

Base/Rover Setup

If RTK corrections are to be transmitted via UHF radio from your BASE receiver to your ROVER, there are a few settings that will need to be transferred onto the Base receiver.

Depending upon which type of receiver that you're using for your base, the task may be accomplished in more than one way, or possibly unneeded altogether; for example, if you have two **TRIUMPH-LS** receivers, the transfer of the BASE Setup might not be needed if it was already present to choose from on both units.

Other options for setting up the BASE may be afforded using *Javad Mobile Tools* and your mobile device and either the **iOS** or **Android** developed by JAVAD GNSS - see website for details.

For the purposes of this article; however, the **TRIUMPH-2** is used as the BASE receiver with its various particulars transferred using the **TRIUMPH-LS**. If you're using Spread Spectrum,

the discussion is similar, but your range may not be. Also, for the purposes of this article, it is assumed that you have already followed the directions for defining your BASE receiver's Setup as discussed in the section entitled **My Default Base Setup** (p. 71) and its sub-section entitled **RTK via UHF** (p. 104). You must have an existing Rover Setup previously defined that uses UHF in order to set up the Base as discussed in the section entitled **Define the RTK Rover Setup** (p. 120)

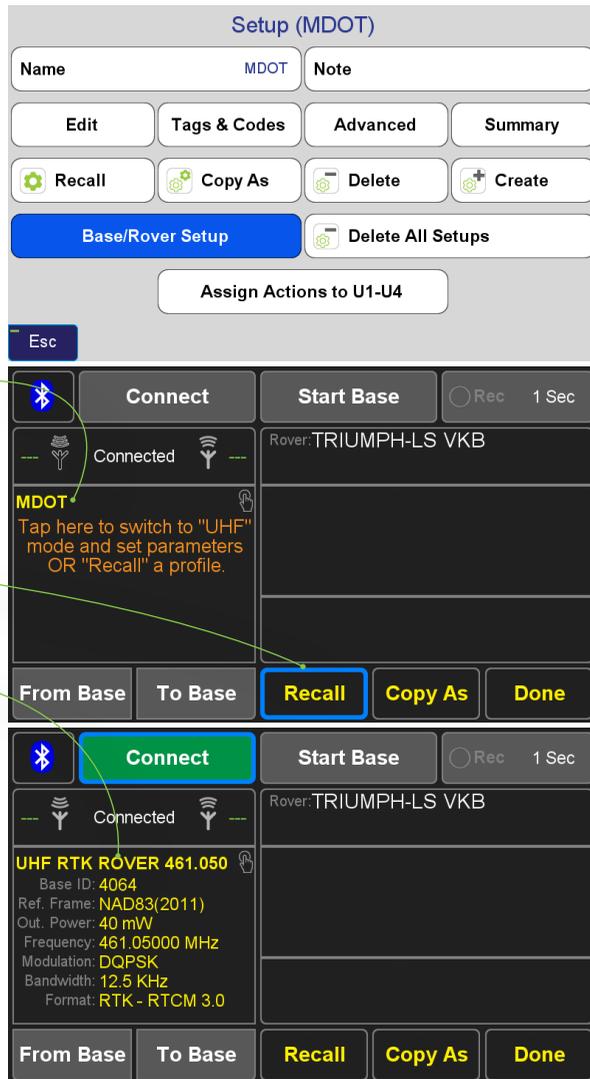
The transfer of the BASE Setup takes place in the field allowing you to immediately test the communications from the ROVER. It is also recommended that all communications be satisfactorily demonstrated *before* heading to the job site.

Follow the procedures and cautionary recommendations for the physical setting up of the equipment as outlined in the section entitled **Field Setup** (p. 36) starting with the UHF radio and its antenna connected before powering it on.

Corrections from your BASE receiver will be streamed via Bluetooth to your UHF modem before the radio relays those corrections to the ROVER via UHF. As previously outlined, keep your distances between the BASE and the radio reasonable.

