



Enabling RUGID RTUs to Communicate Over Ethernet

The purpose of this document is to assist you in connecting RUGID RTUs to Ethernet using a serial device server. There are many serial device servers available and they generally all work the same way. For this example we are using the HelloDevice™ series from SENA (www.sena.com). This series includes both wired and wireless options. They are a low cost option for adding an Ethernet connection to any RUGID RTU. These device servers are best used in slave applications because of the limitation of one host address. In server mode they can accept connections from any client, but as a client they can only connect to one predefined address and port. Please refer to application note AN0803 "[Enabling RUGID RTUs to Communicate Over Ethernet / Internet as Masters](#)". Application Note AN0803 utilizes serial device servers with AT Command support to dynamically modify the remote address. The focus of this document is to setup the serial device server only. In the case of the slave there should be no modification to the RTU's program unless you wish to use an Ethernet protocol such as Modbus TCP/IP; that only requires changing the mode in the ComSetup module (please refer to the ComSetup module in the RUGID support software for selecting the right mode). The following procedure will help you configure and connect a SENA HelloDevice™ serial device server to any RUGID model. This includes the SENA LS100, SENA LS110 and SENA LS100W. As most serial device servers work the same you can use the following steps to assist in configuring any serial device server.

Utilizing a serial device server allows you to upgrade any existing RUGID control and/or telemetry system without the large expense of new equipment and programming. Simply install the low cost serial device servers at each remote. For master site integration please refer to application note AN0803. For new systems, the serial device server allows you to continue using RUGID RTUs for jobs that require an Ethernet enabled RTU or PLC.

Configuring the Device Server:

There are several ways to configure the HelloDevice™. One way is to use a serial port and a standard terminal program such as HyperTerminal™; another way is to use its network connection and configure it through the "HelloDevice Manager V2™" supplied with your serial device server from Sena; or finally a telnet connection. In the case of a secure wireless network, 64 or 128-bit encryption you will need to use the console port because it will not be allowed on the network until you configure it with the encryption key. An encrypted network is one that scrambles the data (based on encryption key) before sending the data over airwaves. The receiving end must then unscramble the data, using the same encryption key before processing the data. This reduces the chance that someone could intercept your data or send data to your device without your permission.

The following simple steps will allow you to have any RUGID RTU communicating over Ethernet in minutes. When connecting the device server to an Ethernet connection make sure to use a crossover cable for point-to-point connections (see Troubleshooting section for correct pin out) and a straight thru cable when connecting to a Ethernet hub or switch.

When using the serial port for setting the configuration you must type the commands into the terminal window. You cannot cut and paste the command examples below into the terminal. The steps below are for the basic system configuration of a HelloDevice™. You may need to or want to change other settings for your specific system. One setting in particular you may choose to change is the inter-character timeout (default 50ms) to increase performance. This controls the delay between the last serial byte and the device server sending the data out over Ethernet.

Using a PC Serial Port

Step 1. Power the HelloDevice™ and switch the serial port into Console mode by pushing the red slider switch to the right on the HelloDevice™.

Step 2. Connect the HelloDevice™ to the PC using a null-modem cable (supplied crossover cable from SENA).

Step 3. Open a terminal program such as HyperTerminal (Start->All Programs->Accessories->Communications). Setup the serial port configuration for:

9600 Baud, 8 Data Bits, No Parity, 1 Stop Bit, and Hardware Flow Control

Step 4. Press enter for the logon prompt. Type in your user name (default "admin") and press "Enter". Now type in your password (default "admin") and press "Enter". You should now be logged on and can view and set the parameters.

Step 5. To configure the IP settings type in the following command, filling in the <> fields with your network settings, separating each field with a space:

"set ip <IP Mode> <ip address> <subnet mask> <gateway> <Allowed IP> <Allowed Mask>" Enter

For example type: "set ip static 192.168.0.8 255.255.255.0 192.168.0.1 0.0.0.0 0.0.0.0" and press "Enter". Response "OK"

For more details on the options for each field, type in "help ip" enter or look in the device server manual.

