

Spectra Precision Survey Pro 4.8 GPS

General Operations

Topcon Receiver/Radio Configuration

One-Point Calibration

Multi-Point Calibration

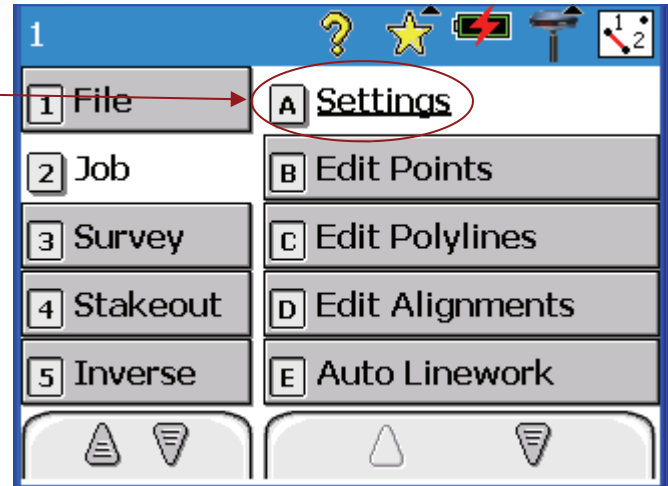
Mapping Plane

Procedures Manual

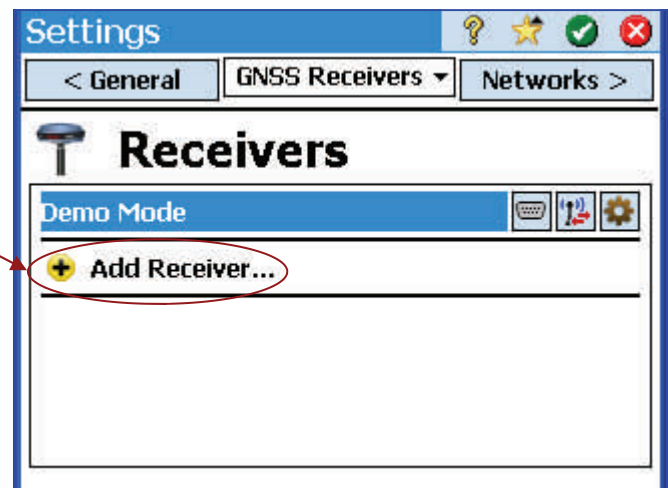
Creating a profile for the Topcon GPS Receiver

The following procedure will create a profile for your Topcon GPS receiver. This only needs to be done once per receiver. Make sure the receiver is ON and within 10 ft of the data collector.

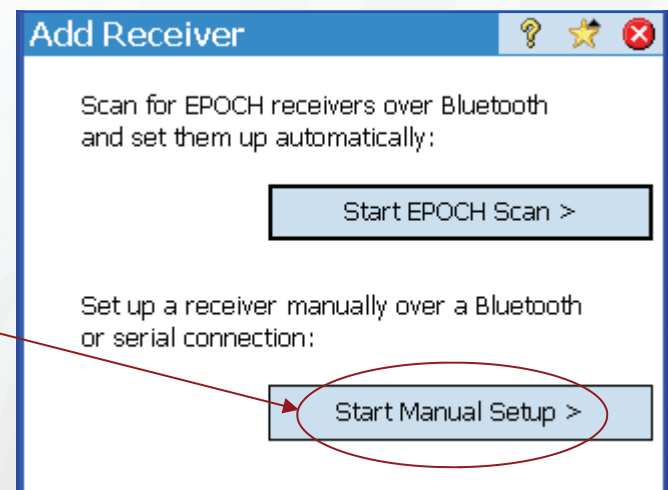
Step 1:
Tap [Job] - [Settings]



Step 2:
Tap [Add Receiver]



Step 3:
Tap [Start Manual Setup]

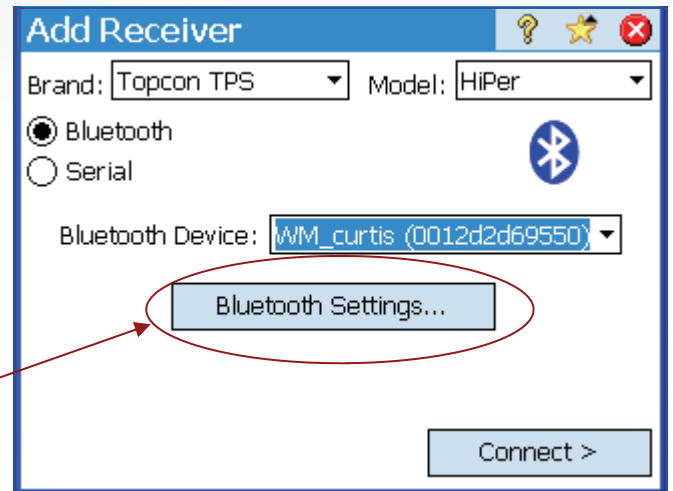


Creating a profile for the Topcon GPS Receiver

Step 4:

Set the dialog up as shown.

- Brand: Topcon TPS
- Model: (Select your GPS model)
- Bluetooth: (if using BT connection)

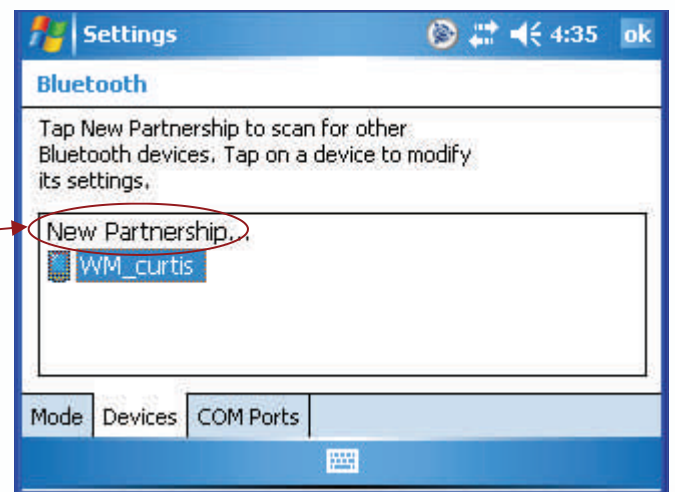


Step 5:

If your Bluetooth connections have already been created **then** go to **Step 13** Else tap [**Bluetooth Settings**] to create them.

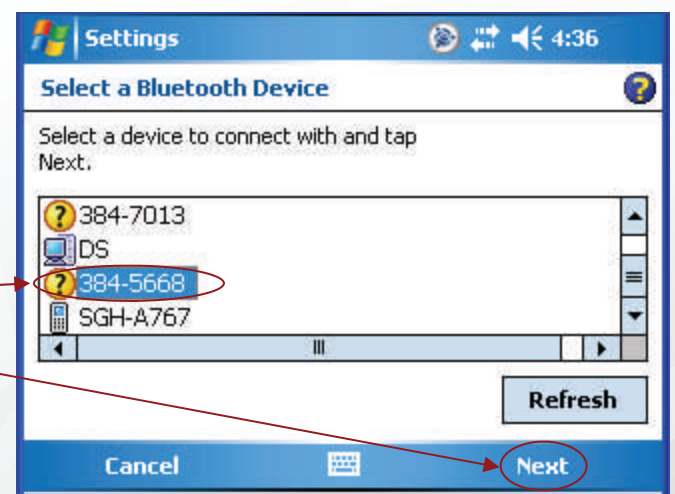
Step 6:

Tap [**New Partnership**]



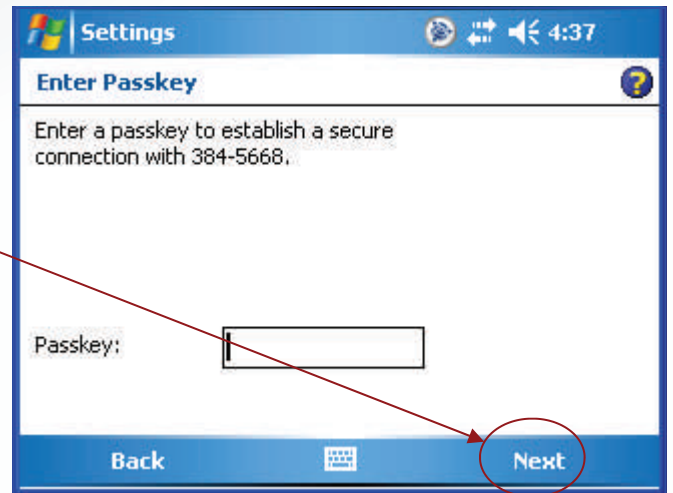
Step 7:

Select your receiver off the list and press [**Next**]

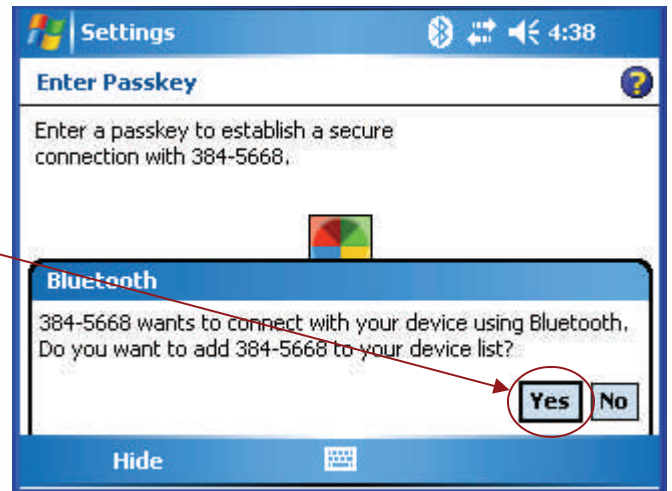


Creating a profile for the Topcon GPS Receiver

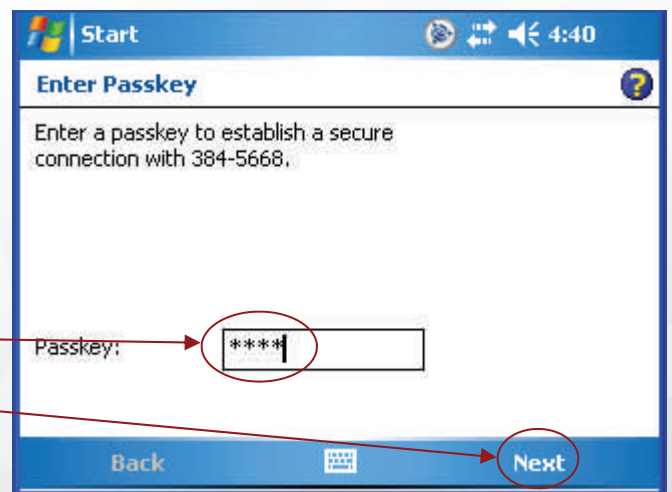
Step 8:
Press [**Next**]



Step 9:
Press [**Yes**]



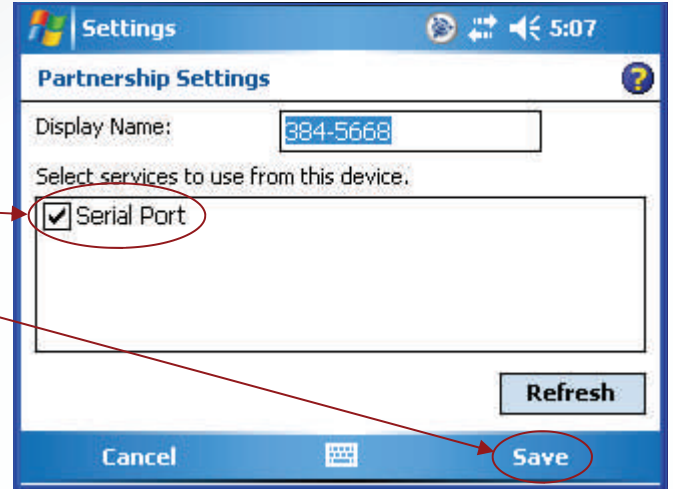
Step 10:
Enter **1111** for the passkey and press [**Next**]



Creating a profile for the Topcon GPS Receiver

Step 11:

Check [X] Serial Port and press [Save] or [Finish]



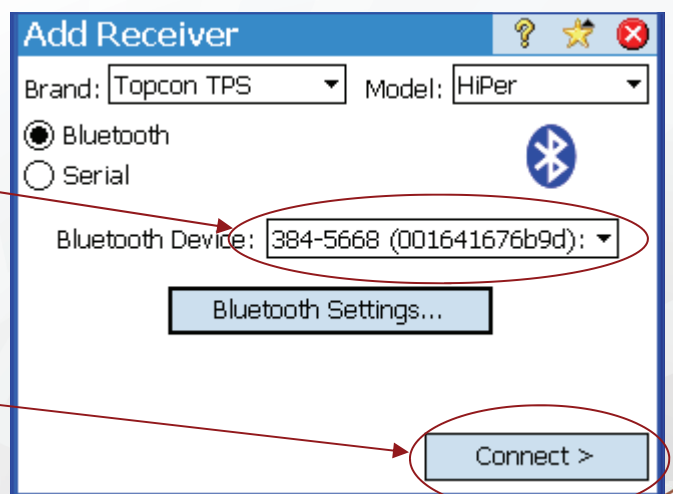
Step 12:

Press [OK]



Step 13:

Set the Bluetooth Device: to the bluetooth connection we just created.