Your radio and the **TRIUMPH-2** come from the factory already paired and communicating with each other out of the box. Both radio and receiver will show their blue LEDs lit indicating their link. Usually this only takes a few seconds. Rarely, if after waiting a few minutes, the receiver fails to show its Bluetooth indicator LED light as blue, the receiver and the radio may have become unpaired. Should this occur, **NetView** and *Javad Mobile Tools* are available to reestablish their pairing - see website for details.

From the Setup screen tap on **Base/Rover Setup**



Notice the tabular data on the left side. The top line is the name of the current RTK Rover setup, which in this case is not configured for UHF corrections as indicated by the prompt in the orange text beneath it. Should that be the case, tap on **Recall** and bring up a previously defined UHF Rover setup either from this Base/Rover Setup screen or from the main Setup screen.

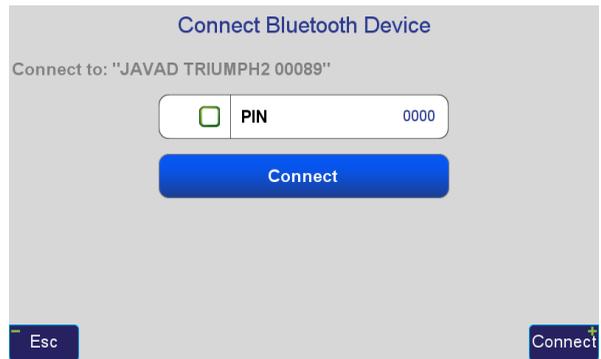
If your current Rover Setup is configured to use UHF, this data table will reflect the previous settings.

To connect the Base and the Rover via Bluetooth, tap on **Connect**

Immediately a scan of available Bluetooth devices will begin and a few seconds later will be completed. Choose the device intended to be used as the Base receiver and tap **Connect**.



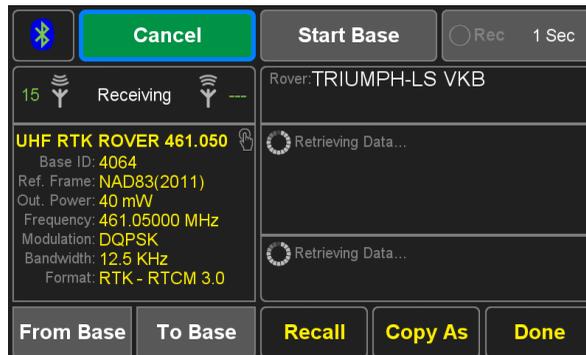
Leave the default credentials as shown and tap **Connect**.



Tap **OK**.

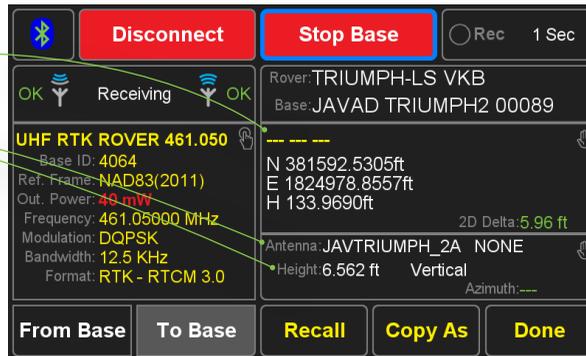


Once the Bluetooth connection has been initiated, it will take a few seconds before it has completed. During that interim few seconds, your screen may appear like what is shown on the right.

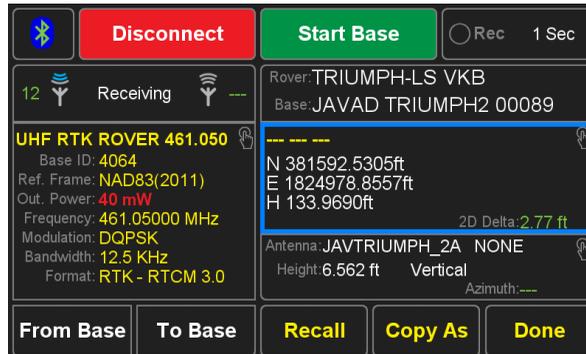


In this example, the **TRIUMPH-LS** has successfully connected to the **TRIUMPH-2** and has read the previously entered base coordinates while displaying them in the current Page's defined coordinate system. The antenna type and the antenna height are also shown.

