Trimble NetRS - UNAVCO Basic Use Guide

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The purpose of this guide is to walk UNAVCO users through common tasks on the Trimble NetRS. A complete [Trimble NetRS user guide](#) is also available.

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The easiest way to communicate with and configure a NetRS is through its web interface. If you know the receiver's IP address, skip to B. If not, proceed with A.

A. Setting the receiver's IP via the serial port

If you do not know the receiver's IP address or if the receiver is set to DHCP (factory default), do the following:

- Connect the receiver to a computer via a straight serial cable connected to Port 1 (front) on the NetRS.

- Open a terminal emulator (e.g. Hyperterminal on Windows, Z-term on Mac—see Appendix A if you are unfamiliar with these programs). In the terminal emulator, change settings on the appropriate comm port to a baud rate of 115,200, 8 data bits, parity of none, 1 stop bit, and no flow control.

Now power up the NetRS (or power cycle it if it was already on).

- The boot process should stream to the terminal emulator. At the end of the boot process (after 2-4 minutes), the current IP configuration will appear on the screen and you will be given the option to change it. Type **yes** and change to your desired network settings. Note that a typical configuration (and the standard UNAVCO configuration) is as follows:

    - IP: 192.168.1.2

    - Gateway: 192.168.1.1

    - Netmask: 255.255.255.0

- Allow the receiver to continue to boot.

B. Connecting to a NetRS via the web interface.

We assume here that your NetRS is set with a static IP. Your computer must be on the same network as the receiver; that is to say, your computer's IP must have the first three numbers in common with the receiver's IP. For instance, if your receiver is set to 192.168.1.2, your computer must be 192.168.1.x, where x must not be 2 (which is the address of the receiver). A good default in this case is 192.168.1.1. For instructions on how to change your computer's IP address, see Appendix B. Note that you will not be able to be on another network (wireless, LAN) while connected directly to a NetRS, so disable any active wireless connection.

- Connect the NetRS (using the dongle) to your computer via an Ethernet cable. Some computers accept either straight or crossover cables, some accept only crossover cables.

- Open a web browser (e.g. Mozilla Firefox).

- Type the NetRS IP address into the web browser address bar.

An indroductory screen for the NetRS should appear in the web browser. If it does not, it is possible that the NetRS has not fully booted. The receiver generally takes about four minutes to boot. Try to refresh your web browser. Be patient.

C. Configuring a NetRS via the web interface.

All NetRS receivers coming from UNAVCO should have a standard UNAVCO configuration loaded unless the user has requested otherwise. The receivers are configured to have an IP address of 192.168.1.2, to log data at a 15 s sample rate into 24-hour files, to have an elevation mask of 0 degrees, and to not be password-protected.

System Name:

The system name (generally either the receiver's serial number or the site's 4-character ID) and the receiver's serial number are displayed in the upper right-hand corner of the screen. A menu on the left allows you to navigate through receiver information and survey parameters. To change the system name, select Set System Name under Receiver Status – Identity.

Data Logging:

- Select Data Logging from the left-hand menu. The Data Logging Status screen should appear.

- There are five sessions pre-programmed in the UNAVCO configuration file. Only one is enabled (15 s sample rate in daily files).

  - The Session Name describes the configuration in file duration (HR=hour), sample rate (S=seconds, H=Hz), and session identifier. The session identifier indicates where the data are stored.

  - Schedule determines how often the files are collected. "Continuous" indicates uninterrupted data collection. "Daily at xx:xx" indicates that a file will be collected only once daily, starting at the time shown. This may be used if, for example, you have a limited power source (in which case you should also enable the Power Saving Mode, also on this page) or limited memory and only want to record data for part of each day. Note, however, that each UNAVCO NetRS has 1 GB of data storage.

  - Duration refers to file duration.

  - Status tells whether a session is active or not, and, if so, where the data are being stored.

  - Enable allows you to enable or disable sessions from this screen.

  Note that multiple sessions may record simultaneously.

- To check to make sure that the session you select will record as you anticipate, edit a session, or create a new session, click a Session Name. Alternatively, select Create a New Session from the bottom of the screen.