Step 14:

Press [Connect]

Creating a profile for the Topcon GPS Receiver

Step 15:

Give the profile a specific name (I.e. serial number, HiPer 1, Dave, etc.) and press **[Save]**

Note:

Spectra Precision does not recognize a receiver as a "Base" or "Rover". Any receiver with the capability to be a base or a rover can be used as either when selected.

Note:

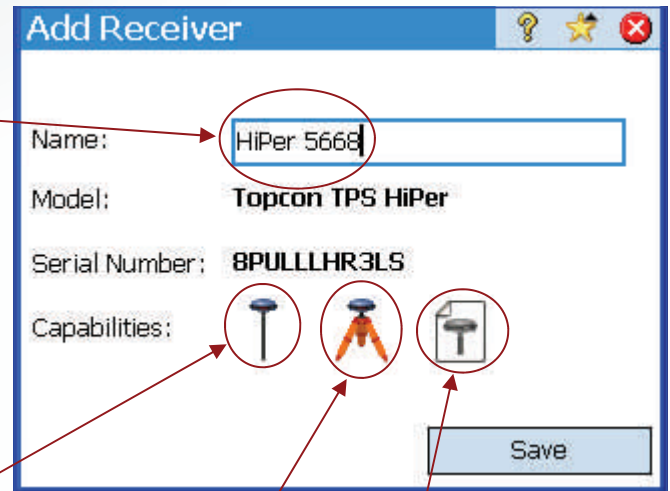
This symbol means the receiver can be used as a Rover.

Note:

This symbol means the receiver can be used as a Base.

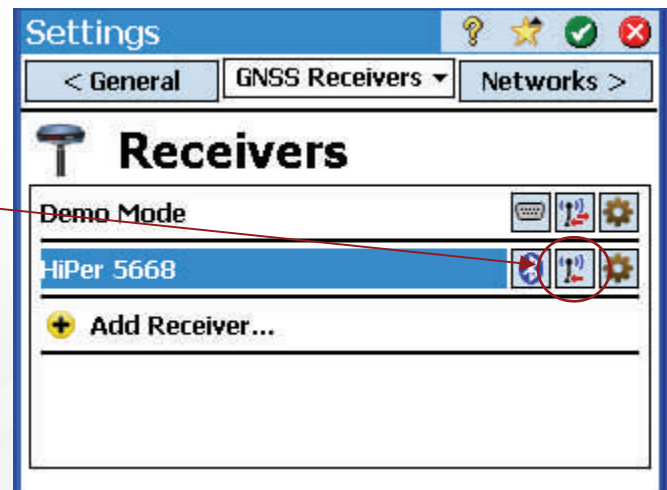
Note:

This symbol means the receiver can be used for Post Processing.



Step 16: Configure the Radio

Tap 



Creating a profile for the Topcon GPS Receiver

Step 17:

Set the Data Modem to the radio type of your GPS receiver.

- I.E. HiPer Lt is <**Internal FH915+**>
- HiPer GA is <**Internal D-UHF**>

Step 18:

Tap [**Configure**] to configure the serial port.

Step 19:

- Set the Port to **C**
- Baudrate to **38400**.
- Parity to **None**

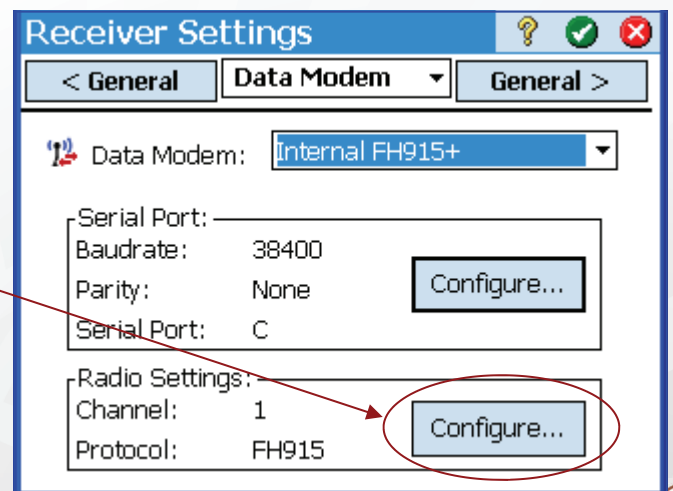
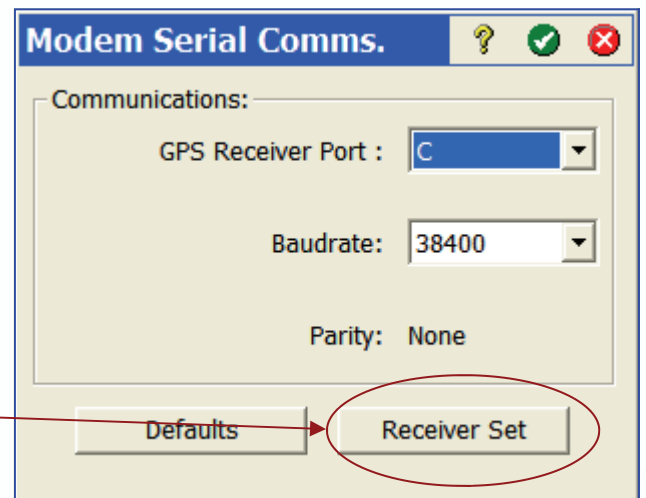
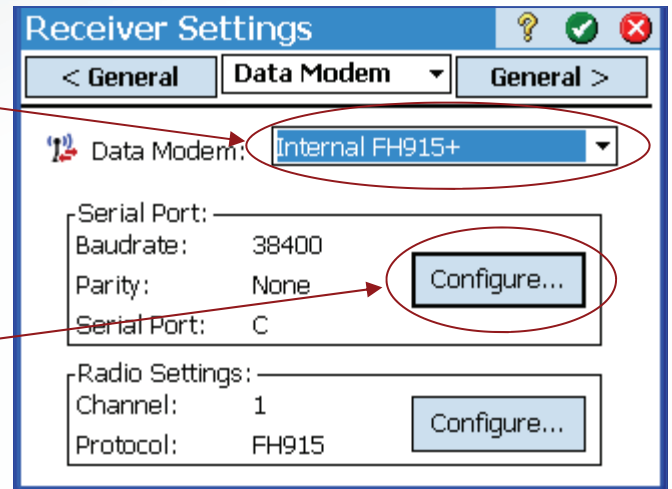
Note: Typical for HiPer Settings.

Step 20:

Press [**Receiver Set**]

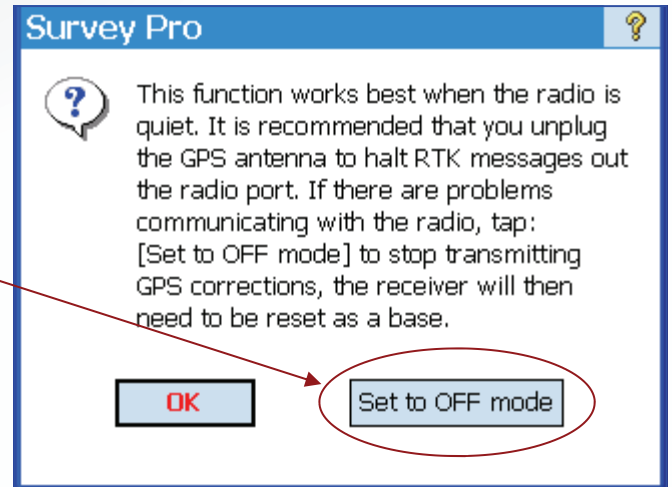
Step 21:

Press [**Configure**] to configure the Radio Settings.

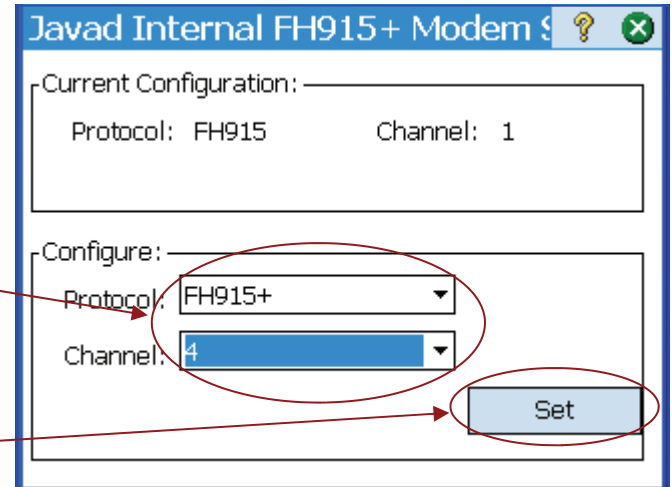


Creating a profile for the Topcon GPS Receiver

Step 22:
Tap [**Set to OFF mode**]

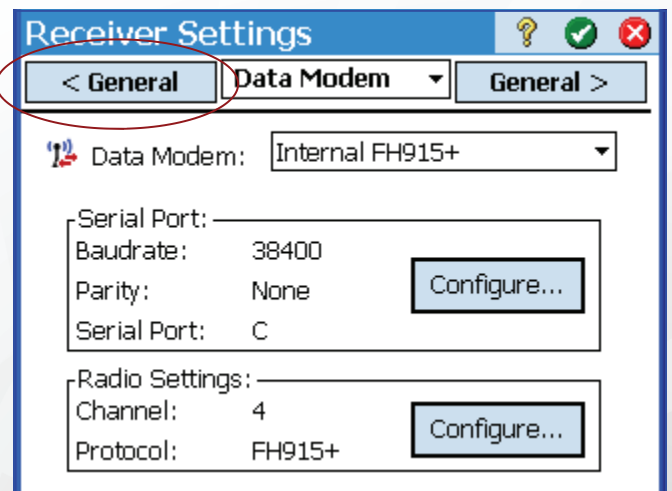


Step 23:
Set the Protocol and Channel



Step 24:
Tap [**Set**]

Step 25:
Tap [**General**]

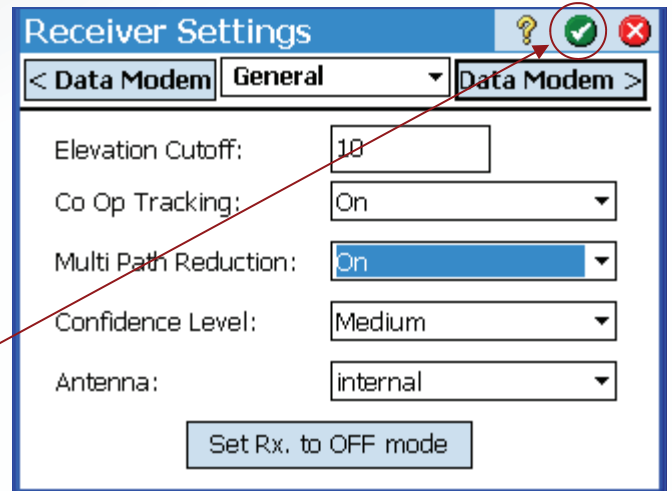


Creating a profile for the Topcon GPS Receiver

Step 26:

