

Configuring Trimble TSC2 for RTK over internet – establishing IP connection

This Technical Tip provides instructions for establishing an internet-protocol (IP) connection from a Trimble TSC2 data collector running the Windows Mobile 5 operating system via a Bluetooth-enabled mobile (cellular) phone operating as a modem.

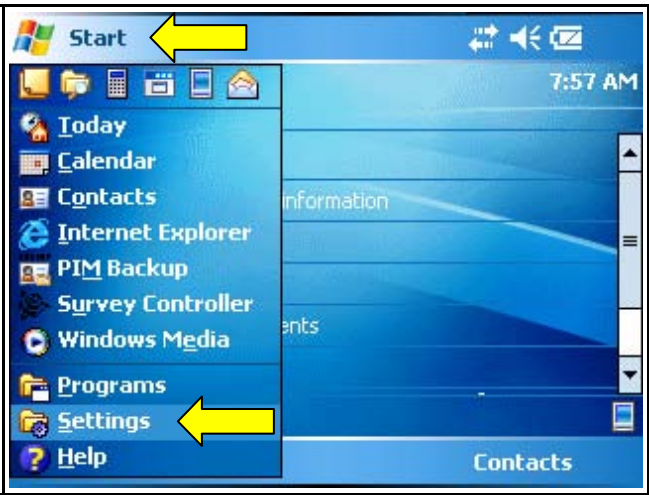
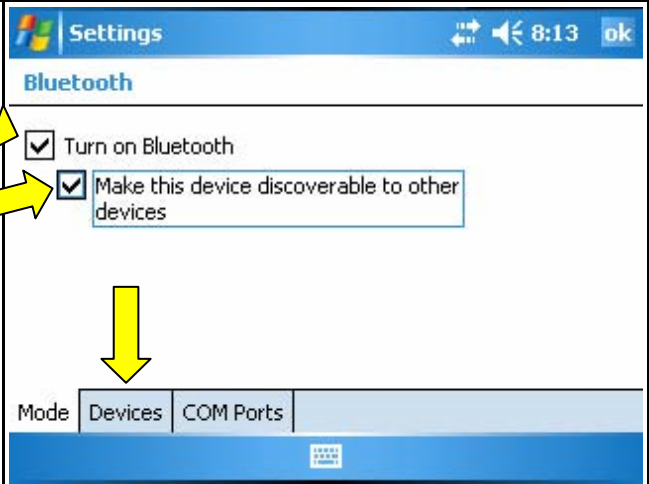
The typical purpose for this IP connection is obtaining RTK GPS reference-station data via a mobile phone, but the connection can be used for other purposes such as web browsing, e-mail, and file transfer as well.

Two other Technical Tip documents in this series will cover creating the Survey Controller dial profiles and survey styles to connect to and utilize different types of RTK-GPS-data sources. Links are provided later in this document.

These instructions were prepared using a Verizon LG VX8300 phone, which has the Bluetooth dial-up networking (DUN) profile enabled.

The steps to get everything working are -

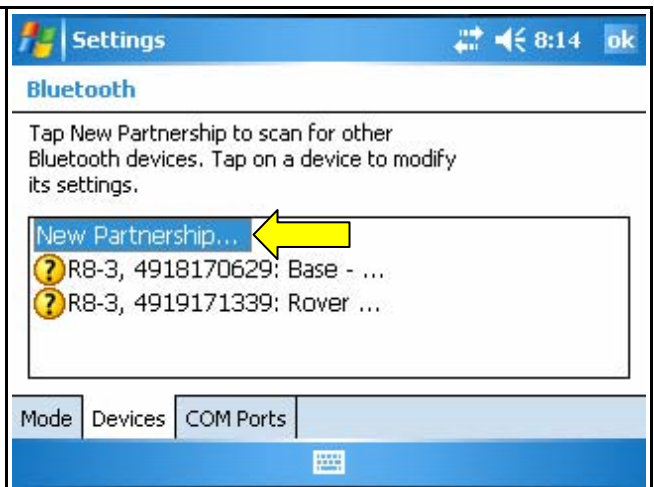
1. Establishing a Bluetooth partnership between the TSC2 and the mobile phone

