

Trimble R8 Base and Rover Quick Setup Guide



Inland GPS Inc.

Setting up the GPS Base Equipment Hardware

First – Find the best, most advantageous secure place to setup the GPS base equipment. Look for a high point open site, close to your project location where you can setup your GPS equipment without any obstructions to the sky. Beware of trees, telephone poles, chain link fences, steel roofed building etc. Location is very important to a successful your survey.



Setup a tripod with a tribrach and adapter over a point whether it's a hub and tack you put in the ground or a permanent monument already on site. Level up over the point making sure the tripod is secure.

Once you're all leveled up:

- ✘ Twist on the .25 meter range pole to the brass tribrach adapter center piece
- ✘ Twist on the R8 receiver to the pole
- ✘ Put on the radio antenna
- ✘ Place on the tribrach, fasten clamp
- ✘ Power up receiver
- ✘ If possible wait about 15 minutes to gather a new Ephemeris before starting your survey.
- ✘ Setup the radio equipment while you're waiting for a new ephemeris.



Setting up the Trimmark 3 Base Radio Hardware



Setup the radio equipment about 10' north of the GPS antenna so the antenna mast does not block any GPS satellites. If you are using the Inland TM3 accessory kit then drive the spike in the ground and drop the battery. Twist the wipe antenna on the black mount and place in top of pole using adapter. Place one pole on the spike, place the TM3 adapter on the pole and place the second pole with the radio antenna on the top of the TM3 bracket. If you are using a tripod then place the black disk on the tripod head and twist on the 6' snap lock pole with the radio antenna on the top. Make sure to connect the radio antenna cable from the pole to the TM3 first before adding power. The higher the antenna, the further the range.



Setting up the Trimmark 3 Base Radio Hardware - Continued



- ✘ Connect the Radio Antenna cable to the TM3 radio
- ✘ Plug the 25' black cable into port 2 on the Trimmark 3 radio and plug the other end in the GPS receiver.
- ✘ Make sure everything is connected before plugging in the grey power cable into the center port 1 and connecting to the 12v deep cycle battery.
- ✘ Do not cross the leads or you will pop the fuse. The white wire with the fuse is the positive lead.

Make sure the Trimmark 3 is powered up and displaying the appropriate radio frequency. Using the next button check the following settings to make sure the TM3 radio is properly configured and ready to operate. Use the ↓↑ keys to toggle between settings, use the next key to switch menus.

- ✘ Mode – “Base w/No Rpt” unless you are using a repeater, then pick the correct setting
- ✘ Channel sharing should be set to “Avoid weak signal”
- ✘ Transmit power High Power 25 W
- ✘ Wireless Mode “TT450s @ 9600bps (this is over the Air)
- ✘ Data port Config 38400 – 8 – none – 1 (this is out the port thought the Black cable)
- ✘ Call Sign “On” - Only Federal Agencies should have this set to “no”
- ✘ The radio will blink “**Trans**” in the upper Right hand corner when broadcasting.

Back to the GPS Base Equipment Hardware



After the radio equipment set is completely setup and ready to operate we need to do the following things before we can start a survey with the base receiver.

- ✘ Plug the black Y cable PN 50012-00 into port 2 on the R8 receiver
- ✘ Plug a fully charged 6AH “cow bell” battery into one side of the Y cable. It does not matter – either side.
- ✘ Plug the TM3 black 25' data cable into the other side of the Y cable
- ✘ Measure and record the Instrument Height – The measure up is from the point on the ground to the center of the Blue bumper on the R8 receiver. Use either the pocket tape or a collapsible measuring rod.



Setting up the

R8 Rover



- ✘ Assemble the range pole and twist on the R8 receiver. Use the bipod to hold the pole with receiver in the upright position
- ✘ Twist on the radio antenna
- ✘ Make sure you have a battery in the unit
- ✘ Power up receiver
- ✘ Place the TSC2 bracket on the pole
- ✘ Remember if you use a quick release with adapter then you need to add 10 CM to your measure up. Instead of entering 2m we enter 2.1m and the TSC2 converts from metric to English units.

