

Follow this guide to set up the standard configuration for the LAND-PAK base and rover, and the internal radio modem.

With minimal setup time, LAND-PAK™ can be configured and operating to the point of collecting positions with RTK/UltraRTK™.

**By opening, assembling, and using this product, you agree to the terms of the License Agreement contained in the LAND-PAK Product User Guide.**

**Important: This device will not track satellites until after the option file is loaded in the receiver. See instructions contained in this guide.**

Refer to the supplied *LAND-PAK User Guide* to check inventory, charge batteries, and set up hardware.

Refer to these supplied guides for complete instructions for optimum performance:

- ✓ *NavCom LAND-PAK User Guide*
- ✓ *NavCom SF-3040 GNSS Receiver Product User Guide*
- ✓ *MicroSurvey Nautiz X8 User Guide*
- ✓ *MicroSurvey FieldGenius User Guide*
- ✓ *SATELLINE-3ASd Radio Modems User Guide*

■ **NavCom Customer Support:**

Telephone: +1 (310) 381-2000

Web: <http://www.navcomtech.com/Contact/ContactSupport.cfm>



## Install UHF Radio

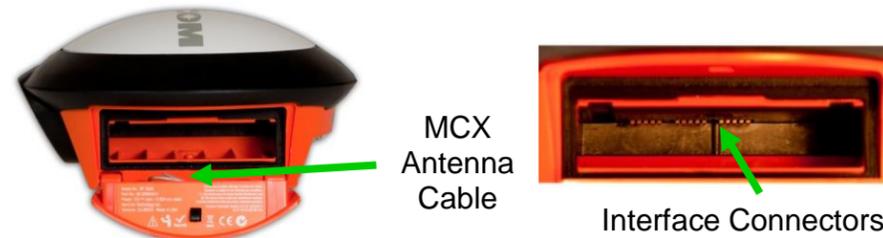
Follow these steps to install the radio:

1. Turn the SF-3040 off.
2. Slide the release button downward on the radio bay.



SF-3040 Radio Bay Release Button

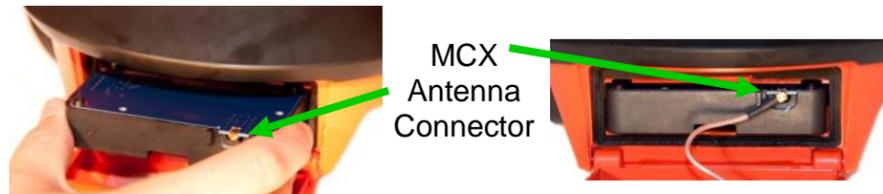
3. Insert the multi-pin end of the radio in the bay with the contact-side up, until a click is heard.



MCX Antenna Cable

Interface Connectors

4. Carefully align the coaxial cable MCX connector center pin with the radio module. Press the connector on straight with significant pressure and without damaging the center pin.



MCX Antenna Connector

5. Route the cable to prevent pinching.
6. Close the door until it clicks shut.
7. Connect the radio antenna to the TNC connector.

Refer to the SF-3040 Product User Guide for additional detail.

## SF-3040 Battery Installation

Charge the batteries in accordance with the steps outlined in the SF-3040 Product User Guide.

- ☐ New batteries must be charged for a *minimum of 12 hours prior to use*, regardless of the LED indicator on the charger.

The battery chambers are located on the side of the SF-3040 receiver. There are two locking clips on the outside edge of each battery chamber to hold the battery packs in place.

Follow these steps to install the battery packs:

8. Open the battery pack chamber (located on the left-hand side of the SF-3040 as you hold the receiver with the front facing toward you) by pressing downward on the black button.
9. Align the battery pack with the chamber.
10. Holding the locking clip to the side, insert a battery pack into each chamber, metal-contact end first.
11. Push the locking clips back into place.



Repeat steps 8 through 11 with the second battery pack.

- ☐ Refer to the supplied *SF-3040 GNSS Receiver Product User Guide* for complete details on battery charging, installation, use, safety, and disposal.

The SF-3040 GNSS receiver battery packs are keyed to prevent improper installation. There are two locking clips on either side of the battery bay.

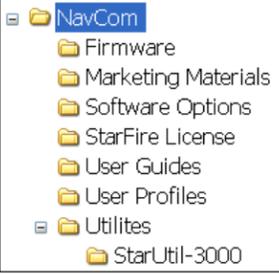


- ☐ *Ensure that both locking clips are locked in place.* If both locking clips are not locked in place, the battery packs can disengage.