<p>On the TSC2, exit out of Survey Controller or other application software to get to the Windows desktop.</p> <p>Tap on Start, and then tap on Settings.</p> <p>The Settings window will open, tap on the Connections tab.</p> <p>Tap on the Bluetooth icon to get to the window shown in the next row.</p>	 <p>A screenshot of the Windows Mobile Start menu. A yellow arrow points to the 'Start' button at the top left. Another yellow arrow points to the 'Settings' icon in the application list on the left side of the screen. The time shown is 7:57 AM.</p>
<p>Under the Mode tab (which should open by default), check both Turn on Bluetooth and Make this device discoverable to other devices.</p> <p>Tap on the Devices tab to get to the window in the next row.</p>	 <p>A screenshot of the Windows Mobile Bluetooth settings window. Two yellow arrows point to the checkboxes for 'Turn on Bluetooth' and 'Make this device discoverable to other devices', both of which are checked. A third yellow arrow points down to the 'Devices' tab in the bottom navigation bar. The time shown is 8:13.</p>

The window at right shows the TSC2's existing Bluetooth partnerships. We are going to add the mobile phone to this list.

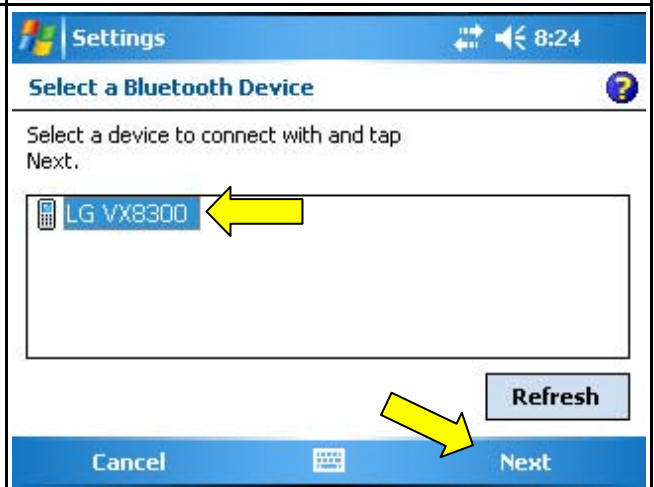
On the mobile phone, turn on Bluetooth and make sure the device is discoverable. For security, on many Bluetooth devices the discoverable status only lasts for a minute or so.

Tap on **New Partnership** and the TSC2 will begin scanning for other Bluetooth devices within range.



During its scan the TSC2 found the mobile phone as shown at right.

Highlight the desired device and tap the **Next** button at bottom right.

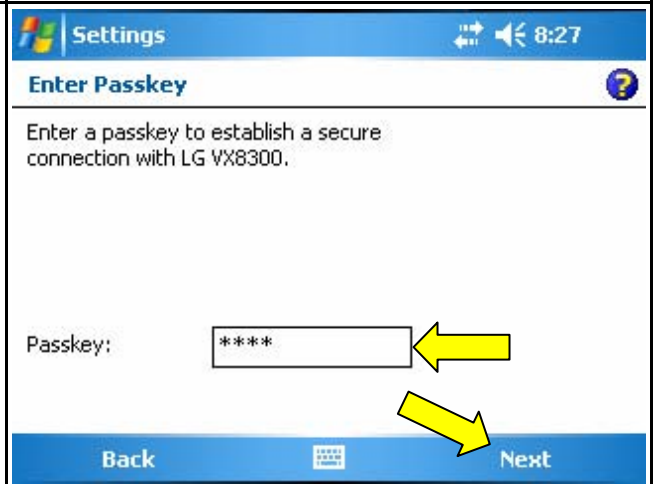


You will likely encounter and **Enter Passkey** dialog as shown at right.

It is believed that the most common default Bluetooth passkey is 0000 (four zeros) so that is what was used in this example. Other possible default passkeys are 1234, 9999, and the last four digits of the telephone number.

Consult with your mobile-phone provider if you need help with the passkey.

Tap the **Next** button at bottom right.