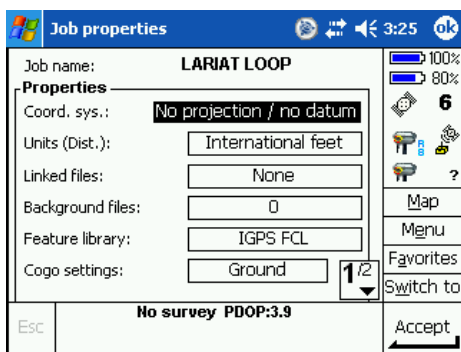


Setting up the TSC2 Survey Controller



- ✘ Make sure to set your Survey Style and configure your data collector before heading to the field.
- ✘ If you use a feature code and Attribute library make sure this is loaded in the data collector.
- ✘ Set the windows setting to suite your personal style
- ✘ Make sure you have a screen cover on your TSC2

Setting up a job in the TSC2 Survey Controller

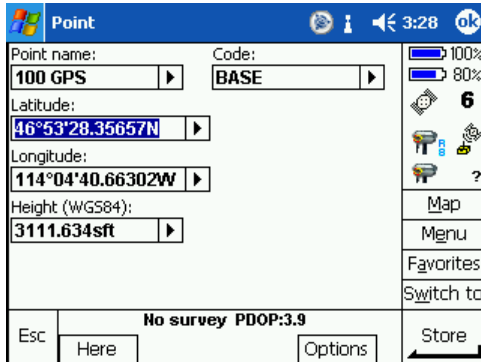


From the Desktop tap on "Files" "New Job" Type in the Job Name

- ✘ If you intend to calibrate in the field either on one point or several points start the job with No Projection / No Datum as in this example. You will need to know the average Height of the project and make sure the geoid is turned on.
- ✘ Make sure you set the units correctly; these settings will be saved from job to job.
- ✘ If you have a control file you can link this file to your Job
- ✘ Choose your feature code library if you intend to use one
- ✘ Set the cogo settings to Ground

Once you have all these setting the way you want press Accept

Starting the R8 Base Receiver



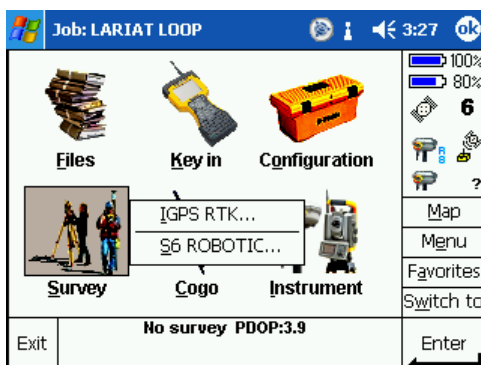
You will be prompted to disconnect from the receiver once the Survey begins. Make sure to go back to “Configuration” “Controller” “Bluetooth” and set the Bluetooth “Connect to GPS Receiver” to the rover you wish to use. Make survey to verify the Serial # of the receiver you are connected to.

Connect to the R8 Base Receiver – Make sure the TSC2 is talking to the base. Go to “Configuration” “Controller” “Bluetooth”. Make sure the “Connect to GPS Receiver” is set to the Serial # of the Base Receiver – Press Accept – Once the TSC2 finds the Base R8 you will see the GPS icon on the right side of the screen, wait for satellites before you begin the Survey.

- ✘ Tap on “Survey” choose your Survey Style
- ✘ Tap “Start Base Receiver”
- ✘ Input the point name with a space and the letters GPS
- ✘ Set the code to Base so we know this is the GPS Base
- ✘ If you don’t have a know point to set up over you will need to hit the “Here” key to gather a Latitude, Longitude and ellipsoid Height. If the screen is set to North East and Elevation hit the options key and choose WGS84 instead of grid. This will fill in the L, L, & H, fields. Hit Store.
- ✘ Enter your measure up, from the point on the ground to the center of the Blue bumper.
- ✘ Tap “Start” and the survey will begin

Once the base has started make sure to look at the Trimmark 3 Base radio to make sure the letters “TRANS” appear in the upper right side of the screen on the Trimmark 3 radio. The letters “TRANS” should blink at one second intervals if everything is running perfectly. It is a good idea to have a Radio Frequency Scanner to monitor your base radio for interference from other radios.