## Connect Equipment

12. Fully charge the battery packs in the supplied battery charger before operation.
13. Install the battery packs in the side battery slots.
  - Refer to the *SF-3040 GNSS Receiver Product User Guide* for complete instructions on charging and installing the battery packs.
  - Three optional power cables are also available.
14. Use one of the two supplied data cables for communications:
  - USB Device cable (PN 96-212238-01): Connect the 7-pin LEMO connector end to the USB-COM1 port on the bottom of the SF-3040. Plug the USB end into the PC.
  - Or
  - COM 2 serial cable (optional) (PN 96-212169-01): Connect the 6-pin LEMO connector end to COM2 port at the bottom of the SF-3040. Connect the DB9S end to the PC.
- An optional COM1 serial cable (PN 96-212170-01) is also supported.
- Bluetooth™ connectivity is also available. Refer to the *StarUtil 3000 User Guide* for detailed instructions on connecting a Bluetooth™ device. Loading firmware via Bluetooth is not supported.
15. Locate the receiver in an area with a 360° clear view of the sky.
16. Press and hold the On/Off switch  on the front Indicator Panel to turn on the SF-3040. All front panel LEDs illuminate for 3 to 5 seconds during power-up. The Indicator Panel status LEDs change from **red** to **green**.

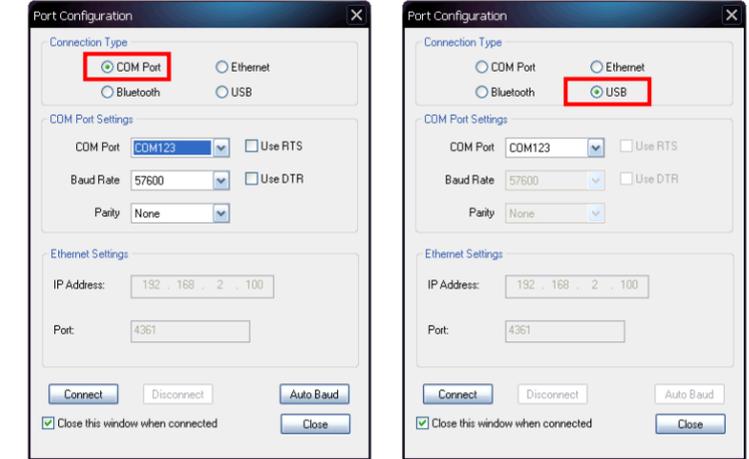
## Save Folder/Files to PC

- The SF-3040 Product Configuration USB Flash Drive (PN 82-043000-0001) includes the following:
  - Root Directory: Software Options File and StarFire License (if purchased)
  - NavCom Folder: Includes these sub-folders: Firmware, Marketing Materials, User Guides, User Profiles, Utilities (The contents of the NavCom folder are subject to change.)
17. Plug the SF-3040 Product Configuration USB Flash Drive into the PC.
18. Browse to the USB Flash Drive.
19. Save the Software Options File, StarFire License (if purchased), and NavCom folder to the PC.
 

## Establish Communications

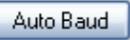
20. Browse to Navcom\Utilities\StarUtil-3000 on the PC.
21. Ensure that these files are in the StarUtil-3000 folder: "Starutil-3k\_v1\_0\_x.exe", "navcomx1c45x3040.inf" (USB driver), and 96-312007-3001.pdf.
  - The USB driver must be in the same folder as StarUtil-3000 for the USB port to auto-recognize the SF-3040.
22. Double-click "Starutil-3k\_v1\_0\_x.exe" to open the program.
 
23. Click the Connections button to establish communications between the PC and the SF-3040. The Port Configuration window opens.

24. Depending on the current Connection Type, do not change the default option, COM Port, or select USB.



COM Port Settings

USB Settings

25. Set the appropriate options according to the Connection Type:
  - **COM Port.**
    - *COM Port:* The appropriate PC COM Port
    - *Baud Rate:* 57600 (keep the default)
    - *Parity:* None (keep the default)
  - Or
  - **USB Port.**
    - *COM Port:* The appropriate virtual PC COM Port
26. Click  to ensure the baud rate is correct for the selected port.
27. Click .
28. Verify that the SF-3040 is connected to the PC: Messages scrolling in the Communication window indicate that the connection is established:



## Upload Software Options

Software Options must be uploaded before the StarFire License (if purchased) is loaded.