Set the user preferences in the <General tab>

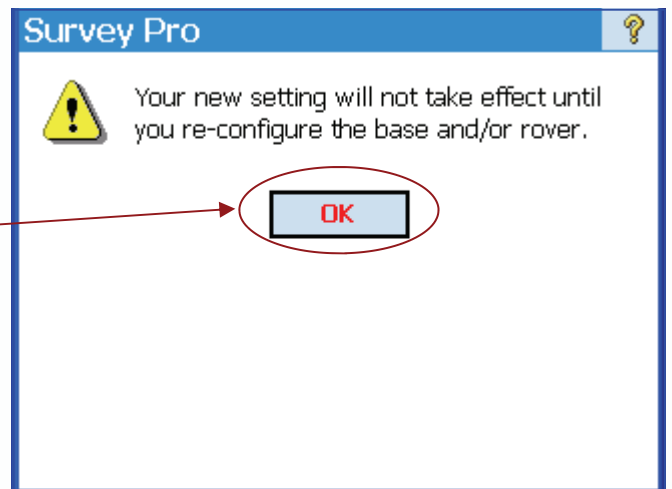
- I.E. Elevation Cutoff to **10**
- Co Op Tracking to **ON**
- Multi Path Reduction to **ON**
- Confidence Level to **Medium**
- Antenna to **Internal** (Optional)



Step 27:

Tap 


Step 28:
Tap [OK]

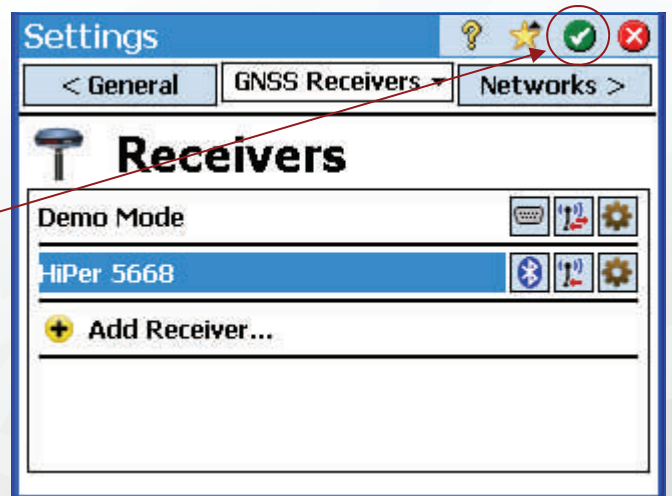


Step 29:

Repeat **Step 2** to **Step 29** until all your receivers are entered.

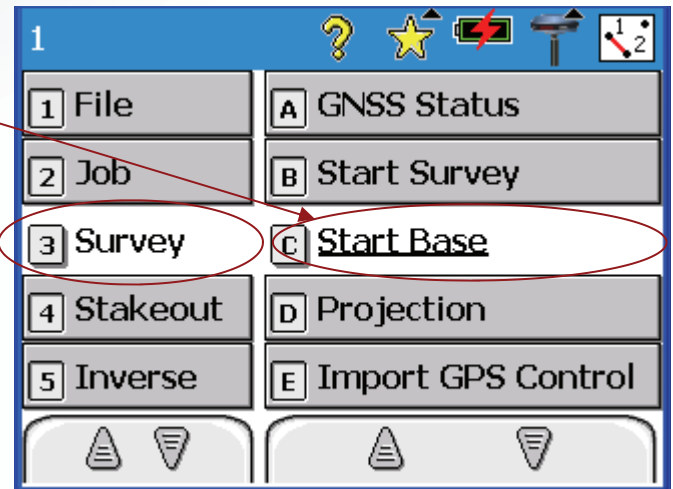
Step 30:

Tap  To finish adding receivers.

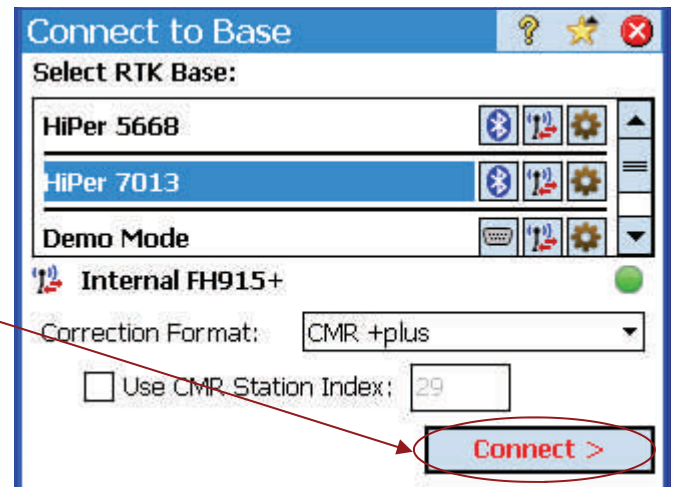


One-Point Setup Base and Rover

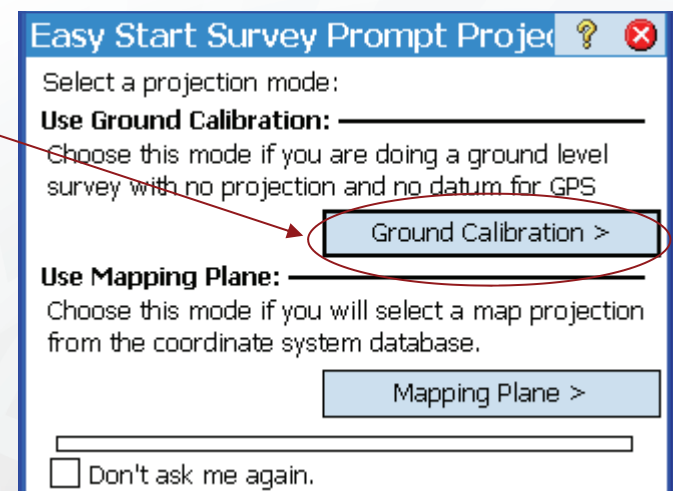
Step 1:
Tap [Survey] - [Start Base]



- Step 2:**
- Select a receiver to be the Base (**Note:** this can be any receiver you have profiled.)
 - Set the Correction Format (typically CMR+)
 - Make sure your base is in proximity, powered on and ready to work.
 - Press [**Connect**]



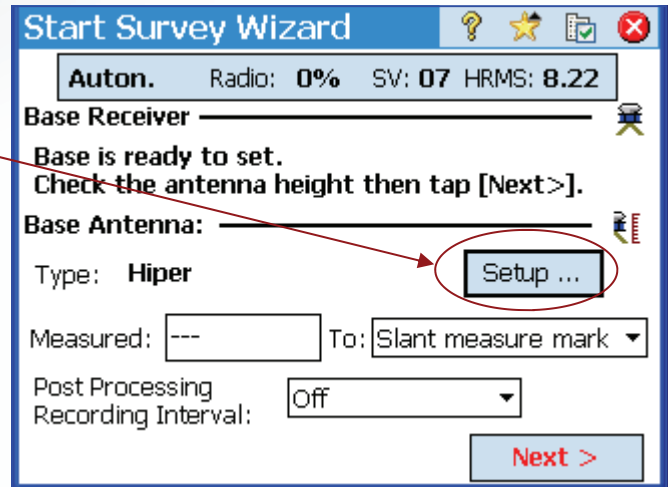
Step 3:
Since we are assuming a simple one point setup, Press [**Ground Calibration**]



One-Point Setup Base and Rover

Step 4:

If this is a new setup, we need to set the antenna profile. Press [**Setup**]



Start Survey Wizard

Auton. Radio: 0% SV: 07 HRMS: 8.22

Base Receiver

Base is ready to set.
Check the antenna height then tap [Next>].

Base Antenna:

Type: Hiper **Setup ...**

Measured: --- To: Slant measure mark

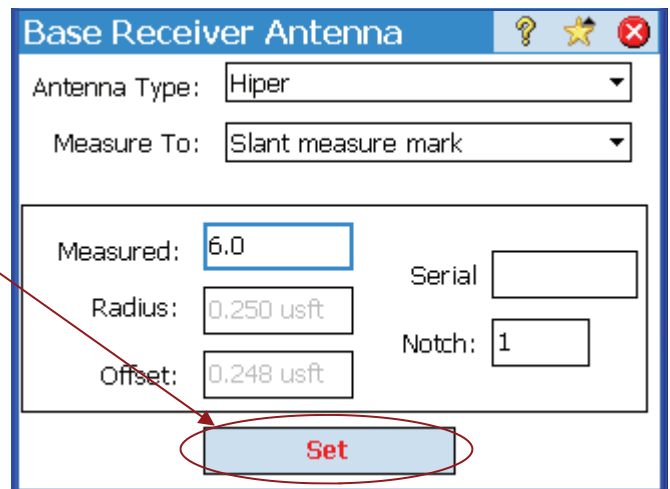
Post Processing: Off

Recording Interval: Off

Next >

Step 5:

- Set the Antenna Type to the correct model. (HiPer for all HiPer Receivers)
- Set the Measure To: (Typically Slant on the Base)
- Enter in the measure-up value.
- Press [**Set**]



Base Receiver Antenna

Antenna Type: Hiper

Measure To: Slant measure mark

Measured: 6.0

Radius: 0.250 usft

Offset: 0.248 usft

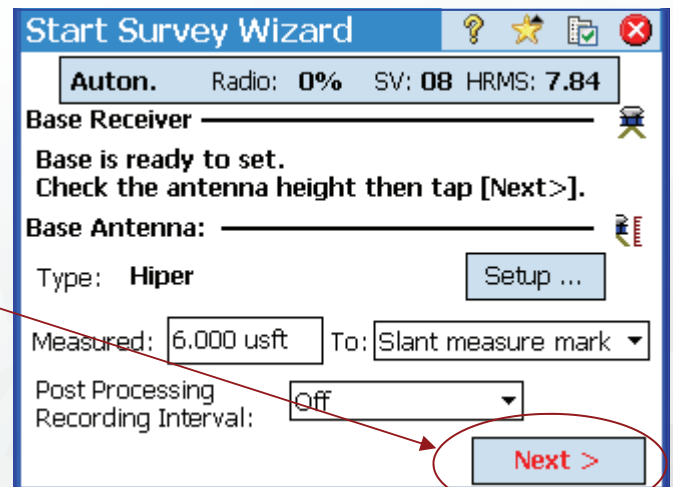
Serial

Notch: 1

Set

Step 6:

Tap [**Next**]



Start Survey Wizard

Auton. Radio: 0% SV: 08 HRMS: 7.84

Base Receiver

Base is ready to set.
Check the antenna height then tap [Next>].

Base Antenna:

Type: Hiper **Setup ...**

Measured: 6.000 usft To: Slant measure mark

Post Processing: Off

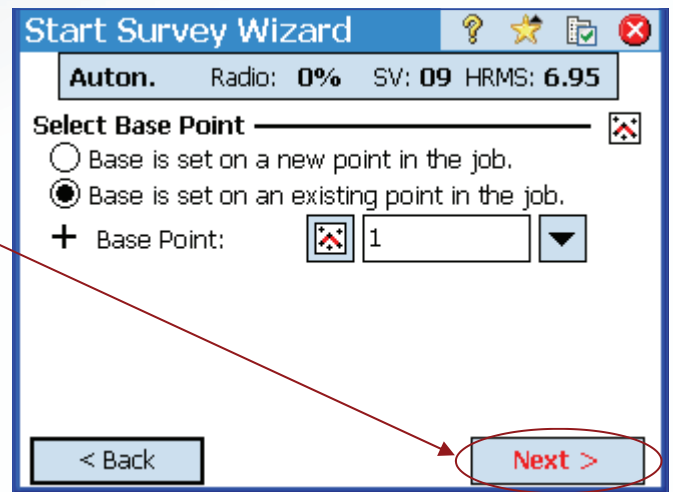
Recording Interval: Off

Next >

One-Point Setup Base and Rover

Step 7:

- Make sure [x] Base is set on existing point.. is checked. (Default)
- Press [**Next**]



Start Survey Wizard

Auton. Radio: 0% SV: 09 HRMS: 6.95

Select Base Point

Base is set on a new point in the job.