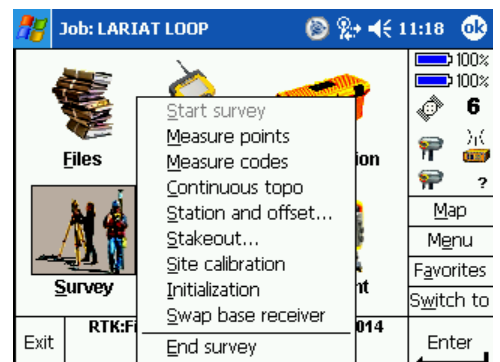
Starting the R8 Rover Receiver



Once the base has been started and the radio is broadcasting walk over to the rover receiver. The rover receiver should have been turned on at the same time the base receiver was powered up; this allows the rover receiver to collect satellites data. Then go to Configuration, Controller, Bluetooth and make sure you have the rover receiver chosen in the “Connect to GPS receiver” use the down arrow to toggle between receivers. Make sure you have radio icon on the screen then go to Survey, pick your Survey Style, and pick Start Survey from the menu.



Once the Survey has begun you will see a message showing “Building Base File” once this has completed press “Accept”. The Survey has been started, we are ready to begin measuring points or we can go directly to site calibration in the Survey



Single point calibration

If you plan on calibrating on a single point then go to the Survey menu and tap on:

- ✘ “Site Calibration” then Press “Add” on the lower left
- ✘ You are prompted to enter the grid point; this is the Northing, Easting and Elevation value you intend to use for your base position. Use the arrow key to pull this grid point from the list or choose key in and hand enter the point.
- ✘ As an example key in 10,000, 10,000 and the elevation, make sure not to check the control box if you wish to process the base position with OPUS once you return to the office.
- ✘ GPS point name is the point we started the base with, in this case 100 GPS. Pull this from the list.
- ✘ Once both the Grid point and GPS points have been entered tap accept. This will make your GPS Base position and your N,E,E position the same point.
- ✘ Once the single point calibration has been complete hit Accept and you will be show the grid point 100 and the GPS point 100 GPS used in the calibration. Make sure the “Use” is set to Horizontal & Vertical. Accept this and tap “apply” to save the calibration. The calibration is the projection parameters that take you from Lat, Long and Ht to Northing, Easting and elevation.
- ✘ Now your job has Northing, Easting and Elevations associated with your GPS L, L, H positions you are now about to measure.

Measuring Points

Now that we are ready to begin measuring points go to Survey

- ✘ Open the Measure Point menu
- ✘ Enter in the point number you wish to begin with i.e 1000
- ✘ Type in the feature code of the point i.e. GS
- ✘ Use the Topo Point for the Method
- ✘ Type in 2M the data collector will convert to English units.
- ✘ Measure is set to “bottom of antenna mount”
- ✘ Tap “Measure” in the lower right corner