If those previously entered values are valid; i.e., you're reoccupying the same station and your radio communications are unchanged, you're all set; otherwise you'll need to tap **Stop Base** to set the Base Coordinate or make other changes such as entering a different HI.



To make any changes to the Base coordinate, tap on the **displayed data**.



If the coordinate of the Base is already loaded on the **TRI-UMPH-LS** either as a previously Surveyed Point or Design Point, tap **From List** to pick it.

Proposed Base Position			Autonomous Position
From List	Enter	From Auto	N 381595.2390ft E 1824979.4286ft H 145.3141ft 2D Delta: 2.77 ft
--- --- --- N 381592.5305ft E 1824978.8557ft H 133.9690ft			
Broadcasting Ref. Frame WGS84(ITRF2008)			
Send to Base			
Esc			

Another option is to enter the coordinate manually. Begin with a tap on **Enter** and proceed to fill out the values appropriate for the current page's coordinate system.

Proposed Base Position			Autonomous Position
From List	Enter	From Auto	N 381595.2664ft E 1824979.4595ft H 145.4246ft 2D Delta: 2.8 ft
--- --- --- N 381592.5305ft E 1824978.8557ft H 133.9690ft			
Broadcasting Ref. Frame WGS84(ITRF2008)			
Send to Base			
Esc			

The third option is to use the **Autonomous** position of the Base receiver, noting that the Base's position used will be its *current* (1-epoch) position. Be aware that an autonomous position may have many meters of error in its actual location. To do so, tap **From Auto**.

Proposed Base Position			Autonomous Position
From List	Enter	From Auto	N 381595.2516ft E 1824979.4828ft H 145.4636ft 2D Delta: 2.79 ft
--- --- --- N 381592.5305ft E 1824978.8557ft H 133.9690ft			
Broadcasting Ref. Frame WGS84(ITRF2008)			
Send to Base			
Esc			

Confirm that the appropriate Reference Frame has been selected and if necessary, tap **Broadcasting Ref. Frame** to make changes

Tap the appropriate selection

Tap **Send to Base**

The screenshot displays a software interface for configuring a Base/Rover system. It is divided into two main sections: 'Proposed Base Position' and 'Autonomous Position'.
In the 'Proposed Base Position' section, there are three columns: 'From List', 'Enter', and 'From Auto'. Below these columns, the coordinates are listed: N 381595.2587ft, E 1824979.5207ft, and H 145.3898ft. A blue button labeled 'Broadcasting Ref. Frame' is set to 'WGS84(ITRF2008)'. Below this is a white button labeled 'Send to Base'.
The 'Autonomous Position' section shows coordinates: N 381595.2918ft, E 1824979.6027ft, and H 145.4729ft. The '2D Delta' is indicated as 0.09 ft.
An 'Esc' button is located below the 'Proposed Base Position' section.
The second part of the screenshot shows the 'Base Reference Frame' selection screen. It features five buttons: 'WGS84(ITRF2008)', 'NAD83(2011)', 'NAD83(PA11)', 'NAD83(MA11)', and 'ETRS89'. The 'NAD83(2011)' button is highlighted in blue. An 'Esc' button is located below this section.
The third part of the screenshot shows the 'Proposed Base Position' section again, but now the 'Broadcasting Ref. Frame' is set to 'NAD83(2011)'. The 'Send to Base' button is now blue. The 'Autonomous Position' section shows updated coordinates: N 381595.1167ft, E 1824979.7050ft, and H 145.9338ft. The '2D Delta' is now 0.23 ft. An 'Esc' button is located below this section.

Make any necessary changes to the Stored Point Name of the Base Point, Page, Description and Code

N 381595.2587ft
E 1824979.5207ft
H 145.3898ft

Do you want to send this coordinate to Base?

Stored Point Name Point1

Code Page0

Description

Yes, Store Point and Send to Base

Esc

Confirm changes and send to the Base receiver with a tap on **Yes, Store Point and Send to Base**

N 381595.2587ft
E 1824979.5207ft
H 145.3898ft

Do you want to send this coordinate to Base?

