



How to setup a VRS or Single Base connection with a Trimble 2005 GeoXH receiver using an AT&T cell phone

GeoXM, GeoXT, GeoXH Summary Steps

1. Turn on the Bluetooth radio in your GeoCE
2. Setup the connection between the GeoCE and your Bluetooth cell phone
3. Activate the DUN cell phone modem
4. Setup a Modem with a Bluetooth Internet connection
5. Enter the number to be dialed
6. Enable the connection between GeoCE and cell phone
7. Launch TerraSync Professional software
8. Select Status/Setup/Real Time Settings/External Source
9. Select the “wrench” tool
10. Select Single Base or VRS
11. Establish an Internet connection complete with IP address and port
12. Type in your Username and Password
13. Select the VRS or Single base you want to use
14. Select OK.
15. You are now using a streaming, real-time correction source from the Internet through your cell phone as it applies corrections to your raw, GPS data.

Explanation

There are several reliable sources of real-time corrections available to GPS users today. They are 1) the WAAS satellite system, 2) the Coast Guard Beacon system, 3) Omnistar, 4) Racal, 5) a private, “closed-circuit” system locally set up on-site, and 6) a VRS or Single Base solution delivered via the Internet through a cellular phone system.

Each one has its benefits and limitations. WAAS and the Coast Guard are free of charge, providing you have the necessary hardware to receive those signals. Omnistar and Racal cost \$800. per year as of this writing. Setting up your own on-site base is very costly and time consuming. A VRS or Single Base solution may be free or have a fee imposed, depending on the managerial policies of that particular system. Continuous use of this option depends on being able to maintain a good cell phone signal.

Currently, the Washington State network is free for the first 90 days and the Oregon network is free until further notice.

<http://www.wsrn.org/> Washington State Reference Network (WSRN)

<http://www.theorgn.net/> Oregon Real Time GPS Network (ORGN)

In preparation for using a VRS or Single Base solution, you need to obtain the right equipment. Any member of the Trimble GeoCE family, ProXT or ProXH will work fine providing you are using TerraSync Professional or GPScorrect software Extension for ArcPad software. This requires a Windows Mobile Device or PC platform.

You will also need a cellular phone that has the ability to connect to the Internet. We recommend that you purchase a “data plan” with that phone. This will typically provide you with unlimited data streaming. Currently AT&T’s data plan with “tethering option” is \$64.95 per month. The tethering option allows a cellular phone to act as a Dial Up Networking modem to connect to a Windows Mobile device. You can connect to the Internet without an unlimited data plan, but that could result in very large cellular phone bills, as your connection time would be billed as “voice” time.

I am currently using an AT&T BlackBerry 8310 phone with “Edge” technology. Edge technology can provide up to 236 kbps. 3G is currently the fastest cell technology, offering 128 kbps while moving in a vehicle, 384 kbps moving at pedestrian speeds or while stationary, and up to 2Mbps in fixed applications. Special note: delivery speed of the VRS or Single Base corrections are not as critical as maintaining strong signal connection with a cell tower.

Although you could connect the cell phone to the GPS unit with a cable, we recommend that you use Bluetooth. This will provide a wireless connection between the two devices making this system easier and less physically restrictive to use in the field. The Bluetooth signal should maintain connectivity with the GPS receiver or PDA and your cell phone, for up to 10 meters (32.82 feet). Make sure the cell phone you purchase has Bluetooth built in.

For the purposes of this document, we will assume that you are using one of the members of Trimble’s GeoCE family and a Cingular cell phone with Bluetooth and Internet connectivity. If you have different equipment, these instructions could be slightly different for your system. These instructions are for a Trimble 2005 Series Geo using Windows Mobile 5, OS 5.1.16, v1.82 GPS firmware. *There is a companion to this document if you’re using a new Trimble 2008 Series Geo using Windows Mobile 6. You can obtain that document by clicking here.*

Step-by-step instructions

Section One

This first series of steps will create a COM Port through which your cell phone can communicate with your GeoCE (XM/XT/XH).

1. Turn on your cell phone
2. Go to a menu that allows access to the Bluetooth radio, probably “Settings”
3. Turn Bluetooth on and escape back to the main screen
4. Turn on your GeoXH and tap Start/Settings
5. Tap the Connections tab at the bottom of the screen
6. Tap the Bluetooth icon
7. Put a checkmark in the box labeled “Turn on Bluetooth.” (You do not have to make it “discoverable.”)
8. Tap the Devices tab at the bottom of the screen
9. Tap “New Partnership”
10. The GeoXH will automatically begin searching for all Bluetooth devices in the vicinity
11. When your cell phone is found by the software, tap the name listed in the window
12. Tap “Next” at the bottom of the screen
13. You can change the Display Name if you want. Select “Dialup Networking”
14. Tap Finish at the bottom of the screen
15. At the bottom of the screen you will find a DUN tab. Tap the DUN tab



16. Tap and hold the stylus on the name of your cell phone and select “Activate”

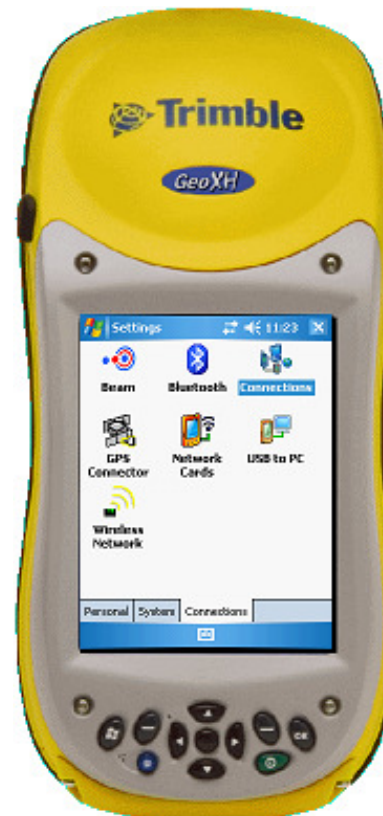
17. Tap OK at the upper right corner of the screen.

