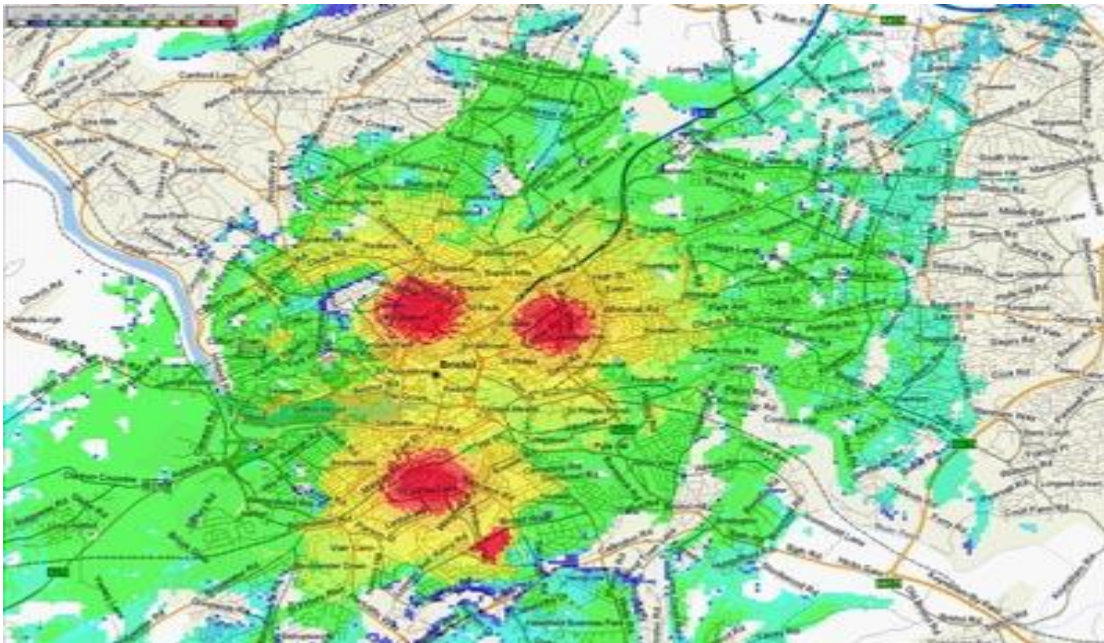




Expanding the Coverage

Terminals Servers in a *RavTrack™* System



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1. Overview

There are a number of ways to expand the radio coverage of a RavTrack GPS tracking system. Any (or all) of the following methods will increase the coverage of a *RavTrack* GPS tracking system.

- 1) Increase the height of the receiving antenna. This may mean locating the base station on top of a tall building or even a mountain.
- 2) Add more base stations. *RavTrack PC* supports up to 6 base stations connected to it.
- 3) Install repeaters, and relay position reports.

A handy device that can be used with any of these methods is a “Terminal Server”, also called an IP Server, Telnet Server, or Serial IP converter. .

A terminal server delivers standard serial-to-Ethernet connectivity simply and reliably. It easily addresses the need to connect individual devices to a computer network over industry standard Ethernet.

Without a terminal server, the transceiver used to receive the position reports in a *RavTrack* system must be directly connected to the PC running the tracking software. An RS232 serial port (COM Port) on the PC will receive position reports directly from a *Raveon M7 GX* transceiver using one of its RS232 serial ports.

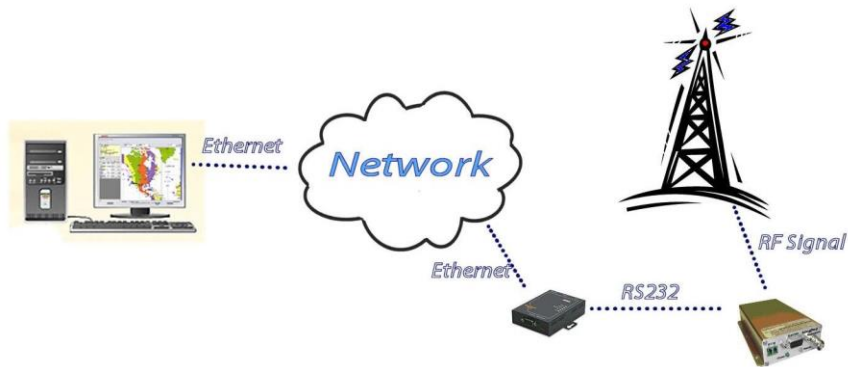
AVL System using only RS232



RS-232 serial cables are very limited on how long they may be run, so the RV-M7 transceiver must be physically close to the PC running the AVL software.

Using a terminal server, an *M7 GX* transceiver may be located a long distance away from the PC that is processing the AVL data from it. It may easily be located across town or in another country.