Stored Point Name KILO

Code Page0

Description

Yes, Store Point and Send to Base

Esc

To make any changes to the antenna HI, tap on the **displayed data**.

Note, if there aren't any changes needed to the antenna parameters, skip the next step

Bluetooth icon **Disconnect** **Start Base** Rec 1 Sec

118 Receiving

UHF RTK ROVER 461.050
Base ID: 4064
Ref. Frame: NAD83(2011)
Out. Power: 40 mW
Frequency: 461.05000 MHz
Modulation: QPSK
Bandwidth: 12.5 KHz
Format: RTK - RTCM 3.0

Rover: TRIUMPH-LS VKB
Base: JAVAD TRIUMPH2 00089

KILO
N 381595.2586ft
E 1824979.5208ft
H 145.3899ft
2D Delta: 0.07 ft

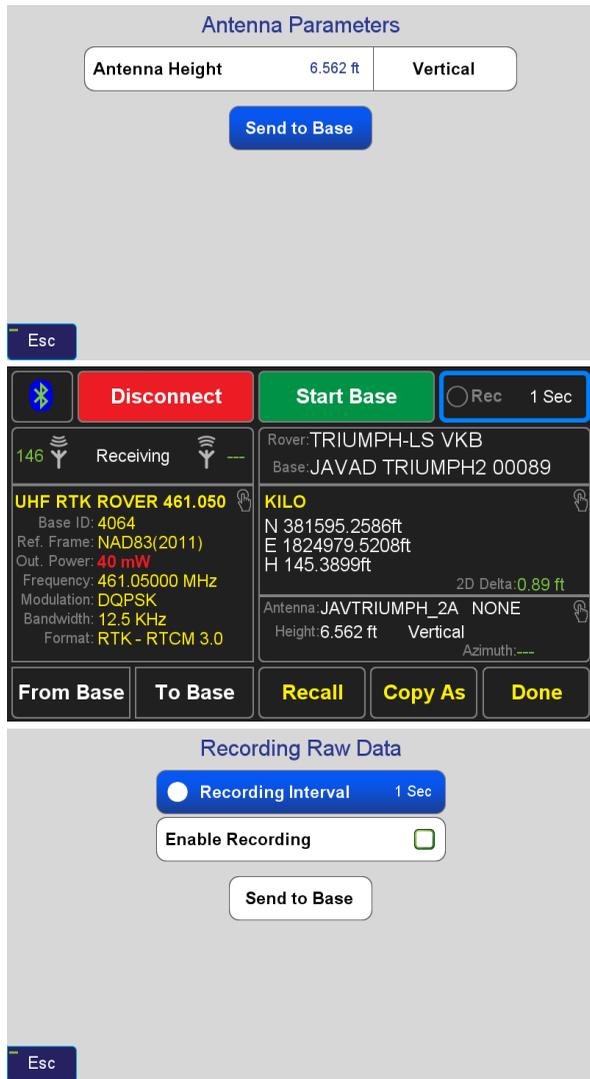
Antenna: JAVTRIUMPH_2A NONE
Height: 6.562 ft Vertical
Azimuth: ----

From Base **To Base** **Recall** **Copy As** **Done**

Confirm changes made to the antenna parameters and send to the Base receiver with a tap on **Send to Base**

If desired, recording GNSS data can be started anytime during the Base/Rover Setup, to do so, tap **Rec**

To assign a desired recording interval, tap **Recording Interval**.



Tap **a value**

Enable Recording on the Base receiver with the check box. Check to see that the orientation of the Base receiver is properly pointing north and then tap **Send to Base**. Recording will begin immediately.

To make any changes to the mutual communications settings for the Base and the Rover, tap on the **displayed data**.

