Leica Viva GNSS

October 2010

CS 10/15 and GS 10/15
Communication Connections

Summary

This quick guide will go through the several procedures outlining the different methods of communication connection with the RTK Rover Wizard, manual configurations and Base setups.

The following connections will be discussed:

- SLG modems
- SLC modems
- ADL Radios for Base and Rover
- PDL Base setup
- Cellular phone connection via Bluetooth
- Corrections via Wi-Fi

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License Keys and Devices

The flowing list is from the Equipment List for Leica Viva GNSS. The license keys and currently available are shown.

771 497	**LOP16**	DGPS option for GS10 and GS15 receivers, enables the receiver to compute a DGPS position.
767 812	**LOP9**	5km RTK option, enables RTK positions to be computed up to a distance of 5km from a single base station.
767 813	**LOP10**	Unlimited RTK option, enables RTK positions to be computed from a single base station with no limit of distance.
767 814	**LOP11**	Upgrade from 5km RTK to unlimited RTK. (LOP9 to LOP10)
767 815	**LOP12**	Unlimited RTK and Network RTK, enables RTK position to be computed from a single base station and within a RTK network.
767 817	**LOP14**	Upgrade option for GS10 or GS15 receivers from RTK unlimited only to RTK unlimited including RTK Network. (LOP10 to LOP12)
771 971	**LOP20**	Leica Lite option, to receive System 900 RTK data on the GS10, GS15 receivers.
767 816	**LOP13**	RTK Reference station option, allows a GS10 or GS15 receiver to transmit RTK data.
Satelline radio modules		
767 819	**SLR1**	Satelline M3 T1 403-470 MHz TXO radio. RTK transmitting only UHF radio module to be easily plugged into the GS15 GNSS receiver.
767 820	**SLR2**	Satelline M3 R1 403-470 MHz RXO radio. RTK receive only UHF radio module to be easily plugged into the GS15 GNSS receiver.
Pacific Crest radio modules		
767 821	**SLR3-1**	Pacific Crest ADL RX/TX radio 390-430Mhz. RTK receive and transmit UHF radio module to be easily plugged into the GS15 GNSS receiver.
767 822	**SLR3-2**	Pacific Crest ADL RX/TX radio 430-470Mhz. RTK receive and transmit UHF radio module to be easily plugged into the GS15 GNSS receiver.
Mobile phone modules		
767 823	**SLG1**	5-Band (850/900/1800/1900/2100MHz) Telit 3G GSM/GPRS/UMTS module. Provides full flexibility due to 5-band technology and is globally compatible to all GSM, GPRS, EDGE and UMTS network providers. Can be easily plugged into the GS15 GNSS receiver.
774 689	**SLG2**	4-Band (850/900/1800/1900MHz) Siemens MC75i GSM/GPRS module. Universal 4-band technology supports GSM, GPRS, and EDGE network providers. Can be easily plugged into the GS15 GNSS receiver.
767 824	**SLC1**	Dual band Telit CDMA 1xRTT module for US. Supports Sprint (US) network

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License Keys and Devices

Satelline Radio Modems

Satelline modems

733 275	**GFU14-0**	Satelline 3AS radio modem (433.525MHz, 25.0kHz channel spacing, 0.5W) already intergrated into housing, fits on side of GPS receiver. User manual and CE Declaration of Conformity included.
733 276	**GFU14-1**	Satelline 3AS radio modem (406.425MHz, 25.0kHz channel spacing, 1.0W) already intergrated into housing, fits on side of GPS receiver. User manual and CE Declaration of Conformity included.
738 272	**GFU14-2**	Satelline 3AS radio modem (445.000MHz, 12.5kHz channel spacing, 1.0W) already intergrated into housing, fits on side of GPS receiver. User manual and CE Declaration of Conformity included.
738 273	**GFU14-3**	Satelline 3AS radio modem (443.000MHz, 12.5kHz channel spacing, 1.0W) already intergrated into housing, fits on side of GPS receiver. User manual and CE Declaration of Conformity included.
738 274	**GFU14-4**	Satelline 3AS radio modem (440.550MHz, 25.0kHz channel spacing, 0.5W) already intergrated into housing, fits on side of GPS receiver. User manual and CE Declaration of Conformity included.
738 275	**GFU14-5**	Satelline 3AS radio modem (458.150MHz, 12.5kHz channel spacing, 1.0W) already intergrated into housing, fits on side of GPS receiver. User manual and CE Declaration of Conformity included.
738 276	**GFU14-6**	Satelline 3AS radio modem (439.8625MHz, 12.5kHz channel spacing, 1.0W) already intergrated into housing, fits on side of GPS receiver. User manual and CE Declaration of Conformity included.
753 928	**GFU14-7**	Satelline 3AS radio modem (464.5000MHz, 25.0kHz channel spacing, 1.0W) already intergrated into housing, fits on side of GPS receiver. User manual and CE Declaration of Conformity included.
756 623	**GFU14-8**	Satelline 3AS radio modem (458.6000MHz, 25.0kHz channel spacing, 0.5W) already intergrated into housing, fits on side of GPS receiver. User manual and CE Declaration of Conformity included.

Cables for Satelline modems

733 297	**GEV171**	1.8m Y-cable to program the Satelline 3AS radio modem inside the GFU14 housing.
762 026	**GEV221**	Y-cable, connects Satelline 3AS Epic Pro (10W) to GS10/GS15 and 12V car battery.
639 968	**GEV125**	Cable for Satelline radios without GFU housing to be connected to GS10/GS15.

Pacific Crest Radio Modems

Pacific Crest radio modems must be ordered directly from your local Pacific Crest office or representative.

PDL receive only modems built into the Leica GFU radio housing with 12.5 or 25kHz channel spacing within the following frequency bands are available:

- 410 - 430MHz
- 430 - 450MHz
- 450 - 470MHz

Mobile Phones

750 242	**GFU24**	Housing with Siemens MC75 GSM/GPRS module (Quad-Band GSM 850/900/1800/1900MHz), fits on side of GS10 receiver.
750 243	**GFU25**	CDMA cellular phone for Canada, Multitech MTMMC-C-N12 for Bell mobility network, integrated into housing, fits on side of GS10 receiver.
744 754	**GFU19**	US CDMA cellular phone Multitech MTMMC-C-N3 for Verizon network, integrated

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Field Controller		
767 866	**CS10 Radio Field Controller**	**CS10 Radio Field Controller.** Ruggedized WinCE field controller with full VGA touch display, 1GB NAND flash memory, 512MB SDRAM, CF/SD card slot and 2MP camera. Includes Bluetooth, internal WLAN module, internal TPS radio module, numeric keypad, stylus. Available with either Lemo connector (CBC01) or DSUB connector module (CBC02).
767 871	**CS15 Radio Field Controller**	**CS15 Radio Field Controller.** Ruggedized WinCE field controller with full VGA touch display, 1GB NAND flash memory, 512MB SDRAM, CF/SD card slot and 2MP camera. Includes Bluetooth, internal WLAN module, internal TPS radio module, QWERTY keypad, stylus. Available with either Lemo connector (CBC01) or DSUB connector module (CBC02).

CS 10/15 and GS 10/15
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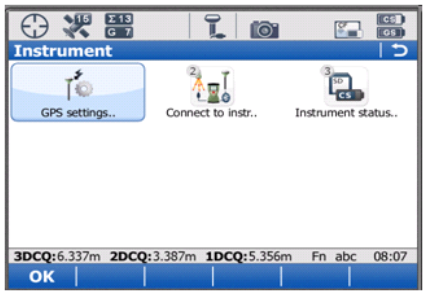
Method: GS15 SLG Modem via RTK Rover Wizard

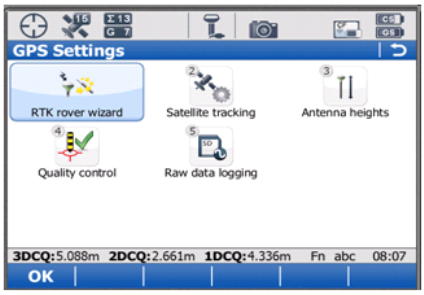
The SLG is Leica's GSM slot modem for the GS15. In the United States the prevailing GSM carriers are AT&T (Cingular) and T Mobile. For Canada it is Rogers and Bell. The following explanation will go through the commonality of connecting the SLG to the internet and receiving NTRIP corrections through the Leica Spider Network.

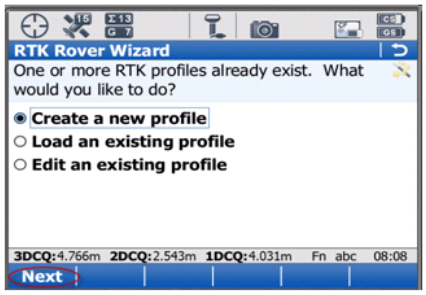
A successful connection from the GS and CS is required by either by Bluetooth or cable.

Procedure: GS15 SLG Modem via RTK Rover Wizard

From the Main menu of Smartworx go to 3 (Instrument), 1 (GPS settings..), 1 (RTK rover wizard), select the 'Create a new profile' radio button and press F1 (Next)







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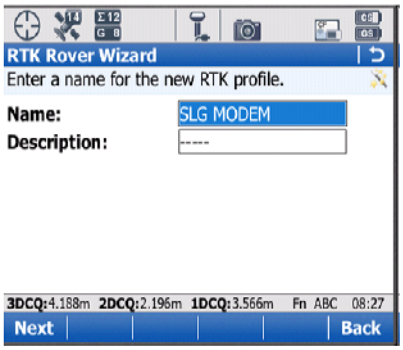
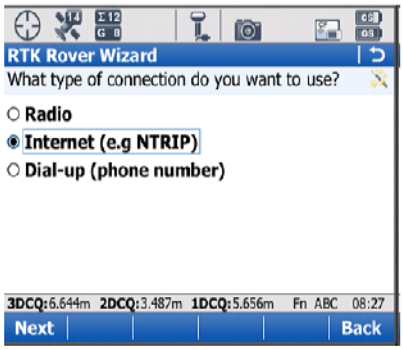
CS 10/15 and GS 10/15
Communication Connections

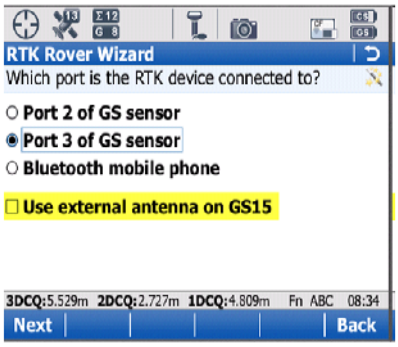
Procedure: GS15 SLG Modem via RTK Rover Wizard

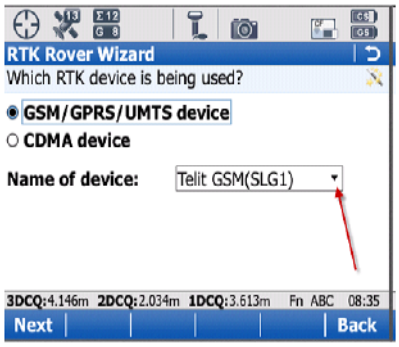




Create a name for the Profile. This RTK Profile can be saved and copied to an external memory device and re-imported for future use.

Once created, press F1 (Next) then select 'Internet (e.g. NTRIP) radio button, press F1 (Next)





Select 'Port 3 of GS sensor' … The SL devices are always Port 3 on the GS15. If an external antenna is to being used on the GS 15, the box "Use external antennae on GS15 must be selected. Press F1 (Next).

Select 'GSM/GPRS/UMTS device' and from the pull-down select the 'Telit GSM(SLG1)
Press F1 (Next).