You have just created a COM Port through which your cell phone can communicate with your GeoCE (XM/XT/XH).

Section Two

This next step will allow you to use that connection through which you can connect your cell phone to the Internet.

1. In the Settings dialog (window), tap Connections
2. Under “My Work Network,” tap “Add a new modem connection”

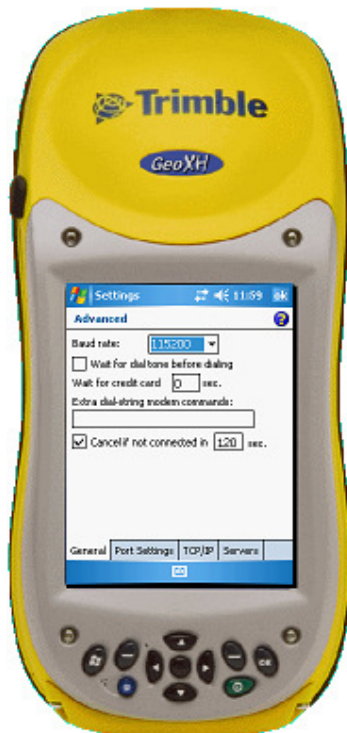


3. Give your connection a name. I simply called mine "VRS Phone"
4. Under "Select a modem," select Bluetooth
5. Tap "Next" at the bottom of the screen
6. Select the name of your phone, then tap Next at the bottom of the screen
7. You must now type in the number that your GeoXH will dial to connect with your cell phone. For AT&T phones, that number is *99# or *99***1# (Contact your cellular service provider for this number if you are using another service)
8. Tap Next



9. Tap the “Advanced” button
10. Select the fastest Baud rate: 115200
11. Uncheck the box, “Wait for dial tone before dialing”
(there are no dial tones in cell phones)
12. Tap OK in the upper right corner of the screen
13. Tap Finish at the bottom of the screen

You will also see a radio button (☉) in the left margin of the number to be dialed. If you wish to try the connection you’ve just setup, you can touch and hold on the connection displayed in the list. When the menu pops up, select “Connect.”



You are connected when you see two, stationary opposing arrows in the status bar at the top of the screen. ⇐
You should observe the screen on your cell phone. Initially, you may have to provide permission for this connection to complete. For future use, you can select that you will “Always allow” these devices to connect so you shouldn’t have to provide this permission each time. This feature or command is unique to each cell phone. Once connected, you can proceed to launch TerraSync Professional software.

Before you proceed to the last set of instructions, you must have already contacted the manager of the Single Base or VRS Real Time Network you want to work with and obtained an IP address for the Internet Server, the Port number, a username and password to identify yourself on the network, and a list of stations that are broadcasting RTCM v2.3 protocol. This is the only signal that TerraSync Professional and GPSCorrect will recognize.

Section Three

This section explains how to use TerraSync Professional (or GPSCorrect) to establish a connection with a VRS or Single Base.

1. Tap Start, then TerraSync (or Programs, then TerraSync)
2. Tap Status, then Setup, the Real Time Settings
3. In the first pull down menu, Choice 1, select External Source, then tap the wrench tool to the right of that field.



4. The first pull down is Type. Select either Single Base or VRS
5. Under Connection Method, select Internet
6. Type in the IP Address of the server you have been given by your provider
7. Type in the Port number
8. Tap the wrench to the right of Source
9. Because your cell phone has established a connection with your Geo, you will see a list of possible base stations to choose from (this may take a few seconds. You can also check to see how many bars you have on your signal strength meter on your cell phone. Having a good connection is important).
10. Select either a Single Base or VRS. When using TerraSync Professional or GPSCorrect, you must select a station that broadcasts RTCM v2.3 protocol. Some base station managers will put “2.3” or “23” in the name of the station so you will know which ones will work and which ones will not.
11. Enter your User Name
12. Enter your Password
13. Select Auto for Connection Control
14. Select Any for Station ID



15. Once selected, tap OK, then OK again. You are now back at the main Setup menu. Go to the Status menu and wait until you have at least 4 GPS satellites, an acceptable PDOP and the radio icon stops flashing. You will see a number above the satellite icon representing your Estimated Real Time Accuracy. With a Trimble 2005 GeoXT or XH, you should be able to obtain submeter accuracy.

If you have any questions, you can call Jim Lahm at (503) 624-6133 office, or (503) 706-4272 cell or email at jim@elecdata.com

Using the Single Base or VRS solution will result in excellent horizontal accuracy that will eliminate the need to post-process GPS data. This statement is only a general guideline and applies only if you are able to achieve the level of accuracy your project requires.

Jim Lahm
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