The screenshot shows the JAVAD software interface. At the top, the 'Record Period' section has buttons for 1 Sec, 2 Sec, 5 Sec, 10 Sec, 15 Sec, and 30 Sec. The 30 Sec button is highlighted in blue. Below this is an 'Esc' button. The 'Recording Raw Data' section has a 'Recording Interval' set to 30 Sec, an 'Enable Recording' checkbox which is checked, and a 'Send to Base' button. Another 'Esc' button is below. The bottom section shows a Bluetooth connection status with 'Disconnect' and 'Start Base' buttons. The 'Rec' indicator shows '30 Sec'. The main display area shows '209 Receiving' and 'UHF RTK ROVER 461.050' with various parameters: Base ID: 4064, Ref. Frame: NAD83(2011), Out. Power: 40 mW, Frequency: 461.05000 MHz, Modulation: DQPSK, Bandwidth: 12.5 KHz, Format: RTK - RTCM 3.0. To the right, it shows 'KILO' rover data: N 381595.2586ft, E 1824979.5208ft, H 145.3899ft, 2D Delta: 1.16 ft, Antenna: JAVTRIUMPH_2A NONE, Height: 6.562 ft, Vertical, Azimuth: ---. At the bottom are buttons for 'From Base', 'To Base', 'Recall', 'Copy As', and 'Done'.

The Base ID is used to distinguish multiple bases broadcasting in the same area. By setting your Base ID to a unique value, your RTK rover will only accept corrections from base stations with a matching Base ID. Base ID works with RTCM and CMR broadcast formats and accepted values are as follows:

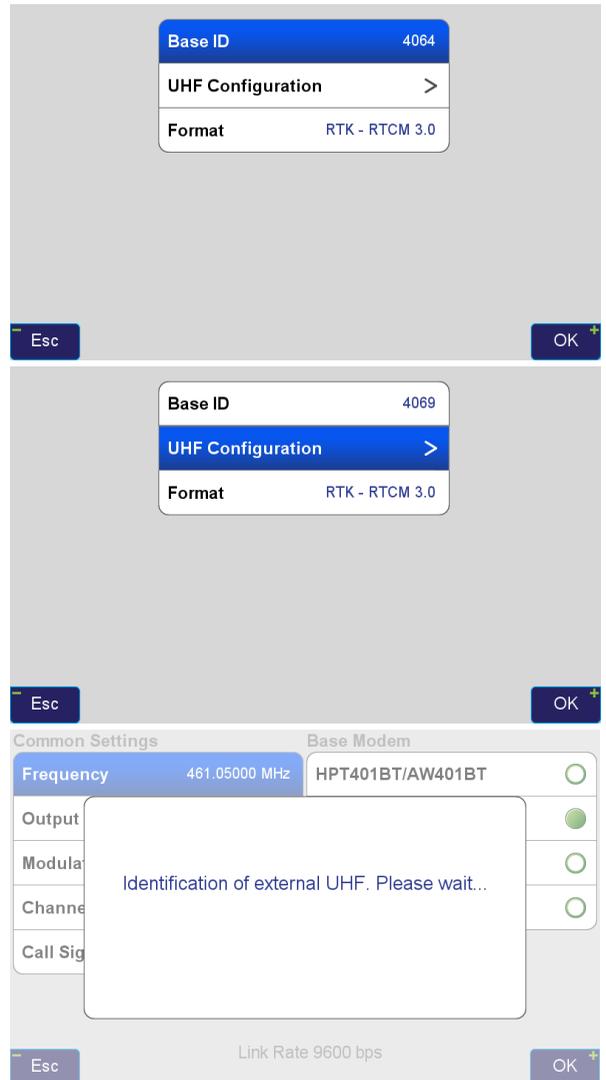
- ◆ **RTCM 3.0 - 0 to 4095**
- ◆ **RTCM 2.x - 0 to 1005**
- ◆ **CMR - 0 to 31**

To make any changes, tap on **Base ID**

Confirm the message format is appropriate

Tap **UHF Configuration** to make any changes to the radio's settings. This will trigger an immediate search for the radio via Bluetooth between the Base and the radio.

Identification of the radio may take a few seconds



Confirm that your specific radio has been selected on the right side of the screen under Base Modem. Note, that in most cases when sufficient time has been allowed for the Base to recognize and connect with the radio, the other radio selections will be grayed out.

Glance over the Common Settings and make any necessary tweaks to your communications settings including your **Output Power**.

If finished, tap **OK**.

For more information on this screen see *RTK via UHF* (p. 104)

NOTE!

