10.2 for its wireless interface. Notice that the Ethernet interfaces of each NovaRoam

reside on unique networks, while the wireless interfaces of each NovaRoam participate in the same network.

Assigning Routes

Depending on the routing mode you have selected, you may or may not have to add static routes. Since GPS is used to track mobile assets, it is highly likely that your NovaRoam will utilize Dynamic Routing, either with or without the optional mobile ad hoc networking algorithm, TORA. If this is the case, there is no need for static routes. If your NovaRoam is not utilizing Dynamic Routing, you must setup the appropriate routes to each NovaRoam network.

In **figure 1**, the Node 1 NovaRoam would need a route to the Node 2 NovaRoam. The route statement would look like this:

10.2.1.0	255.255.255.0	10.10.10.2	1
Network	Netmask	Gateway	Metric

This route states that all traffic destined for Node 2 must use the Node 2 NovaRoam's wireless interface as the gateway. In addition to this route entry, the computer from Node 1 must use the Node 1 NovaRoam as its default gateway.

The Node 2 NovaRoam would need a route to the Node 1 NovaRoam. The route statement would look like this:

10.1.1.0	255.255.255.0	10.10.10.1	1
Network	Netmask	Gateway	Metric

This route states that all traffic destined for Node 1 must use the Node 1 NovaRoam's wireless interface as the gateway.

Configuring the Serial Port

Since GPS data is being sent across the NovaRoam's serial port, you must configure the serial port so that the data is sent to the proper destination. There are several user-definable settings for the NovaRoam serial port.

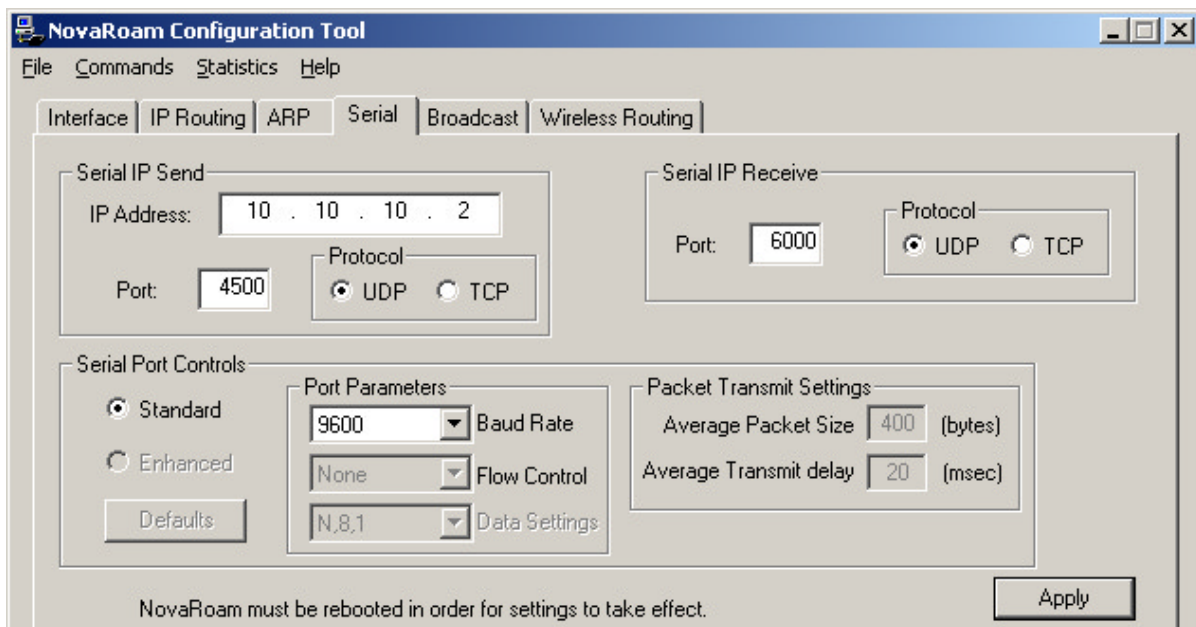


Figure 2: Serial tab from the NovaRoam Configuration Tool (NRCT).

First, configure the “Serial IP Send” settings. The Node 1 NovaRoam must have its Serial IP Send address set to 10.10.10.2, the wireless interface of the Node 2 NovaRoam. Assign the port number that you wish to send the data. Port 4500 was used in this example. Select the protocol you wish to use – UDP is recommended.

To configure the “Serial IP Receive” settings, simply assign a receive port and select the protocol you wish to use. Port 6000 was used in this example.

Next, select the baud rate at which the GPS receiver transmits data. This is typically either 4800 or 9600.

Node 2 should be configured to send and receive according to Node 1's settings. Since Node 1 is configured to send data on port 4500, Node 2 must receive on port 4500. Since Node 1 is receiving on port 6000, Node 2 must send to port 6000. Node 2's Serial IP Send address should be 10.10.10.1, the wireless interface of the Node 1 NovaRoam.

At this point, the NovaRoams should be configured properly. Data will be sent from the GPS receiver to the computer over the wireless NovaRoam link. Once the data reaches the computer at the data collection point, the data will be displayed on the GPS tracking software that you are using.

Nova Engineering has worked with and recommends GPS-Link by Integrated GPS Technologies. Information about this software can be found at <http://www.gpsgis.com/>.

Note: This application note describes a basic setup in which a single mobile asset is being tracked with GPS. The NovaRoam 900 Wireless IP Router can be used to track multiple mobile assets as well. Additionally, NovaRoams can be used for wireless Ethernet links and GPS data simultaneously.

Summary

The NovaRoam 900 Wireless IP Router's long-range capabilities, along with its mobile ad hoc networking abilities, make it an excellent choice for Global Positioning System (GPS) applications. The NovaRoam 900 Wireless IP Router may also be used to send and receive IP data, such as the Internet or e-mail.

Keywords:

Global Positioning System, GPS, DGPS, RTK, GIS, AVL, Ethernet, mobile, Internet, ISM, spread-spectrum, data comm, networks, TCP, IP, UDP, router, survey, tracking.



Nova Engineering, Inc.

5 Circle Freeway Drive
Cincinnati, OH 45246 USA

1-800-341-NOVA (6682)

+1-513-642-3000

FAX +1-513-642-3300

www.nova-eng.com

info@nova-eng.com

© 2001 Nova Engineering, Inc. All Rights Reserved.

This material is in the public domain and may be reprinted without permission; citation of this source is appreciated. This brochure has been released into the public domain in accordance with International Traffic in Arms Regulations (ITAR) 22 CFR 120.11(a)(6).

NL-NR054-070514