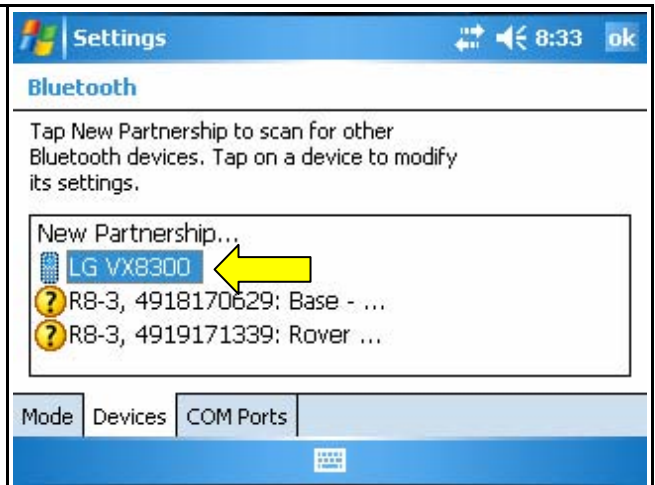


Pay attention to your mobile phone at this time – you may need to acknowledge and allow the pairing request from the TSC2 and enter a passkey on the mobile phone.

Your mobile phone may also offer an option that asks each time a Bluetooth connection with the TSC2 is established. That provides an additional level of security, so you may wish to use that option.

After the partnership with the mobile phone is established, the mobile phone will show up in the device list as shown at right.

Tap and hold on the name of the mobile-phone device until the context menu appears, then tap **Edit** to bring up the dialog shown in the next row.

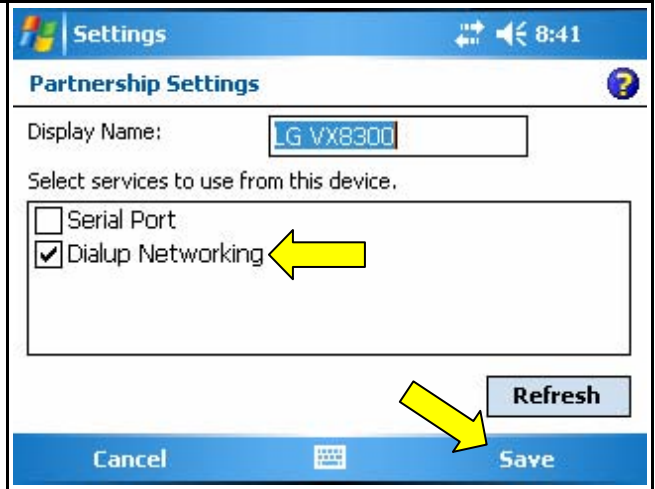


In the **Partnership Settings** dialog, make sure **Dialup Networking** is checked, then tap the **Save** button at bottom right.

This completes the partnership, so tap the **OK** button at upper right to get back to the **Connections Settings** window.

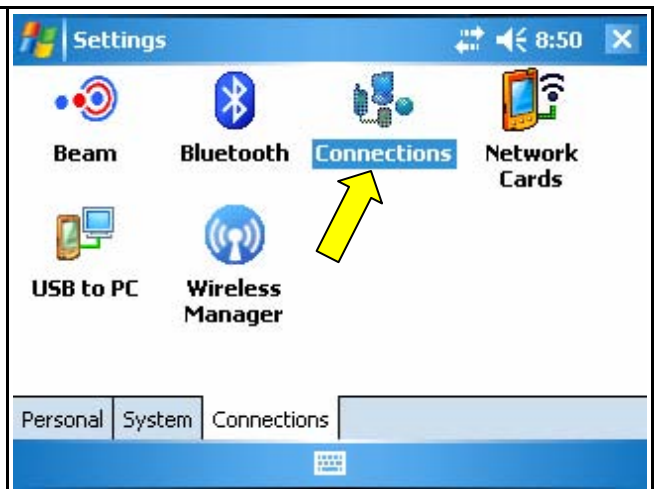
If **Dialup Networking** does not appear in the list of available services, you should check with your mobile-phone provider.

If it is confirmed that your mobile device does not provide the Bluetooth Dialup Networking service, see the Wi-Fi information toward the end of this document and the linked document.