**Important: This device will not track satellites until after the option file is loaded in the receiver.**

29. Select Software Options on the File Upload window.



30. Click and browse to the NavCom folder on the PC.

31. Select the software options file (the file extension is \*.opt). The path to the software options file is displayed in the upload field.

32. Click . At the end of the upload, a confirmation box opens. Click OK.

The *Input Terminal* window also displays the outcome of the upload. In the example below, the load is successful:



33. Click on the Software Options window to display the loaded software options.

If any of the purchased software options are not displayed in the *Software Options* window, refer to the section "Use the Input Terminal to Upload Software Options" in the *StarUtil-3000 User Guide*.

Also refer to the *Sapphire Technical Reference Manual* for detailed information on the [INPUTSWOPTION] command.

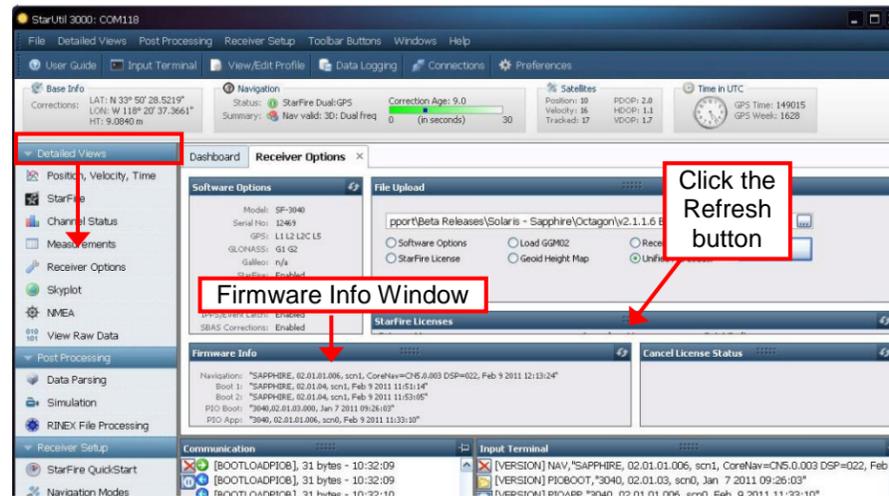
"StarFire: Enabled" indicates that the StarFire Software Option is loaded. It does not indicate that a StarFire License is installed. Do not close StarUtil-3000. Perform one of these steps:

- If a StarFire License is purchased, go to the *Upload StarFire License* section.
- If a StarFire License is not purchased, go to the *Factory Default User Profile* section.

## Determine Firmware Versions

The user determines that the firmware installed in the SF-3040 is the most current. The version of the installed firmware is important to the proper operation of the receiver.

