

IP Communication with the Room Navigator

Overview

This paper will cover the method for sending commands to an IP device with the Room Navigator.

Background

The Room Navigator is equipped with an IP module that provides connectivity to an IP network. Until now, the function of the IP module has been limited to serving web pages for remote control. With the release of CIO 3.06 and CU 3.0, the ability has been added to send commands to remote devices through the LAN port.

LAN communications can be thought of as a session. The session is broken down into 3 parts, Opening the Session, Exchanging Commands and Responses and Closing the Session. For the purposes of this document, we will be talking about point to point sessions.

IP devices may or may not have the ability to have multiple sessions open at the same time. When considering IP communication, it is important to know if your devices are single session or can support multiple sessions. If the device cannot support multiple sessions, you should take great care to make your sessions as short as possible to free the device to communicate with other devices. The Room Navigators and the PathFinders are single session devices.

Getting Started

IP Addresses

IP addresses are made up of 4 3 digit numbers. Each group of 3 digits has a range of 0 to 255. Common private network addresses are 192.168.0.x where x is a value from 2 to 255. If a router is in use, there is also a sub net mask that controls which addresses can be accessed from one another. This mask is also a group of 4 3 digit numbers ranging from 0 to 255. The most common sub net mask is 255.255.255.0. With this setting, only devices who's first 3 address groups match, can communicate with one another.

Example:

Sub Net Mask 255.255.255.0

IP Address 192.168.0.201 can communicate with 192.168.0.10 but cannot communicate with 192.168.1.10.

If the sub net mask were 255.255.0.0, then 192.168.0.201 could communicate with 192.168.1.10.

Every device on a network must have a unique IP address. There are 2 ways for a device to obtain an IP address, automatically through a DHCP server or by being given a fixed value.

It is important to know a little about the network that you are attaching to.

Does it have a DHCP server?

What is the server's address range?

Are there any excluded ranges?

If you are working within a larger network, you should work with the System Administrator to make sure that you do not do something that interferes with other network operations.

If you are setting up a stand alone network, then you may be on your own to create the network as you see fit. At the heart of the network could be a simple switch or a more advanced device such as a router. The one piece of information that you will need to know is: Does it have a DHCP server? If it does not, you will need to assign all of the devices on your network an address by hand. If it has a DHCP server, then you should set up the server to only automatically

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assign addresses through a portion of the available range, generally up to address 50. This leaves you room for devices with fixed addresses.

NOTE – Common Practice:

Generally it is good form to assign private networks an address of 192.168.0.x where x is a value from 2 to 255. Sub net masks should be set to 255.255.255.0. Automatically assigned DHCP addresses should be from 0 to 50 and fixed address devices should start at 201.

Automatic V Fixed IP Addresses

If a device will ONLY initiate IP communication, it can automatically get an IP address from the DHCP server. If a device will need to receive IP communication, it is generally necessary to assign a fixed IP address. This will prevent the address from changing during power outages etc.

Example:

Room Navigator talking to a PathFinder on a DHCP network:

Room Navigator IP Address: Automatic

PathFinder IP Address: Fixed 192.168.0.201

Even if the Room Navigator's IP address changes, it will be able to communicate with the PathFinder because the PathFinder address is fixed.

Room Navigator Talking to a Room Navigator and a PathFinder on a DHCP Network

RN # 1 IP Address Automatic

RN # 2 IP Address: 192.168.0.201

PathFinder IP Address: 192.168.0.202

As in the first example, RN # 1's IP address can change, but it can still talk to the other devices since their addresses are fixed.

In any of the examples, if the network did not have a DHCP server, then all devices would need a fixed address and should start at 201.

You should keep a written record of the IP address assigned to a device. It may be useful to place this information on a label on the device itself.

IP Port Addresses

IP devices may have multiple Port addresses. These are not physical ports, they are logical ones. The Port address allows a device to process incoming messages differently based on the Port that the message is coming through.

Example:

The Room Navigator's IP module uses several Ports:

Port 80 for Web Server Requests

Port 10001 for Telnet Communication

Port 9999 for Configuration

The Eagle Family communicates on Port 3000

Standard Telnet is Port 23

Along with a device's IP address, you should note its Port requirements.