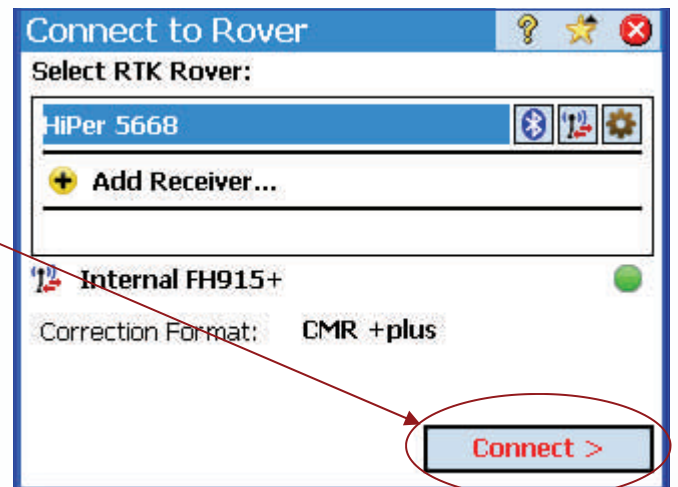
Base is set on an existing point in the job.

+ Base Point: 1

< Back Next >

Step 8:

- Select the receiver you want to use as a Rover.
- Press [**Connect**]



Connect to Rover

Select RTK Rover:

HiPer 5668

+ Add Receiver...

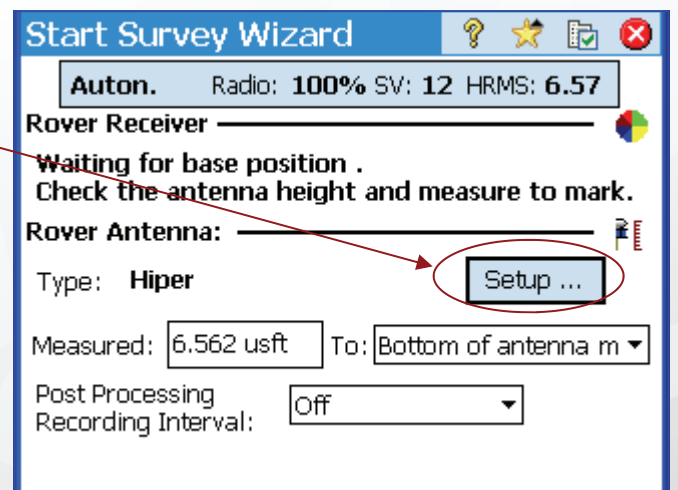
Internal FH915+

Correction Format: CMR +plus

Connect >

Step 9:

If this is a new setup, we need to set the antenna profile. Press [**Setup**]



Start Survey Wizard

Auton. Radio: 100% SV: 12 HRMS: 6.57

Rover Receiver

Waiting for base position .
Check the antenna height and measure to mark.

Rover Antenna:

Type: Hiper

Measured: 6.562 usft To: Bottom of antenna m

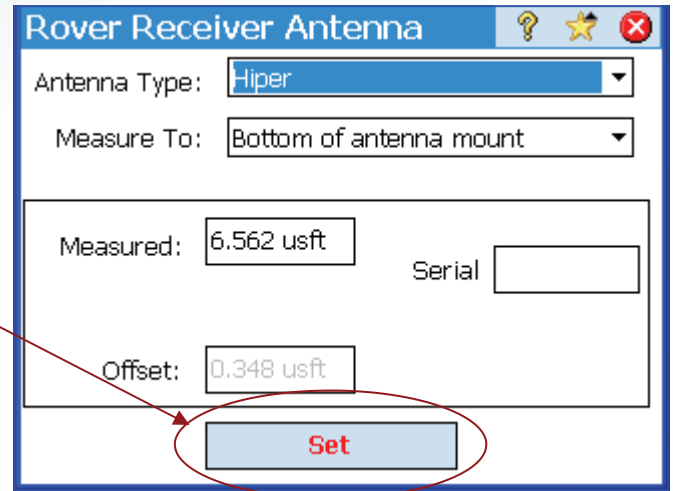
Post Processing Recording Interval: Off

Setup ...

One-Point Setup Base and Rover

Step 10:

- Set the Antenna Type to the correct model. (HiPer for all HiPer Receivers)
- Set the Measure To: (Typically Bottom of Mount on the Rover)
- Enter in the measure-up value.
- Press [**Set**]



Rover Receiver Antenna

Antenna Type:

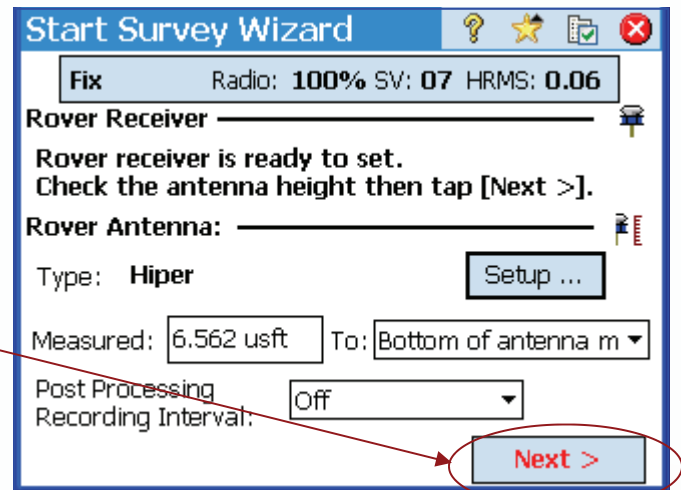
Measure To:

Measured: Serial:

Offset:

Set

Step 11: Tap [**Next**]



Start Survey Wizard

Fix Radio: 100% SV: 07 HRMS: 0.06

Rover Receiver

Rover receiver is ready to set.
Check the antenna height then tap [Next >].

Rover Antenna:

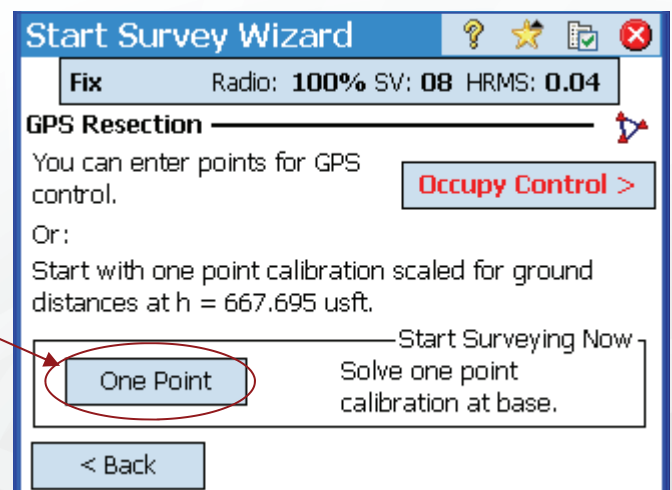
Type: Hiper Setup ...

Measured: To:

Post Processing Recording Interval:

Next >

Step 12: For one-point Setup, press [**One Point**]



Start Survey Wizard

Fix Radio: 100% SV: 08 HRMS: 0.04

GPS Resection

You can enter points for GPS control. **Occupy Control >**

Or:
Start with one point calibration scaled for ground distances at h = 667.695 usft.

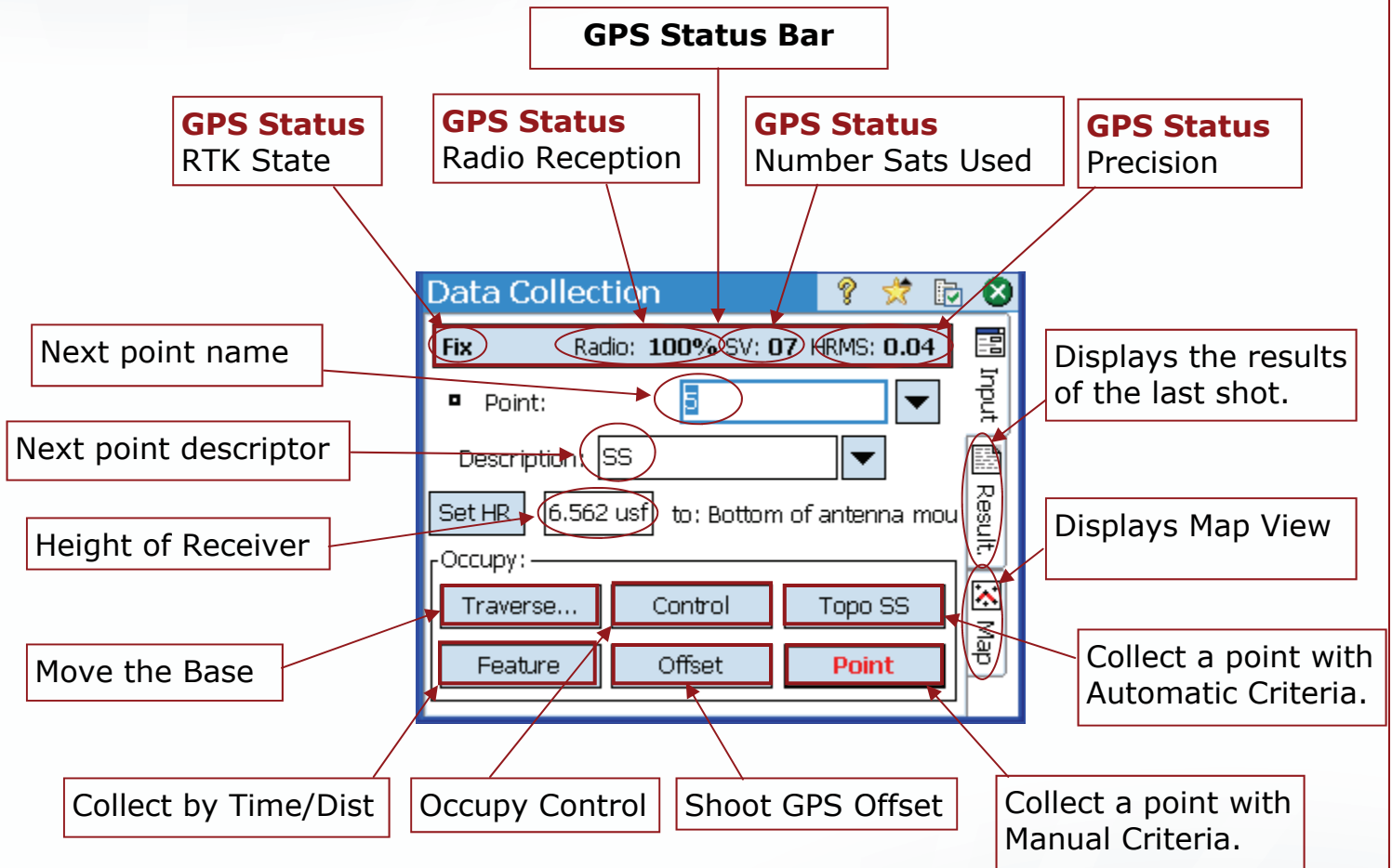
Start Surveying Now

One Point Solve one point calibration at base.

< Back

One-Point Setup Base and Rover

Anatomy of the Data Collection Dialog



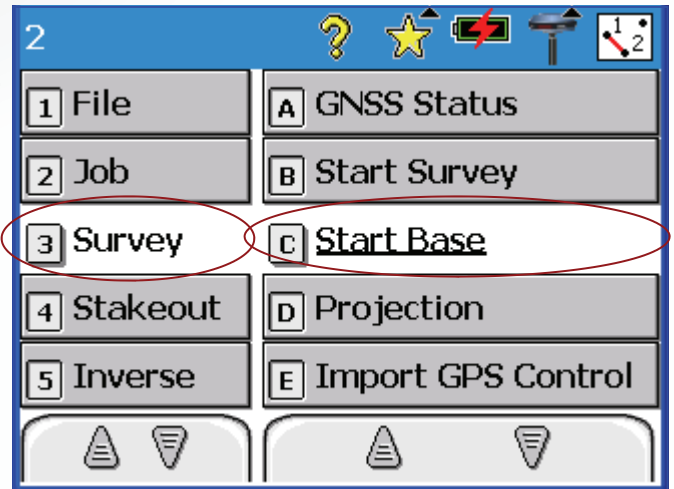
Step 13:

Survey Pro should go Fixed and you can begin work.