34. On the Detailed Views menu, click Receiver Options to open the Receiver Options tab.

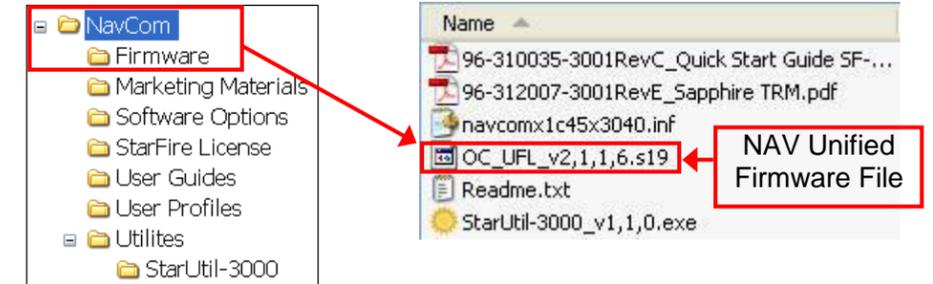


35. Click (refresh) on the Firmware Info window to display the installed options.



36. Browse to the NavCom\Firmware folder on the PC. The Firmware folder is copied from the SF-3040 Product

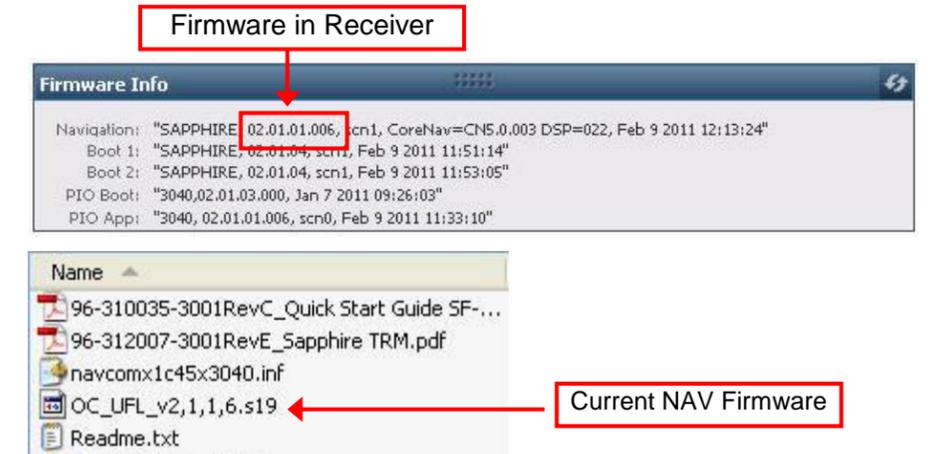
Configuration USB Flash Drive. It contains the most current firmware. The firmware file extension is \*.s19.



Open the Readme.txt file for additional information.

The \*.s19 file may begin with 'SP' instead of 'OC' after January 2012.

37. Compare the current NAV Firmware version in the Firmware folder with the installed version displayed in the Firmware Info window.



In the example above, the NAV firmware in the receiver matches the firmware in the folder.

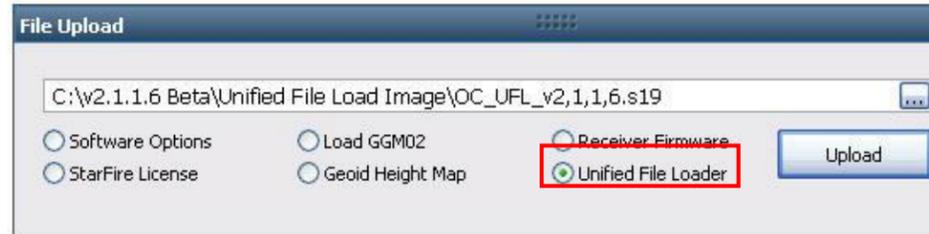
38. Perform one of the steps below:

- If the NAV firmware installed in the receiver is the *most current version*, go to the *Upload Software Options* section.
- If the NAV firmware installed in the receiver is *not* the most current version:
  - Check the versions of the other firmware.
  - Write down all the firmware that must be updated.
  - Go to the Upload Firmware section below.

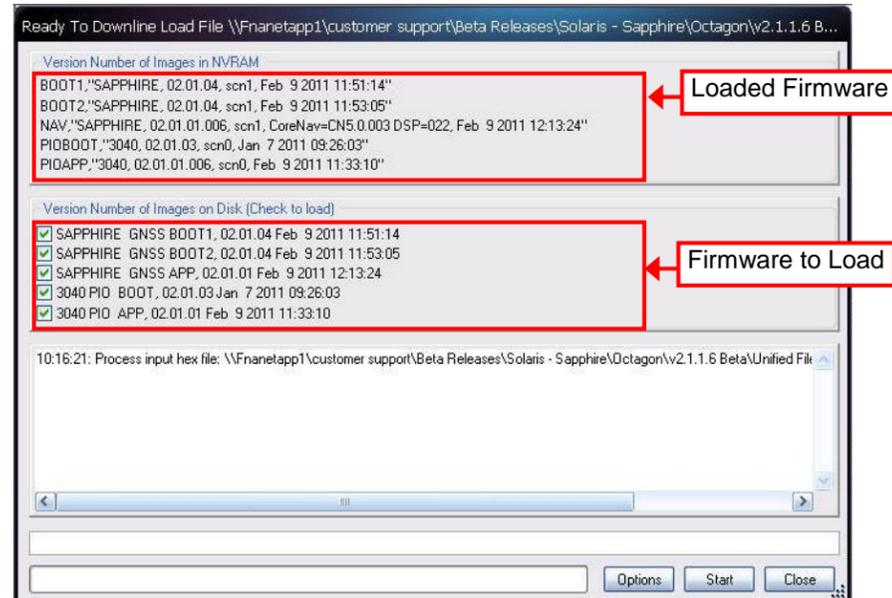
## Upload Firmware

### Upload a Unified Firmware File

39. Select Unified File Loader on the File Upload window.



40. Click and browse to the NavCom\Firmware on the PC.
41. Select the unified firmware file (UFL) to upload (the file extension is .s19). The path to the UFL file is displayed in the upload field.
42. Click . The options to be uploaded are checked on the Ready to Downline Load File window.