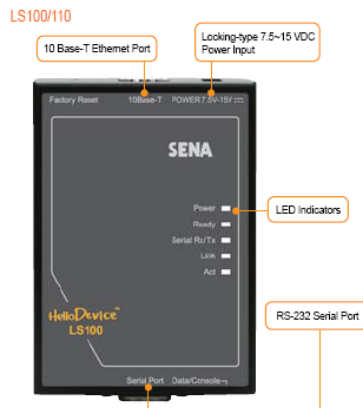
Typical Terminal Server Setup



A terminal server converts the RS232 serial data to/from TCP/IP, the protocol used in most modern computer networks. A terminal server has two connections on it

- 1) An RS-232 serial port
- 2) A network interface port, typically an Ethernet or WiFi.

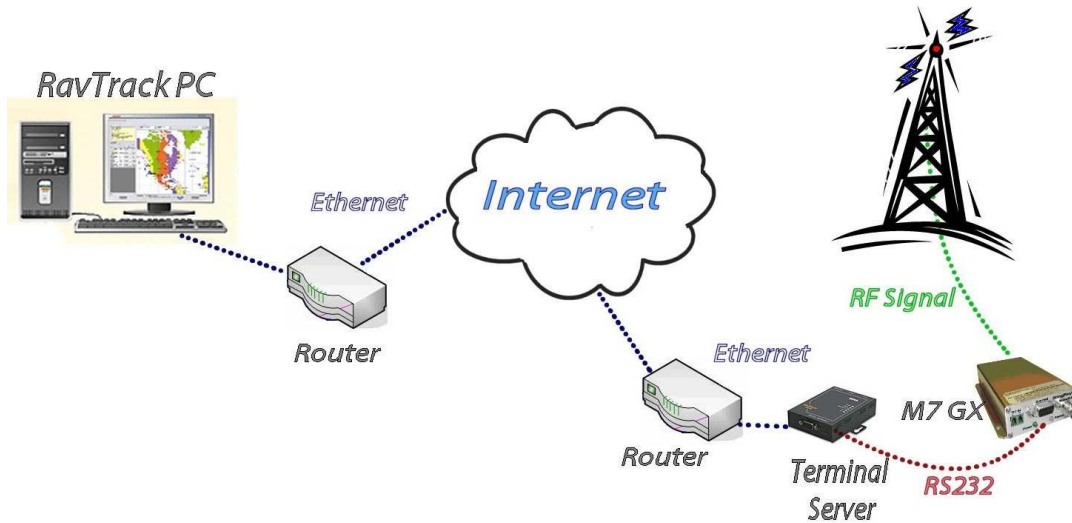
A typical Terminal server is show below. It is a Sena LS100.



The RS232 serial port of the terminal server is connected to the RS232 serial port of the Raveon M7 GX transceiver. The network connection is connected to the computer network that the AVL PC is located on. This may be a corporate or private LAN, or to the Internet via a router – any network that supports TCP/IP.

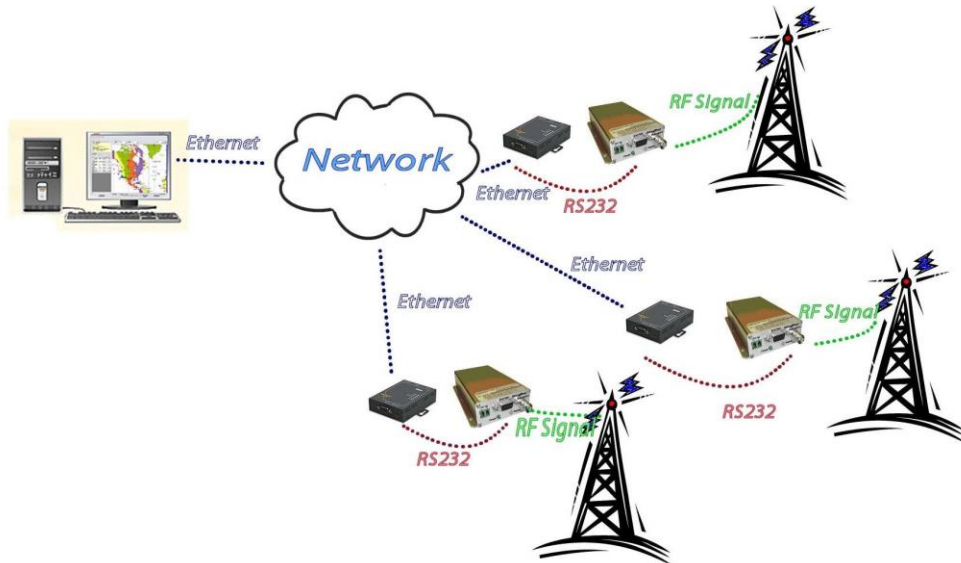
When using a terminal server to connect to the RavTrack PC through the internet, Data from the M7 GX will pass through the terminal server and through a number of routers.

Important: Most Terminal servers have DCE connections, and thus require a “Null Modem” adaptor to connect to the M7 radio.



To create a wide-area RavTrack system, multiple terminal servers with multiple M7 GX transceivers may be used. RavTrack PC software version 1.4 and higher support up to 6 simultaneous connections, either RS232 or TCP/IP.