Step 6. To configure the HOST settings type in the following command, filling in the <> fields with your host settings, separating each field with a space:

"set host <host mode> <local port> <Destination IP> <Destination Port> <Cyclic_connection_interval> <Inactivity_timeout>" Enter

For example type: "set host tcpsc 4000 192.168.0.11 4000 0 300" and press "Enter". Response "OK"

For more details on what the options are for each field type "help host" or look in the device server manual.

Step 7. If you are using a wireless device server you need to configure the WLAN, otherwise you may skip this step. To configure the WLAN settings type in the following command, filling in the <> fields with your WLAN settings, separating each field with a space:

"set wlan <SSID> <Type> <Adhoc Channel> <Encryption Type> <Key method> <WEP Key> <National Code>" Enter

For example type: "set wlan "Your wireless network" i 1 6 1 h "WEP Key" and press "Enter". Response "OK"

For more details on what the options are for each field type "help wlan" or look in the device server manual.

Step 8. You must save the settings before leaving the Console mode or they will be lost and you will have to reenter them. Type "save" and press "Enter". After the device responds with "OK" type "reboot" and press "Enter" so that the new settings will be applied.

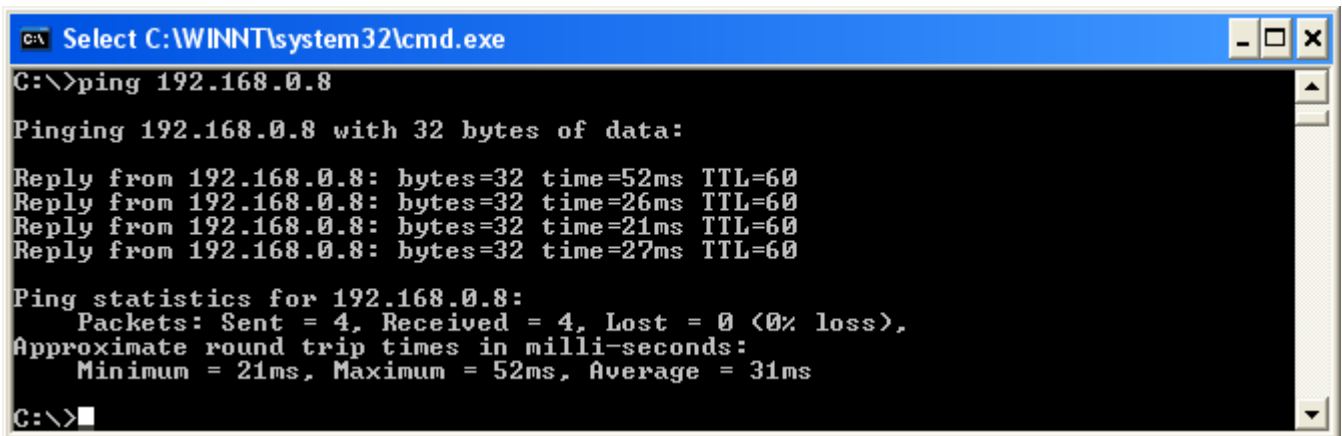
Step 9. On the HelloDevice™ push the red slider switch to the left to put the device in data mode. You are now ready to verify an Ethernet connection to the RUGID. Please refer to "Verifying an Ethernet Connection" below.

```
Sena - HyperTerminal
File Edit View Call Transfer Help
login: admin
password: *****
Type 'help' to get command usages
> set ip static 192.168.0.13 255.255.255.0 192.168.0.1 0.0.0.0 0.0.0.0
OK
> set host tcpsc 4000 192.168.0.11 4000 0 300
OK
> set wlan LOCALLAN i 1 6 1 h 1234567890
OK
> save
OK
> reboot
Disconnected Auto detect 9600 8-N-1 SCROLL CAPS NUM Capture Print echo
```

Verifying Ethernet Connection:

To verify that an Ethernet connection is established, try one of the following three methods:

1. One simple way to verify that an Ethernet connection to the RUGID is established is to ping the device. Pinging a device is a very high level messaging protocol that most Ethernet devices support. It is simply a means of measuring connectivity of Ethernet devices just as you would measure connectivity of a wire. If the ping fails, as in you get 0 packets received, there is no connection to the device; in essence the wire is broken. Until you fix the connection (refer to the Troubleshooting section if the ping fails) you will not be able to pass data between the RUGID and any other device. To ping the device, open a command window on your PC (Start->Run->cmd enter). Then type "ping" with a space followed by the IP address of the device (ex. "ping 192.168.0.8") and press enter. If a connection is established you should get a response as seen in the figure below.



```
C:\ Select C:\WINNT\system32\cmd.exe
C:\>ping 192.168.0.8

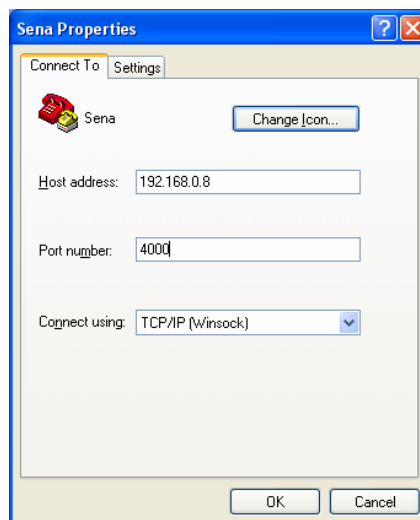
Pinging 192.168.0.8 with 32 bytes of data:

Reply from 192.168.0.8: bytes=32 time=52ms TTL=60
Reply from 192.168.0.8: bytes=32 time=26ms TTL=60
Reply from 192.168.0.8: bytes=32 time=21ms TTL=60
Reply from 192.168.0.8: bytes=32 time=27ms TTL=60

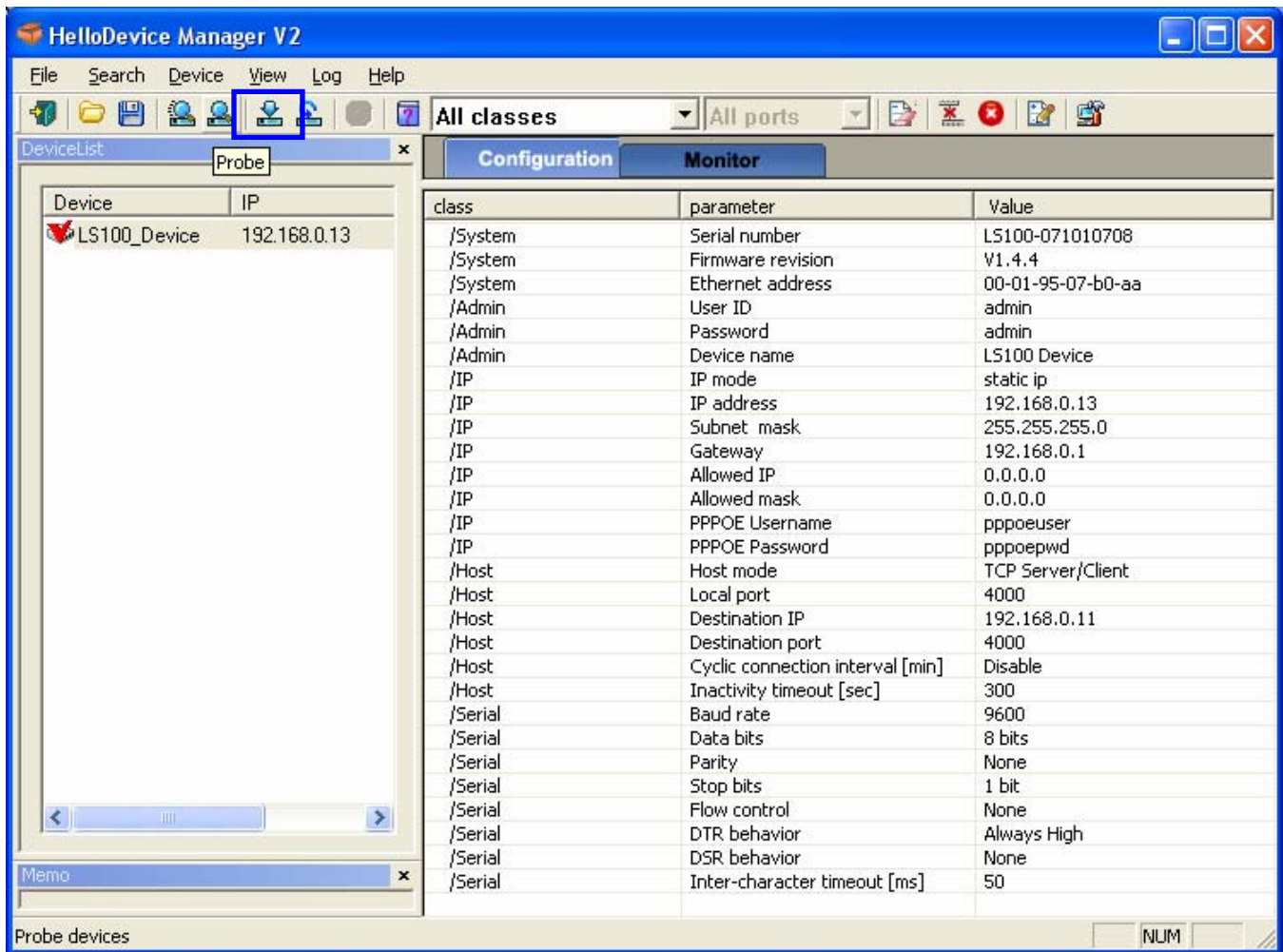
Ping statistics for 192.168.0.8:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 21ms, Maximum = 52ms, Average = 31ms

C:\>
```

