**Trimble NetRS Configuration Guide**
For the HamSci TEC Project

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1. Connect power/ethernet "dongle" to the receiver. Then connect antenna, ethernet cable, and power (12 – 24 VDC). Power can be provided either via a dedicated power cable connected to the radio if one is available, or via the barrel socket on the dongle. It doesn't really matter which one you use.

2. To reset receiver to factory, allow it to finish booting (LEDs stop flashing and only ethernet activity and power LEDs are on), then press the power button until the "EXT REF" LED (the one furthest to the left) turns on after about 15 seconds, and keep pressing it until the EXT REF LED turns off (another 15 seconds). Release the power button and watch the LEDs blink for a couple of minutes until only the ethernet activty and power LEDs remain on.

3. The receiver will get an IP address via DHCP. Connect to it with a web browser to the default port 80 (Note: the web interface does not support HTTPS, so your browser might give you warnings about that.)

4. The first page you see will be like this:
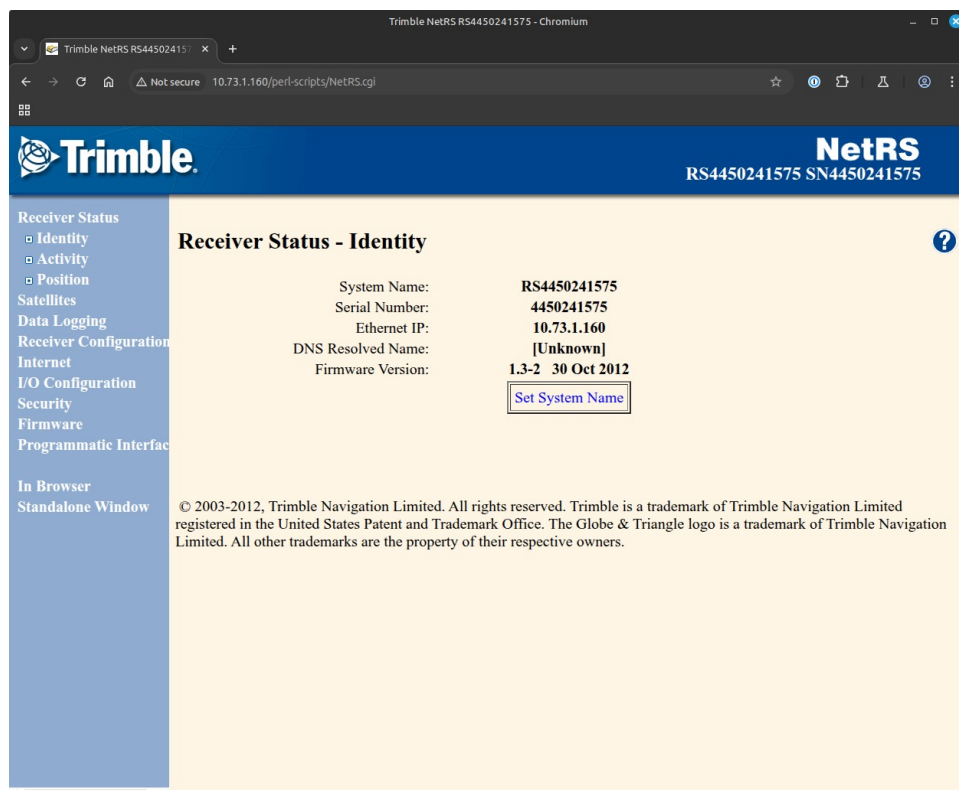
Click on "Set System Name" and change the name to something that makes sense for you.

5. Click on "Receiver Configuration".

      A. Click on Antenna. Select the best match for the Antenna Name. If you have a "real" survey/geodetic antenna, set its NCG/IGS name (you can search https://www.ngs.noaa.gov/ANTCAL/ for it). Leave the height at 0.000 unless you want to offset your measurement plane from the antenna height. Then click "OK".

      B. Click on "Clock Steering" and make sure that is enabled, unless you are using an external 10 MHz reference, in which case you MUST set it to "disabled." Click OK.