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CS 10/15 and GS 10/15
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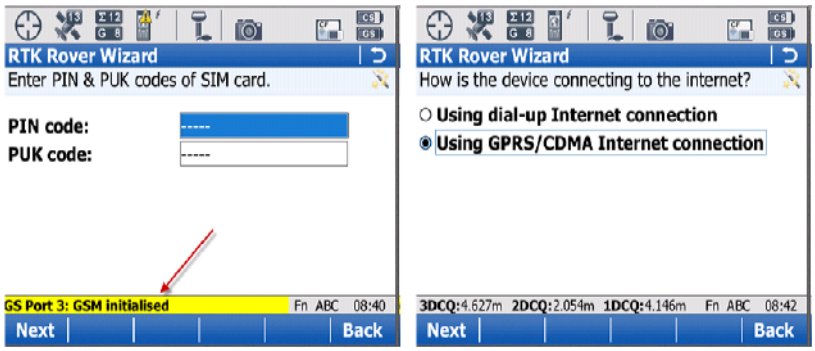
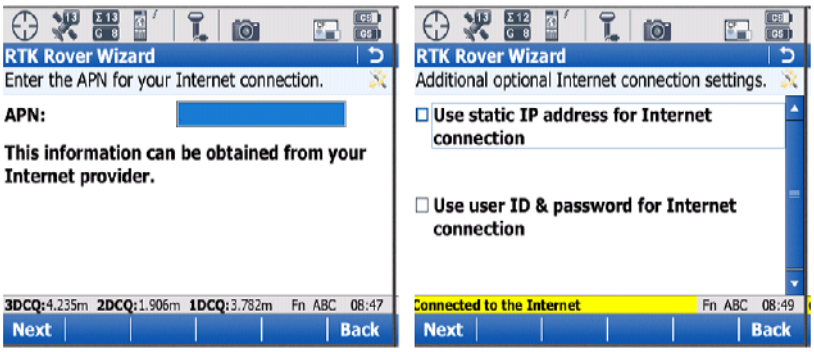
Procedure: GS15 SLG Modem via RTK Rover Wizard



The PIN or PUK codes do not need to be entered. Once the message 'GS Port 3: GSM Initialized' appears at the bottom of the screen, Press F1 (Next)

Next, select the GPRS/CDMA Internet connection radio button Press F1 (Next)



Enter in the APN (Access Point Name) in the APN: field. This information is obtained from your Internet Provider and is unique for each provider. Press F1 (Next)

Unless a static IP address was purchased from the Internet Provider leave the "Use static IP address fro Internet connection" box unchecked. If there is a static IP address purchased, then select the top box enter the address. If there is a User ID and password are required by your Internet Provider select the second box and fill in the appropriate fields. Press F1 (Next)

Note: If the correct APN is entered, the SLG1 will connect to the internet, as indicated on bottom of the optional connection settings screen.

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CS 10/15 and GS 10/15
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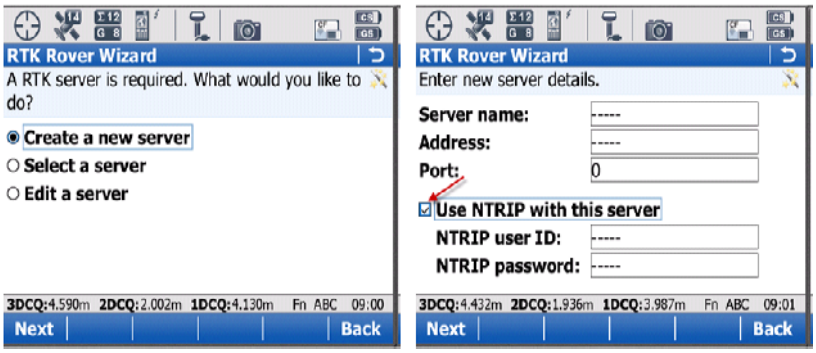
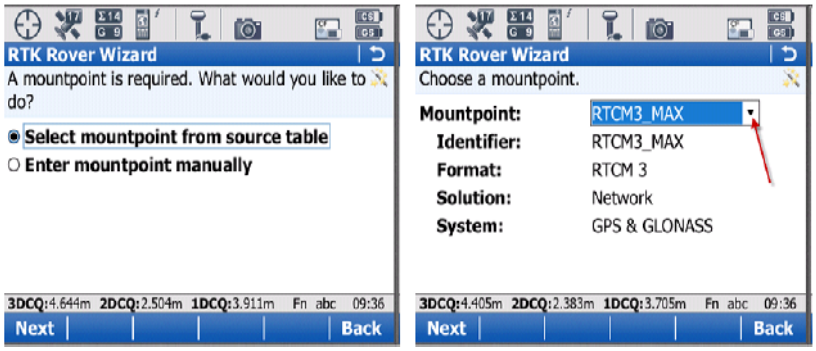
Procedure: GS15 SLG Modem via RTK Rover Wizard



Once connected to the Internet, select the 'Create a new server' radio button and press F1 (Next)

You must enter the Server name, IP Address (Address: field) and Port for the server connection. If your network is utilizing a NTRIP caster protocol, select the 'Use NTRIP with this server' box and populate the required fields.



Select the 'Select mountpoint from source table' option and press F1 (Next)

From the pull-down (as pointed out with arrow in image), select the appropriate Mountpoint. Next, select F1 (Next)

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CS 10/15 and GS 10/15
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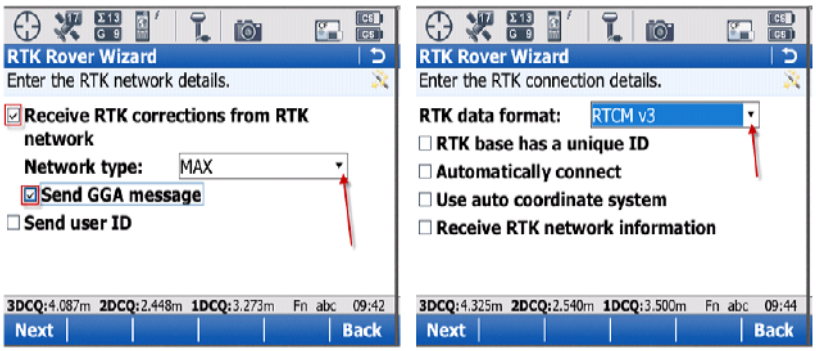
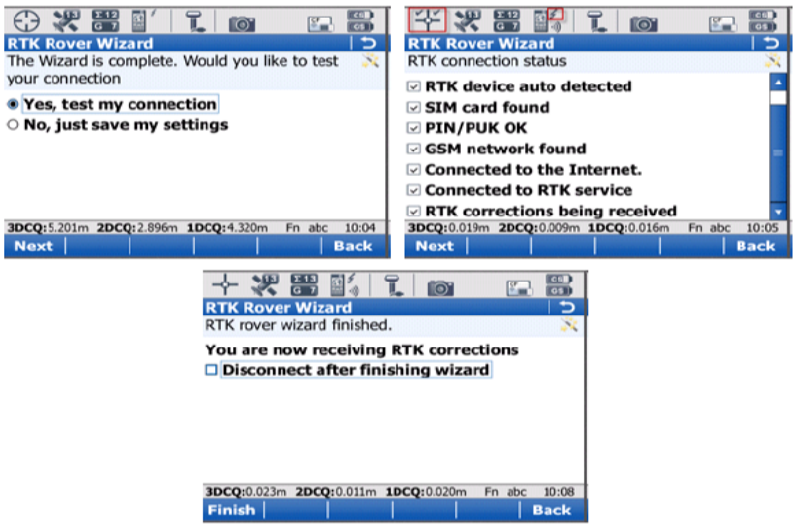
Procedure: GS15 SLG Modem via RTK Rover Wizard



Check the top box to receive correction from the network. Use the drop down to select the network type the is for the mount point chosen in the previous step. Check the 'Send GGA message' box to send out the uncorrected position of the instrument to the network server. If user ID and password and/or password are needed, select the last box and fill in the appropriate information. Press F1 (Next)

Using the pull down, select which RTK correction format of data the instrument will receive from the network. Unless specified from your RTK Network Administrator, all other boxes should stay unchecked. Press F1 (Next)



Once the settings are all correct, select 'Yes, test my connections'. The following screen will give a visual of what the input settings will accomplish. If all items are checked the instrument will then proceed to get a fixed position (as indicated in the highlighted icon). The pulsating arrow pointing towards the instrument icon in the middle of the icon bar is also an indication that corrections are being received from the network.

With all complete, the choice of disconnecting the instrument from the network is given. Press F1 (Finish) to complete the RTK Rover Wizard.

CS 10/15 and GS 10/15
Communication Connections

Method: GS15 SLC Modem via RTK Rover Wizard

SLC is Leica's CDMA slot modem for the GS15. In the United States the prevailing CDMA carriers is Sprint. The following will go through the commonality of connecting the SLC to the internet and receiving NTRIP corrections through the Leica Spider Network.

A successful connection from the GS and CS is required by either by Bluetooth or cable

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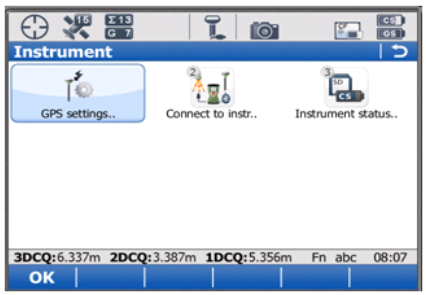
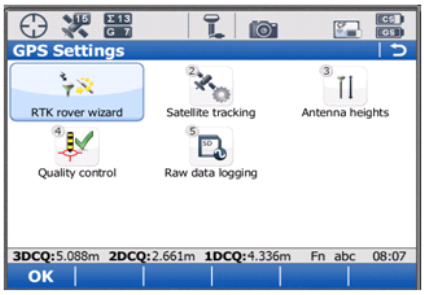
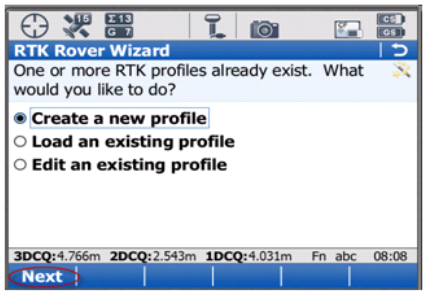
Procedure: GS15 SLC Modem via RTK Rover Wizard

From the Main menu of Smartworx go to 3 (Instrument), 1 (GPS settings..), 1 (RTK rover wizard), select the 'Create a new profile' radio button and press F1 (Next)







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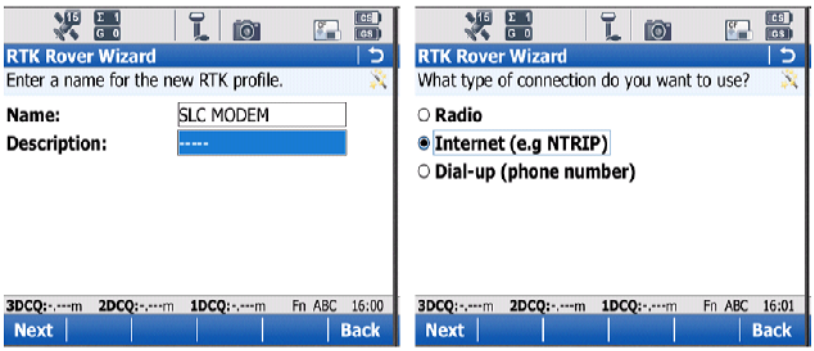
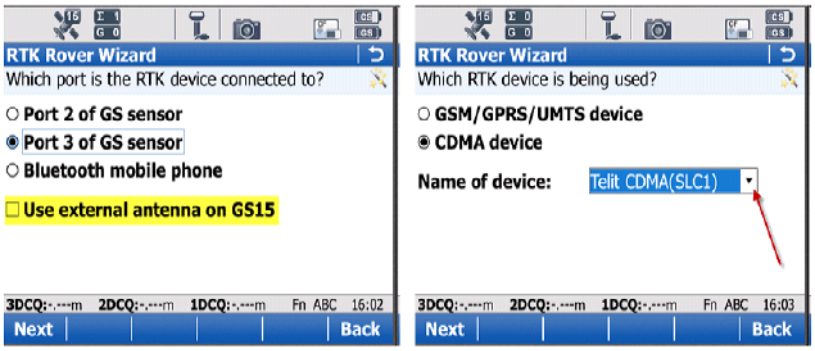
CS 10/15 and GS 10/15
Communication Connections

Procedure: GS15 SLC Modem via RTK Rover Wizard



Create a name for the Profile. This RTK Profile can be saved and copied to an external memory device and re-imported for future use.