Room Navigator Set-up

In order for the Room Navigator to be able to initiate connections to other devices, you must configure the IP module correctly.

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IMPORTANT NOTE:

Changing these setting will adversely effect the operation of the built in Web Server. If the Web Server is needed, you should use serial communications.

The following changes should be made to the IP module's configuration:

Connect Mode:	Change to C4
Disconnect Mode:	Change to 32
Disconnect Time:	00:00

These settings will allow the Room Navigator to initiate sessions and disconnect only on command.

IP Sessions

We are going to assume that the devices on your network are single session devices. This means that they can only be involved with one session at a time. If you have 2 RN's talking to 1 PathFinder, RN # 1 must end its session before RN # 2 can begin a session. Care should be taken to ensure that sessions are as short as possible, a session should open, send the command(s) and close immediately afterwards.

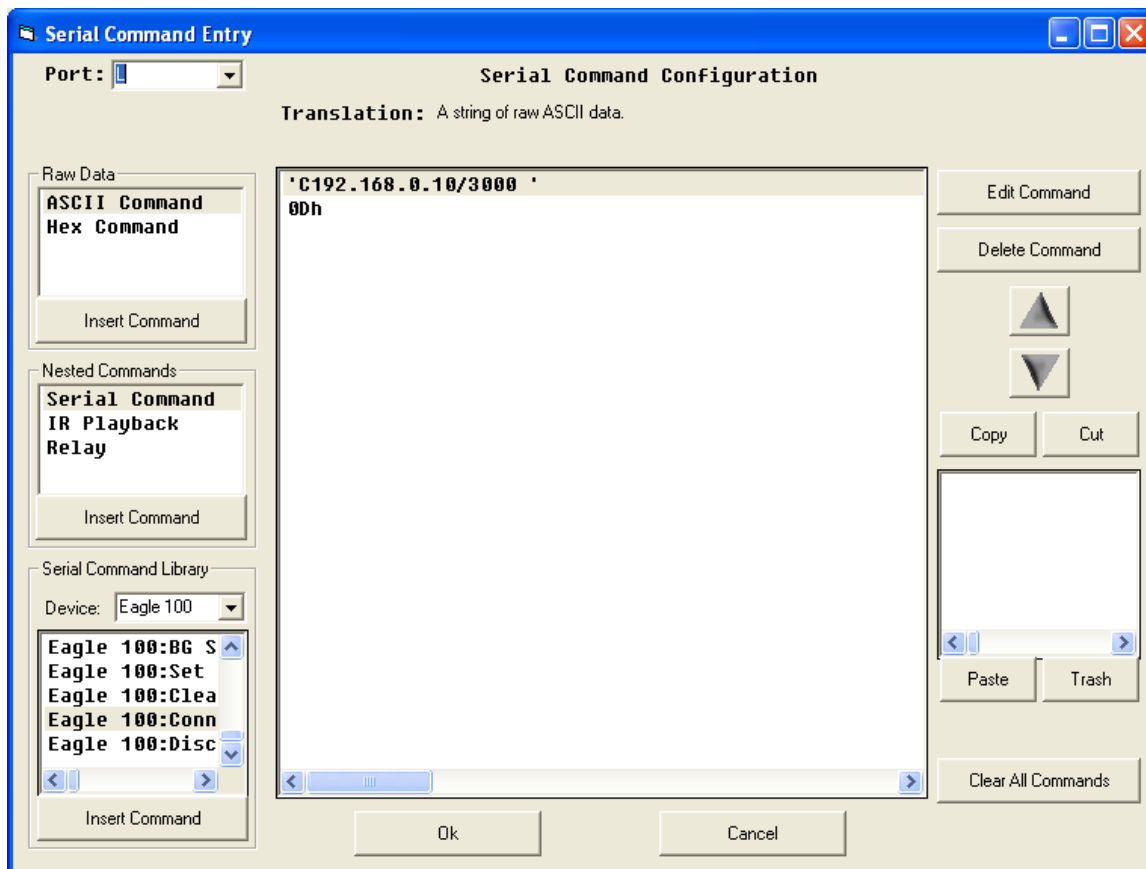
Implementing Sessions in the Room Navigator