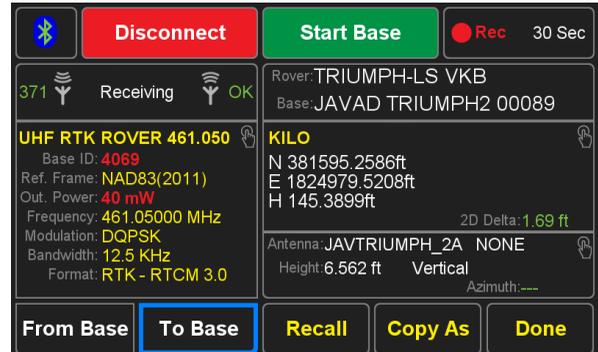
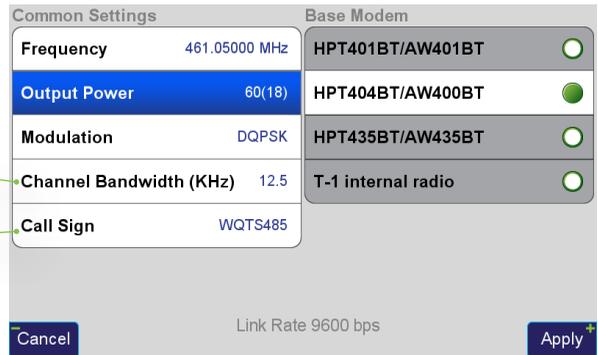
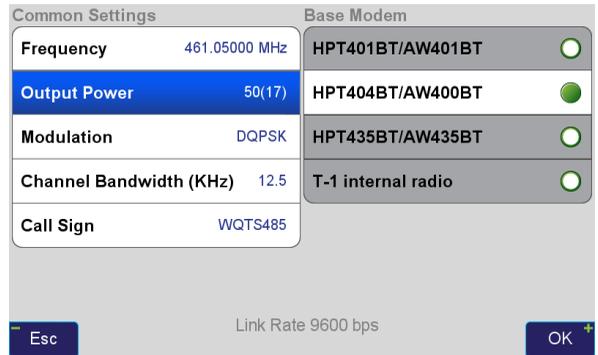
Channel Bandwidth: In the United States the FCC requires the narrowband setting of 12.5 KHz

Enter your FCC License **Call Sign**

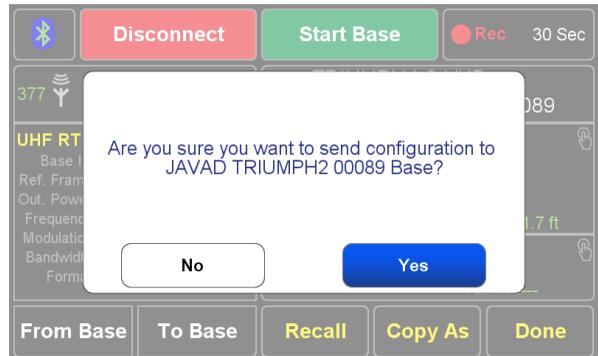
Once all settings have been entered, tap **Apply**. or
Once all unchanged settings have been confirmed, tap **OK**.

Note that the **To Base** button sends the shared data, while the **Yes, Store Point and Send to Base** button in the **Base Coordinate Confirmation** screen sends the base coordinates and HI to the base.

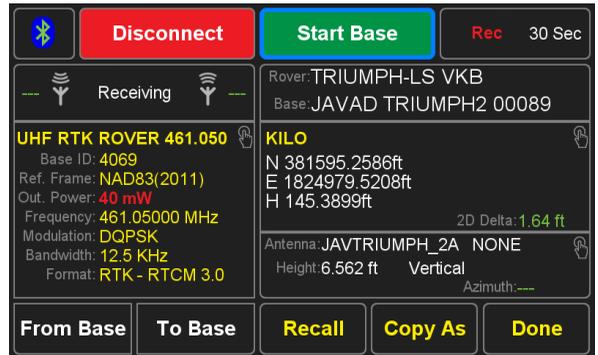
To send the shared communications configuration to the Base with a tap on **To Base**.



Confirm sending the configuration to the Base with a tap on **Yes**.