43. Check or uncheck firmware files as necessary (based on existing loaded version numbers).
44. Click and the upload progress window updates.

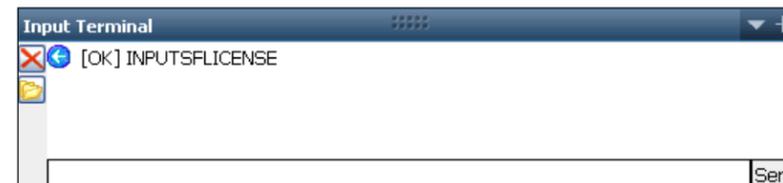
45. When the upload is complete, click .
46. If any file fails to upload, verify which files loaded and uncheck those files, then reload the remaining files. If this fails, contact NavCom Customer Support for further guidance.

### Upload the StarFire License

- For the initial configuration, the StarFire license must be installed via data cable. Subsequent renewals of the license are typically transmitted to the receiver via radio broadcast. Refer to the *SF-3040 GNSS Receiver Product User Guide*.
- The receiver must be tracking GPS satellites and providing a valid position solution at the time of the StarFire license upload to accept the license.
47. Select StarFire License on the File Upload window.



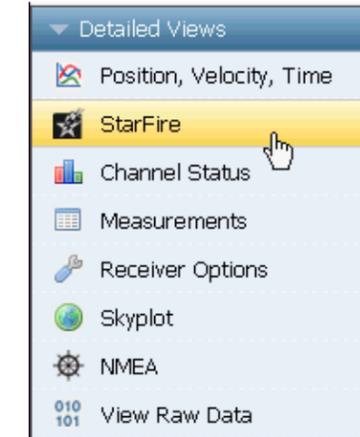
48. Click and browse to the NavCom folder on the PC.
49. Select the StarFire license file (the file extension is \*.lic). The path to the StarFire license file is displayed in the upload field.
50. Click . At the end of the upload, a confirmation box opens. Click OK.
- The *Input Terminal* window also displays the outcome of the upload. In the example below, the upload is successful.



51. Ensure that the purchased StarFire License is loaded. These tabs provide license information:

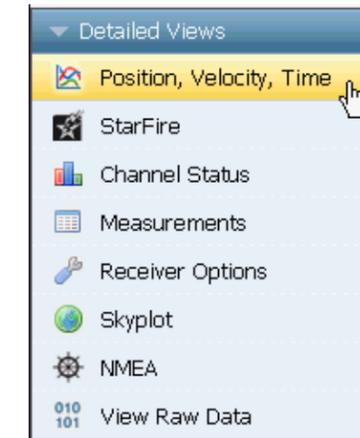
- *Receiver Options* tab: *StarFire Licenses* and *Cancel License Status* windows
- *StarFire* tab: *License Info* window

To open the *StarFire* tab, click *StarFire* on the *Detailed Views* menu.



### Confirm StarFire Navigation

52. Click *Position, Velocity, Time* on the *Detailed Views* menu to determine if the receiver is navigating in StarFire mode. The PVT tab opens.

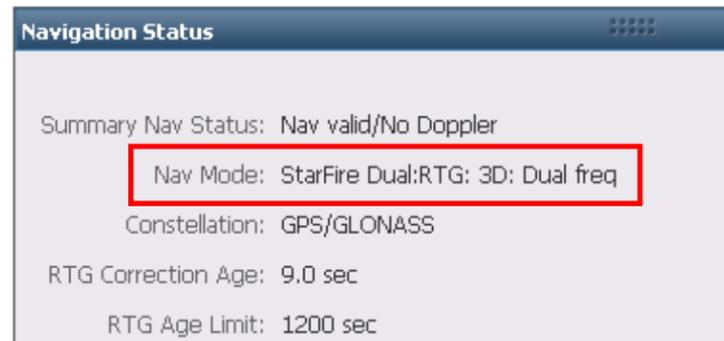


The receiver enters StarFire mode in approximately 3 minutes after it is first turned on; then the convergence period starts.