      C. Click on "L2 Tracking" and select "L2C and L2-Y Code". Click OK.

      D. You shouldn't need to change anything else under Receiver Configuration for now, though you might want to experiment with things like Elevation Mask and PDOP Mask if your antenna location is challenged.

6. Click on "Data Logging / Data Files" which will show the currently saved files. Unfortunately, doing a reset does not delete existing files. You'll need to click into each directory shown, then click into each subdirectory, and finally click on "Delete All Files and Subdirectories in this directory" to delete them. It's tedious but should be done to maximize the free space for new files.

7. Click on "Data Logging / Status" and change the settings to match what is shown below, and click "OK":

8. Click on "Data Logging / AutoDelete" and make sure the AutoDelete box is clicked. The default of 1MB is OK.

9. Click on "I/O Configuration / Reference Station". If the receiver is already locked to satelltes and tracking, click "Here" to set an initial estimate of the location, then click OK. (You will come back later to set this much more accurately. You can set the RTCM, CMR, and BINEX parameters, but the trimble_ftp tools will override those settings for the data files.)

That is the basic setup. Click on "Receiver Configuration" and you'll see a summary of the settings. Click on "Receiver Status" and "Satellites" and their sub-categories to see how the receiver is doing.

After the receiver has been logging for a full day you should have a file with ".T00" extension in the data storage area. You can run the get_gnss_ftp.py program one time to download and convert that file to a RINEX file that you can use to get your antenna position to within a few millimeters.

Run the program like this:

./get_trimble_ftp.py -m /data/dir -s StationName -f my.ip.add.ress

and it should result in a file with ".obs" extension in the specified data directory.

You can upload that file to a post-processing site to get a report of your station location. I use the Natural Resources Canada Precise Point Position ("PPP") service at webapp.csrs-scrs.nrcan-rncan.gc.ca/geod/tools-outils/ppp.php, though the USGS "OPUS" service at https://geodesy.noaa.gov/OPUS/ also works well, but it has more limited data input and output options. Appendix A walks through how to use the NRCan site.

APPENDIX A
Using NRCan PPP for Precise Location Information

(NOTE – Lately (as of June 2025) the NRCan web site seems to have intermittent but ongoing issues and often presents a security error or sometimes isn't reachable at all. Hopefully they will get this issue rectified Real Soon Now.)

The National Resources Canada Precise Point Position Service is available at https://webapp.csrs-scrs.nrcan-rncan.gc.ca/geod/tools-outils/ppp.php. It requires you to create an account, but that process is simple and they don't ever spam you.

First, make sure you have a RINEX file, generated by the get_trimble_ftp.py program. RINEX files have an extension of ".obs" or if zipped, ".obs.zip".

After logging in, scroll down the page and enter your email address, then make sure the "Static" button is clicked, and select the "ITRF" tab. Then use "Choose File" to select the RINEX file to upload (uncompressed or zipped both work), and click "Submit to PPP".

If all goes well, you will see a notice that the file was successfully submitted for processing. The results will be emailed to you, usually within a few minutes to a couple of hours.

There is a complicating factor to consider. To do its magic, the PPP service relies on data generated by GNSS monitoring stations around the world that provide more precise information about the satellites' orbits than is available in real time. There are three levels of this correction data – ultra, rapid, and final. "Final" gives the most precise results, but the correction data for a given day are not available until more than two weeks later. The "Ultra" results, on the other hand, are available a few hours after the end of the data, but are less precise. The "Rapid" results are available about 18 hours after the end of each day, and are usually the best compromise between quality and impatience.

NRCan will process your data using the correction set available at the time of upload, so if you can stand it, wait for two days after the end of your RINEX data to submit your files. That way you'll get results based on the "Rapid" corrections which are nearly as good as the final version for which you have to wait two weeks.

The results email will contain several links. The "full output" link provides a multi-page PDF file that has (almost) everything you'd want to know. The first page will show you your antenna's coordinates, often with an uncertainty of just a few millimeters.

Once you have your results, you can go back into the receiver, select "I/O Configuration / Reference Station", and enter the coordinates. Remember to click "OK" at the bottom of the page.