Multi-Point Calibration (Localization)

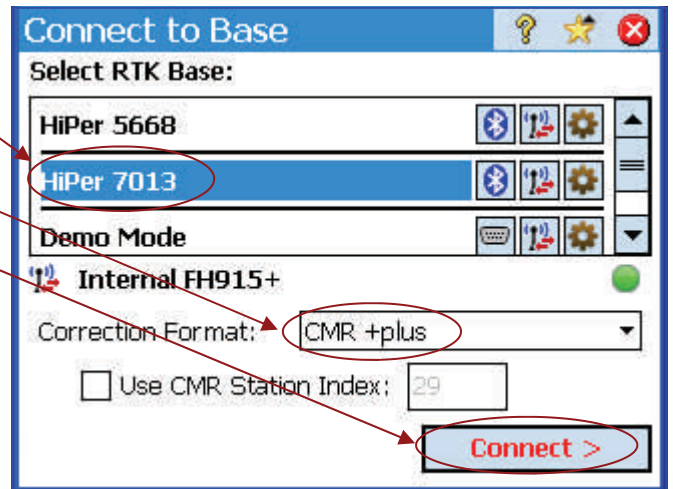
This procedure assumes you have a base and rover setup and that you are localizing (calibrating) into an existing ground system for the first time. For further reading on Calibration see "Introduction to RTK GPS" on www.hayeshelp.com.

Step 1:
Tap [Survey] - [Start Base].

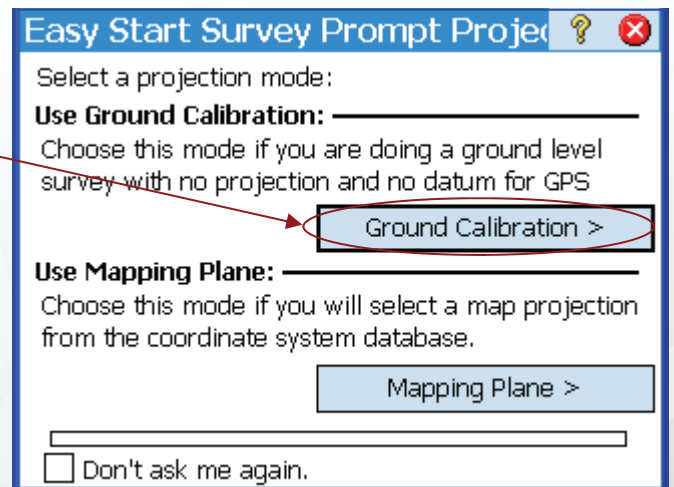


Step 2:

- Select the receiver profile to use as a base.
- Set the Correction Format. (CMR+ or RTCM 3.0 are good)
- Press [Connect]



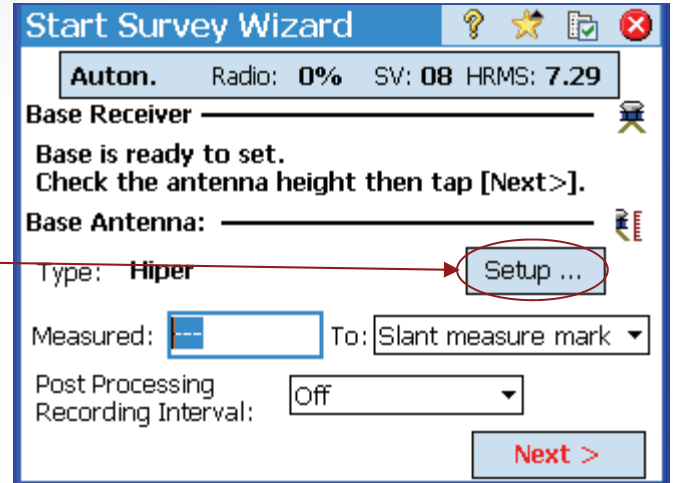
Step 3:
Tap [Ground Calibration]



Multi-Point Calibration (Localization)

Step 4-

- **If**— The antenna is already configured— then enter the HR and skip to **step 6**
- **Else**—this is our first setup we will need to configure the GPS antenna for the first time. Press [**Setup**]



Start Survey Wizard

Auton. Radio: 0% SV: 08 HRMS: 7.29

Base Receiver

Base is ready to set.
Check the antenna height then tap [Next>].

Base Antenna:

Type: Hiper **Setup ...**

Measured: --- To: Slant measure mark

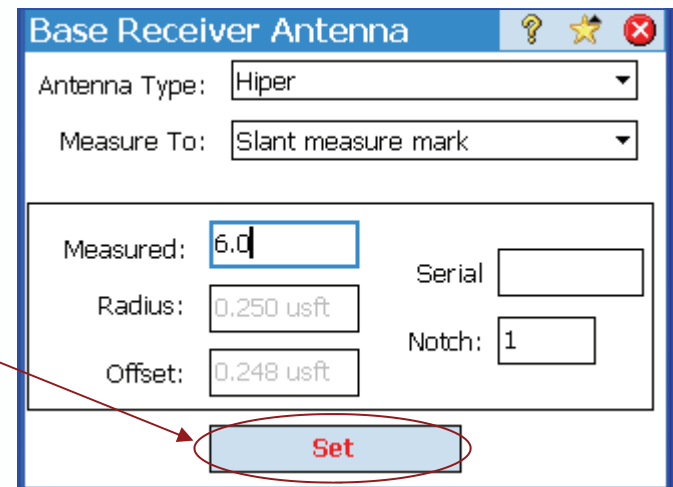
Post Processing Recording Interval: Off

Next >

Step 5:

Setup the Base Receiver Antenna.

- Set Antenna Type: (HiPer for all HiPer model receivers).
- Set the Measure to: (Typically slant for the base.—Nail to face of receiver).
- Enter the measured HR.
- Press [**Set**]



Base Receiver Antenna

Antenna Type: Hiper

Measure To: Slant measure mark

Measured: 6.0

Radius: 0.250 usft

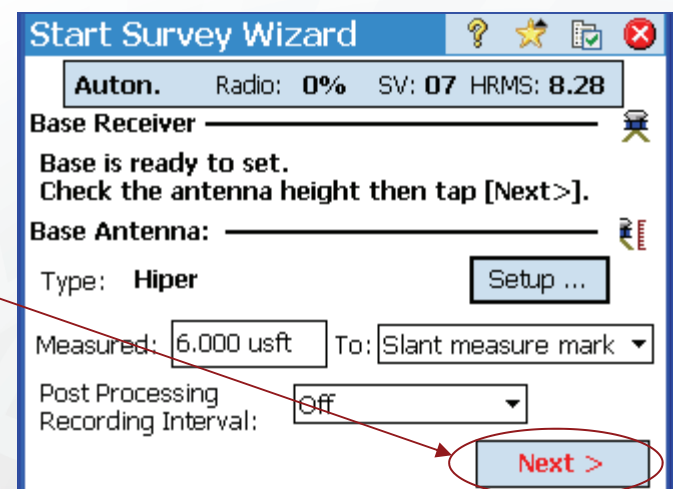
Offset: 0.248 usft

Serial

Notch: 1

Set

Step 6:
Tap [**Next**]



Start Survey Wizard

Auton. Radio: 0% SV: 07 HRMS: 8.28

Base Receiver

Base is ready to set.
Check the antenna height then tap [Next>].

Base Antenna:

Type: Hiper **Setup ...**

Measured: 6.000 usft To: Slant measure mark

Post Processing Recording Interval: Off

Next >

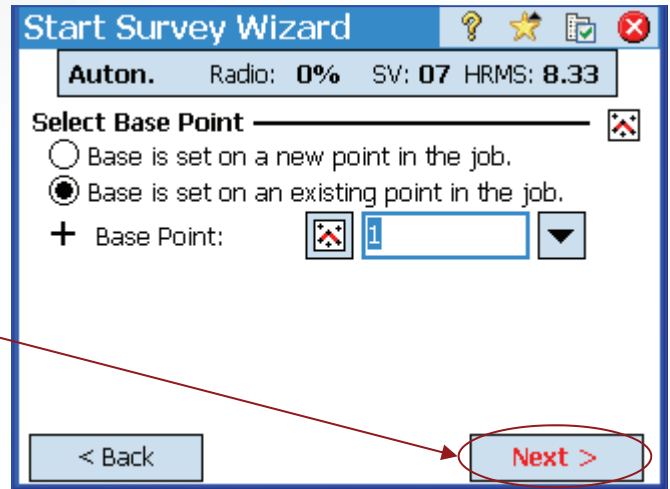
Multi-Point Calibration (Localization)

Step 7:

Set the Base Point—

- Select whether the base is on a new point or an existing point.
- Enter the Base Point Name.
- Press [**Next**]

Note* The base will automatically set.



Start Survey Wizard

Auton. Radio: 0% SV: 07 HRMS: 8.33

Select Base Point

Base is set on a new point in the job.

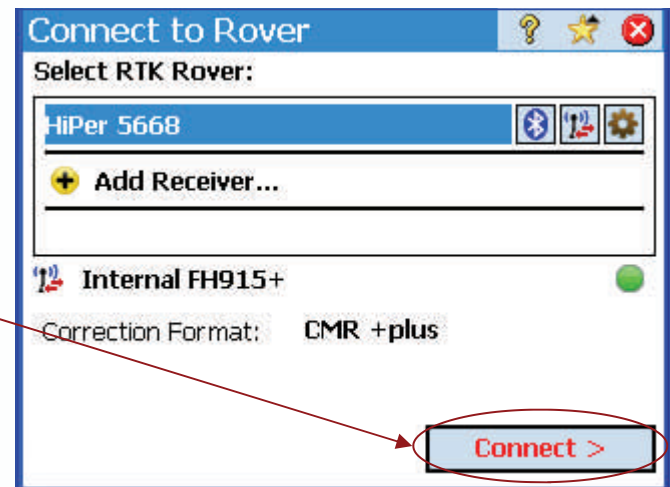
Base is set on an existing point in the job.

+ Base Point: 1

< Back Next >

Step 8:

- Select the receiver profile to use as a rover.
- Press [**Connect**]



Connect to Rover

Select RTK Rover:

HiPer 5668

+ Add Receiver...

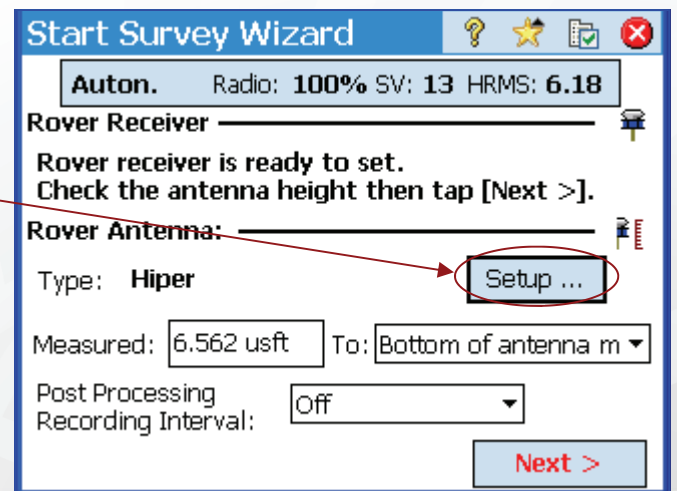
Internal FH915+

Correction Format: CMR +plus

Connect >

Step 9-

- **If**— The antenna is already configured— then enter the HR and skip to **Step 11**
- **Else**—this is our first setup we will need to configure the GPS antenna for the first time. Press [**Setup**]



Start Survey Wizard

Auton. Radio: 100% SV: 13 HRMS: 6.18

Rover Receiver

Rover receiver is ready to set.
Check the antenna height then tap [Next >].