*Newer software versions:* The Nav Mode *StarFire Dual:GPS*, indicates that the receiver is navigating in the old StarFire format, accurate to <10cm. The Nav Mode *StarFire*

*Dual:GNSS*, indicates that the receiver is navigating in the new StarFire format which supports GLONASS, accurate to <5cm.

*Older software versions:* The Nav Mode *StarFire Dual:RTG: 3D: Dual freq*, indicates that the receiver is navigating in StarFire dual frequency with a 3D position fix, which is very accurate. RTG is another term for StarFire.



## Base Station Hardware Setup

This section provides the steps to correctly and safely set up the base station. It is important to select an open area for the test setup.

⚠ The base station tripod leg points may damage soft materials, including indoor carpets.

53. Set up the base station in an open, flat, safe location.
54. Unbuckle the strap that holds the tripod legs together.
55. Open the tripod legs until the tripod is stable. Use the tripod leg levers and the tripod wing screws to adjust the height and secure the tripod (see Figure 1). Leveling the tripod by eye is sufficient.



Figure 1: Base Station Tripod – Leg Adjustments



Figure 2: Base Station Tripod

Refer to Figure 2 for the steps below:

56. Unscrew the tribraich fastener and remove the tripod cap. If necessary, use the 4 mm and/or 5mm Allen wrench (found on the top plate of the tripod) to tighten the hex screws at the top of the tripod.
57. Replace the Allen wrench for future use.

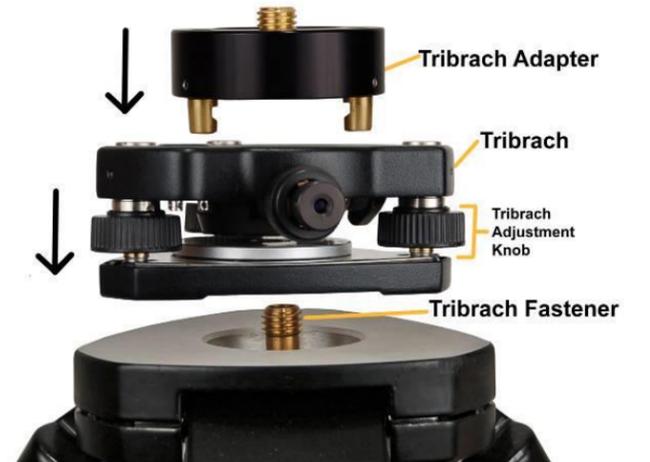


Figure 3: Mounting Tribraich & Tribraich Adapter

Refer to Figure 3 for the steps below:

58. Mount the tribraich to the top of the tripod as follows:
  - a. Position the tribraich so that it fits flat and evenly on the top plate.
  - b. Screw the tribraich fastener into the tribraich until secure.
- ☐ The tribraich has a leveling bubble and three adjustment knobs for making fine adjustments.
59. Align the tribraich adapter with the three holes on the tribraich, and turn the knob on the side of the tribraich to lock it in place.
60. Screw the pole extension onto the tribraich adapter. The pole extension allows for easier access to the connectors and exchange of the batteries in the SF-3040 GNSS receiver.

## Rover Hardware Setup

This section provides the steps to correctly and safely set up the rover. It is important to select an open area for the test setup.

- ⚠ The rover pole may damage soft materials, including indoor carpets.
- ⚠ Over-tightening of the attachments on the rover pole may cause damage.

61. Set up the rover in an open, flat, safe location.



Figure 4: Pole Clamp and Cradle

Refer to Figure 4 for the steps below:

62. Connect the rover pole clamp to the Nautiz cradle, if necessary:
  - a. Insert the cradle quick-release adapter into the hole in the pole clamp.
  - b. Depress the button on the pole clamp and, if necessary, twist the cradle to the desired position by inserting the small peg into one of the available holes on pole clamp.
  - c. Release the black button on the pole clamp to lock the assembly in place.



Figure 5: Mounting the MicroSurvey Nautiz X8

Refer to Figure 5 for the steps below:

63. Connect the clamp assembly to the rover pole:
  - a. Loosen the knob on the pole clamp.
  - b. Connect the pole clamp to the rover pole above the level so that it does not obscure the level from view.
  - c. Tighten the knob.