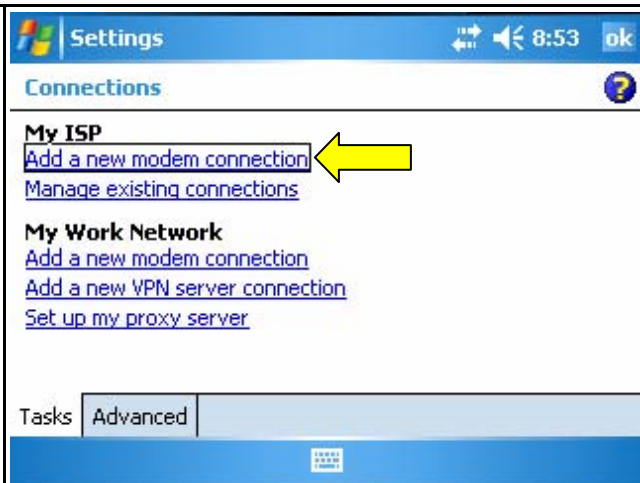


2. Establishing a modem connection to the internet

Under the **Connections** tab, tap the **Connections** icon.



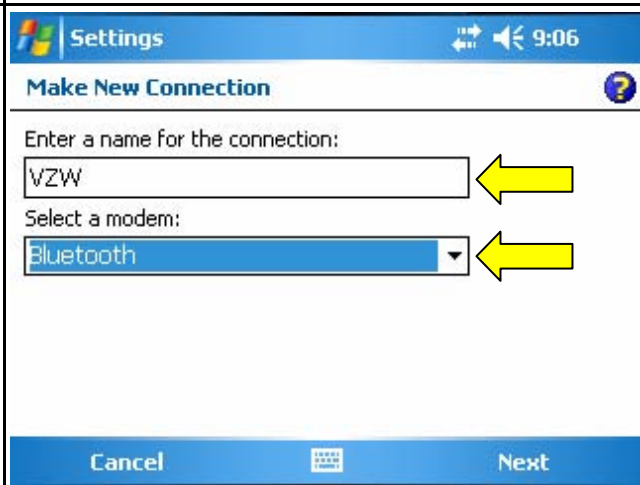
Tap on **Add a new modem connection** to open the dialog shown in the next row.



For purposes of this document, the new connection was named **vzw**, an abbreviation for Verizon Wireless. You should use a name that makes sense for your situation.

Select **Bluetooth** for the **Select a modem:** field.

Tap the **Next** button at bottom right.



Now we will tell Windows Mobile which Bluetooth device to use for the modem connection.

Highlight the Bluetooth device for which you created a partnership under Step 1 and tap the **Next** button at bottom right.

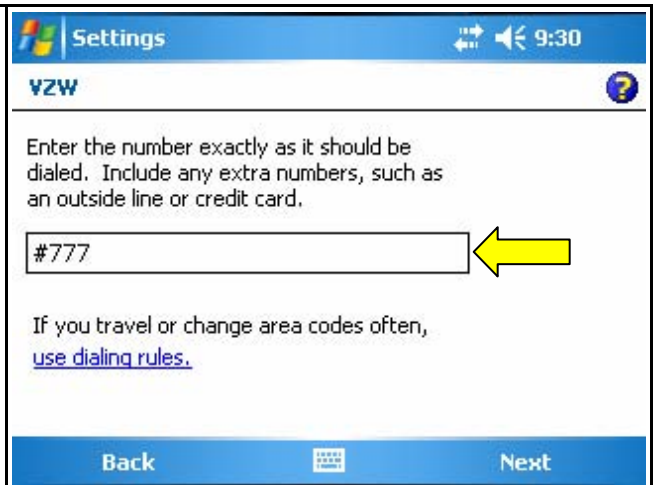


Here is where the “dialup” part comes in – we now enter the number to dial to reach the internet.

This document was prepared using a Verizon connection, so we entered #777 in the number field.

Inland GPS has attempted to compile settings for some mobile-phone carriers in the region, That information is provided later in this document. For other mobile-phone carriers you will have to consult with their technical representatives to determine the correct entries for this and the following settings.

Tap the **Next** button at bottom right.

