

## Ethernet Port

On rear panel.

An 8-pin RJ45 waterproof connector, fitted with sealing cap.



Pin	Signal Name
1	TX+
2	TX-
3	RX+
4	NC
5	NC
6	RX-
7	NC
8	NC

NOTE: All signals are electrically isolated from the chassis ground and power source.

## Physical and Virtual Port IDs

Port ID	Port Definition
A	External serial port (RS232)
B	External serial port (RS232/RS422)
C, H	Bluetooth SPP (server)
D	Internal UHF radio
F	External serial port (RS232)
I, J	TCP/IP ports (server)
M	Internal memory, data recorded as G-file
P, Q	TCP/IP ports (client)
T	Bluetooth SPP (client)
U	USB external serial port

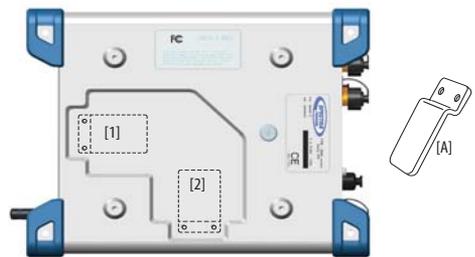
# Installation Instructions

## Receiver

NOTE: Depending on how you install the receiver, you may need to change the orientation of the displayed data on the front panel screen. This is possible using one of the options in the **Display Settings** menu (see *page 36*).

## Tripod Mount

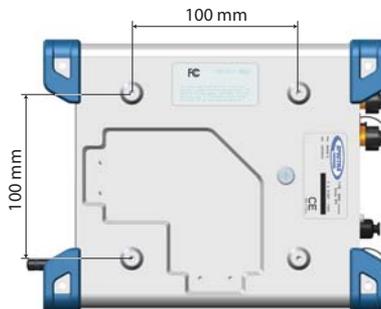
In land surveying applications, for example when used as a roaming base mounted on a tripod, the SP90m can be secured on one of the legs of the tripod using the lug ([A]) fastened on its bottom side (see illustration below).



The lug may be secured onto the receiver case in two different ways allowing the receiver to be installed either with its front panel upwards ([1]) or sideways ([2]) (recommended).

## Bottom Plane Mount

This type of installation is suitable for machine guidance or marine applications. The SP90m is secured from underneath the receiver case, using four screws M4.



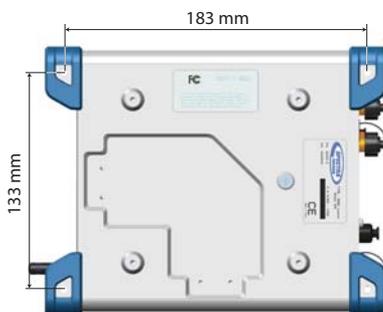
Preparing the support on which the receiver will be mounted only consists of drilling four holes, forming a simple,

100-mm square. In the receiver case, the four tapped holes are designed as follows: M4 x 0.7 - 7 mm. When tightening M4 screws, the recommended torque is 2.6 N.m (23 lbf.in). Note that this is a VESA<sup>1</sup>-compliant mounting scheme.

### Bumper Mount

This type of installation is also suitable for machine guidance or marine applications.

In this setup, the receiver is secured from its bottom side, using the holes (dia. 4.5 mm) located in the lower part of the four blue bumpers (see illustration below). The receiver will be secured using M4 screws of appropriate length inserted through these holes. Other holes (dia. 6.5 mm) also exist in the upper part of the bumpers so you can insert a screwdriver and tighten the four M4 fixing screws.



## GNSS Antennas Setup for Heading Measurements

### Choosing the Appropriate Baseline Length

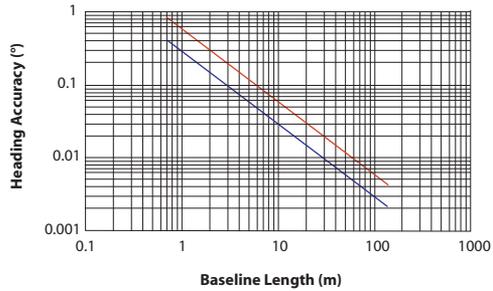
In theory, the baseline length (i.e. the distance between the phase centers of the two GNSS antennas used, also called antenna separation) can be set between 5 centimeters and 1,000 meters.

In practice, you will choose the baseline length taking into account the level of expected heading accuracy as well as the various installation constraints in the vehicle.

The chart below shows the expected heading accuracy for a baseline ranging from 30 centimeters to 150 meters.

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1.VESA= Video Electronics Standards Association.