- If editing a session, change the desired parameters and click OK. To create a new session, give the session a name. Both the T00 and Binex formats can be converted to RINEX, so if you don't know specifically which you prefer either should be fine. Position Interval dictates how often (if at all) the receiver will record its estimated position. This provides a starting coordinate for programs such as Trimble Geomatics Office but is not necessary for high-precision applications. Do NOT select Smooth Code Phase nor Smooth Carrier Phase. This will alter your raw data. The Session Identifier appears at the end of the filename and will be the name of the data folder in which the files are stored if you select "Create Per-SessionId subdirectories"; select a letter which

is not already in use. Click OK.

- Make sure your new session is enabled.

You may allot different amounts of storage to different sessions. For instance, your priority is 30 S continuous data logging to determine long-term deformation rates, but you would also like to record 1 Hz data in case there is an event such as an earthquake nearby. To do this:

- Select Data Logging from the left-hand menu.

- Select Reserved Space from the main window or AutoDelete from the left-hand menu.

- In the UNAVCO configuration, the receiver is programmed to allow the memory to fill until only 10 MB are left, at which point it will delete files (starting with the oldest) to make space for new data. For this configuration, AutoDelete should be selected and 10 MBytes specified.

- To allot different amounts of space for different sessions, select your session ID from the drop-down menu next to Add New Pool. A table should appear. In this table, specify the amount of space you would like to allot. By de-selecting AutoDelete, you configure the receiver to stop logging once the pool fills (rather than deleting the oldest files and continuing to log new data).

- Do the same for other sessions.

Miscellaneous items in the Receiver Configuration menu:

Under Receiver Configuration, UNAVCO default settings are as follows: Clock steering enabled, multipath control disabled, L2C tracking disabled, one pulse per second disabled (this is output generally transmitted to time an external device), internal reference frequency, and shutdown voltage of 10.680 V (which is the Trimble default).

Antenna Setup:

Antenna information can be entered in the RINEX files after data collection. If you would like to enter the correct antenna type and height information into the receiver, you can do so under Receiver Configuration-->Antenna in the left-hand menu.

Masks (Elevation, PDOP):

The elevation mask determines to what angle above the horizon the receiver will collect GPS data. Errors in atmospheric delays increase as the satellites near the horizon. The UNAVCO default is 0º; additional data can be eliminated during processing.

PDOP (position dilution of precision) is a quantitative measure of satellite geometry. Low PDOP

indicated good geometry (satellites distributed at differing azimuths throughout the sky) while high PDOP indicates poor satellite geometry (e.g. all visible satellites clustered in one part of the sky). We set the PDOP mask very high (at 50—good PDOP values are < 6) because we want the receiver to continue recording data regardless of satellite geometry.

Internet options:

You can change your receiver's IP settings through the web interface. Note that you may have to change your computer's IP settings accordingly (see **B. Connecting to a NetRS via the web interface**, above).

UNAVCO default settings for internet options are: IP address 192.168.1.2, MTU 1500, Netmask 255.255.255.0, Gateway 192.168.1.1, and Name Servers, Domain, and Search Path not set. HTTP Standard Port 80 enabled and HTTPS Standard Port 443 enabled, others disabled. IP Filtering disabled. Anonymous FTP enabled.

I/O (Input/Output) Configuration and the serial ports:

There are four serial ports on the NetRS: 1, which is in the front, and 2-4, which are in the back. 1 and 2 are straight connections, while 3 and 4 are null.

Security:

You can control access to the configuration of and the data on the NetRS by creating user accounts. Under Security-->Accounts in the left-hand menu you can create accounts and specify access for each. Note that an account is not needed to access the data via anonymous ftp. (Ftp access is controlled under Internet-->FTP on the left-hand menu.)

D. Creating and uploading a configuration file.

If you have many receivers that you want configured in a way that differs from the UNAVCO configuration, you may want to create, upload, and apply your own configuration file.

- Configure a NetRS to your liking (see above).

- Select Receiver Configuration from the left-hand menu, then Configuration Files.