Once created, press F1 (Next) then select 'Internet (e.g. NTRIP) radio button, press F1 (Next)



Select 'Port 3 of GS sensor' … The SL devices are always Port 3 on the GS15. If an external antenna is to being used on the GS 15, the box "Use external antennae on GS15 must be selected. Please make sure that this box is set correctly. Press F1 (Next).

Select 'CDMA device" and from the pull-down select the 'Telit CDMA (SLC1), Press F1 (Next).

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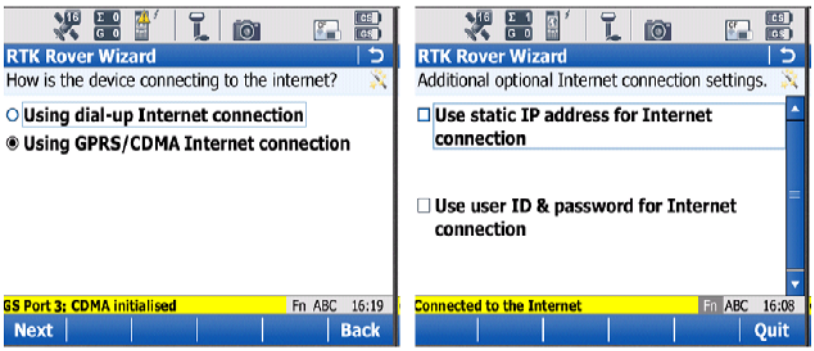
CS 10/15 and GS 10/15
Communication Connections

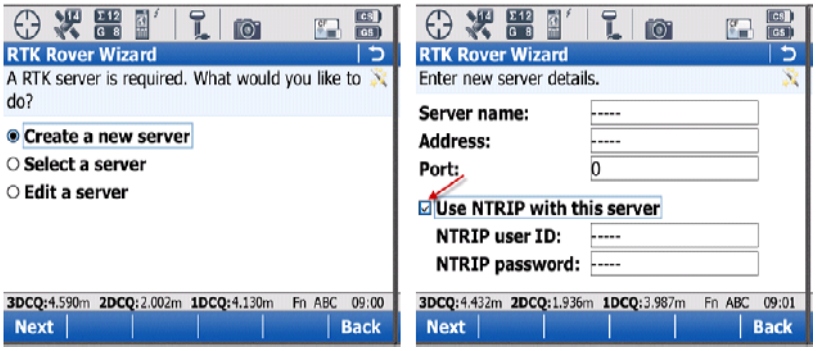
Procedure: GS15 SLC Modem via RTK Rover Wizard



Select the GPRS/CDMA Internet connection radio button Press F1 (Next)
Make sure that the GS Port 3: CDMA initialized message appears at the bottom of the screen before continuing to the next screen.

Unless a static IP address was purchased from the Internet Provider leave the "Use static IP address fro Internet connection" box unchecked. If there is a static IP address purchased, then select the top box enter the address. If there is a User ID and password are required by your Internet Provider select the second box and fill in the appropriate fields. Press F1 (Next)

After the pertinent information has been filled in the 'Connected to the Internet' should pop up. If this does not occur here, contact your modem service provider to verify the data plan is correct.



Once connected to the Internet, select the 'Create a new server' radio button and press F1 (Next)

You must enter the Server name, IP Address (Address: field) and Port for the server connection. If your network is utilizing a NTRIP caster protocol, select the 'Use NTRIP with this server' box and populate the required fields.

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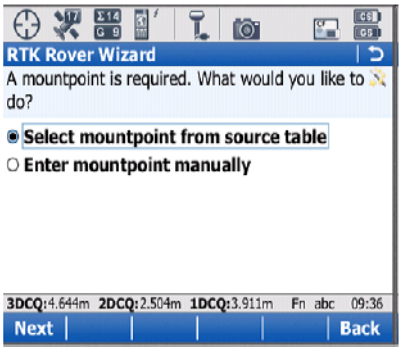
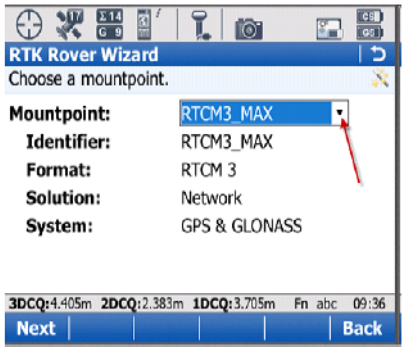
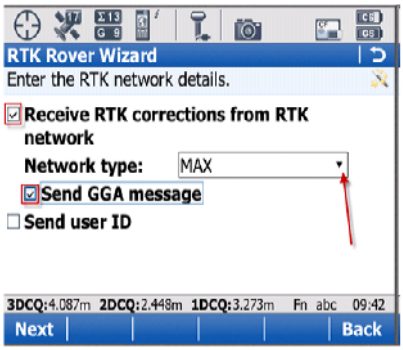
Procedure: GS15 SLC Modem via RTK Rover Wizard

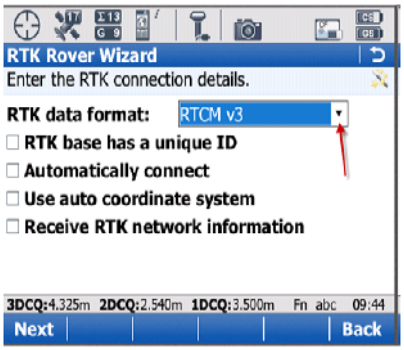




Select the 'Select mountpoint from source table' option and press F1 (Next)

From the pull-down (as pointed out with arrow in image), select the appropriate Mountpoint. Next, select F1 (Next)





network type the is for the mount point chosen in the previous step. Check the 'Send GGA message' box to send out the uncorrected position of the instrument to the network server. If user ID and password and/or password are needed, select the last box and fill in the appropriate information. Press F1 (Next)

Using the pull down, select which RTK correction format of data the instrument will receive from the network. Unless specified from your RTK Network Administrator, all other boxes should stay unchecked. Press F1 (Next)

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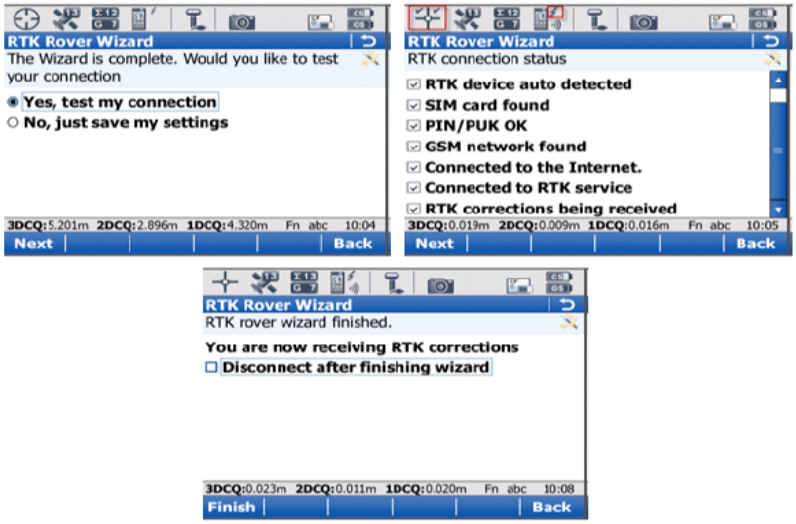
Procedure: GS15 SLC Modem via RTK Rover Wizard



Once the settings are all correct, select 'Yes, test my connections'. The following screen will give a visual of what the input settings will accomplish. If all items are checked the instrument will then proceed to get a fixed position (as indicated in the highlighted icon). The pulsating arrow pointing towards the instrument icon in the middle of the icon bar is also an indication that corrections are being received from the network.

With all complete, the choice of disconnecting the instrument from the network is given. Press F1 (Finish) to complete the RTK Rover Wizard.

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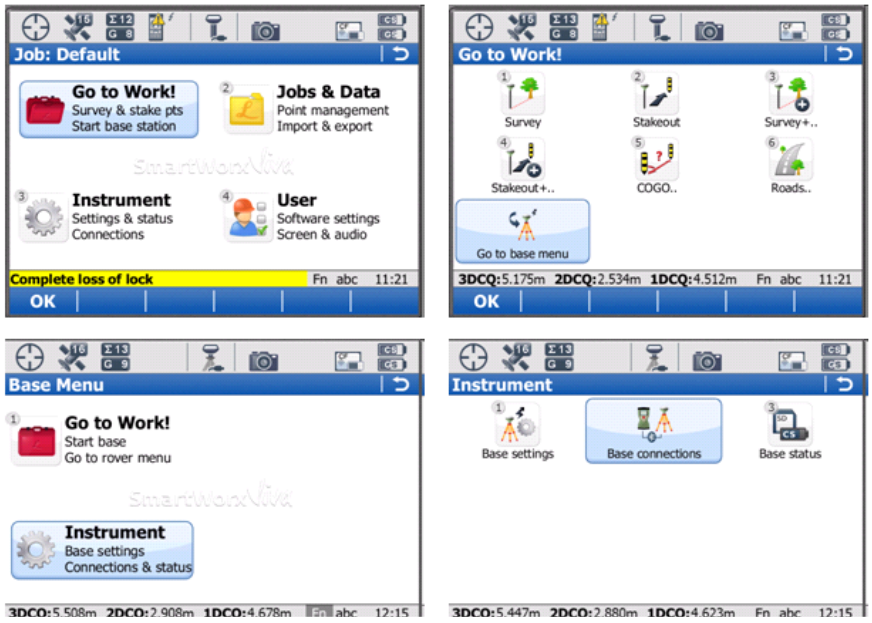
Method: GS15 PDL & SLR3 Base setup

The PDL and SLR3 ADL is a Pacific Crest radio offered in the SLR housing. The following demonstrates the procedure of setting up a base radio to transmit RTK corrections. It is assumed that before the user attempts to connect the base to a rover that the frequencies for each channel have been programmed. Please contact your salesperson to accomplish this.

A successful connection from the GS and CS is required by either by Bluetooth or cable.

Procedure: GS15 PDL & ADL Base setup



From the main menu in Smartworx, press 3 (Go to Work!), 7 (Go to base menu)
FROM THE BASE MAIN MENU: 3 (Instrument), 2 (Base connections)

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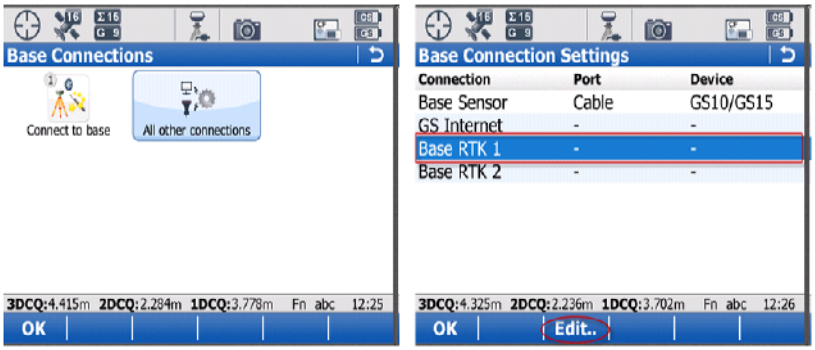
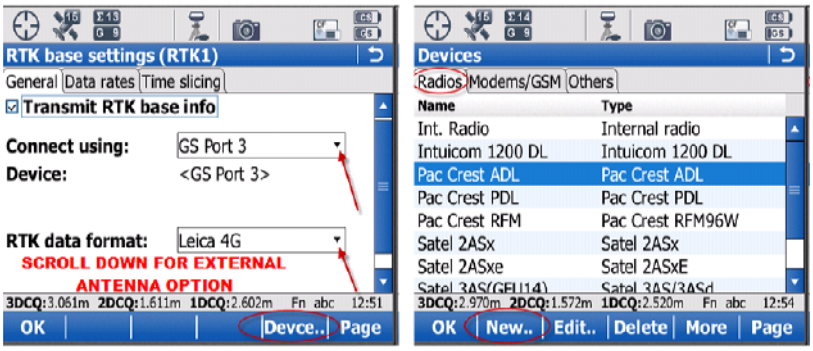
Communication Connections

Procedure: GS15 PDL & ADL Base setup



Select 2 (All other connections), Highlight the connection 'Base RTK 1' and press F3 (Edit)

ADL and PDL differences



At this point the differences between utilizing an ADL and a PDL radio as a base station will be discussed.