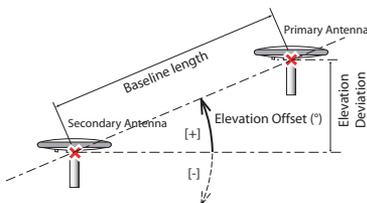
This chart deserves a few more comments and explanations:

- Accuracy is inversely proportional to baseline length. However a too long baseline can result in multipaths between antennas and introduction of vehicle flexing into the heading solution. These two factors are detrimental to heading accuracy. In addition, the longer the baseline, the longer the calibration sequence. That's why baselines of three to five meters are recommended. Baseline lengths less than one meter are not advised.
- Accuracy figures given above are 1-sigma values, or RMS, which means that 67% of the measurements are at or below these figures.
- Heading accuracy will be about a factor of 2 better than pitch or roll accuracy. Pitch and roll accuracies are the same.
- The lower line (blue) represents accuracy achievable if no multipath errors were present. In a normal environment, this is not possible. Multipath effects from typical environments are depicted by the upper line (red). For a given baseline length, the performance of the SP90m should lie somewhere near the upper line.
- A moving vehicle does not experience as many multipath effects as when it is stationary. This is because multipath is a correlated error. Correlated errors become more noise-like under vehicle dynamics and therefore can be filtered out. Therefore, accuracy results improve toward the lower line (blue) when the vehicle is moving.

### Elevation Offset

Ideally, the two antennas should be installed at the same elevation. You may however be facing some installation constraints on your vehicle compelling you to install the antennas at different elevations. If that is the case, this is how you should calculate the elevation offset between the two

antennas after measuring the elevation deviation and the baseline length. The sign of the elevation offset is also provided on the diagram below (elevation offset negative if the secondary antenna is lower than the primary antenna and vice versa).



$$|Elevation\ Offset\ (^{\circ})| = \arcsin \frac{Elevation\ Deviation\ (m)}{Baseline\ Length\ (m)}$$



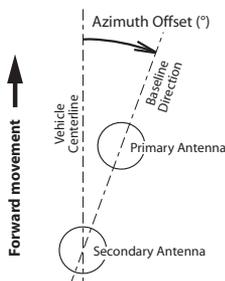
**The elevation offset should not be more than 45 degrees (or less than -45 degrees), or the receiver will consider the antenna setup to be invalid. No heading, roll or pitch measurements would be calculated in this case.**

### Azimuth Offset

Ideally, the two antennas should be installed in such a way that the baseline direction is strictly parallel or perpendicular to the vehicle centerline.

However, you may also be facing some installation constraints on your vehicle compelling you to install the antennas differently. The azimuth offset describes the non-alignment of the baseline with respect to the vehicle centerline.

When the baseline is strictly parallel to the centerline and it is oriented in the direction of forward movement, the azimuth offset is zero. In all other cases, the offset is non-zero and should be measured as shown in the diagram below.

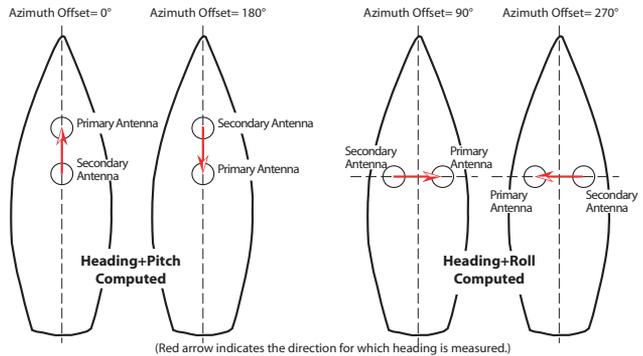


The non-alignment of the baseline with respect to the vehicle centerline may be intentional (see explanations in the next section below).

## Azimuth Offset, Antenna Setup & Resulting Heading

Consider the following four setups before installing your antennas. This explanation applies to all types of vehicles (ship represented in our example).

Depending on the type of measurements you wish the receiver to perform (heading + roll or heading + pitch) and the installation possibilities offered aboard the vehicle, you will choose the most appropriate setup and set the azimuth offset accordingly.



For each of these setups, if you enter the indicated azimuth offset, then the receiver will deliver the vehicle's true heading, and not the heading value it actually computes.

### Delivering an RTK Position for the Primary Antenna

There may be an additional requirement you should take into account when setting up your antennas which is that the receiver should also deliver an RTK position for the primary antenna.

In this case, the absolute location of the primary antenna in the vehicle is probably critical and this will impact the location of the secondary antenna as well.

# Powering the SP90m

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## External DC Source vs. Internal Battery

The SP90m may be powered from either its internal battery or an external DC source.

The internal battery will be charged if necessary when the receiver is powered from an external DC source.

## Power Mode

You may set the receiver to behave in a very specific way when applying or removing the external DC source. Below are the options you may use and the resulting behavior. Note that these settings can only be done using the Web Server:

- With **Automatic Power-on** enabled, the receiver will be turned on automatically when an external DC source is detected at the DC power input, whether the internal battery is present or not.

With this option disabled, you will have to turn on the receiver manually after connecting the external DC source to the DC power input.

- With **Automatic Power-off** enabled, the receiver will be turned off automatically when the external DC source is removed from the DC power input, even if the internal battery is still present in the receiver at that time.

With this option disabled, and if the internal battery is present, you will have to turn off the receiver manually after disconnecting the external DC source from the DC power input.

To change the power mode settings, run the Web Server, go to **Receiver > Configuration > Power Mode** and set the displayed parameters as required.

## Charging the Internal Battery

The battery comes with four LEDs indicating the current battery charge status. Push the button by the LEDs to read the battery charge status. All lit LEDs means the battery is fully charged. If none of them lights up when pushing the button, then the battery is exhausted and needs recharging. The battery may be charged in two different ways:

- Leave the battery within the receiver's battery compartment and charge it from the external DC source you are using to power the receiver. The charging state will be reported as an icon on the General Status screen (see *page 28*).
- You may use the dual-battery charger provided as part of the receiver shipment.