Wide-Area RavTrack System using Terminal Servers



2. Terminal Server Protocols

2.1. Configuration options

Terminal servers often support a large variety of protocols. For use with *RavTrack PC*, two of them are most appropriate.

- 1) TCP Client using a Socket or IP Port.
- 2) Virtual COM port.

Either method of utilizing a terminal server will work with RavTrack PC, and it is up to the system installer to choose the method most suitable for the installation.

2.2. TCP/IP Socket Services Control

TCP Socket communications can be used to enable a software application to communicate with a serial device that has been network-enabled using a terminal server, without installing a driver on the PC running *RavTrack PC*.

Socket communication is usually based on either TCP or UDP. TCP is the protocol of choice for applications where an end-to-end connection with guaranteed packet delivery is required. The client and server in a TCP based connection need to maintain an open and active link to exchange data. This provides a reliable connection between two endpoints, which is why RavTrack PC uses TCP sockets.

With TCP Sockets, one device is the “client” and one is the “Server”. RavTrack PC implements a TCP Socket server, so the terminal server must be configured to be as the TCP Client.

Important: The terminal server must be configured as the TCP Client.

When the terminal server is configured, the following parameters must be set:

Protocol *TCP Client*
Serial Port Settings:..... *38400, 8 data, no parity, 1 stop*
IP address of the TCP Server *The IP address of the PC running RavTrack PC*
Socket Number (also called TCP Port) .. *The TCP Port configured in RavTrack PC. Usually 53885 – 53890.*

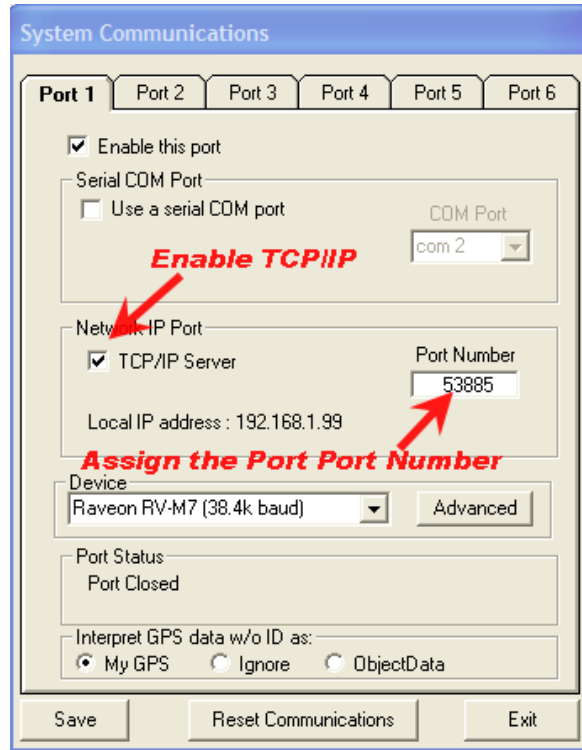
2.3. Virtual COM Port Driver-Based Control

“Virtual COM ports” allows applications to talk to devices across a network as though the devices were attached directly to the host server or PC, when in fact the devices are connected to a terminal server. They require a terminal server specific software driver to be installed on the PC running *RavTrack PC*. Once the driver is installed, the PC will have a virtual COM port connection to the terminal server. It will appear as another COM port on the PC.

All communications to/from the terminal server will take place through this virtual COM port. Virtual COM ports establish a connection between the PC and a networked terminal server device by creating a local COM or TTY port on the host, thereby delivering fully transparent and robust network connectivity for serial devices.

3. Configuring RavTrack PC

To configure RavTrack PC to work with a terminal server configured to use TCP Sockets, select **Config IO** from the main RavTrack PC screen. Select one of the 6 RavTrack PC “Ports” and enable it.



On the System Communication window, the operator is able to see the IP address of the PC that RavTrack PC is running on. In the example above, it is 192.168.1.99.

Each of RavTrack PC’s 6 communication “Ports” may be configured to use either RS232 or TCP Sockets. When configuring for TCP sockets, a TCP Port Number must be assigned to the RavTrack PC port. The default TCP Port Number for RavTrack PC’s port 1 is 53885. For #2, it is 53886, and so forth.

The user may configure RavTrack PC to use any valid TCP Port Number, but many TCP Ports are used by well-known applications. A quick internet search for *TCP “well known ports”* will find many lists of applications that use various TCP Ports.

4. Terminal Server Vendor Links:

Moxa NPort: http://www.moxa.com/product/NPort_6150.htm

Digi PortServer: <http://www.digi.com/products/serialservers/portserverts.jsp>

Lantronix: <http://www.lantronix.com/device-networking/external-device-servers/intellibox-io.html>

MRV: <http://www.mrv.com/oobn/console-servers/>

Patton: http://www.patton.com/products/pe_products.asp?category=156

Sena: http://www.sena-terminalservers.com/products/1-port_terminal_servers/