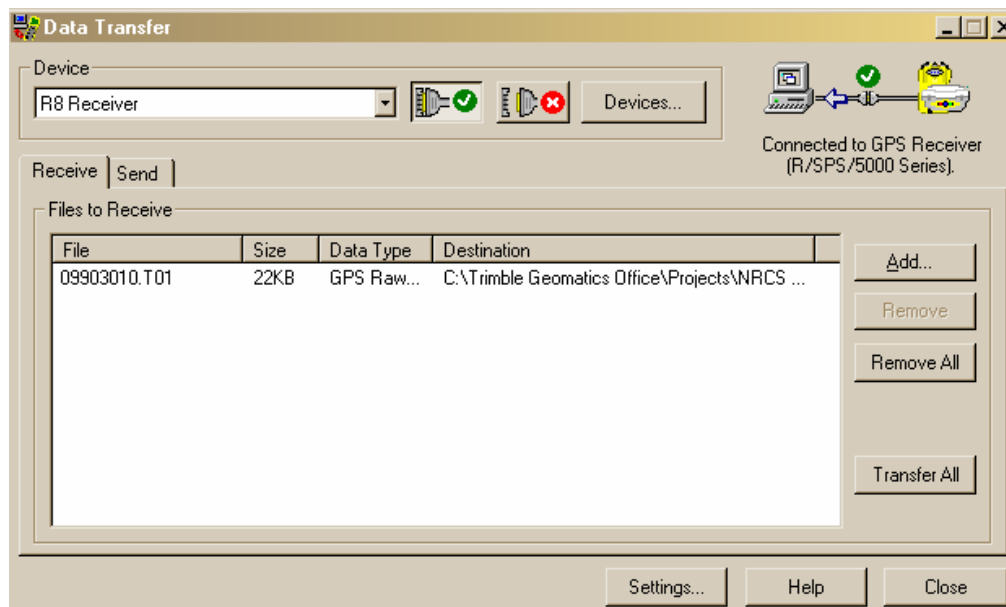
Make sure the bottom of the screen says RTK: Fixed before you can measure any points. Once you begin to measure a point the data collector will show you how many positions have been collected and the horizontal and vertical precisions. If you wish to auto store the point once the H & V specs have been met tap on “Options” check the Auto Store box. Once the H & V specs are met the point will automatically be stored and the point number will increase by one.

Ending your Survey

Once you have completed your surveying for the day, make sure to end the survey on the controller. Go to the “Survey menu” and go to “End Survey” you will be prompted to turn off the rover receiver say “Yes” and the receiver will shut down. Next, go back the main menu, Configuration, Controller, Bluetooth and switch the “Connect to GPS Receiver” from the rover to the base receiver. When you walk up to the Base receiver the TSC2 will automatically connect to the Base receiver. Go to the “Survey menu” and go to “End Survey” again and you will be prompted to turn off the base receiver say “Yes” and the receiver will shut down. Now when you return to the field the next day the TSC2 will already be set to communicate with the base receiver. Make sure you are connected to the base receiver when to start base and not the rover receiver.

Downloading the Base file from the R8 Receiver

Once you have completed your survey and returned to the office you will need to download the base receiver file in order to send this file to OPUS for processing. Start Trimble Geomatics Office software and turn on the R8 receiver. Using the yellow data cable PN 32960 plug into port 1 on the R8 and plug the 9 pin connector into your computer. Go to “Utilities” Data Transfer and choose R8 for the device. Once the receiver is connected click on “add” and it will pop open a window and display the files in the R8. Check the destination so you know where the file is going to be saved on your computer. Double click on the R8 file then choose the correct .T01 file usually the top file and click Transfer all. This will transfer the file to the location you designated.



Processing an OPUS position at the base:

Go to the *OPUS Web* site <http://www.ngs.noaa.gov/OPUS/>. Fill out the 4 requested fields:

1. Enter the *email address* to receive the processed position.
2. “*Browse*” to the *Checkin* directory of the *TGO Project* for the *DAT* file containing the raw data from the field Base position. The first four digits of the file name will correspond to the last four digits of the receiver serial number. The next three digits of the file name will be the Julian Day (day of the year) that the data was observed (Greenwich Time). The last digit of the file name will be the session number for that day, beginning with zero.
3. From the list, select the appropriate antenna type, for example *TRM5800*.
4. Enter the *Antenna Height* from the monument to the *Bottom of the Antenna* or *Center of Bumper* **IN METERS**.

Select the “**UPLOAD FILE**” button at the bottom of the page. The processing/adjustment through *OPUS* usually only takes a few minutes. Check the inbox for the entered email address for the reply.