Before inserting the battery, insert a spacer in the battery slot used (see picture below where the two spacers provided have been inserted into the charger and the battery has then been inserted into one of them). Two battery spacers/inserts are provided with the receiver shipment.

Connect the charger to the power supply (provided), which you then connect to the power line.



Charging takes approximately 3 hours at room temperature. If two batteries are inserted in the battery charger, then the batteries will be charged sequentially, from left to right.

**Warning:** Ensure that nothing obstructs the vents in the back and bottom of the charger and that the charger is placed on a hard, flat and level surface, to ensure that there is airflow under the charger. Do not operate the battery charger while it is in the transport case.

On the charger, beside each slot are two LED indicators (red and green) to display the battery status.



Status	Red	Green
No battery detected (no battery present or battery defect)	On	Off
Battery detected (charging not started yet) - Conditioning not required - Conditioning required	Off Blinking	Off Off
Charging in progress - Conditioning not required - Conditioning required - Over/under temperature (charge is inhibited)	Off Blinking 1 flash / 25 s	Off Blinking Blinking
Conditioning in progress	On	Blinking
Conditioning done (battery fully charged)	On	On
Battery fully charged - Conditioning not required - Conditioning required	Off Blinking	On On
Power supply over/under voltage	Off	1 flash / 25 s

## Using an External Battery

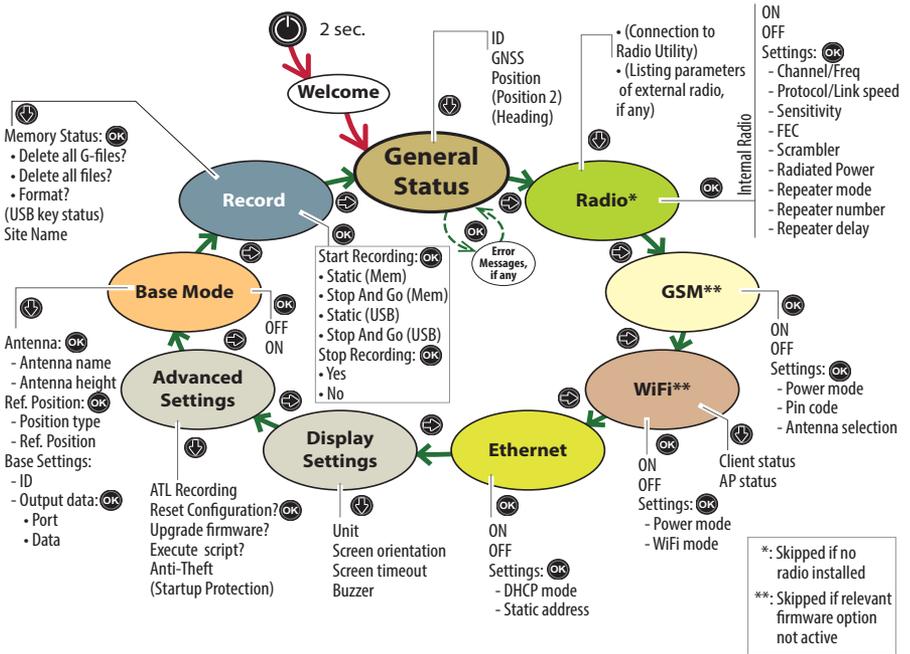
When used in the field as a roaming base, the SP90m may be powered from a standard car battery for example, provided you take these precautions:



- Connect the receiver to an external battery, using an SAE-terminated cable with electric wires all certified UL 758 and CSA C22.2 No. 210, or similar.
- The minimum wire section should be AWG 18.
- The cable should include a 5-A fuse placed in series. The fuse should be certified “UL listed” and CSA certified 3-30 A (or equivalent).

# Receiver User Interface

The diagram below summarizes all the receiver parameters that you can display or edit from the receiver front panel. It also shows which keys to use to scroll through the different screens.



NOTE: You can navigate in the reverse order using the left-arrow button.

## Welcome Screen



This screen appears after about 2 seconds of depressing the **Power** button. (You may then release this button.)

After about 10 to 20 seconds of displaying the Spectra Precision logo – corresponding to the receiver boot sequence – the screen will get blank for a few seconds, then the General Status screen will appear automatically.

## Using the Front Panel Controls

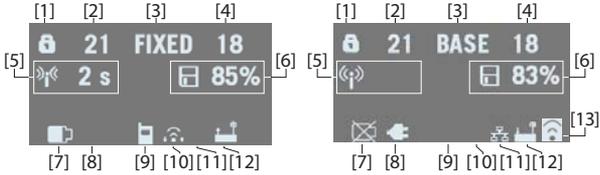
- : Use the horizontal (left and right) arrow keys to scroll through the different screens. Horizontal arrows are also used to switch from a digit to another when you are editing a numerical value.