IP sessions are implemented in the Room Navigator as serial commands. The first step is to send a serial command to the IP module to open a session. The command is as follows:

Cxxx.xxx.xxx.xxx/y followed by a carriage return
where xxx.xxx.xxx.xxx is the IP address of the device that you wish to communicate with
y is the port number within the device to talk to
Hex 0Dh is a carriage return

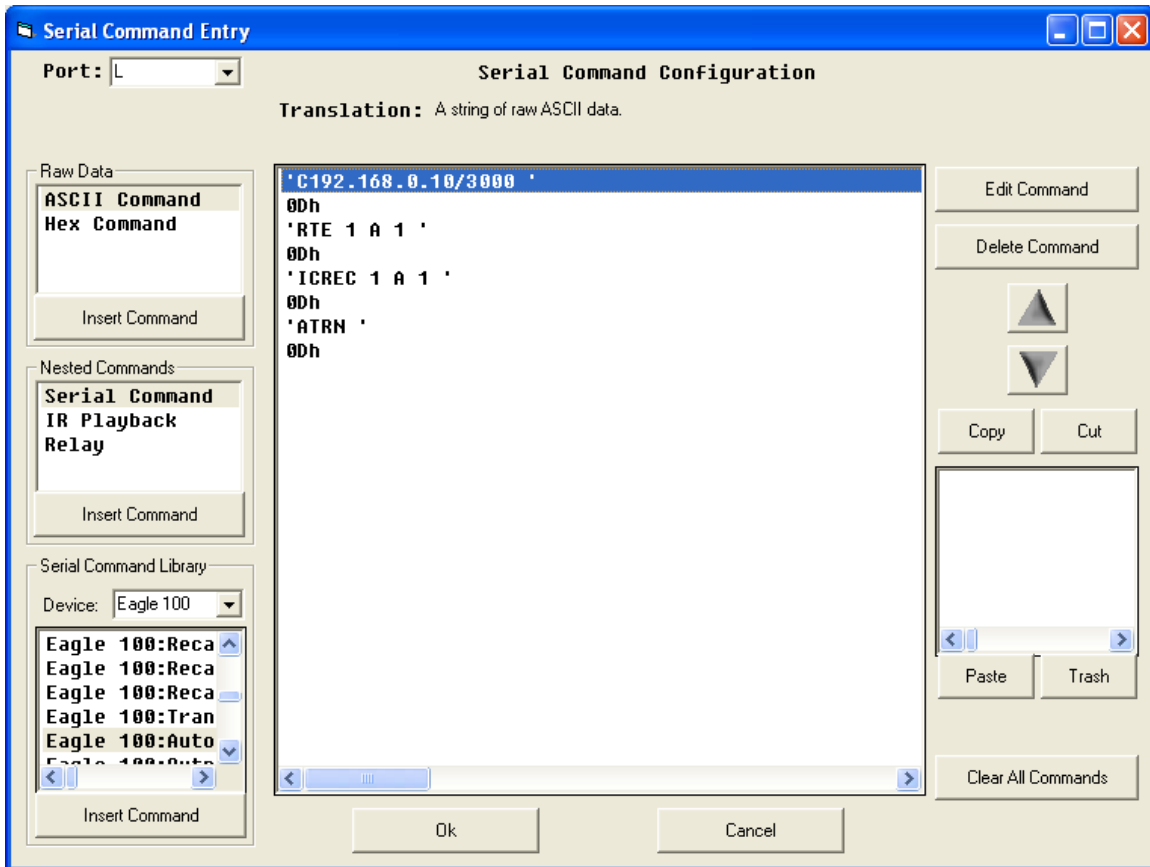
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This command is sent to port L within the CU.