Check the box to Transmit RTK base info. From the drop down menu Select GS Port 3 if using an ADL or GS Port 2 if using a PDL radio connect to Port 2 via a cable. Select the desired RTK format… this format needs to be the same as on the rover. Scroll down to the bottom of the screen for the option of using the external antenna on the GS15. Press F5 (Devce..)

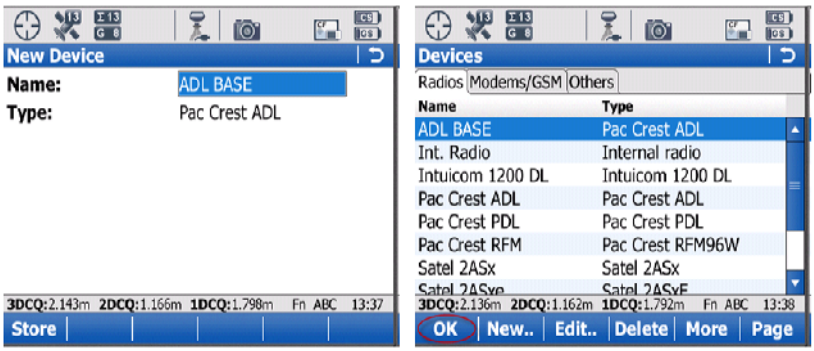
From the Radio tab select the correct radio.

If using the PDL or if the GS15 being used as a base has a separate CS controller being used with the base and rover highlight the appropriate Pac Crest PDL or Pac Crest ADL and press F1 (OK).

Continued on Next Page

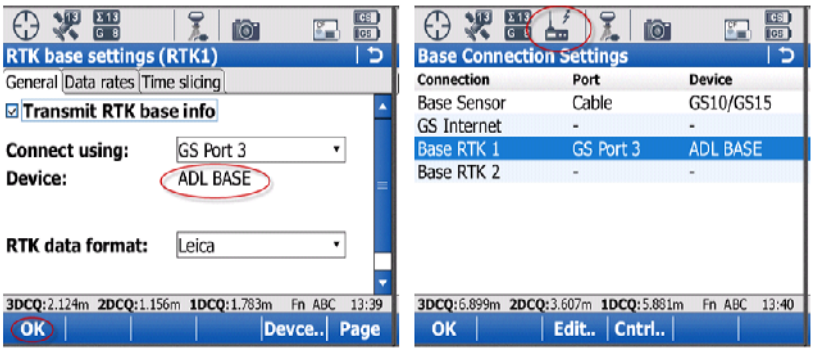
CS 10/15 and GS 10/15
Communication Connections

ADL Base and Rover with One CS unit



The same CS cannot have two devices running the same radio. So it is necessary to copy the Pac Crest ADL and name it different. If the user is using only one CS to operate both the Base and Rover and have ADL radios, highlight the Pac Crest ADL and select F2 (new). You need to create a new device for the base and you are now making a copy of the original ADL device listing. Give the new device a unique name such a “ADL Base” and save the new device by selecting F1 (Store)

Highlight the newly created Radio and press F1 (OK).



With the Device as the correct radio, Press F1 (OK).

As illustrated by the icon on the top bar, the radio will have an arrow pulsating out; indicating the radio is transmitting out a signal.

CS 10/15 and GS 10/15
Communication Connections

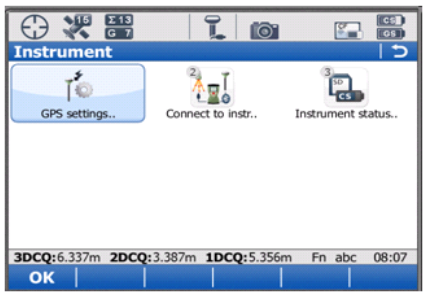
Method: GS15 SLR3 Rover via RTK Rover Wizard

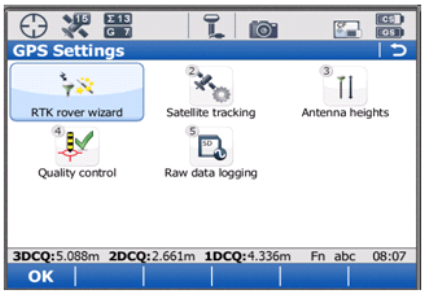
SLR3 ADL is the Pac Crest slot radio for the GS15. The following will go through the process of connecting the SLR3 in an RTK Rover GS15 with the RTK base. Please see the section covering base station setups. This guide assumes that the user has the correct frequencies programmed. Please contact a Leica salesperson for assistance.

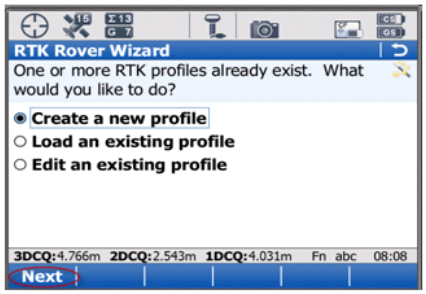
A successful connection from the GS and CS is required by either by Bluetooth or cable.

Procedure: GS15 SLR3 Rover via RTK Rover Wizard

From the Main menu of Smartworx go to 3 (Instrument), 1 (GPS settings..), 1 (RTK rover wizard), select the 'Create a new profile' radio button and press F1 (Next)



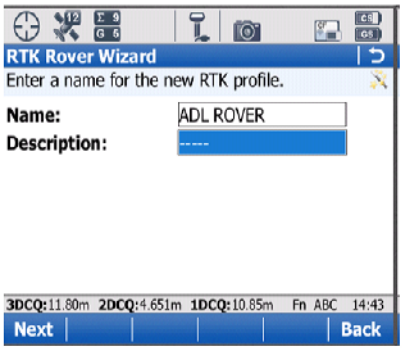


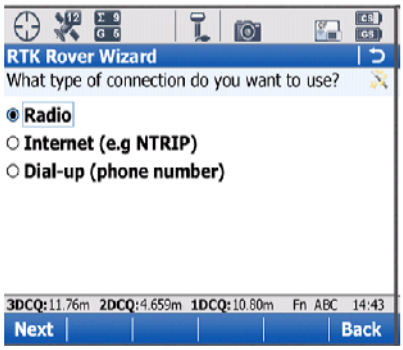


Continued on Next Page

CS 10/15 and GS 10/15
Communication Connections

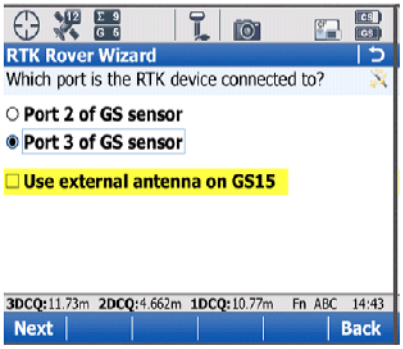
Procedure: GS15 SLR3 Rover via RTK Rover Wizard

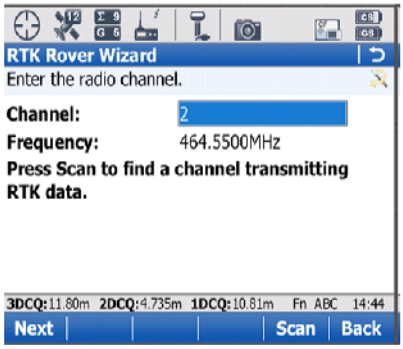




Name the RTK Profile

Starting in the Wizard, Select Radio and press F1 (Next)





Select 'Port 3 of GS sensor' … The SL devices are always Port 3 on the GS15. If an external antenna is to being used on the GS 15, the box "Use external antennae on GS15 must be selected. Press F1 (Next).

Note: If the antenna is attached and this is not checked the system will not actual physically switch to the use of the external antennae. In reverse if the this box is checked and the external antenna is mounted on the GS15 the RX signal will be extremely weak.

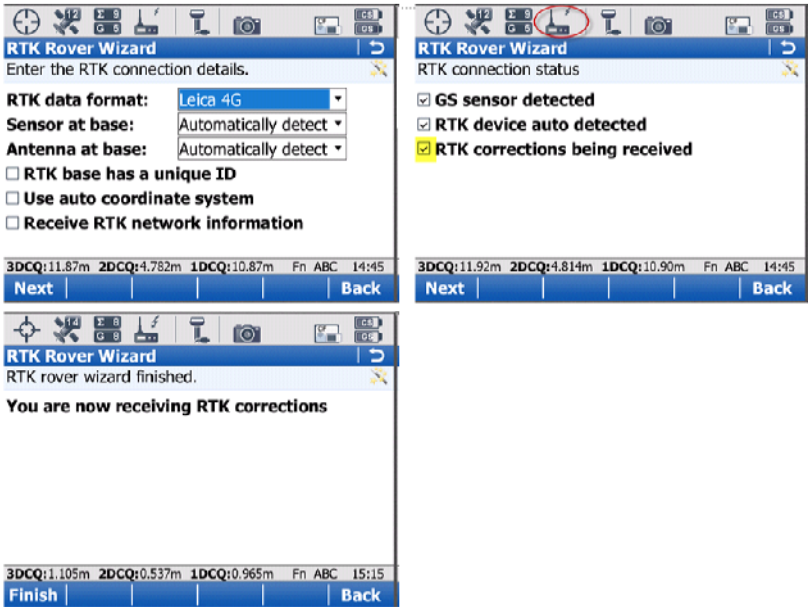
The Rover Wizard will automatically detect the ADL and the currect channel that is set in the radio. To scan for other signals that maybe transmitting in the work area on this frequency the user can selct the F5 (Scan) option to check if the is surrounding radio traffic.

Press F1 (Next)

Continued on Next Page

CS 10/15 and GS 10/15
Communication Connections

Procedure: GS15 SLR3 Rover via RTK Rover Wizard



Select the RTK data format that the Base Station is transmitting.

When using a Leica receiver as the RTK base station, leave the Sensor at base: and Antenna at base: fields as 'Automatically detect'. Otherwise, select the type of Sensor and Antenna of the RTK base being received by choosing from the selections in these fields.

Press F1 (Next)

The Instrument will check off what the current settings will accomplish. The icon on the top of the radio will also have an arrow pointing down and will be pulsating at the rate of receiving corrections from the base. Press F1 (Next)

Once the wizard is finished, Press F1 (Finish).