- : When a function title is displayed, use the vertical (up and down) arrow keys to scroll through the possible options, if any.  
 Where **Settings** is displayed and after selecting it, use the vertical arrow keys to make a selection within a choice of possible parameters.  
 Vertical arrows are also to be used when you are requested to enter numerical values, such as repeater delay or static IP address. In this case, use vertical arrows to set a value for each digit.  
 In fields that combine letters and figures (password for example), a long press on either of these keys allows you to switch between lower-case, upper-case and numeric entry.
- : Use the **OK** button to enter the edit mode (for those functions that have one) or to validate a selected parameter.
- Where options are listed for you to choose, the currently active option is marked with a right arrow (▶).
- The General status screen has no associated edit mode but should error messages be reported, the **OK** button can then be used as acknowledgment. Press **OK** as many times as there are error messages to be acknowledged.
- Display Settings** and **Advanced settings** are access points to additional parameters. After you have selected one of them, just press one of the vertical keys to select an option in the menu. Then press the **OK** button to enter the edit mode for this parameter.
- : Use the **Escape** button to go up to the “parent” screen, when applicable. A long press on the **Escape** button will take you back from anywhere to the General Status screen (except if you are editing a value).

NOTICE: The screenshots illustrating this section are just examples. Your receiver may show different information depending on its own configuration.

# General Status

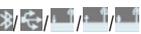
See examples below for a rover (left) and a base (right). Refer to the tables below for more details on each of the icons or data reported on this screen.



*NOTE: In the second column, the slash symbol (“/”) is used between icons to indicate that these icons occupy the area successively at the indicated displaying rate.*

Area	Icon or Data Reported	Meaning
[1]		Anti-theft or/and startup protection active (solid icon).
		Receiver running after entering startup protection password. Startup protection still active and will require same password at next power up.
		One or more alarms set (blinking icon). Press the Scroll button as many times as necessary to read and acknowledge the alarms.
		One or more alarms set and anti-theft or/and startup protection active. Icons appear in succession every 1 second.
	(Blank)	No alarm set and anti-theft protection inactive.
[2]	{a number}	Total number of satellites from all GNSS constellations visible (tracked) from the current location.
[3]	{a text string}	Position solution status: – NONE: Position not available – AUTO: Autonomous GNSS position – DGPS: Differential GNSS position – SDGPS: SBAS Differential GNSS position – BDGPS: BeiDou only position solution – FLOAT: Float solution – FIXED: Fixed solution (RTK is operational) – RTX: CenterPoint® RTX solution – BASE: Receiver configured as a base.
[4]	{a number}	Total number of satellites actually used.
[5]	<b>Data link information:</b>	
	{x seconds}	For a rover: Corrections received. The age of corrections is displayed after the icon, when available.
		For a base: Corrections generated and transmitted.
	(Blank)	No corrections received or transmitted.

Area	Icon or Data Reported	Meaning
	<b>Memory information and raw data recording:</b>	
[6]	 {percent}	No data recording in progress (static icon). Percentage of free memory in the storage medium used.
	 {percent}	Data recording in progress (dynamic icon). Percentage of free memory in the storage medium used. Icons appear in succession every 1 second.
		ATL data recording in progress
	<b>Battery:</b>	
[7]	 / {percent}	A battery has been inserted in the compartment and the energy left in the battery is represented both visually and as a percentage. These two indications are shown successively (percentage appears for 1 second every 5 seconds).
		The battery is missing (battery compartment empty).
Area	Icon or Data Reported	Meaning
[8]		The receiver is powered from the AC/DC power supply, not from its battery.
[7], [8]		The battery is being charged from the external DC source (first icon is animated to show charging).
	<b>Modem:</b>	
	(Blank)	Modem turned off.
[9]	 or 	Modem turned on: • Blinking: Not initialized yet • Static: Initialized and ready for a connection  The vertical bars indicate the signal strength at the modem antenna input. The higher the number of bars the better.  The antenna symbol shown in the upper left corner stands for "2G". If the modem detects a 3G network, "3G" is displayed instead.  When the signal strength is very weak, four dots appear at the bottom of the icon, instead of vertical bars.
		When the signal strength is very weak, four dots appear at the bottom of the icon, instead of vertical bars.
		Modem on line/connected to the cellular network.
	<b>WiFi:</b>	
	(Blank)	WiFi turned off.
[10]		WiFi Client active (1 to 3 waves depending on signal level).(1 wave: no signal yet). (Blinking icon: WiFi Initializing.)
		Data being transmitted over WiFi (2 to 3 waves).
[11]		Ethernet connection active
		Data flowing through Ethernet connection
	(Blank)	No Ethernet connection

Area	Icon or Data Reported	Meaning
[12]	<b>Bluetooth, Radio, USB:</b>	
		Bluetooth connection active
		Internal radio connected, but not used
	  	Internal radio used respectively as receiver, transmitter or repeater
		USB connection active
		Any combination of the five icons is possible. Icons appear in succession every 1 second.
	(Blank)	No Bluetooth or USB connection active, no internal radio installed.
[13]	<b>WiFi (continued):</b>	
		WiFi Access Point active (Blinking icon: WiFi Initializing).

Use the down-arrow key to view the following pages of information:

1. **Receiver identification screen.** From top to bottom (see screen example):

```
SN: 5703A00111
FW: 3.50.5
WD: 2017-04-16
BT: SP90m_0301
```

- **SN:** Receiver serial number
- **FW:** Installed firmware version
- **WD:** Receiver warranty date (YYYY-MM-DD).
- **BT:** Receiver Bluetooth name. If the name does not entirely fit on the screen, it will automatically and slowly be scrolled from right to left.