- From the main window, select Create New Configuration File.

- Name your file (xxx.cfg) and select which options you would like to save (most likely, Save EVERYTHING from the bottom). Click Save. If receiver security is set, you will have to enter a user name and password.

- The new configuration file should appear in the Configuration Files list. Select Download to download it to your computer.

To apply your configuration file to another NetRS:

- In the same menu on your new NetRS (Receiver Configuration-->Configuration files) click Upload Configuration File from the main window.

- Browse for your configuration file and click Upload.

- The screen should refresh with your configuration file listed. Click Apply. A warning box will ask you to confirm upload, stating that the receiver will restart; click Yes and wait for receiver to reboot. There is no need to close down or refresh the http window, but neither of these actions will impede the upload. When upload is finished, the Receiver Status – Identity screen will appear. You may now navigate around the receiver.

E. File downloading and deletion.

Files can be downloaded either via the web interface (convenient for a small number of files) or via ftp (convenient for a large number of files). File names are created automatically as [system name]+[year]+[month]+[day]+[start time]+[session ID], e.g. CCRI200706030000a.T00 for a file in the T00 format from site CCRI started at 00:00 UTC on June 3, 2007.

Downloading files via the web interface:

- Click on Data Logging --> Data Files from the left-hand menu. A list of folders should appear in the main window.

- The folders are named by year and month. Click on the appropriate folder.

- From here, files will be sorted into either folders named for their day (if you selected Create Per-Day subdirectories when creating the data logging session) or for their session IDs (if you selected Create Per-SessionId subdirectories). Click on the appropriate folder. A list of files should appear.

- Click on the name of the file you wish to download. You will not be able to download a file that is currently logging. If the NetRS has security, you will be asked for a Username and Password.

- Downloading a data file will not delete it. To delete the file, click the corresponding X under "Delete." If the NetRS is secure, you will be prompted for a Username and Password. To delete all the files in the directory, click the X for Delete next to Delete ALL FILES AND SUBDIRECTORIES in this directory. This does not always work, and you will not be able to delete any currently logging files.

Downloading files via ftp:

To download files from the NetRS using ftp, you must:

1. know the IP address of the NetRS, and, if not using a receiver configured with the UNAVCO configuration file,

2. configure the NetRS to accept ftp connections.

If you do not know the IP address of the NetRS, see "**A. Setting the receiver's IP via the serial port"** above.

To configure the NetRS for ftp communication:

- Click on Internet-->FTP on the left-hand menu.

- Select Modify from the main window.

- For a standard configuration, select Enabled without Delete under Anonymous FTP in the main window. Named FTP and Administration FTP should be disabled.

To download files:

- Connect the NetRS (using the dongle) to your computer via an Ethernet cable. Some computers accept either straight or crossover cables, some accept only crossover cables.

- Make sure your computer is on the same network as the NetRS (see "**B. Connecting to a NetRS via the web interface**," above).

- Open a command prompt. (If using Windows, go to Start-->Run and type **cmd** next to Open.)

- Change directories to where you would like your data to go on your computer. To change directories within DOS, type **..** to go up one directory or type **cd xxx** where xxx is the full name of the directory to which you want to change.

- Connect to the receiver by typing the following:

    ○ ftp 192.168.1.2

    ○ anonymous [when prompted for User]

    ○ [your e-mail address] [when prompted for Password]

- You should get a command line beginning with "ftp>". At this prompt, type **dir** to see a list of directories.

- Change to the desired directory/ies by typing **cd xxx** where xxx is the directory name.

- When you see a list of your desired files, type **bin** to ensure that your files will be downloaded in binary format.

- Type **prompt** if you would like to download files without being asked for confirmation for each one.

- Type **mget *** to download all available files in the directory. Note that you will not be able to download an active (currently logging) file. A file is active if still open, even if there are no data being collected (e.g. the GPS antenna is unplugged).

- When finished, type **bye** to close the connection.

F. Troubleshooting.

To reset the receiver back to factory default settings:

- With the receiver switched on, press and hold the Power button until the External Frequency LED turns on (at 15 seconds) and then turns off (at 30 seconds).