Continued on Next Page

CS 10/15 and GS 10/15
Communication Connections

Method: Bluetooth connection via GSM cellular phone to CS10/15

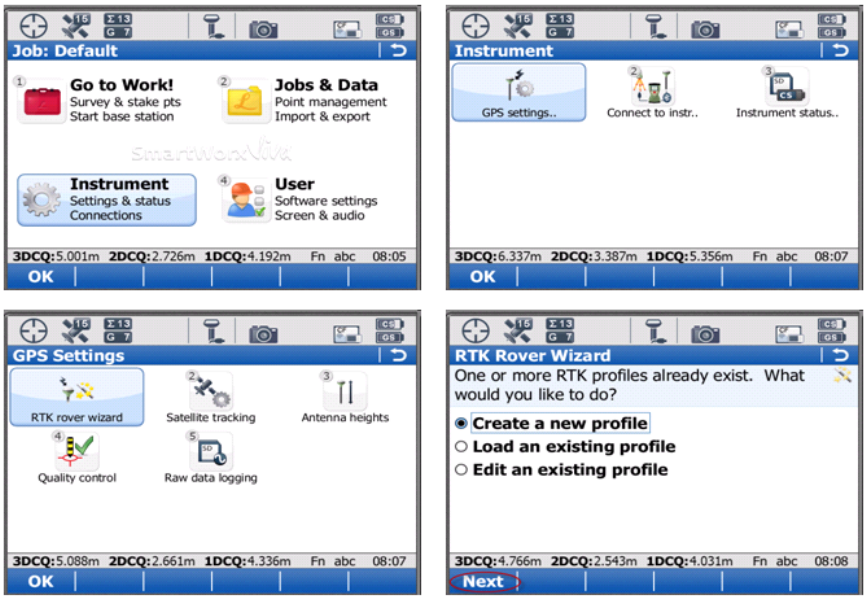
With this method, a cellular phone must have a data plan that allows the phone to connect to the internet. More importantly, the Bluetooth capabilities of the phone MUST allow the phone to be the slave in the connection process. Phones that do not allow itself to do this will not work; i.e. I-phones, droids, blackberries (without a tethering option) or any 'smartphone'. Please contact your service provider to inquire if your phone allows Bluetooth tethering for data transfer through an internet connection.

This method will demonstrate the typical steps to connect the Field Controller to the internet via a Bluetooth connection to a GSM phone. Once connected to the internet, additional steps will be illustrated to connect the instrument to the Smartnet server and receive corrected positions.

A successful connection from the GS and CS is required by either by Bluetooth or cable.

Procedure: Bluetooth connection via GSM cellular phone to CS10/15

From the Main menu of Smartworx go to 3 (Instrument), 1 (GPS settings..), 1 (RTK rover wizard), select the 'Create a new profile' radio button and press F1 (Next)



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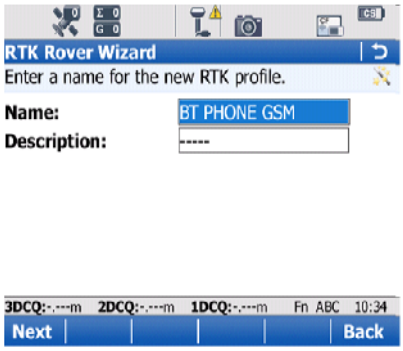
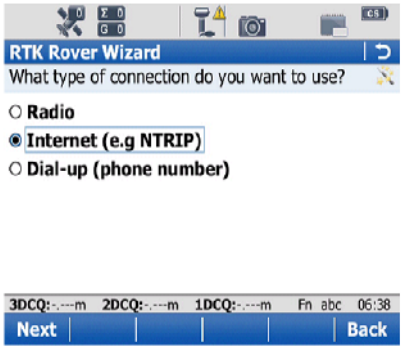
CS 10/15 and GS 10/15
Communication Connections

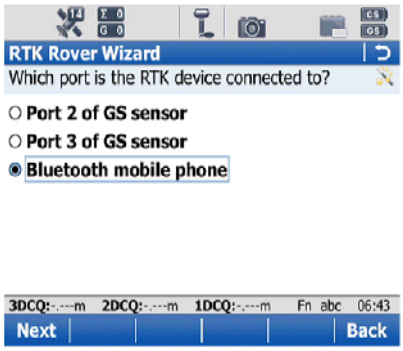
Procedure: Bluetooth connection via GSM cellular phone to CS10/15

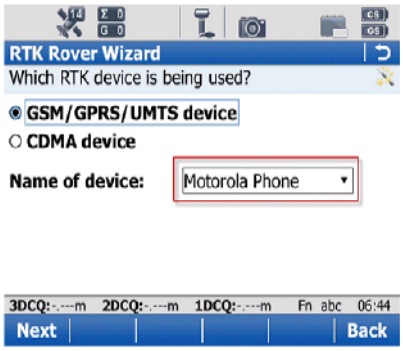




Enter in a name for the Profile and Press F1 (Next)

Select the 'Internet (e.g. NTRIP)' radio button. Press F1 (Next)





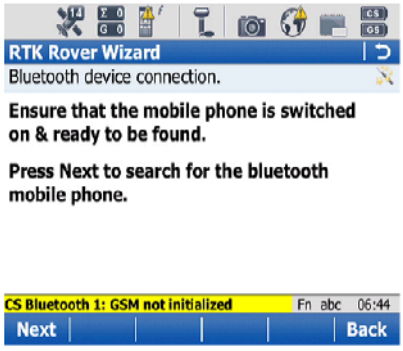
Select the 'Bluetooth mobile phone' radio button and Press F1 (Next)

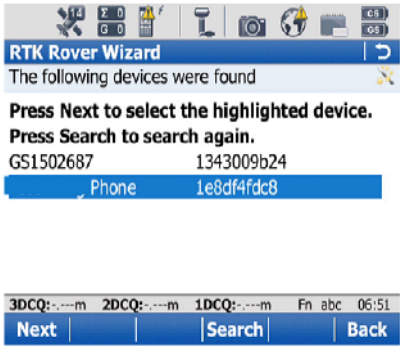
Select the 'GSM/GPRS/UMTS device' radio button and choose the device which is to be used. Press F1 (Next)

Continued on Next Page

CS 10/15 and GS 10/15
Communication Connections

Procedure: Bluetooth connection via GSM cellular phone to CS10/15

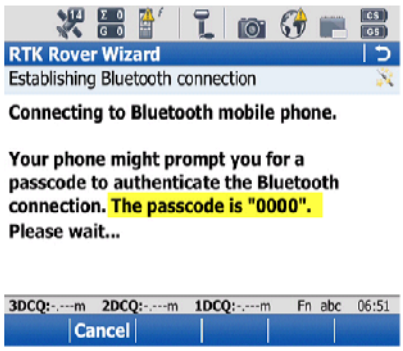


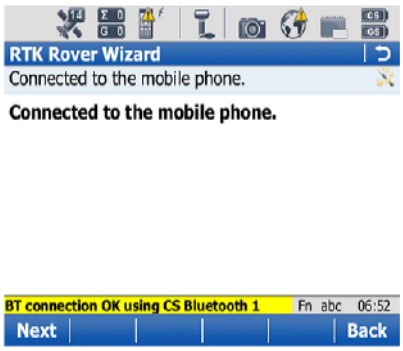


With the Bluetooth turned on in the cell phone, take the necessary to enable the phone to be Bluetooth discoverable. Once that is accomplished, Press F1 (Next). The CS will now perform a Bluetooth search to find available devices.

After the search is completed the CS instrument will display which devices were found. Select the correct device and Press F1 (Next).

Note: If there is more Bluetooth devices available then what the screen can display, the cell phone may not show up. If this is the case, isolate the number of devices and search again.





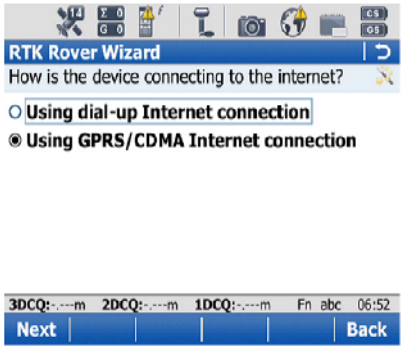
The phone should ask for permission to Bond with the CS and will prompt for a passcode . This is simply 0000 (four zeros) which is given on screen in the CS instructions. Input the passcode onto the phone. Press F1 (Next) on the CS.

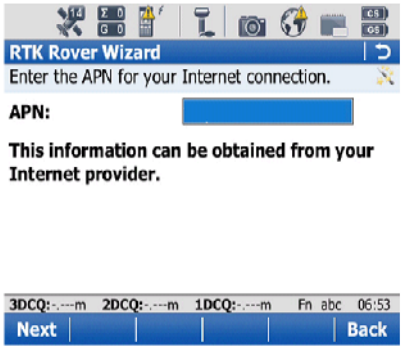
Once the phone and the instrument has bonded, the screen will indicate so; as well as a message to pop up at the bottom of the screen. When this occurs, press F1 (Next).

Continued on Next Page

CS 10/15 and GS 10/15
Communication Connections

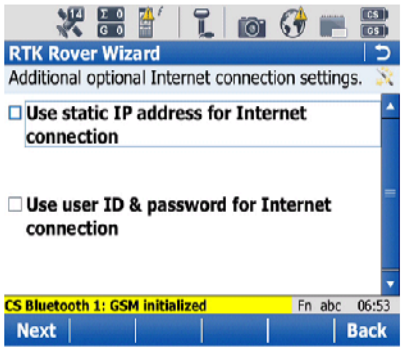
Procedure: Bluetooth connection via GSM cellular phone to CS10/15

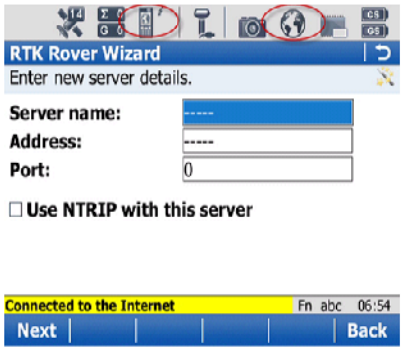




Select the 'Using GPRS/CDMA Internet connection' Radio Button.

Enter in the GSM carrier APN: (Access Point Name) This information is obtained from your salesperson and is different for each provider. A form is available at the end of this guide to list all of the pertinent information regarding your connections. Select F1 (Next).





Unless a static IP address was purchased from the Internet Provider leave the "Use static IP address for Internet connection" box unchecked. If there is a static IP address purchased, then select the top box enter the address. If there is a User ID and password are required by your Internet Provider select the second box and fill in the appropriate fields. Press F1 (Next)

The bottom of the screen will post a message stating that the instrument in connected to the Internet. The icons on the top of the screen (World and Instrument) will also indicate that the instrument is connected to the internet by removing the yellow yields signs. Press F1 (Next).

Enter in all pertinent information, Press the 'Use NTRIP with this server' box and populate the required fields.

Once connected to the Internet, select the 'Create a new server' radio button and press F1 (Next)

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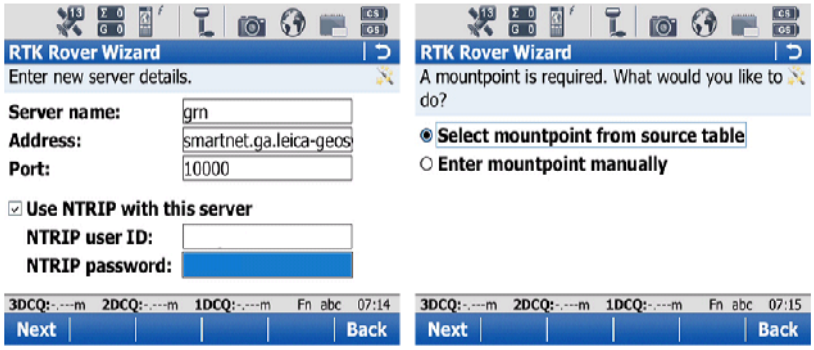
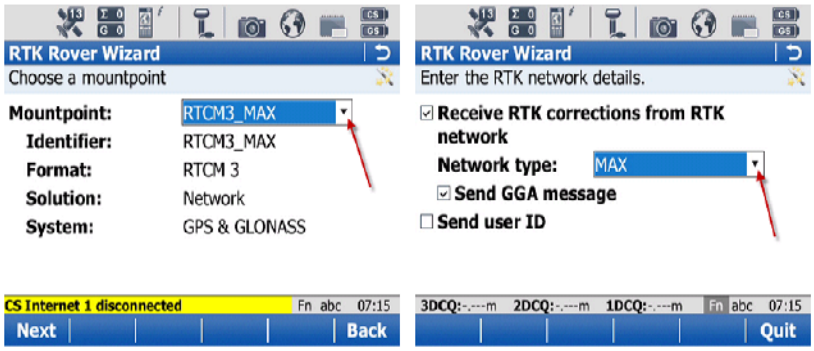
CS 10/15 and GS 10/15
Communication Connections

Procedure: Bluetooth connection via GSM cellular phone to CS10/15



You must enter the Server name, IP Address (Address: field) and Port for the server connection. If your network is utilizing a NTRIP caster protocol, select the 'Use NTRIP with this server' box and populate the required fields. Press F1 (Next).