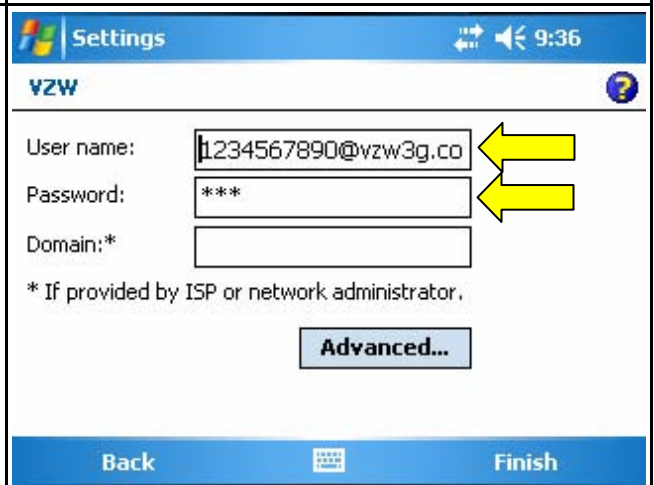


Now for the authentication –

On Verizon, the **User name** is (ten-digit mobile-phone number)@vzw3g.com and the **Password** is vzw.

(The Survey Controller Ver 12.46 Help document indicates that the default settings under the **Advanced** button are all correct.)

Tap the **Finish** button at bottom right and you will be back at the **Connections** window shown in the next row.

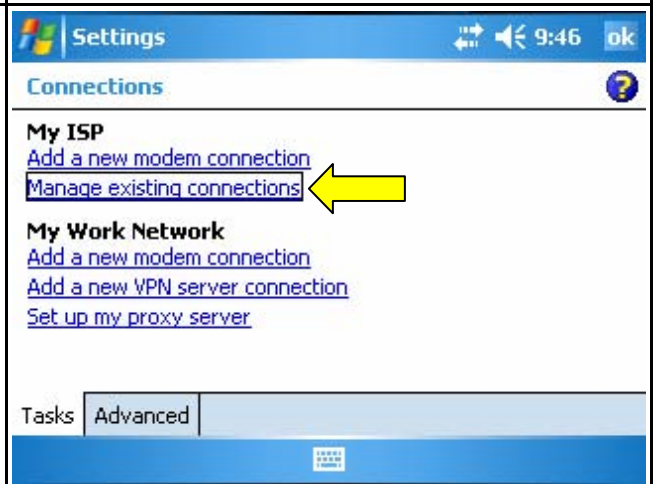


The next order of business it to test the new connection.

Unplug any cables that may be connected to the TSC2 and confirm that Wi-Fi is turned off.

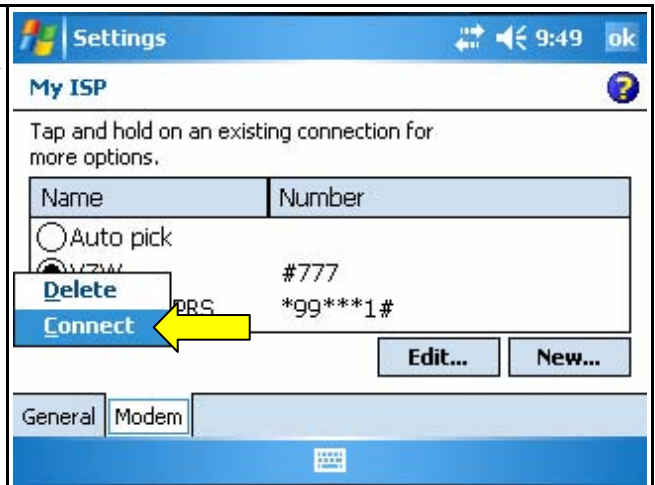
Tap on **Manage exiting connections** to bring up a list of available connections.

Our brand-new connection appears in the list.



Tap and hold on the name of the new connection (VZW in the example – yours may be different) until the context menu appears.

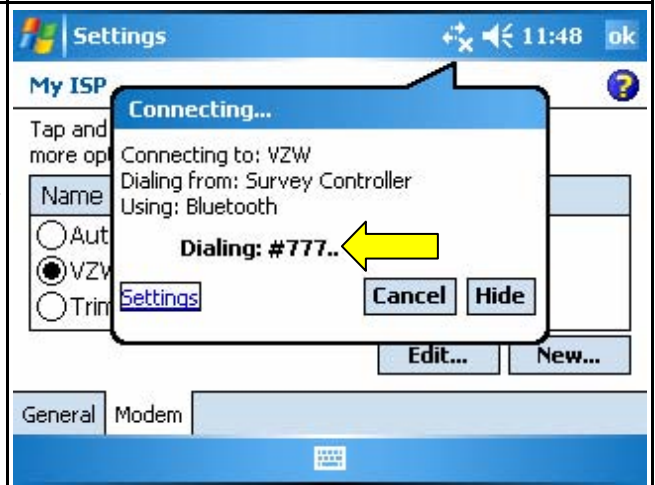
Tap on **Connect**.