64. Mount the Nautiz X8 on the cradle clamp and tighten the cradle knob.

- ⚠ Do not over-tighten the cradle. Over tightening may cause damage to the Nautiz X8 screen
- ⚠ Do not lean the pole in a location where the equipment is likely to fall. Though the electronic products are tested for a pole drop, repeated drops or drops on the wrong axis may cause equipment damage.

65. Insert the two lithium-ion battery packs into the SF-3040 GNSS receiver. Refer to Chapter 3 (Battery Charging) of the SF-3040 GNSS Product User Guide, if necessary.
66. Extend the rover pole to the maximum height and snap it into place. This may require turning the top pole to align the spring-loaded clasps with the bottom pole.
67. Tighten the connector at the base of the extension to secure the extension pole.
68. Extending the rover pole reduces the possibility of satellite signal blockage by passing pedestrians or vehicles.
69. Screw the receiver antenna onto the SF-3040.
70. Mount the SF-3040 to the top of the rover pole and screw into place.

## Bluetooth Interface

71. Log on to FieldGenius and select a project or create a new one (see the Field Genius User Guide for detailed instructions).
72. On the **Instrument Selection** dialog box (refer to Figure 6), select **GPS Rover**.
  - a. Separate profiles are maintained in the FieldGenius database so that one data collector can connect to multiple devices. Select and name the unit being configured.

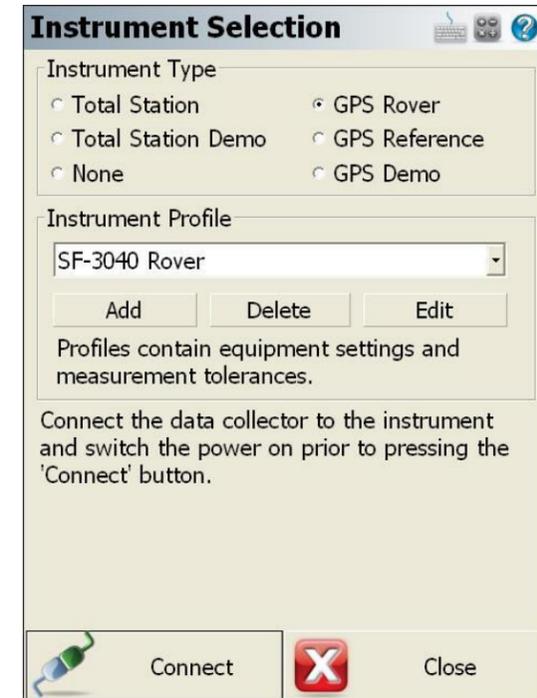


Figure 6: Instrument Selection

73. Click **Edit** to set the data collector interface up.

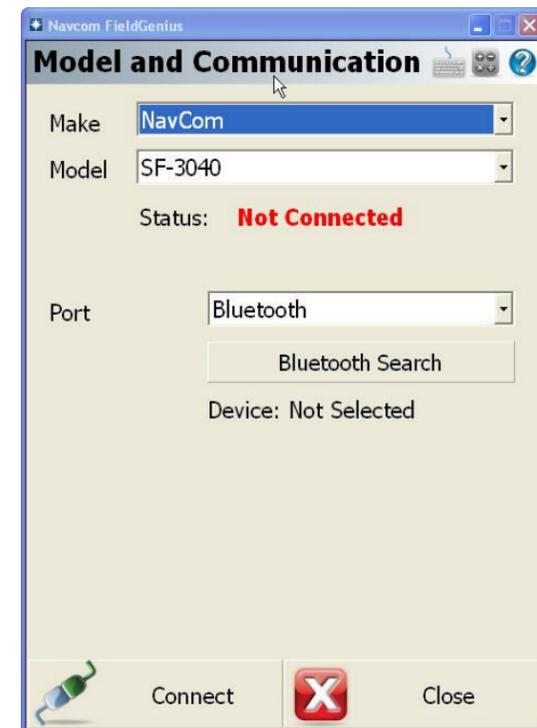


Figure 7: Model and Communication

74. From the dropdown lists, select:
  - a. Make: *NavCom*
  - b. Model: *SF-3040*
  - c. Port: *Bluetooth*
75. Click **Bluetooth Search**. The display will update with SF-3040 and the unit serial number, i.e.: SF304020024.
76. Select the appropriate device and click **OK**.
77. Click **Connect**.