Choose the 'Select mountpoint from source table' radio button. Press F1 (Next).



From the pulldown (as pointed out with arrow), select the appropriate mountpoint.
Press F1 (Next)

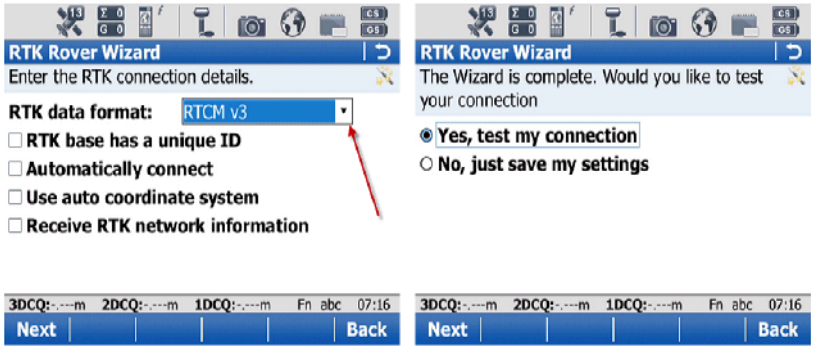
Check the top box to receive correction from the network. Use the drop down to select the network type the instrument will be used in.

Check the 'Send GGA message' box to send out the uncorrected position of the instrument to the network server. If user ID and password and/or password are needed, select the last box and fill in the appropriate information. Press F1 (Next)

Continued on Next Page

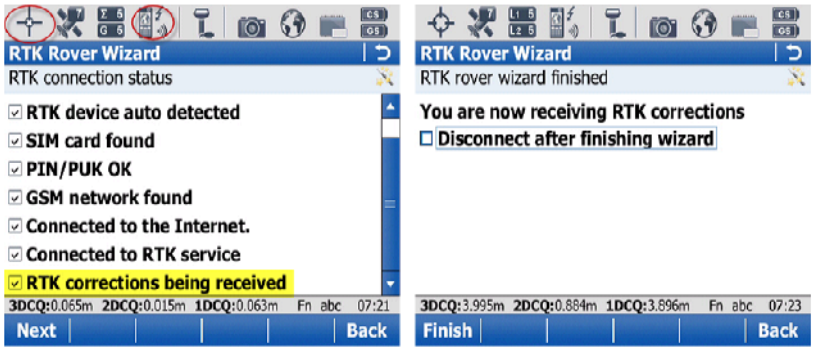
CS 10/15 and GS 10/15
Communication Connections

Procedure: Bluetooth connection via GSM cellular phone to CS10/15



Using the pull down, select which format of data the instrument is to receive. Unless specified from your RTK Network Administrator, all other boxes should stay unchecked. Press F1 (Next)

Once the settings are all correct, select Yes, test my connections'.



The following screen will give a visual of what the input settings will accomplish. If all items are checked the instrument will then proceed to get a fixed position (as indicated in the highlighted icon). The pulsating arrow pointing in towards the instrument icon is also an indication that corrections are being received from the network.

With all complete, the choice of disconnecting the instrument from the network is given. Press F1 (Finish) to complete the RTK Rover Wizard.

CS 10/15 and GS 10/15
Communication Connections

Method: Bluetooth connection via CDMA cellular phone to CS10/15

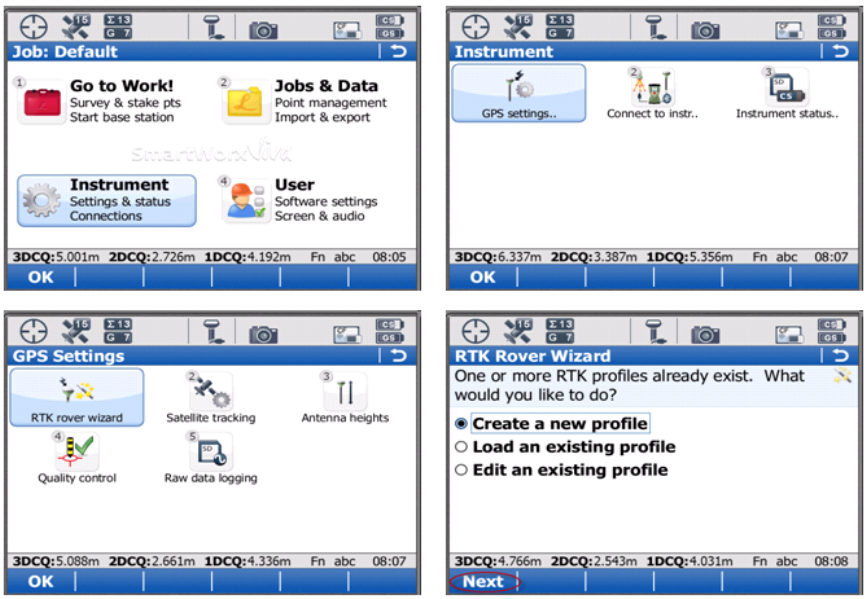
With this method, a cellular phone must have a data plan that allows the phone to connect to the internet. More importantly, the Bluetooth capabilities of the phone MUST allow the phone to be the slave in the connection process. Phones that do not allow itself to do this will not work; i.e. I-phones, droids, blackberries (without a tethering option) or any 'smartphone'. Please contact your service provider to inquire if your phone allows Bluetooth tethering for data transfer through an internet connection.

This method will demonstrate the typical steps to connect the Field Controller to the internet via a Bluetooth connection to a CDMA phone. Once connected to the internet, additional steps will be illustrated to connect the instrument to the Smartnet server and receive corrected positions.

A successful connection from the GS and CS is required by either by Bluetooth or cable..

Procedure: Bluetooth connection via CDMA cellular phone to CS10/15

From the Main menu of Smartworx go to 3 (Instrument), 1 (GPS settings..), 1 (RTK rover wizard), select the 'Create a new profile' radio button and press F1 (Next)



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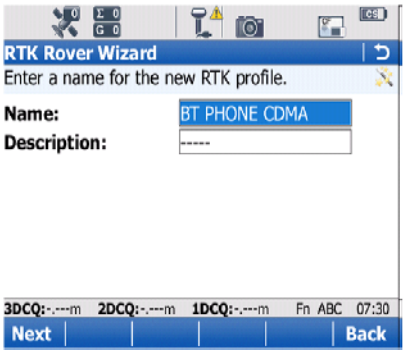
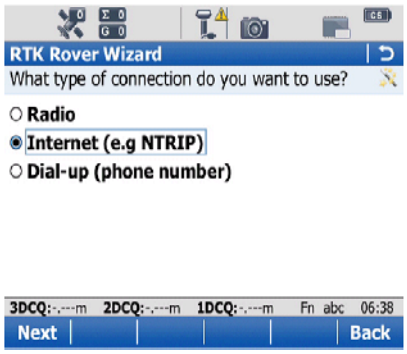
CS 10/15 and GS 10/15
Communication Connections

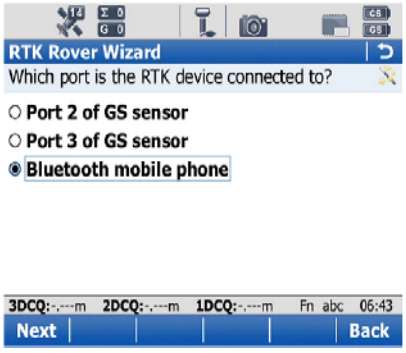
Procedure: Bluetooth connection via CDMA cellular phone to CS10/15

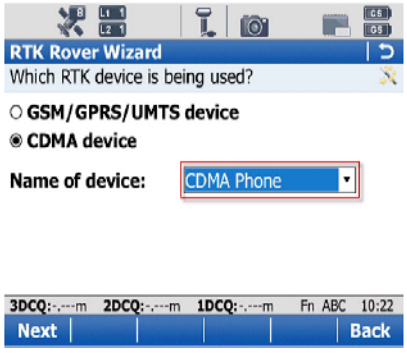




Enter in a name for the Profile and Press F1 (Next)

Select the 'Internet (e.g. NTRIP)' radio button. Press F1 (Next)





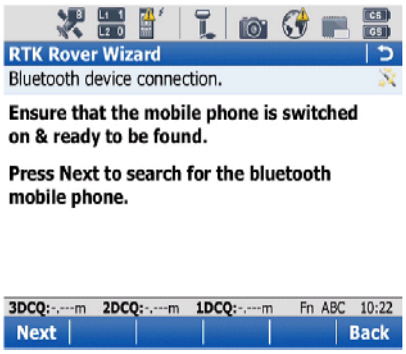
Select the 'Bluetooth mobile phone' radio button and Press F1 (Next)

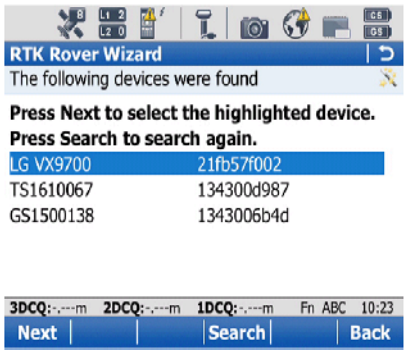
Select the 'CDMA device' radio button and choose the device which is to be used. Press F1 (Next)

Continued on Next Page

CS 10/15 and GS 10/15
Communication Connections

Procedure: Bluetooth connection via CDMA cellular phone to CS10/15

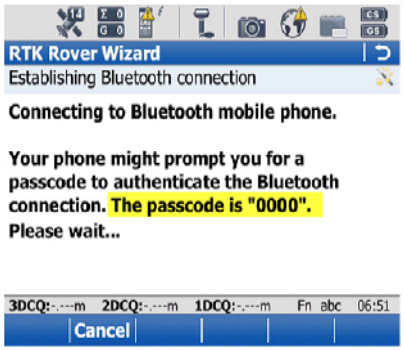


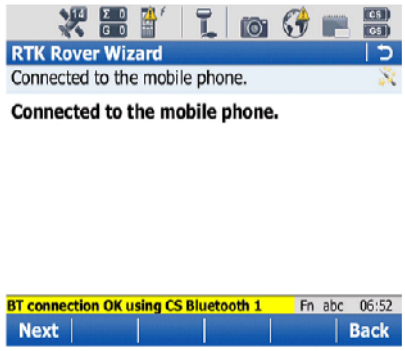


With the Bluetooth turned on in the cell phone, take the necessary steps to enable the phone to be Bluetooth discoverable. Once that is accomplished, Press F1 (Next). The CS will now perform a Bluetooth search to find available devices.

After the search is completed the CS instrument will display which devices were found. Select the correct device and Press F1 (Next).

Note: If there is more Bluetooth devices available then what the screen can display, the cell phone may not show up. If this is the case, isolate the number of devices and search again.





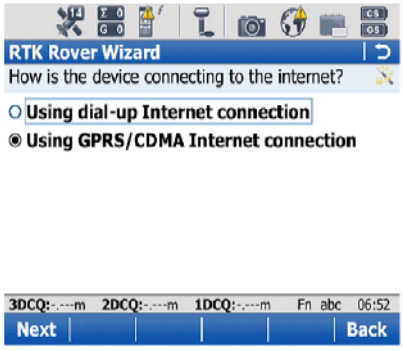
The phone should ask for permission to Bond with the CS and will prompt for a passcode . This is simply 0000 (four zeros) which is given on screen in the CS instructions. Input the passcode onto the phone. Press F1 (Next) on the CS.