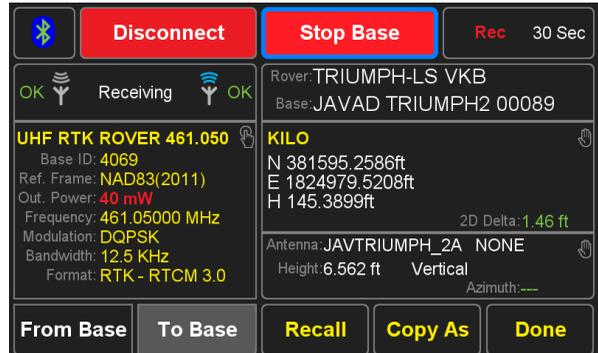


Having now defined the position of the Base, the shared communications configuration between the Base and the Rover, you are ready to tap **Start Base**.



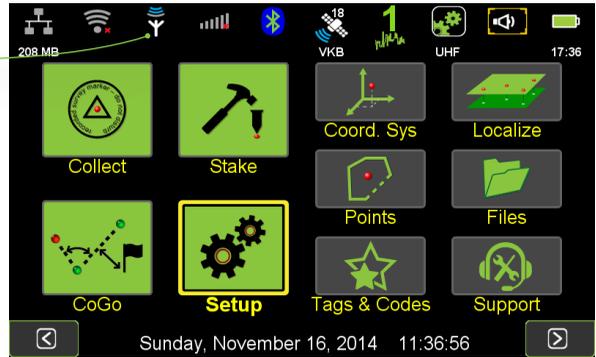
It will generally take about a minute and a half for all of the communications settings to fully implemented and working once the **Start Base** has been initiated.

That's it - you're done setting up the Base and Rover.





Press the Home button and then tap the UHF icon



Confirm that your communications are working properly by reviewing the UHF status screen. Depending upon your swiftness in configuring the Base and Rover, values like those shown in the tabular data in the screen to the right may take several seconds to begin populating.

Distance, Delay Received-Lost and RSSI should all look reasonable for your conditions and be changing with frequent updates.

Once satisfied, tap **Esc**.

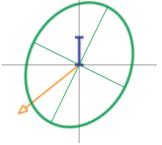
Lastly, you may wish to corroborate that the base position has been correctly entered. One way is by taking a test shot and examining the displayed statistics of the Base. Another way would be by telling *J-Field* to stake out the point you started the Base on.

UHF			
UHF RX	RTK - RTCM 3.0	Region	ALL
Sent	--	Output Power	--
Station ID	4069	Frequency	461.05000 MHz
Distance	10.5 ft	Protocol	JAVAD
LQ	100.0%	Modulation	DQPSK
Delay	1 sec	Ch. Bandwidth	12.5 KHz
Received, Lost	119, 0	FEC, Scrambling	On, 255
RSSI	Very good(-62 dBm)	Link Rate	9600 bps
BER	0E-0	Call Sign	--
UHF State	ready, none	FCC ID	WJ4LMR400



Here we see displayed both the geodetic and grid coordinate values for the Base's (and Rover's) location, focusing in particularly on the Base as a check and your off and running on your next RTK surveying project!

Base	GEO	44°32'40.58287"N	068°25'01.56293"W	64.9067ft
	GRID	381595.2587ft	1824979.5208ft	145.3899ft
Rover	GEO	44°32'40.60134"N	068°25'01.52992"W	66.5936ft
	GRID	381597.1496ft	1824981.8949ft	147.0767ft
To Base		B:231°27'47"	D:3.035ft	ΔH:-1.687ft
AVG FIX:		5.1/6	Sats:5+2	UTC:2014-11-16 16:39:29
HRMS:0.025ft		VRMS:0.021ft	RMS:0.032ft	95% Conf. Ellipse
HDOP:0.866		VDOP:1.375	PDOP:1.625	
oh:0.041ft		TDOP:1.084	GDOP:1.953	
0:26°13'17"		σ ₁ :0.048ft	σ ₂ :0.038ft	
ANT HGT:5.060ft		Epochs: 79s/83s		
Point: KJK1 Code: DefCode				



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