Import OPUS Data Sheet

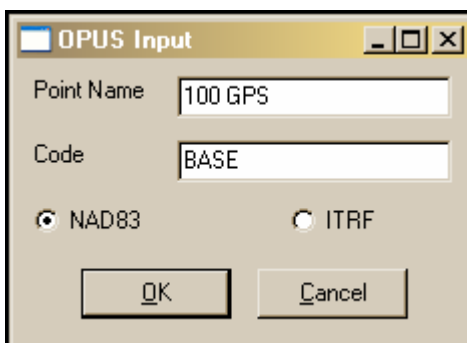
Once receipt of the email from *OPUS* has been established, open the email and save it as a text file (*.txt) to the *Checkin* directory of the *TGO Project*. Open the *Project*, go to the *File* pull down menu and select the *Import* option which will display the *Import dialog box*. Select the *Survey tab*.

(If this is the first time this process has been used it will be necessary to install the OPUS file import routine as follows: under File/Import, select the Survey tab, click Customize, click Add, and select OPUS.dll in the C:\Program Files\Trimble directory. Press OK. This will add the option “NGS OPUS processing results” to the list of Import formats)

From the *Survey tab* listing, select the “*NGS OPUS processing results*” option. The saved email text file (above) should be listed. Double click on the file and the *OPUS Input dialog box* is displayed. Name the *Point* the same as your Base location and select the *NAD83* (the default) datum. A triangle now appears in the project, this is the *OPUS point*; now download the data collector file over the top of the *OPUS position* and all the *GPS positions* are updated.

Importing the OPUS position into TGO

Open your project in Trimble Geomatics Office Software. Go to “File” “Import” “NGS OPUS processing results” and find the *OPUS results* you just saved off. Double click on the file and the *OPUS input file* pops up. Type in the *Point Name*, the same as the base point we started the job with. In this case *100 GPS*. Type in the code “*BASE*” and make sure the *NAD83* toggle is checked. This brings up a *Default projection definition* box. Leave the *northing* and *easting* set to *0.000sft* click *OK*. This puts a triangle in the middle of you project.



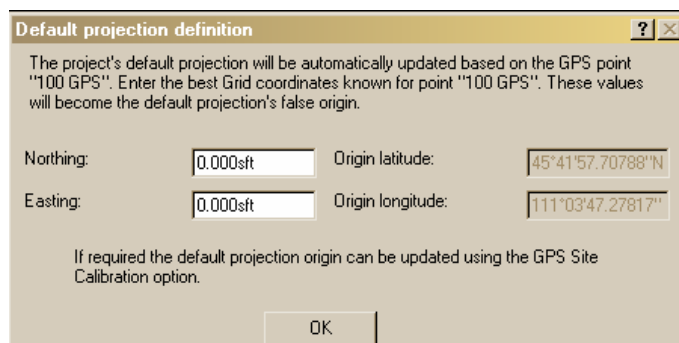
OPUS Input

Point Name: 100 GPS

Code: BASE

NAD83 ITRF

OK Cancel



Default projection definition

The project's default projection will be automatically updated based on the GPS point "100 GPS". Enter the best Grid coordinates known for point "100 GPS". These values will become the default projection's false origin.

Northing: 0.000sft Origin latitude: 45°41'57.70788"N

Easting: 0.000sft Origin longitude: 111°03'47.27817"

If required the default projection origin can be updated using the GPS Site Calibration option.

OK

Transferring data from the TSC2 to the Computer

Open Trimble Geomatics Office and open your project. You should have a triangle in the middle of your screen which is your base position you imported from OPUS. Now we need to import the data collector file into the project.

- ✘ Then go to “Files” “Import” “Survey Device” and pick Survey Controller on ActiveSync
- ✘ Connect the TSC2 to the computer and choose the correct data collector file to import.
- ✘ Make sure the “convert to data collector file definition” is checked, hit OK
- ✘ Once the file imports double click on the triangle and you will see the updated Latitude, Longitude and ellipsoid height along with the Northing easting and elevation.

Exporting data from the Computer to another software package

In TGO go to “Files” “Export” pick the Custom Tab and choose the NRCS export. The file will be saved under the C:\Trimble Geomatics Office, Projects, your project name and then export. The file is saved to this directory. Your data collector file is saved in C:\Trimble Geomatics Office, Projects, your project name, Data Files, Trimble files.