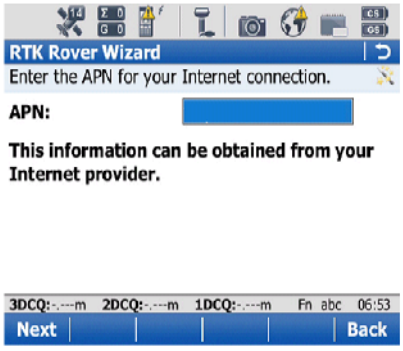
Once the phone and the instrument has bonded, the screen will indicate so; as well as a message to pop up at the bottom of the screen. When this occurs, press F1 (Next).

Continued on Next Page

CS 10/15 and GS 10/15
Communication Connections

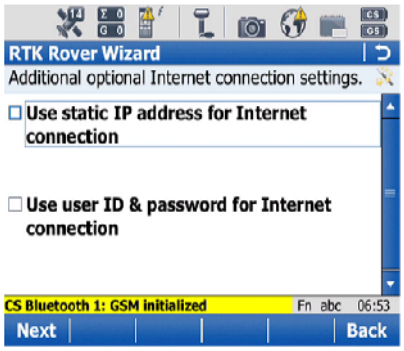
Procedure: Bluetooth connection via CDMA cellular phone to CS10/15

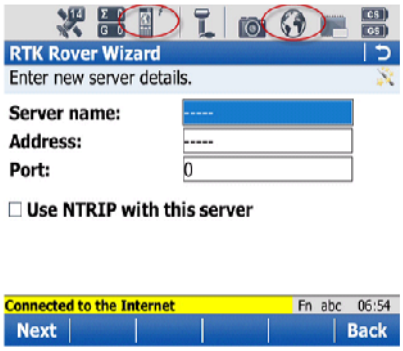




Select the 'Using GPRS/CDMA Internet connection' Radio Button. Select F1 (Next)

There is NO APN for a CDMA phone. Bypass the screen. Press F1 (Next).





Unless a static IP address was purchased from the Internet Provider leave the "Use static IP address fro Internet connection" box unchecked. If there is a static IP address purchased, then select the top box enter the address. If there is a User ID and password are required by your Internet Provider select the second box and fill in the appropriate fields. Press F1 (Next)

The bottom of the screen will post a message stating that the instrument in connected to the Internet. The icons on the top of the screen (World and Instrument) will also indicate that the instrument is connected to the internet by removing the yellow yields signs. Press F1 (Next).

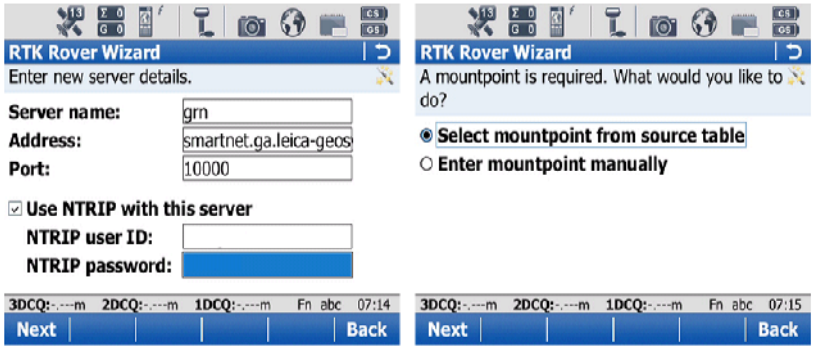
Enter in all pertinent information, Press the 'Use NTRIP with this server' box and populate the required fields.

Once connected to the Internet, select the 'Create a new server' radio button and press F1 (Next)

Continued on Next Page

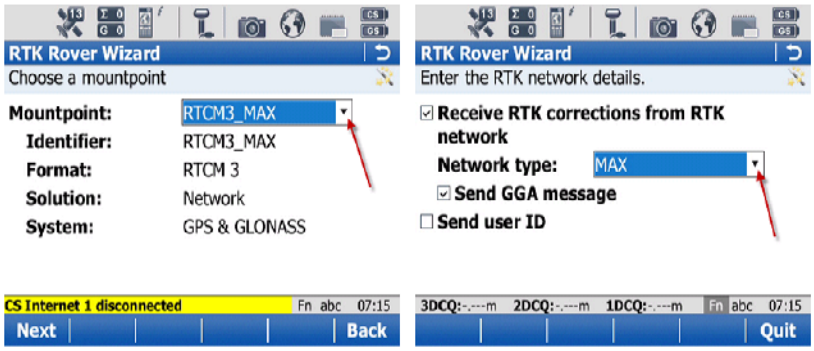
CS 10/15 and GS 10/15
Communication Connections

Procedure: Bluetooth connection via CDMA cellular phone to CS10/15



You must enter the Server name, IP Address (Address: field) and Port for the server connection. If your network is utilizing a NTRIP caster protocol, select the 'Use NTRIP with this server' box and populate the required fields. Press F1 (Next).

Choose the 'Select mountpoint from source table' radio button. Press F1 (Next).



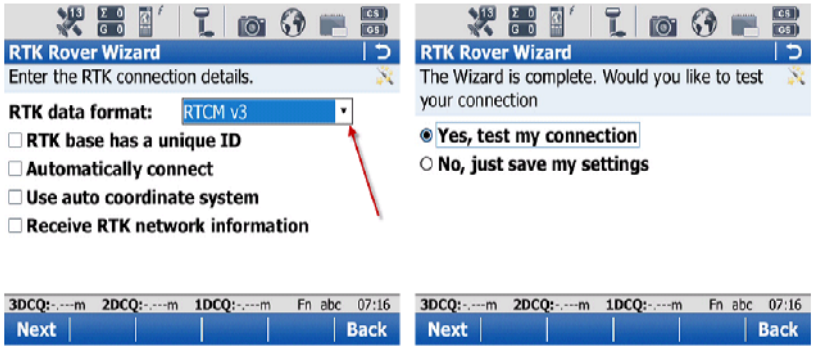
From the pulldown (as pointed out with arrow), select the appropriate mountpoint.
Press F1 (Next)

Check the top box to receive correction from the network. Use the drop down to select the network type the instrument will be used in.

Check the 'Send GGA message' box to send out the uncorrected position of the instrument to the network server. If user ID and password and/or password are needed, select the last box and fill in the appropriate information. Press F1 (Next)

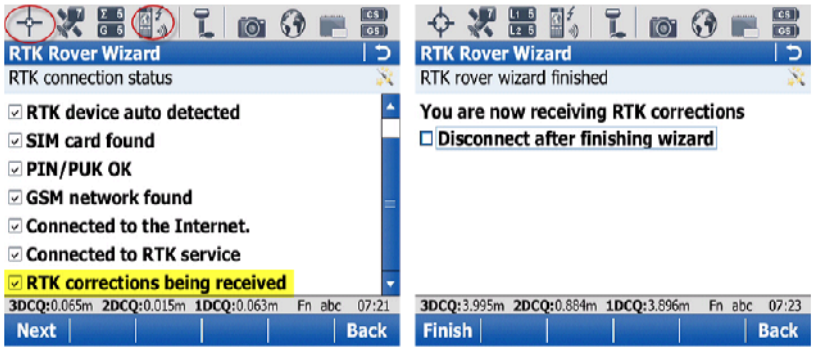
Continued on Next Page

CS 10/15 and GS 10/15
Communication Connections



Using the pull down, select which format of data the instrument is to receive. Unless specified from your RTK Network Administrator, all other boxes should stay unchecked. Press F1 (Next)

Once the settings are all correct, select Yes, test my connections'.



The following screen will give a visual of what the input settings will accomplish. If all items are checked the instrument will then proceed to get a fixed position (as indicated in the highlighted icon). The pulsating arrow pointing in towards the instrument icon is also an indication that corrections are being received from the network.

With all complete, the choice of disconnecting the instrument from the network is given. Press F1 (Finish) to complete the RTK Rover Wizard.

CS 10/15 and GS 10/15
Communication Connections

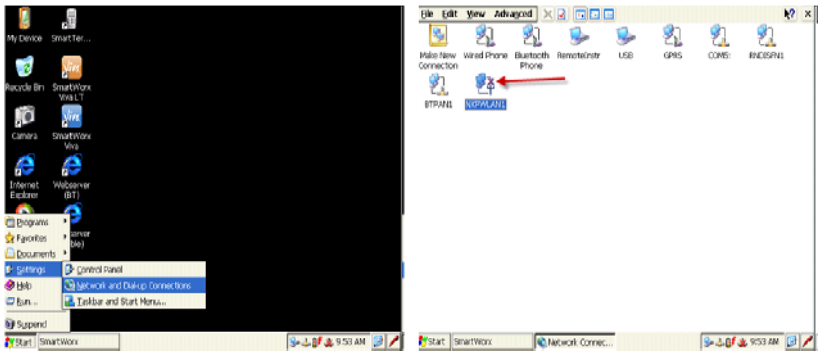
Method: Wi-Fi connection via CS 10/15

With this method, you must have a model of the CS controller that has the Wi-Fi option.

The following section will demonstrate the typical steps to connect the Field Controller to the internet via a Wi-Fi connection. Once connected to the internet, additional steps will be illustrated to connect the instrument to the Smartnet server and receive corrected positions.

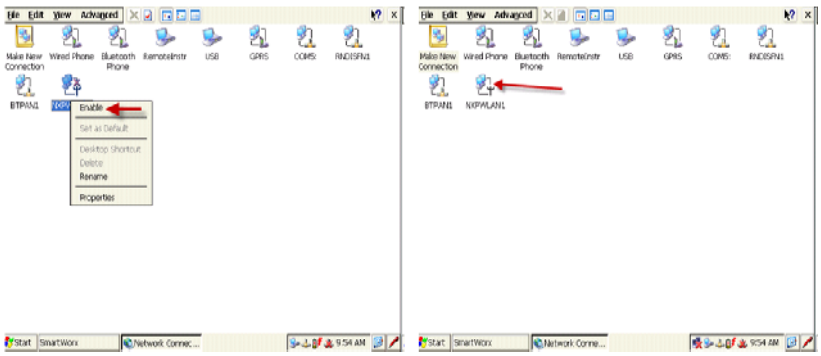
A successful connection from the GS and CS is required by either by Bluetooth or cable.

Procedure: Wi-Fi connection via CS 10/15



From the Desktop of the controller, go to Start > Settings > Network and Dial-up Connections.

In the Network Connections screen, the NXPWLAN1 icon is displayed. If there is a red "X" displayed on this icon the wireless radio is not currently powered on.



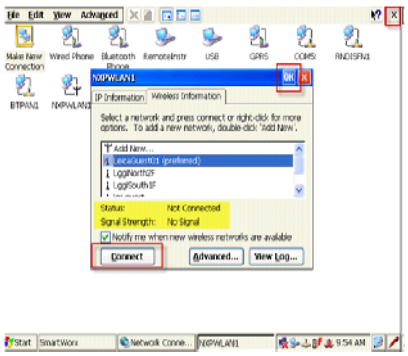
To activate the radio, tap and hold the stylus on the NXPWLAN1 icon to bring up the choice list. Tap on 'Enable' option and this menu will close. This will effectively turn on the wireless radio.

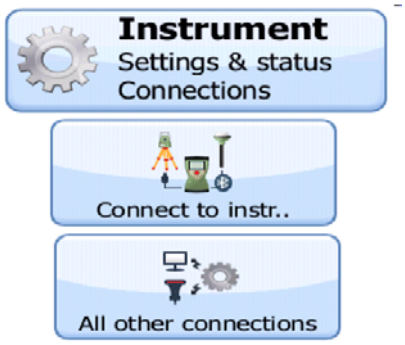
This can visually be noticed by the removal of the red "X" on the icon.