Rover Antenna:

Type: HiPer

Measured: 6.562 usft To: Bottom of antenna m

Post Processing Off

Recording Interval:

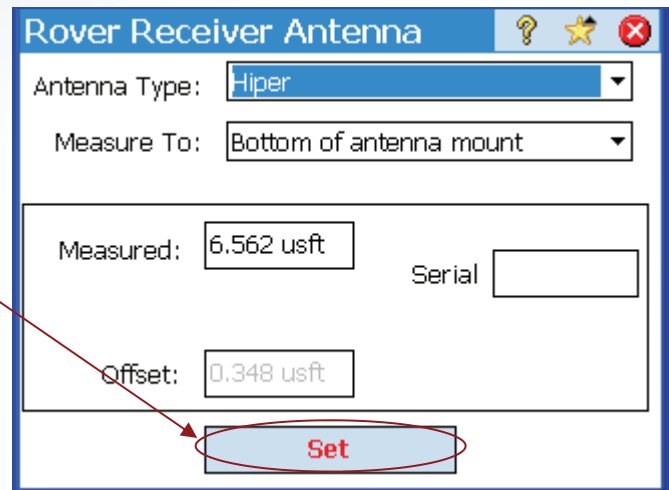
Setup ... Next >

Multi-Point Calibration (Localization)

Step 10:

Setup the Rover Receiver Antenna.

- Set Antenna Type: (HiPer for all HiPer model receivers).
- Set the Measure to: (Typically Bottom of Antenna mount for the Rover)
- Enter the measured HR.
- Press [**Set**]



Rover Receiver Antenna

Antenna Type: HiPer

Measure To: Bottom of antenna mount

Measured: 6.562 usft

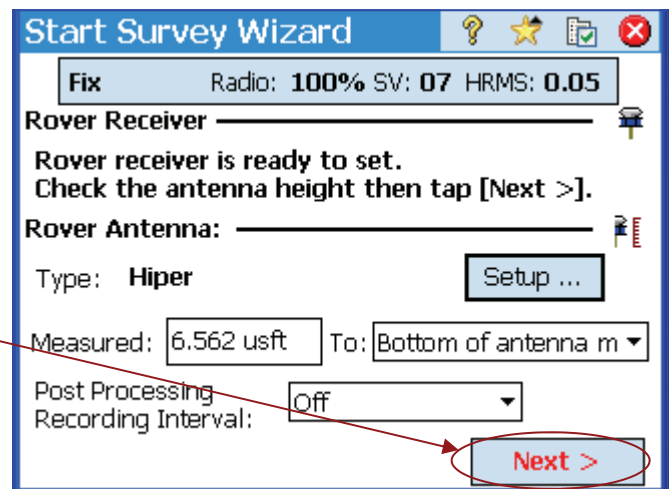
Serial: []

Offset: 0.348 usft

Set

Step 11:

Tap [**Next**]



Start Survey Wizard

Fix Radio: 100% SV; 07 HRMS: 0.05

Rover Receiver

Rover receiver is ready to set.
Check the antenna height then tap [Next >].

Rover Antenna:

Type: HiPer

Measured: 6.562 usft To: Bottom of antenna m

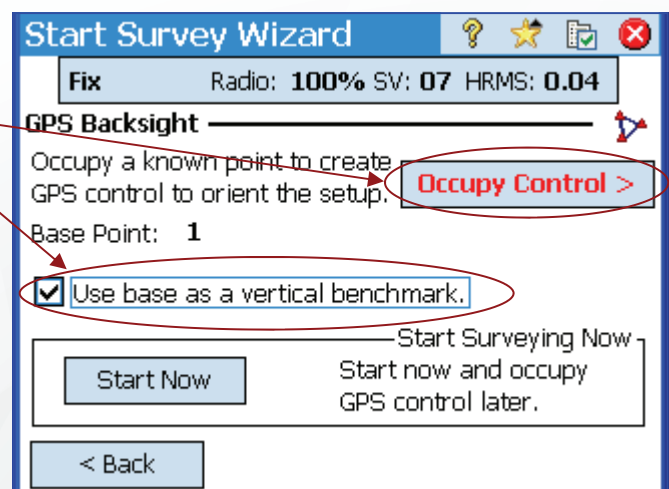
Post Processing Off

Recording Interval: []

Next >

Step 12:

- If the base point elevation is used for a vertical benchmark then check the [x] Use Base as a Vertical Benchmark box.
- Press [**Occupy Control**] to occupy a calibration point.



Start Survey Wizard

Fix Radio: 100% SV; 07 HRMS: 0.04

GPS Backsight

Occupy a known point to create GPS control to orient the setup.

Base Point: 1

Use base as a vertical benchmark.

Occupy Control >

Start Surveying Now

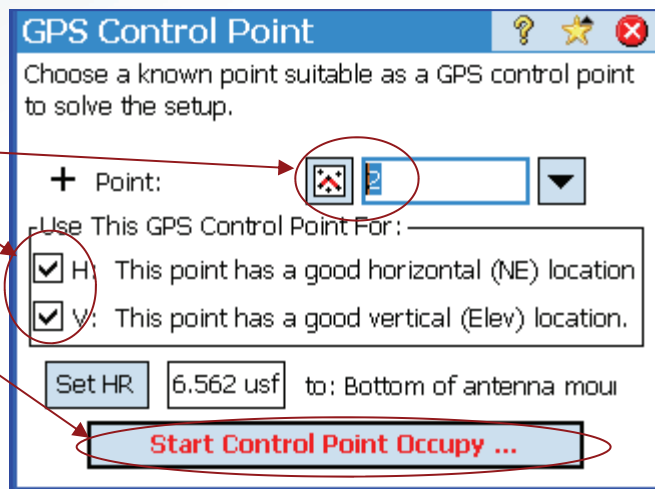
Start Now Start now and occupy GPS control later.

< Back

Multi-Point Calibration (Localization)

Step 13:

- Choose the control point that you are occupying.
- Set whether holding the point for Horizontal, Vertical or both.
- Occupy the point very accurately and press [**Start Control Point Occupy**]



GPS Control Point

Choose a known point suitable as a GPS control point to solve the setup.

+ Point:

Use This GPS Control Point For:

H: This point has a good horizontal (NE) location

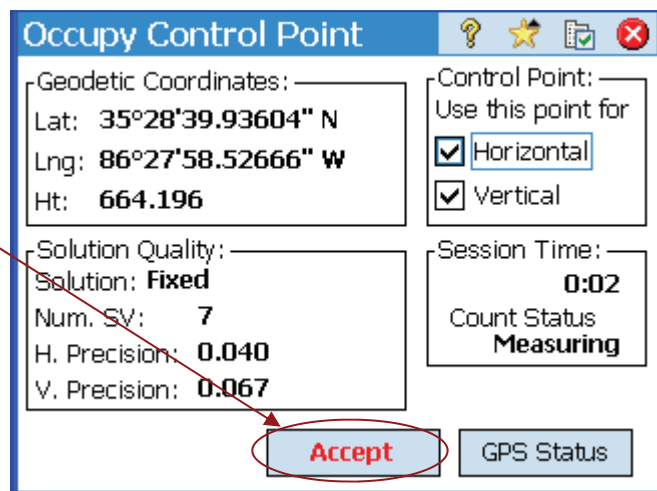
V: This point has a good vertical (Elev) location.

Set HR: 6.562 usf to: Bottom of antenna mou

Start Control Point Occupy ...

Step 14:

- Continue to occupy the point for at least 15 seconds.
- Press [**Accept**]



Occupy Control Point

Geodetic Coordinates:

Lat: 35°28'39.93604" N

Lng: 86°27'58.52666" W

Ht: 664.196

Solution Quality: Fixed

Solution: Fixed

Num. SV: 7

H. Precision: 0.040

V. Precision: 0.067

Control Point: Use this point for

Horizontal

Vertical

Session Time: 0:02

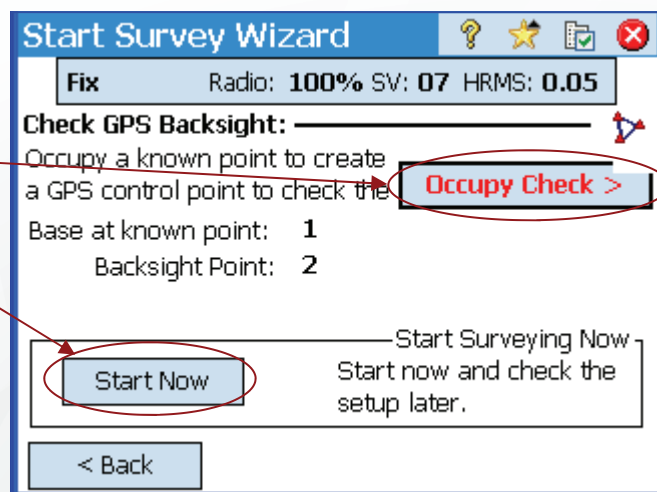
Count Status: Measuring

Accept GPS Status

Step 15:

Note: Spectra Precision now uses conventional survey terminology to describe the GPS occupation.

- Press [**Start Now**] to start a 2 point calibration solution. Go Survey you're done.
- Press [**Occupy Check**] to calibrate to an additional point.



Start Survey Wizard

Fix Radio: 100% SV: 07 HRMS: 0.05

Check GPS Backsight: Occupy a known point to create a GPS control point to check the

Occupy Check >

Base at known point: 1

Backsight Point: 2

Start Surveying Now

Start now and check the setup later.

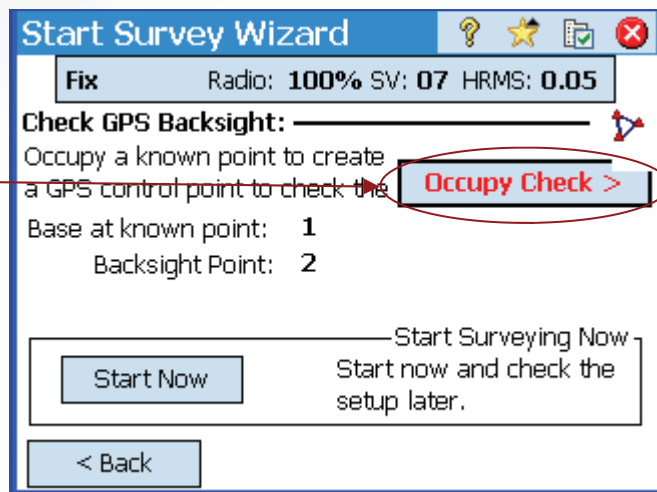
Start Now

< Back

Multi-Point Calibration (Localization)

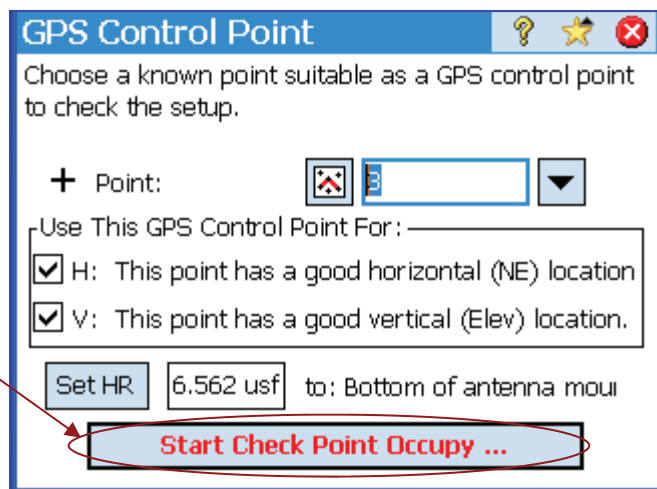
Step 16:

- To add another control point, Press [**Occupy Check**]



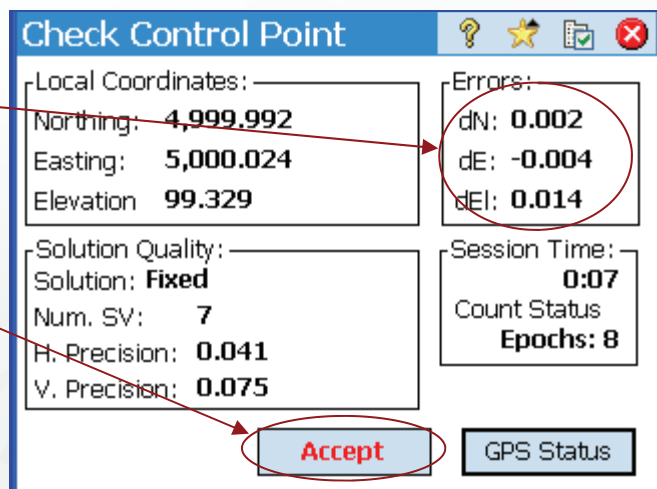
Step 17:

- Choose the control point that you are occupying.
- Set whether holding the point for Horizontal, Vertical or both.
- Occupy the point very accurately and press [**Start Control Point Occupy**]



Step 18:

- Note:** Survey Pro will display the difference between the calculated and measured position of the control point.
- Continue to occupy the point for at least 15 seconds.
- Press [**Accept**]



Multi-Point Calibration (Localization)

Anatomy of the Control Solution Dialog

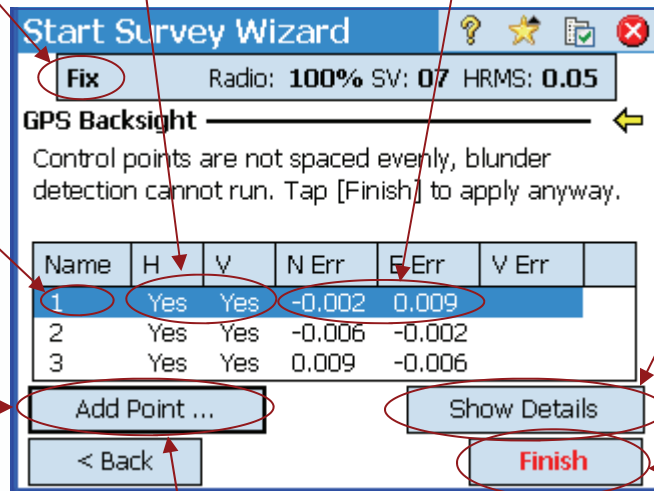
Note:
GPS Status Bar

Note:
Used for Horizontal/
Vertical Control

Note:
North and East
Error

Note:
Control point #

Note: Add Point
[Add Point] will
take you back to
Step 17.



Name	H	V	N Err	E Err	V Err
1	Yes	Yes	-0.002	0.009	
2	Yes	Yes	-0.006	-0.002	
3	Yes	Yes	0.009	-0.006	

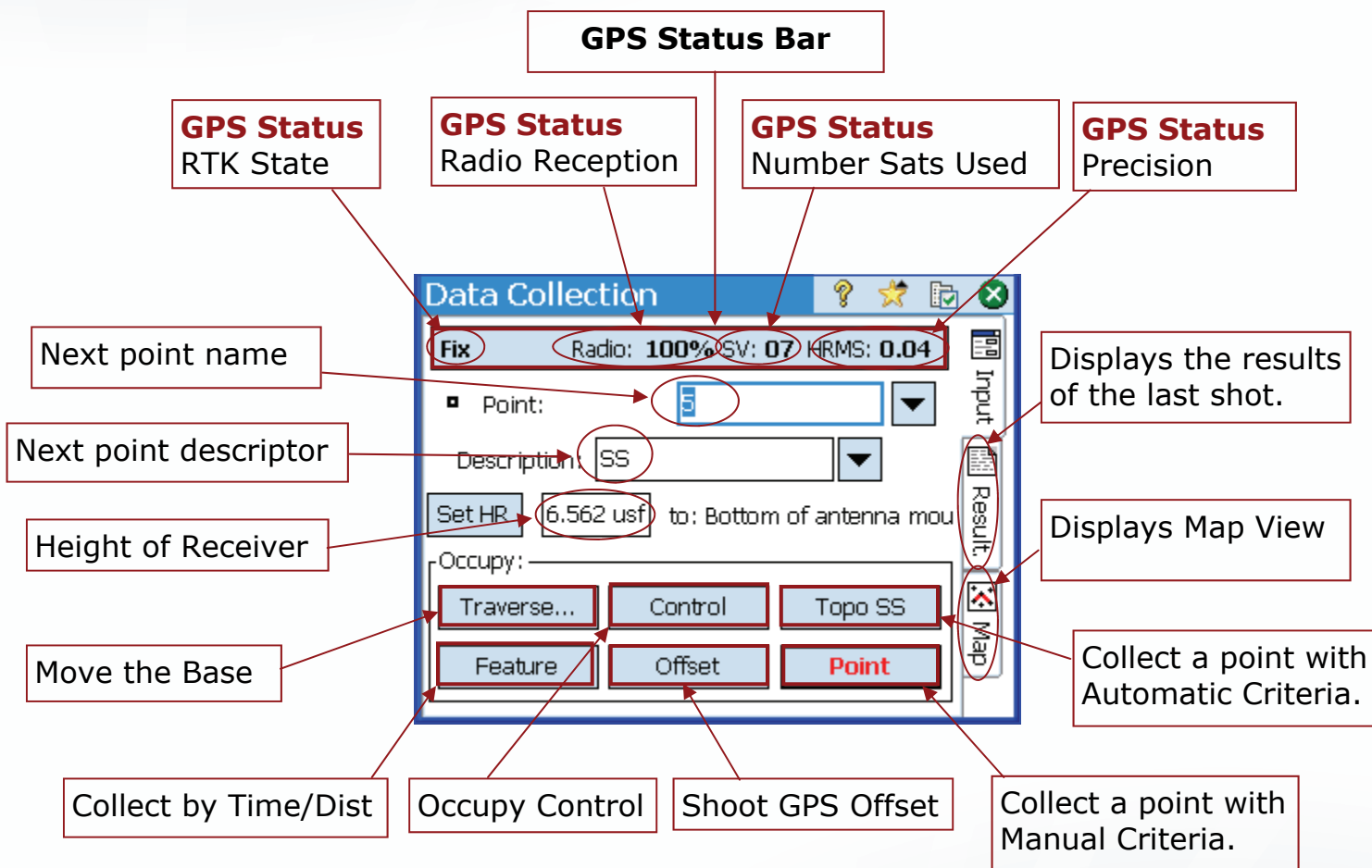
Note:
Projection Details

Note: Finish
[Finish] will solve
the projection and
take you to Data
Collection.

Step 19:
If— You have more control points to
add—Press [**Add Point**]
Else—Press [**Finish**] to solve the projec-
tion and begin surveying.

Multi-Point Calibration (Localization)

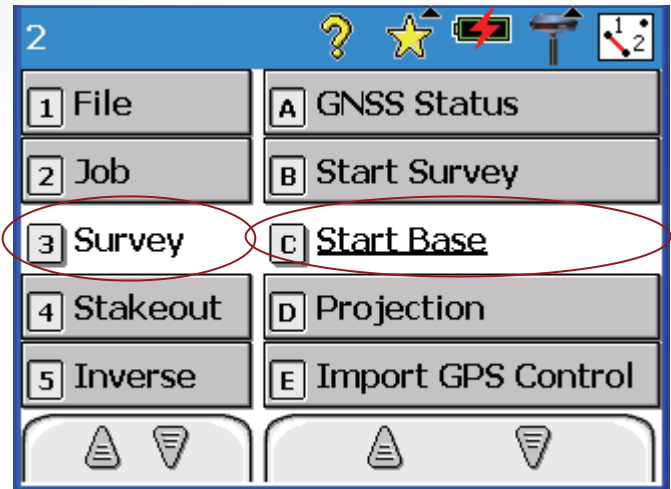
Anatomy of the Data Collection Dialog



Mapping Plane

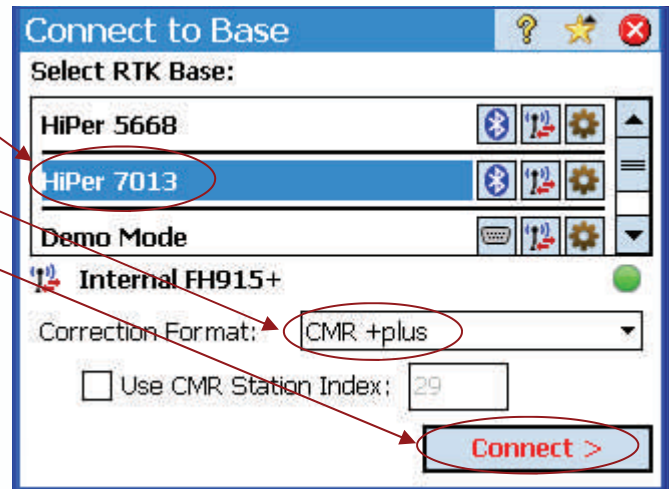
This procedure assumes you have a base and rover setup and that you are occupying into an existing mapping plane (I.e. NAD83 Tennessee 4100). For further reading on Mapping Plane see "**Introduction to RTK GPS**" on www.hayeshelp.com.

Step 1:
Tap [**Survey**] - [**Start Base**].

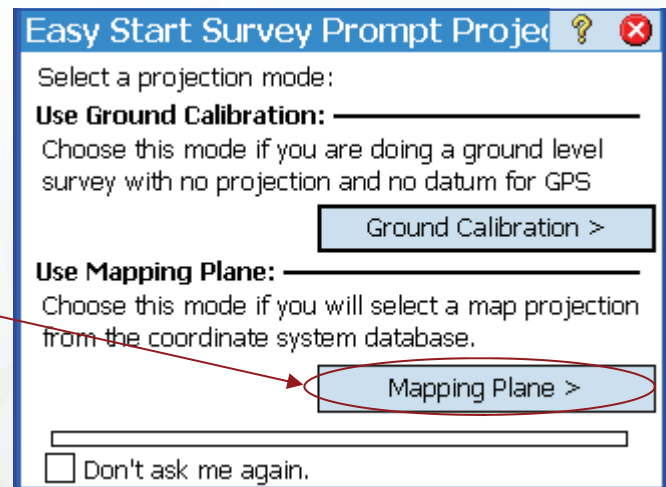


Step 2:

- Select the receiver profile to use as a base.
- Set the Correction Format. (CMR+ or RTCM 3.0 are good)
- Press [**Connect**]



Step 3:
Tap [**Mapping Plane**]

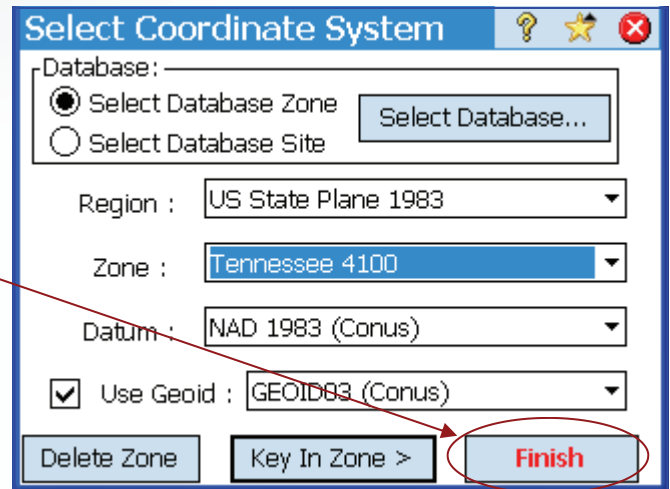


Mapping Plane

Step 4:

Set the Coordinate System.

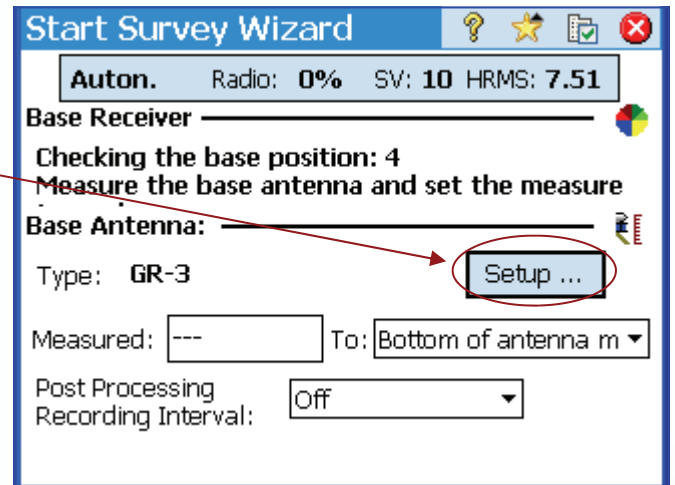
- Check [**x**] Select Database Zone
- Set the Region (i.e US State Plane 1983)
- Set the Zone: (i.e. Tennessee 4100)
- Set the Datum: (NAD 1983)
- Check [**x**] Use Geoid: (Geoid03 files can be found on www.hayeshelp.com.)
- Press [**Finish**]



The screenshot shows the 'Select Coordinate System' dialog box. The 'Database' section has 'Select Database Zone' selected. The 'Region' is set to 'US State Plane 1983', 'Zone' to 'Tennessee 4100', and 'Datum' to 'NAD 1983 (Conus)'. The 'Use Geoid' checkbox is checked, and 'GEOID93 (Conus)' is selected. The 'Finish' button is circled in red.