- Once the External Frequency LED turns off, release the Power button.

- Allow the receiver to reboot.

The receiver performs a full reset. All parameters, including GPS orbit and tracking information, are restored to the factory default values. **Caution** – The reset operation can take 5 to 10 minutes. Wait until the receiver has returned to normal operation before you press the Power button or disconnect receiver power. With the antenna connected, wait until the Satellite tracking LED blinks to indicate normal tracking. Alternatively, connect an office computer to the service port and wait until the diagnostics output displays Switching to runlevel: 5. The default IP addressing mode is DHCP. If the receiver is configured with a static IP address, resetting to factory defaults may cause the receiver IP address to change and result in loss of communications with the receiver over the Ethernet link.

OR (preferred) if you are able to establish a serial connection:

- Boot up the receiver and watch the boot sequence using a terminal emulator (see **A.**, above, and **Appendix A.**, below) set to 115200 baud, 8N1.

- When the boot sequence reads:

  >>autoboot in 3 seconds, Hit space twice to stop autoboot

press the space key twice to get a command prompt.

- At the prompt, enter:

> clearnv

> boot_status 0 254

> reset

The receiver should reboot, reset to factory default settings and reload the kernel. As above, the receiver will be set to DHCP. No GPS data will be lost. All settings will be set to factory defaults; any saved sessions will be erased.

Appendix A: Terminal emulators

Hyperterminal comes with Windows automatically. Go to Start-->All Programs-->Accessories-->Communications-->Hyperterminal.

Mac users can download Z-term from http://homepage.mac.com/dalverson/zterm/.

Hyperterminal:

Enter a name and choose an icon for the connection.

"Connect to:" under "Connect using" select your comm port.

For Port Settings, select 115200 bits per second, 8 data bits, None for parity, 1 for Stop bits, and None for Flow control. -->OK

There are two phone icons under "View" in the window's heading. One has the receiver down, meaning you are connected. In the other the receiver is raised from the phone, meaning disconnected. If you need to change your port settings, you must first click the disconnect icon. Then go to File-->Properties-->Configure.

Make sure you are connected (left-hand phone icon grey, not selectable).

Z-term:

Hold down the shift key and double-click the Z-term application. Select your comm port/ device (e.g. USB-serial adapter) and click OK. The baud rate, bits, and parity should be displayed at the bottom. To change these parameters, go to Settings-->Connection. Set parameters to 115200 for baud rate, none for parity, 8 for data bits, 1 for stop bits, and none for flow control.

Appendix B: How to change the IP address of your computer

If your computer is a PC, you should be able to do the following:

- Start-->Control Panel-->Network Connections-->Local Area Connection (if another window doesn't open by double-clicking, right click and select Properties)

- In the Local Area Connection Properties window, under the General tab, highlight "Internet Protocol (TCP/IP)" (to find this, scroll down under "This connection uses the following items"). Select Properties.

- Under the Alternate Configuration tab, select "User configured" and set the IP address, Subnet mask, and Default gateway. Leave the rest blank. A sample configuration, which will allow you to connect to a NetRS with IP address 192.168.1.2, is:

    - IP address: 192.168.1.1

    - Subnet mask: 255.255.255.0

    - Default gateway: 192.168.1.1

- Select OK.

- Select Close.

If your computer is a PC running Windows Vista:

- Start orb-->right-click on Network-->Properties

- In the "Network and Sharing Center," click on "Manage Network Connections" (left-hand column).

- Right-click the appropriate connection-->Properties. Enter administrative password.

- Highlight "Internet Protocol Version 4 (TCP/IPv4)." Select Properties.

- Under the Alternate Configuration tab, select "User configured" and set the IP address, Subnet mask, and Default gateway. Leave the rest blank. A sample configuration, which will allow you to connect to a NetRS with IP address 192.168.1.2, is:

    - IP address: 192.168.1.5

    - Subnet mask: 255.255.255.0

- Default gateway: 192.168.1.1

- Select OK.

- Select Close.

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