2. Another way to verify an Ethernet connection is to use a terminal program such as HyperTerminal™ to open a TCP/IP socket. After entering the host address and port you should be able to navigate the RUGID menus or dump logs just as you would serially.

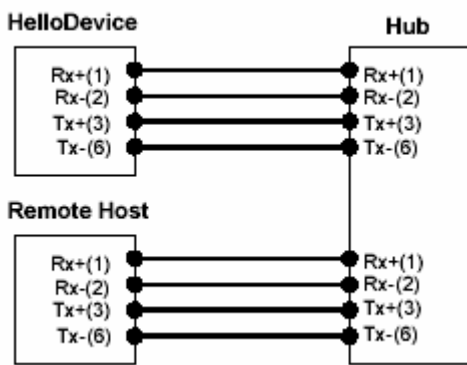


- The third way to verify an Ethernet connection is with the Sena HelloDevice™ Manager software. Install the software included from Sena with your HelloDevice™. Launch the software and probe for any devices by pushing the “Probe” on the upper toolbar (fifth from the left). If the HelloDevice Manager V2™ software finds the device then you have an Ethernet connection to the device, and therefore an Ethernet connection to the RUGID. Add the device by checking the box next to it in the DeviceList and pressing “Add”. You can now modify the settings simply by selecting the device in the device window on the left side. The current settings will be displayed and you can simply click on and modify any of the settings you want to change. You must push the “Set” button on the upper toolbar (sixth from the left) to save any changes to the device.

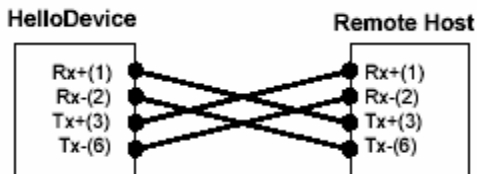


Troubleshooting

1. If you are having problems connecting to the HelloDevice™, verify your system supports 10Mbps devices. The HelloDevices are only 10Mbps. If you need a 100Mbps connection, Sena's Pro Series supports 10/100 Mbps. Please refer to AN0803 for configuring this device.
2. If you are having trouble establishing a connection over a secure wireless network, verify the SSID in the device server exactly matches the SSID of your wireless network. The SSID is case sensitive.
3. If the HelloDevice™ "Link" light is not on, verify you have the correct type of CAT5 cable between the serial device server and your Ethernet device (PC, radio, hub, switch, router, etc). For connections to hubs, switches and other similar devices you need a straight thru cable. For point-to-point connections such as PCs and radios, you will need a crossover cable.



Straight Thru Connection



Direct Connection Using Crossover

For any additional questions regarding integration of serial device servers with RUGID RTUs please feel free to contact us and we will be happy to assist you or direct you to the right entity. Thank you for using RUGID RTUs for your control and telemetry needs.

Contact Information

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References

1. Sena HelloDevice™ User Manuals.
<http://www.sena.com/support/downloads/>