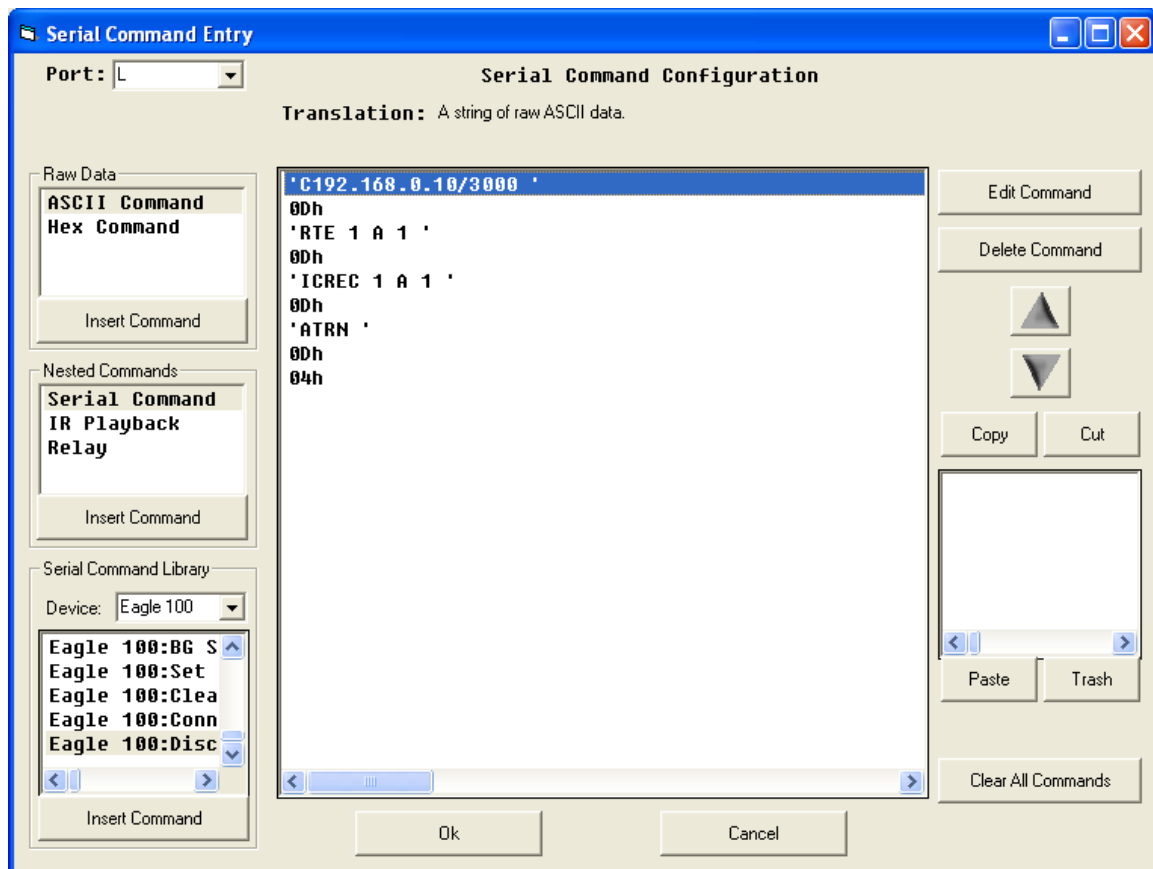
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Now that we have opened the session, we can send commands to the device. These are typically the same as the serial commands for a device, but you should consult the device's manual.



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When we have finished inserting commands, we must close the session. This is done by adding the hex command 04h.



When this button is pressed, the Room Navigator will open a session with the device at address 192.168.0.10 using port 3000 (in this case an Eagle), will send the RTE, ICREC and ATRN commands and close the session. As soon as the session is closed, the Room Navigator and the Eagle are free to communicate with other devices.

IMPORTANT NOTE:

The Room Navigator lacks the ability to interpret feedback. Because of this, it is possible to send commands too quickly to a device. To combat this, you may wish to insert 'Wait' commands between the individual commands to allow the remote device to process the last command and get ready for the next.

This process can be repeated as necessary and can be used to send commands to multiple devices. Simply open the session to device 1, send the commands, close the session, open the session to the next device, send the commands, close the session, etc.

IMPORTANT NOTE:

The command space for a Room Navigator button is 128 bytes, so use the space carefully.

Summary

IP Communication allows the Room Navigator to expand its capabilities beyond simple serial communications. It is now possible to have multiple Room Navigators control 1 PathFinder etc. This is a powerful capability with some important limitations that should always be kept in mind.