The Leica GS sensors models (GS14, 16, 18(t/i)) are typically equipped with an internal modem/UHF radio for RTK Rover and RTK Base usage.   This guide covers the internal UHF radio RTK Base/Rover connectivity.

For UHF RTK Rover or Base usage external radio modems can be connected as well. The UHF modem requires an external antenna. (e.*g. GAT28* UHF radio antenna for GS18 (frequency range 403-473 MHz), GAT2 for GS14/16)

Setting up the base

1. Turn on the base sensor & ensure the radio antenna is connected to the GS sensor.
2. In Captivate, select 'Switch to base' to activate the base station menu.
3. If no Bluetooth connection is established with the base antenna, go to 'settings' -> 'Connections' -> 'Connect to base' and run through the wizard to connect to the GS sensor
4. From the base main menu go to 'Settings' –> 'Connections' -> 'All other connections' then highlight 'GS internet' and press F3/Edit
    a. Uncheck 'Use Internet connection on GS'

5. Highlight 'Base RTK 1' then press F3/EDIT. Check the box that says 'Transmit RTK Base info'
    a. Set the 'connect using' to **'GS radio'**
    b. Set Device by selecting F5 <Device>
        • For GS14 select *Satel OEM22 (M3-TR3*)
        • For G16/18i,t select Satel M3-TR4, TR4, or TR4+
        *Note: ensure that type: <GS radio> is **NOT** selected as the device option.*
    c. Set 'RTK data format' as '*RTCM v3 (MSM)'*, (leave *Apply antenna correction to RTK data stream* unchecked)
    d. Page/F6 to Data rates and change the *Message type* to '**Extended**'. Make note of RTK base ID. Then press OK.

6. Press F4/Control (Radio Settings).
    a. Set 'Channel' to a desirable channel '1, 2, etc. ', *NOTE: Please make note of the actual frequency which will be displayed*
    b. Set 'Radio protocol' to '**Satel 4-FSK**' with **FEC on.**
    c. Press OK twice to return to the main menu.

7. Set up the base station using normal procedure (any position, known point, or last point)
8. You should notice the UHF icon in the status bar with an arrow pulsing upwards, and also a flashing on the BASE upward LED.

Setting up the rover

1. Ensure that any rover GS sensor used is turned on, and the radio antenna is connected to the GS sensor.
2. From the main menu, select 'Switch to rover'
3. If no Bluetooth connection to the rover GS is present, go to 'Settings' -> 'Connections' -> 'GS connect wizard' and follow the prompts for the Bluetooth connection.
4. Go to 'Settings' -> 'Connections' -> 'All other connections', then select the 'GS connections' tab, highlight 'RTK rover', then press F3/Edit, and then check the box 'Receive RTK data'. Also set the following fields.
    a. 'Connect using' as '**GS radio**'
    a. Set RTK Device by selecting *F5/Device.*
        • For GS14 select *Satel OEM22 or 20 (M3-TR3*)
        • For G16/18i,t select Satel M3-TR4, TR4, or TR4+
        Note: ensure that type: <GS radio> is not selected as the device option.
        Note: If message pops up "This is device is already being used…", press OK, high a device, and press F2/New, and enter a Name that is unique and press STORE, and then OK to pick the device.
    b. Set 'RTK data format' as '**RTCM v3'** (or matches what was set up in step *5c)*
    c. All three boxes below should be left unchecked.

5. Select the 'RTK base' tab, and ensure that 'Automatically detect' is used for the fields, and unique ID is unchecked. (Or is matched by BASE ID set in step *5d*)
6. Select the 'RTK network' tab and ensure that all boxes are unchecked, then press OK.

7. Press F4/Control to review the Radio Settings:
   a. Set 'Channel' to a desirable channel '1, 2,etc. ', *NOTE: The Channel and Actual frequency should match what was set up in step 6a.*
   b. Set 'Radio protocol' to 'Satel 4-FSK' with FEC on.
   c. Press OK twice to return to the main menu.

8. You should notice the UHF icon at the top has a downward flashing lightning bolt, which should match the GS sensor download lightning LED.

PLEASE NOTE:

The above radio settings are configured to recommended defaults that we use/test in most typical cases. However, there are other options have can be selected that can affect communication range and performance.

Radio protocols are selected in the **Radio Settings** panel (same panel as where the radio channel is selected)

There are many factors which play a role in transmitting and receiving data between digital radios. (e.g. Height of base radio antenna above the surface, Forward Error Correction (FEC), Output power (Tx)…and much more)

NOTE: All Radio Settings (radio protocol, FEC) must be identical on the transmitting and receiving radio to communicate with each other.

For more information on UHF Radio communication, please visit support.stpg.ca or contact local Spatial Technical Support (support@stpg.ca)