To see what is going on now, pay attention to the mobile-phone screen as well as the information revealed by tapping the **Connectivity** icon (appears just left of the loudspeaker icon) at the top of the TSC2's screen.

Immediately after tapping **Connect** the TSC2 should instruct the mobile phone to begin dialing the specified number.

To confirm that is what is happening, tap the **Connectivity** icon and you will see the information screen shown at right.



When the internet connection is established, the **Connectivity** information will likely disappear.

Again tap the **Connectivity** icon and you will see the information screen shown at right that shows the dial-up connection as well as the elapsed time since the connection was established.



For an additional test of your new IP connection, launch the TSC2's Internet Explorer browser and navigate to a web site of your choice. This provides additional confirmation that the TSC2 has an internet connection via the mobile phone.

Tap the **Connectivity** icon and tap the **Disconnect** button to close the connection when you are finished.



If you have not been successful in getting to this point, you may need to consult with your mobile-phone provider. Most mobile-phone sales representatives have no knowledge of this type of connection, so one way to get the dial-in information and other settings is by telling them that you are trying to tether a Linux computer via your mobile phone.

What's next?

Now you need to create a dial profile to access the source of RTK GPS reference-station data along with an appropriate survey style that will utilize that data.

If you will be connecting to an internet-accessible GNSS receiver, refer to the Inland GPS Technical Tips document titled [Configuring TSC2/Survey Controller for RTK over internet – connecting to a GNSS receiver](#).

If you will be connecting to an NTRIP (Networked Transport of RTCM via Internet Protocol) caster, refer to the Inland GPS Technical Tips document titled [Configuring TSC2/Survey Controller for RTK over internet – connecting to an NTRIP caster](#).

Dial-up networking settings for some mobile-phone carriers in the region

AT&T Please advise Inland GPS as to your results using these settings, especially if you find any errors.

Dial String: *99***1#

Username: (Left blank because SIM card does the authentication)

Password: (Left blank because SIM card does the authentication)

Settings untested!!

Modem command: None required?

Modem PIN: (Leave blank?)

APN: proxy

Union Wireless The support person with whom I spoke was confident that Union Wireless does not offer any devices that support Bluetooth Dialup Networking except possibly one Blackberry device. The best way to check will be to create the Bluetooth partnership and see if the Bluetooth Dialup Networking service shows up in the list. Let us know what you learn and we will add that information to later revisions of this document.

Dial String: ??

Username: (Left blank because SIM card does the authentication)

Password: (Left blank because SIM card does the authentication)

Settings untested!!

Modem command: None required?

Modem PIN: (Leave blank?)

APN: union.wap.com ??

Verizon These settings worked fine on a superannuated LG VX8300 phone during June 2011.

Dial String: #777

Username: (Your ten-digit mobile-phone number)@vzw3g.com

Password: vzw

Modem command: None required?

Modem PIN: (Leave blank?)

APN: None

Other considerations –

Using Wi-Fi instead of Bluetooth Dialup Networking

After speaking with several representatives of mobile-phone carriers it seems that Bluetooth Dialup Networking may be disappearing from mobile devices and is being replaced by Wi-Fi capabilities. For most uses this makes sense because Wi-Fi provides much higher data rates. For RTK-over-internet purposes we can get by just fine with the slower Bluetooth connection, but we have to use what the market offers.

If you need (or prefer) to use Wi-Fi, the Inland GPS Technical Tips document titled [Configuring TSC2/Survey Controller for RTK over internet – using Wi-Fi](#) shows the changes to make when using Wi-Fi. That document is intended for use with this document and the other two documents in this series.

A Bluetooth connection between the TSC2 and the mobile phone is desirable for RTK over internet because Bluetooth uses about one-sixth as much power as Wi-Fi. If you use Wi-Fi expect a significantly shorter runtime from the TSC2's battery.