## Internal Radio Modem Configuration

This section provides the steps to initially configure the SF-3040 1W internal radio modem.

 The only time you select **GPS Reference** is when you are setting up a base station with the internal 1 W or external UHF radio boost.

78. Click **Connect** to connect to the SF-3040 receiver.
79. On the Link Configure dialog box (refer to Figure 8), select **Internal UHF Radio** as the Link Device. The GPS Port is **Internal**, for the 1W radio only.
80. Select a **Data Format** from the drop-down list.
81. Click **Setup**.
82. On the **Radio Setup** dialog (refer to Figure 9), select the **Network ID**, type a frequency in the **Frequency** text box (the Base and Rover frequencies and Network ID's must match), and select the **Transmit Power**. On the Rover, set the Transmit Power to 100mW unless the base requires the rover position for network corrections (i.e. a periodic GGA message). In this scenario, set the rover to match the base power out.
83. Click **OK**.

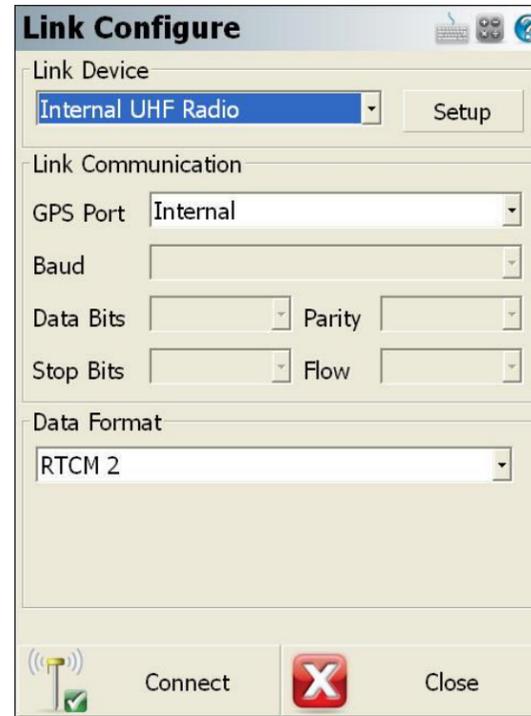


Figure 8: Link Configure

84. On the **Link Configure** dialog box (refer to Figure 8), click **Connect**.

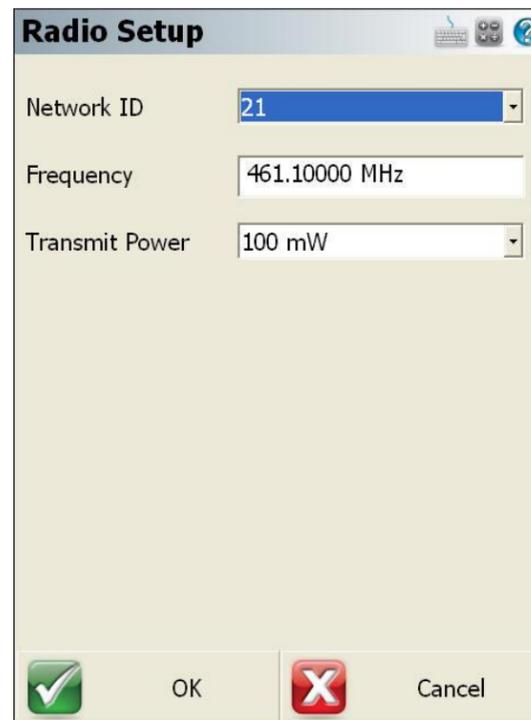


Figure 9: Radio Setup

## NTRIP Setup

Refer to the following documents (located on the USB thumb drive) for complete information on configuring NTRIP:

- *NavCom WM6 Local Internet Guide.pdf*
- *NavCom GPS GSM Profile and Bluetooth Guide.pdf*

## Base & Rover Survey Setup

Refer to the *NavCom FieldGenius.pdf* document (located on the USB thumb drive) for complete information on configuring the base and rover:

- Base reference position
- Base reference ID
- Output message formats and timing
- Rover mode
- Authorized base ID's
- Surveying and staking points
- Line work
- Field to finish work