2. **Constellations tracked/used:** Number of satellites tracked (used) from all possible eight constellations (see example: GPS, GLONASS, Galileo, BeiDou).

```
GPS: 10(09) ▶
GLONASS: 11(09)
Galileo: 03(02)
BeiDou: 03(00)
```

Press one of the horizontal arrow keys to display the status of the next four constellations: SBAS, QZSS, L-band, IRNSS.

3. **Position solution:**

If the receiver is a rover, the displayed position will be the last computed position. The coordinates will be local (“LOC”) only if the rover receives specific RTCM messages from the base describing the local system used by the base.

If the receiver is a base, the displayed coordinates are set ones (not computed ones) representing the WGS84 or local reference position assigned to the base.

See screen example for a rover delivering WGS84 coordinates.

**First line:** Number of satellites tracked; Current position solution status; Number of satellites used.

**Next three lines:** Coordinates of receiver position. This may be:

- Either WGS84 coordinates (“W84” displayed at the beginning of the last line). Coordinates are Latitude (2nd line), Longitude (3rd line) and ellipsoidal height (4th line).
- Or local coordinates (“LOC” displayed at the beginning of the last line). Depending on whether or not a projection is defined in the local coordinate system used, coordinates may be either Easting (2nd line), Northing (3rd line), Elevation (4th line), or Latitude (2nd line), Longitude (3rd line) and Ellipsoidal Height (4th line).

```
17 FIXED 15
47° 17' 56.2926 N
001° 30' 32.5897 W
W84 +76.36 m
```

4. **Position solution 2:** Position of second antenna, if any second antenna connected to the receiver. Same information is provided as above for first position solution. When two position solutions are computed, there is a figure displayed in the top-left corner of the screen allowing you to know which position corresponds to which antenna:

- : Means the displayed position solution is that of the primary antenna (input #1).
- : Means the displayed position solution is that of the secondary antenna (input #2).

5. **Heading:**

- **First line:** Number of satellites received, computation status and number of satellites used.

Computation status:

- NONE: Check that the two antennas are connected.
- CALIB: Calibration is in progress, no valid heading value is available yet.
- FLOAT: Integer ambiguities are being solved, no valid heading value is available yet.
- FIXED: Heading computation is now effective.

- **Second line:** Computed value of heading
- **Third line:** Computed value of pitch
- **Fourth line:** Computed value of roll

The SP90m can deliver either pitch or roll, not both at the same time.

```
31 FIXED 21
Heading: 121.5°
Pitch: ---
Roll: 2.3°
```

## Radio

When you access the Radio screen, the following information is displayed:

- **First line:**
  - Receiver port that the radio is connected to: A, B or F= external radio; D= internal radio
  - Radio function: “Rx” for receiver, “Tx” for transmitter
  - Radio model
  - Current power status: ON or OFF
- **Second line:** Channel number used and its corresponding frequency, in MHz.
- **Third line:** Protocol used and transmission speed (baud rate).

(Rover)

```
D Rx XDL ON
2 420.2500 MHz
TFST 19200 Bd
LOW FEC SCR 4FSK
```

(Base)

```
D Tx XDL ON
2 420.2500 MHz
TFST 19200 Bd
2W FEC SCR 4FSK
```

```
Radio Mode
▶ ON
OFF
Settings
```

- **Fourth line** (see examples on the left):
  - For a rover, current reception sensitivity (low, medium or high), followed by “FEC” (Forward Error Correction) and “SCR” (Scrambling) if these two functions are enabled, followed by the type of modulation used and “REP” if the radio is used as a repeater.
  - For a base, radiated power (500 mW, 1 W or 2 W), followed by “FEC” (Forward Error Correction) and “SCR” (Scrambling) if these two functions are enabled, followed by the type of modulation used.

If the fourth line does not fit on the screen, it will be automatically scrolled from right to left.

The Radio screen being displayed, press the **OK** button to enter the edit mode. From there, you can turn on or off the radio.

If you highlight the third option (**Settings**) and press **OK**, you can edit each of the following radio parameters. After setting a parameter, press **OK** to save it and then press the down-arrow button to access the next parameter:

- **Channel/Freq:** Depending on how the radio was set up, you can choose a channel and corresponding frequency from a list of preset channel/frequency choices.
- **Protocol/Linkspeed:** Possible choices are:

25 kHz Channeling	12.5 kHz Channeling
TTALK@4800	TRANS@4800
TTALK@9600	TRANS@9600
TTALK@16000	TMARK@4800
SATEL@19200	TTALK@4800
TT450S@4800	TTALK@8000
TT450S@9600	SATEL@9600
TMARK3@19200	TT450S@4800
TFST@19200	TMARK3@9600
TRANS@4800	TFST@9600
TRANS@9600	ULINK@4800
TRANS@19200	
TMARK@4800	

- **Sensitivity** (Low, Medium or High)
- **FEC** (ON or OFF)
- **Scrambler** (ON or OFF)
- **Current power** when the radio is used as a transmitter (500 mW or 2 W).
- **Repeater mode** (ON or OFF)

- Repeater number (Base/1 repeater, Base/2 repeaters, Repeater one, Repeater two)
- Repeater delay (in ms).