Step 5-

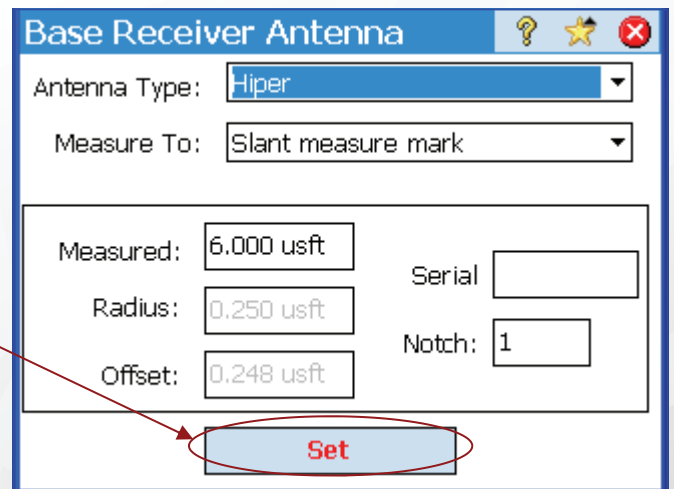
- **If**— The antenna is already configured— then enter the HR and skip to **Step 7**
- **Else**—this is our first setup we will need to configure the GPS antenna for the first time. Press [**Setup**]



The screenshot shows the 'Start Survey Wizard' dialog box. The 'Auton.' checkbox is checked, 'Radio' is 0%, 'SV' is 10, and 'HRMS' is 7.51. The 'Base Receiver' section is active, showing 'Checking the base position: 4' and 'Measure the base antenna and set the measure'. The 'Base Antenna' section shows 'Type: GR-3' and a 'Setup ...' button circled in red. Other options include 'Measured: ---', 'To: Bottom of antenna m', and 'Post Processing Recording Interval: Off'.

Step 6:

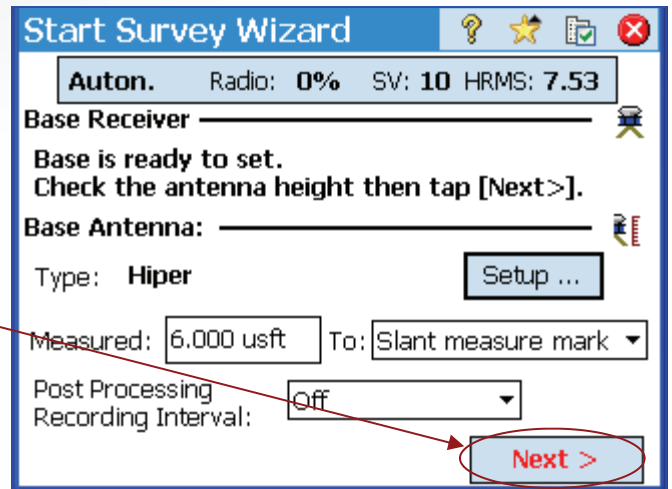
- Set the Antenna Type to the correct model. (HiPer for all HiPer Receivers)
- Set the Measure To: (Typically Slant on the Base)
- Enter in the measure-up value.
- Press [**Set**]



The screenshot shows the 'Base Receiver Antenna' dialog box. 'Antenna Type' is set to 'HiPer' and 'Measure To' is 'Slant measure mark'. The 'Measured' field is 6.000 usft, 'Radius' is 0.250 usft, and 'Offset' is 0.248 usft. The 'Serial' and 'Notch' fields are empty. The 'Set' button is circled in red.

Mapping Plane

Step 7:
Tap **[Next]**



Start Survey Wizard

Auton. Radio: 0% SV: 10 HRMS: 7.53

Base Receiver _____

Base is ready to set.
Check the antenna height then tap [Next>].

Base Antenna: _____

Type: Hiper Setup ...

Measured: 6.000 usft To: Slant measure mark

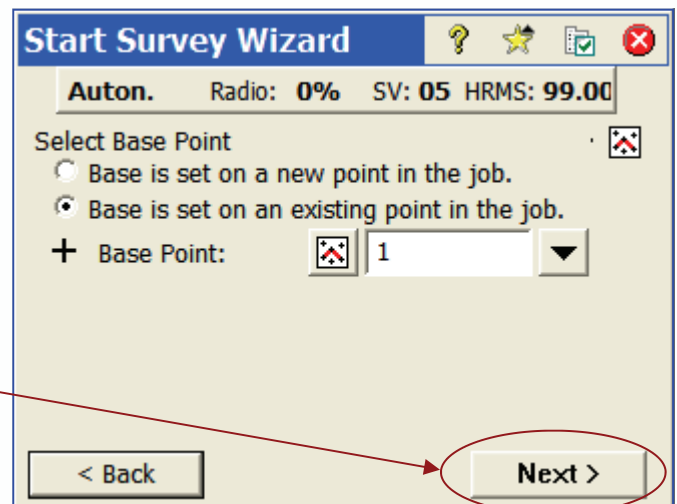
Post Processing Recording Interval: Off

Next >

Step 8:

Set the Base Point—

- **If—** Your Base is on a new point check **[x]** Base is set on a new point... Press **[Next]**
- **If —** your Base is on an existing point check **[x]** Base is set on an existing point.. Press **[Next]**
- **Note:** This document will use existing point operation.



Start Survey Wizard

Auton. Radio: 0% SV: 05 HRMS: 99.00

Select Base Point

Base is set on a new point in the job.

Base is set on an existing point in the job.

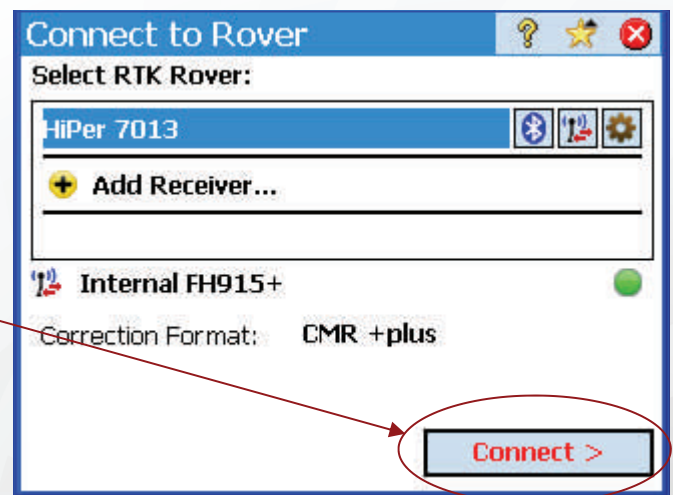
+ Base Point: 1

< Back **Next >**

Step 9:

Connect to the Rover.

- Select the Receiver to be used as a Rover.
- Press **[Connect]**



Connect to Rover

Select RTK Rover:

HiPer 7013

+ Add Receiver...

Internal FH915+

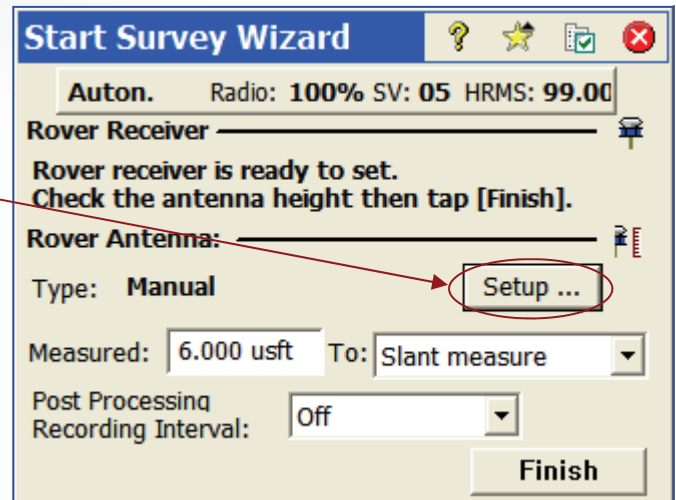
Correction Format: CMR +plus

Connect >

Mapping Plane

Step 10-

- **If**— The antenna is already configured— then enter the HR and skip to **Step 12**
- **Else**—this is our first setup we will need to configure the GPS antenna for the first time. Press [**Setup**]



Start Survey Wizard

Auton. Radio: 100% SV: 05 HRMS: 99.00

Rover Receiver ————

Rover receiver is ready to set.
Check the antenna height then tap [Finish].

Rover Antenna: ————

Type: Manual Setup ...

Measured: 6.000 usft To: Slant measure

Post Processing Off

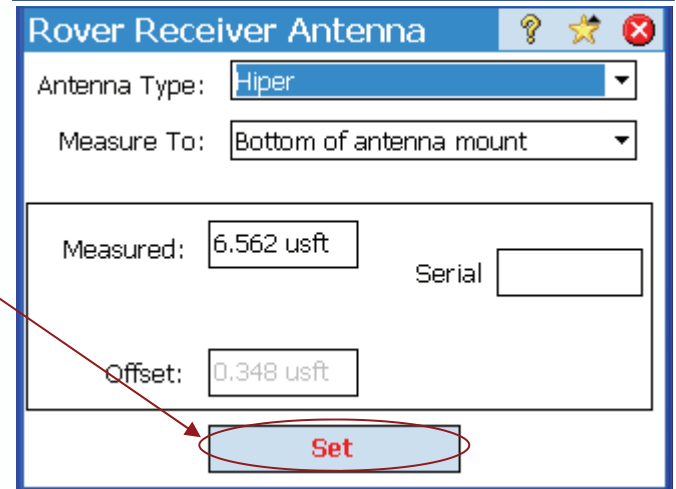
Recording Interval: Off

Finish

Step 11:

Setup the Rover Receiver Antenna.

- Set Antenna Type: (HiPer for all HiPer model receivers).
- Set the Measure to: (Typically Bottom of Antenna mount for the Rover)
- Enter the measured HR.
- Press [**Set**]



Rover Receiver Antenna

Antenna Type: HiPer

Measure To: Bottom of antenna mount

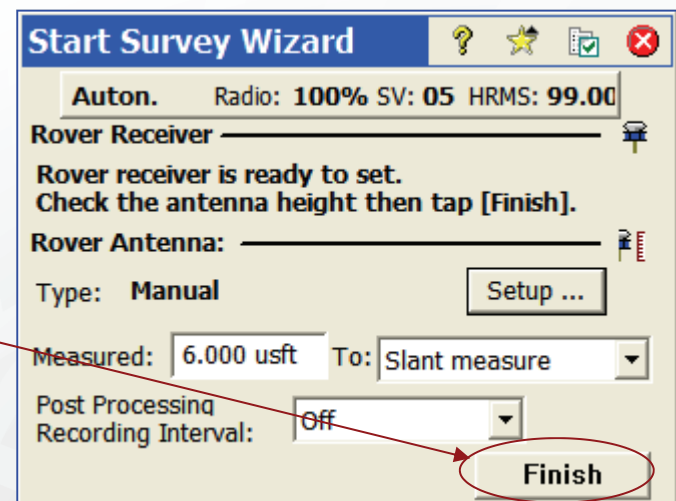
Measured: 6.562 usft Serial

Offset: 0.348 usft

Set

Step 12:

Tap [**Finish**]



Start Survey Wizard

Auton. Radio: 100% SV: 05 HRMS: 99.00

Rover Receiver ————

Rover receiver is ready to set.
Check the antenna height then tap [Finish].

Rover Antenna: ————

Type: Manual Setup ...

Measured: 6.000 usft To: Slant measure

Post Processing Off

Recording Interval: Off

Finish

Anatomy of the Data Collection Dialog