Continued on Next Page

CS 10/15 and GS 10/15
Communication Connections

Procedure: Wi-Fi connection via CS 10/15



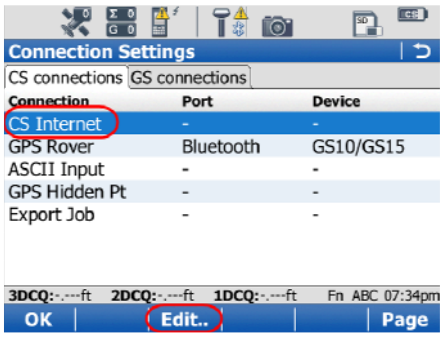


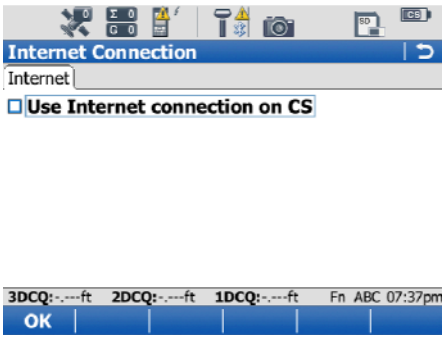
With the radio turned on, the NXPWLAN1 window will pop up along with the list of wireless network. Select the wireless network of your choice and press 'Connect'. Once connected the status filed will display "connected" and will display the signal strength of the connection.

After successfully connected to the Wi-Fi network, press the 'OK' button on the top-right of the window and close out the Network Connection window. Start Viva SmartWorx.

From the main menu of SmartWorx, select "Instrument", then "Connect to instr…", and finally choose "All other connections."

In the CS Connection page highlight the CS Internet option and select F3 (edit). Once in the Internet Connection screen make sure that the "Use Internet connection on CS" is not selected. Next, choose F1 (OK).





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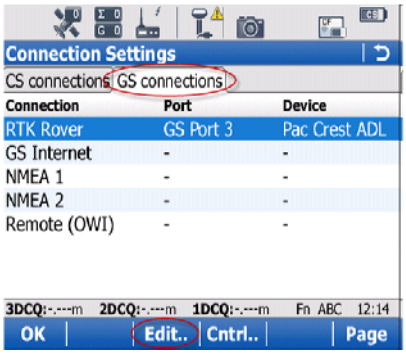
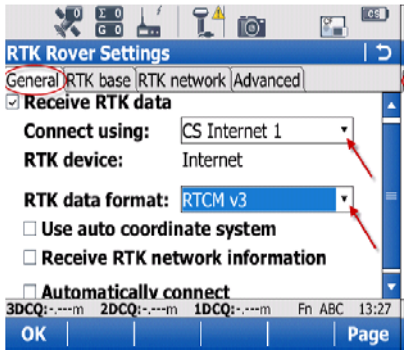
CS 10/15 and GS 10/15
Communication Connections

Procedure: Wi-Fi connection via CS 10/15

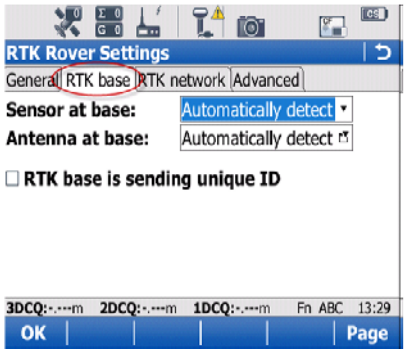


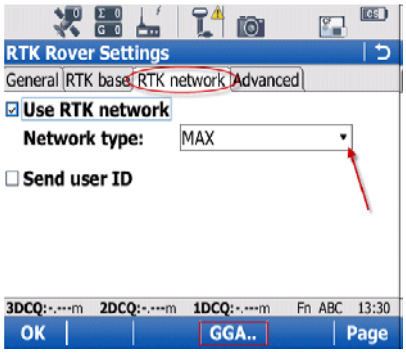


On the GS Connections tab, Highlight the RTK Rover Interface and press F3 (Edit..)

From the General Tab, check the 'Receive RTK data'. In the 'Connect using' field, tap the arrow and select CS Internet 1. Select the RTK data format, use the pull down to see choices.

Press the F6 (Page)





Under the RTK Base Tab select 'Automatically detect' for both the Sensor and Antenna at base. Press F6 (Page)

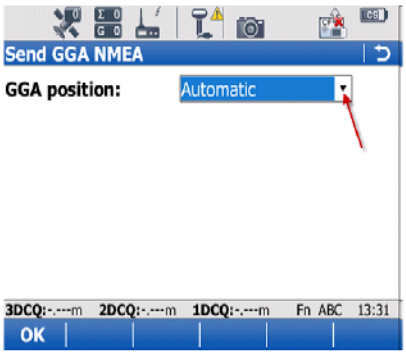
In the RTK Network tab, select the "Use RTK network' box and use the pulldown to select the network type.

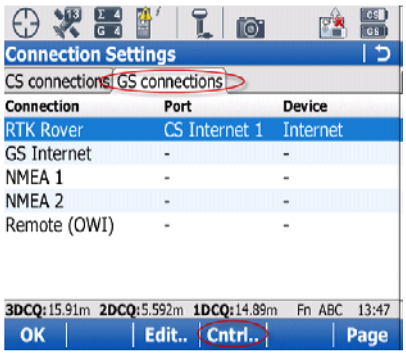
Press F4 (GGA)

Continued on Next Page

CS 10/15 and GS 10/15
Communication Connections

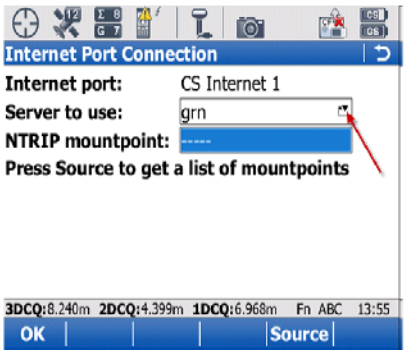
Procedure: Wi-Fi connection via CS 10/15

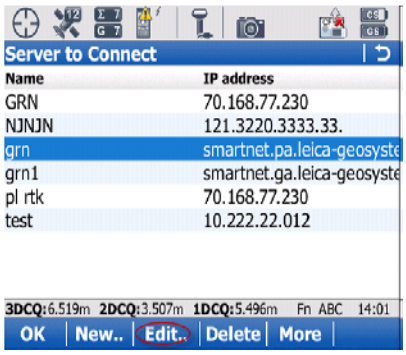




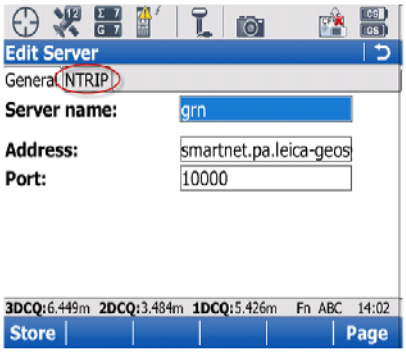
In the GGA page select 'Automatic' to send your uncorrected position to the network server. Press F1(OK)

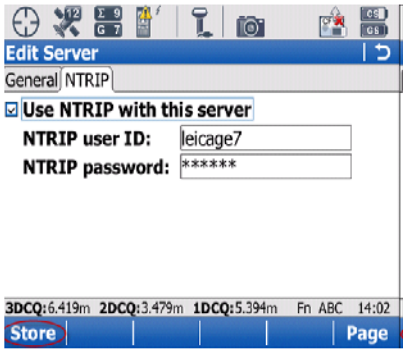
Press F1 (OK) again. Once you are back in the Connection Settings page, Press F4 (Cntrl..)





Under the Internet Port Connection page, use the pull-down to view the server choices. Highlight the server you wish to connect to and press F3 (Edit..)





With correct server connection information in their respective fields, Press F6 (Page) to use and enter the NTRIP User name and password. Press F1 (Store)

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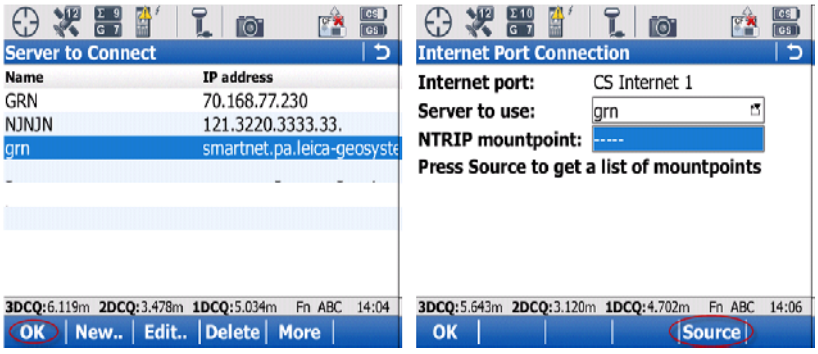
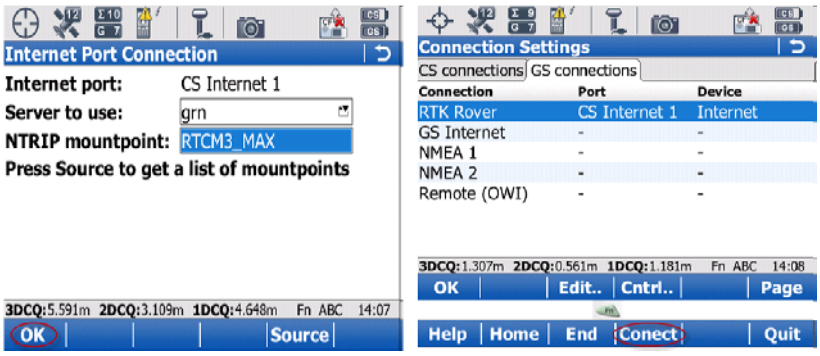
CS 10/15 and GS 10/15
Communication Connections

Procedure: Wi-Fi connection via CS 10/15



Highlight the Server to connect to again and Press F1(OK)

To choose a NTRIP mountpoint, Press F5 (Source)



With the correct NTRIP mountpoint selected Press F1 (OK)

Back in the Connection Settings screen Highlight the RTK Rover interface and press the green <Function> key. On F4 the option (Conect) will appear that allows you to initialize the connection to the RTK Network server. Press F4 (Connect) key to start the connection to the network.

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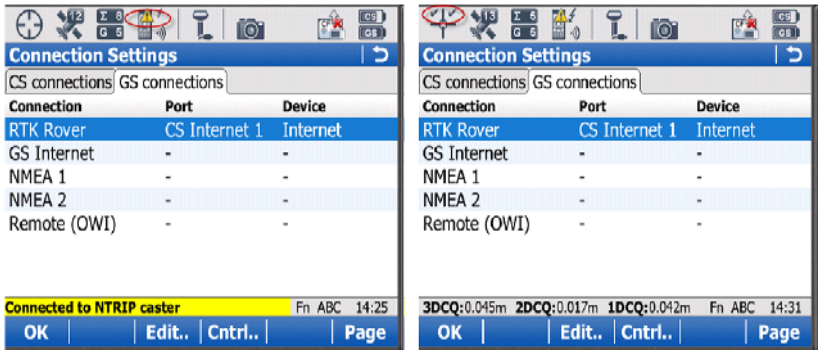
CS 10/15 and GS 10/15
Communication Connections

Procedure: Wi-Fi connection via CS 10/15



Once connected, the instrument will indicate that there was a successful connection to the NTRIP caster.

Note: Although the instrument is indeed connected to the internet and is receiving a network correction from the SmartNet Server, the icon on the top will not indicate that the instrument is connected. Ignore this icon, a visual check in this screen will be that the arrow next to the cell phone icon is pulsating down, the signal waves are present next to the cell phone and the Smartcheck indicates that the instrument has a fixed position.

Press F1 (OK) to return to the main menu.