Still from the Radio screen, pressing any of the vertical keys will display a message (**Connect Internal Radio to ADLCONF?**) prompting you to connect the internal radio to a configuration utility program (ADLCONF).

If you press **OK**, a new message will be displayed asking you to confirm this. If you press **OK** again, the internal radio will be made accessible directly from port A on the receiver rear panel.

From there, if you connect a computer to port A and you run ADLCONF on the computer, you will be able to configure the radio directly from ADLCONF.

When you are done with the radio configuration, you will need to turn off the receiver and then turn it back on to restore normal operation for the internal radio.

## GSM

When you access the GSM screen, the following information is displayed:



GSM ON  
Orange F  
3G: 40%  
NTRIP: PSTRF2

- **First line:** Current modem status (OFF, ONLINE, READY, DIALING or ON)
- **Second line:** Alternately identification of the service provider (ISP) and SIM card phone number.
- **Third line:** Network type (2G or 3G) and measured signal level (in 20% increments; 100%: +43 dBm)
- **Fourth line:** Type of currently active connection (NTRIP or Direct IP) followed by mount point name (in NTRIP), or server address, i.e. host name or IP address (in Direct IP). Blank if no active connection.

The GSM screen being displayed, press the **OK** button to enter the edit mode. From there, you can turn on or off the GSM modem.



GSM Mode  
ON  
▶ OFF  
Settings

NOTE: Turning on the GSM may take up to 4-5 minutes.

If you highlight the third option (**Settings**) and press **OK**, you can edit each of the following GSM parameters. After setting a parameter, press **OK** to save it and then press the down-arrow button to access the next parameter:

- **Power Mode: Manual or Automatic.** “Automatic” means the GSM module will be powered on when you turn on the

receiver. “Manual” means you turn it on or off manually from the GSM screen.

- **PIN code:** Press **OK** to enter the edit mode.  
CAUTION: You won’t be able to turn on the GSM modem until you have entered the correct PIN code.
- **Antenna Mode:** Press **OK** to choose the antenna used by the GSM modem: This can be the built-in antenna (Internal) or an external antenna connected to the rear panel (see [11] on *Rear Panel on page 11*).

## WiFi

When you access the WiFi screen, the following information is displayed (see examples on the left, first in Access Point mode and second, in client mode):



WIFI AP ON  
SP90m\_030111  
192.168.130.1

- **First line:**
  - “WIFI” label
  - WiFi mode: “AP” (for Access Point) or “Client”. “AP” is similar to “Hotspot Wifi”
- **Second line:** Receiver’s WiFi name (WiFi SSID), as seen from an external WiFi device in search of a new connection. In client mode, this line displays the SSID of the WiFi device the receiver is connected to.
- **Third line:**
  - In Access Point mode: Receiver’s static IP address
  - In Client mode: Connection status: “Connected” (or “Not connected” if the second line is empty).
  - Signal level (in 20% increments; 100%: +43 dBm)
- **Fourth line:** (client mode only): IP address of WiFi hotspot the receiver is connected to.



WIFI Client ON  
IP: 45.145.2.14  
Connected

The WiFi screen being displayed, press the **OK** button to enter the edit mode. From there, you can turn on or off the WiFi device.



WIFI Mode  
▶ ON  
OFF  
Settings

If you highlight the third option (**Settings**) and press **OK**, you can edit each of the following parameters. After setting a parameter, press **OK** to save it and then press the down-arrow button to access the next parameter:

- **Power Mode:** **Manual** or **Automatic**. “Automatic” means the WiFi module will be powered on when you turn on the receiver. “Manual” means you turn it on or off manually from the WiFi screen.
- **WiFi Mode:** **Client**, **Access Point** or **AP and Client**.  
In **Client** mode, the receiver’s WiFi module is set to search for a nearby WiFi network. You need to use the Web Server to find and connect to a WiFi network.

In **Access Point** mode, the receiver's WiFi module may be used by nearby, external, WiFi-enabled equipment (a smart phone for example) as a WiFi hotspot.

In **AP and Client** mode, the WiFi device may be used simultaneously as a client or an access point.

**NOTE:** When it is powered on from the dedicated display screen (see above), the WiFi device is automatically set as a WiFi Access Point.

**IMPORTANT:** The receiver's default WiFi key is the receiver's serial number.

## Ethernet

When you access the Ethernet screen, the following information is displayed (see example on the left):

- **First line:** Ethernet status (ON or OFF)
- **Second line:** DHCP state (ON or OFF)
- **Third line:** Receiver IP address (if DHCP off) or 4 x 3 hyphens if DHCP on.



Ethernet ON  
DHCP OFF  
IP: 192.168.0.1

The Ethernet screen being displayed, press the **OK** button to enter the edit mode. From there, you can turn on or off the Ethernet device.

If you highlight the third option (**Settings**) and press **OK**, you can edit each of the following parameters. After setting a parameter, press **OK** to save it and then press the down-arrow button to access the next parameter:

- **DHCP Mode:** If set to ON, the interrogated DHCP server will assign a dynamic IP address to the receiver.  
If it's OFF, use the following field to define an IP address for the receiver.
- **Static Address:** IP address assigned to the receiver when DHCP is off. This is a static IP address (up to 12 figures in the form xxx.xxx.xxx.xxx).

To enter a new IP address, press **OK** then use the vertical arrow keys to set each digit, and the right-arrow key to move to the next digit.

## Display Settings

This screen looks like this:



Display  
Settings

Pressing the down-arrow button will allow you to set the following parameters, one after the other:

1. **Unit:** Choose the distance unit (**Meters, US Survey Feet, International Feet**).
2. **Screen Orientation:** Choose the orientation of the data displayed on the screen (**Normal or Upside down**).
3. **Screen timeout:** Choose the time in minutes during which the screen will stay lit after you leave the control panel inactive. It will go blank after this delay. You will then need to press any front panel button to turn it back on. Enter "0000" to keep the screen permanently on.
4. **Buzzer:** Allows you to silence the buzzer if required. The buzzer is on by default.

## Advanced Settings

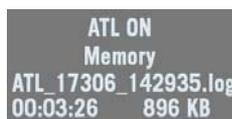
This screen looks like this:



Pressing the down-arrow button will allow you to set the following parameters, one after the other:

1. **ATL Recording:** Is OFF by default. ATL data are used for advanced diagnosis. You don't normally have to record ATL data unless you are requested to do so by Technical Support.

When you activate ATL recording, the screen looks like this:



Then make a long press on **Escape** to return to the General Status screen so you can freely use the other screens.

To stop ATL recording, go back to the ATL Recording screen and press **OK**. Press **OK** again as a positive answer to the message "**Stop ATL?**". ATL recording stops right away.

2. **Reset Configuration?:** This screen allows you to reset the receiver. You need to confirm this request before the reset actually takes place.

During a reset, all parameters are reset to their defaults, except for ephemeris, almanac, position and time data.

SBAS ephemeris data are however cleared. Then the default\_config.cmd file is run if present.

"RESET IN PROGRESS" is displayed throughout the sequence (which may take a few minutes). At the end of the sequence, hold the **Escape** button depressed for a few seconds to return to the General Status screen.

3. **Upgrade firmware?:** Allows you to upgrade the firmware of your receiver.

When Spectra Precision releases a new firmware version, copy the corresponding \*.tar file to a USB key then connect the key to the receiver via the USB connector on the receiver front panel.

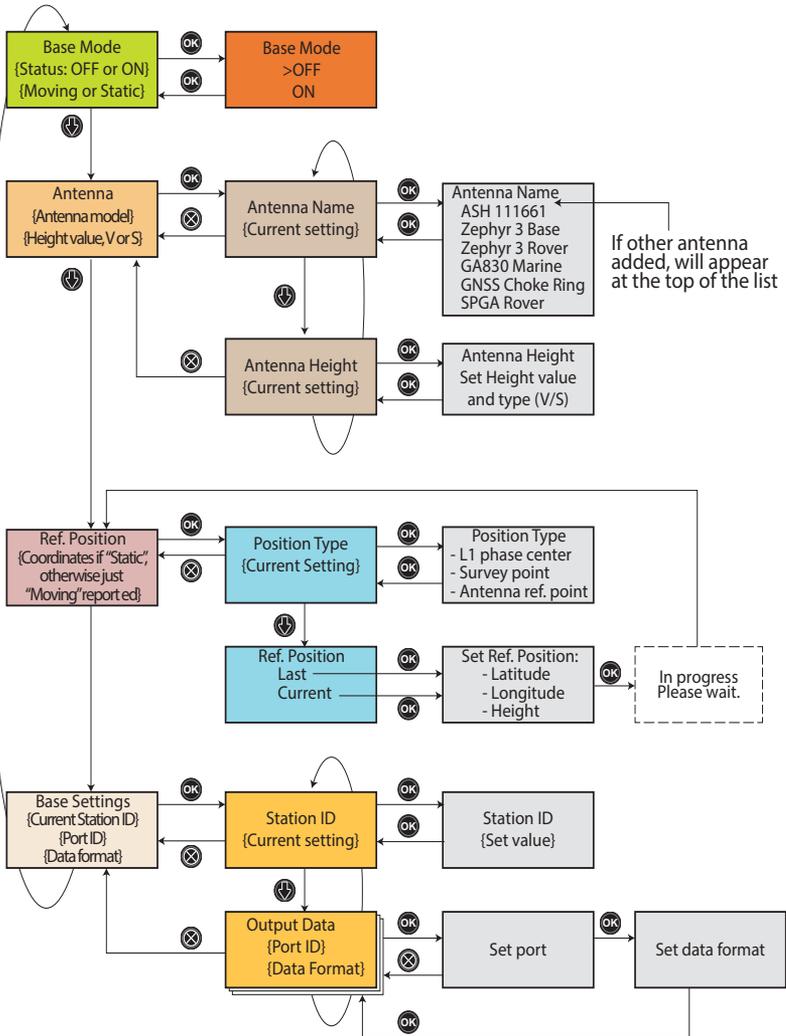
Once done and after selecting the **Upgrade firmware?** function, the screen will show the firmware version you can now install. Press **OK** if you agree and let the receiver complete the installation. For more information on firmware upgrades, see *page 44* or web page **Receiver > Configuration > Firmware Upgrade** in the Web Server.

4. **Execute script?** Allows you to have the receiver executing all the proprietary commands listed in the \*.cmd file stored on the connected USB key.
5. **Anti-Theft:** This screen allows you to enable or disable the anti-theft protection. You need to enter the correct password if you want to remove the anti-theft protection.
6. **Startup Protection Active:** This screen is visible only if the startup protection has been activated through the Web Server. It is visible under the **Advanced Settings** screen but will also pop up whenever you want to enter the edit mode for any of the receiver parameters.

When this screen is visible, you are prompted to unlock the receiver ("Unlock receiver?" displayed). Just press **OK**, enter the password and press **OK** again to make the receiver fully operational.

When the startup protection is active, the receiver does not display or/and output its results of position computation.

**Base Mode** See flowchart and explanations below.



If other antenna added, will appear at the top of the list

In progress Please wait.

When you access the Base Mode screen, the following information is displayed:

- **Base Mode status:** Current receiver operating mode. It can currently be used as a base (Status: ON) or a rover (Status: OFF).
- **Ref. Position:** The type of position currently defining the base location. The base may be “Moving” or “Static” (“Static” being the result of selecting either “Current” or

**Base Mode**  
OFF  
Static

“Last” as the reference position. See **Ref Position** below for more details).

**IMPORTANT:** Using the receiver front panel, you can only configure a static base, not a moving one. Defining a moving base can only be done using the Web Server. However, after a receiver reset, if you enable the base mode from the receiver front panel, then the base will operate by default as a moving base.

The Base Mode screen being displayed, press the **OK** button to enter the edit mode. From there, you can choose to define the receiver as a base (choose **ON**) or as a rover (choose **OFF**). The Base Mode screen being still displayed, press the down-arrow key to access the following parameters:

- **Antenna:** This screen lists the model and height of the antenna currently used (see example).

Second line: Antenna model

Third line: Antenna height and corresponding type of height measurement (“V” for Vertical or “S” for Slant).

Press **OK** to edit these parameters. The following is displayed, one after the other:

- **Antenna Name:** Press **OK** again to select the model of antenna used. A list of antennas commonly used with the receiver is provided.

Choose one, press **OK**, then press the down-arrow key to switch to the next parameter below.

- **Antenna Height:** Press **OK** again to set the antenna height. The antenna height results either from a vertical height measurement (select “V” after entering the measured value) or from a slant height measurement (select “S” after entering the measured value).

Press **OK** when you are done, then press **Escape** to return to the Antenna screen, then the down-arrow key to switch to the next parameter (see below).

- **Ref. Position:** If the base was last defined as moving, then the screen only shows the “Moving” status. If the base was last defined as static, the screen shows the position currently defined as the base’s reference position (see example).

Second line: Latitude of reference position

Third line: Longitude of reference position

Fourth line: Height, preceded by an acronym identifying the point used as vertical reference (this may be PC1 for



Antenna  
Zephyr 3 Base  
02.000 m V



Ref. Position  
47°31'30.00005"N  
001°04'49.00000"W  
ARP +0058.90 m

“L1 Phase center”, **SPT** for “Survey Point” or **ARP** for “Antenna Reference Point”).

Press **OK** to edit these parameters. The following is displayed, one after the other:

- **Position Type:** Press **OK** again to choose the vertical reference. As explained, this may be the antenna phase center (**L1 phase center**), the antenna phase center point projected to the ground (**Survey point**) or the base plane of the antenna (**Antenna ref. point**).

Press **OK** once you have made your selection, then press the down-arrow key to switch to the next parameter below.

- **Ref. Position:** Choose the way you want to define the base position. This can be the last known reference position or the current position computed by the receiver. When you make one of these choices, the receiver returns the corresponding position, which you may possibly modify before validating it.

When you select **Current** or **Last** and no computed position is available at this time, or no position has been computed since you turned on the receiver, then blank fields will be shown and you will have to type in the reference position by yourself.

Press **OK** once this step is complete, then press the down-arrow key to switch to the next parameter below.

- **Base Settings:** This screen provides information on the base settings:

Second line: Base ID

Third and fourth lines: Port delivering data and type of data output (see example). If several outputs are defined, the third and fourth lines show successively the definition of each of these outputs.

- **ID:** A four-figure number (0000 to 9999). Choose an ID in line with the chosen data format (possible formats listed below).
- **Port:** The possible choices are: **A Serial**, **B Serial**, **C Bluetooth**, **D XDL**, **F Serial**, **H Bluetooth**, **I TCP 8888**, **J TCP 8889**, **P NTRIP IP**, **Q NTRIP IP**, **U USB Serial**.
- **Data:** The possible choices are: **OFF**, **ATOM 4**, **ATOM 100**, **ATOM 101**, **RTCM-2.3**, **RTCM-3.0**, **RTCM3.2**, **CMR**, **CMR+**.

Press **OK** precisely at the time a given port and data format are displayed so you can edit these parameters:

- First set the port and press **OK**



Ref. Position  
Last  
Current



Base Settings  
ID 0031  
Port A Serial  
Data ATOM

