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# Trimble SPS550 Location GPS Receiver and Trimble SPS550H Heading Add-On Receiver

## Flexible modular receivers for decimeter and submeter positioning applications in construction and marine environments

The Trimble® SPS550 Modular GPS Receiver provides a range of "Location GPS" positioning techniques ideal for system integrators, OEMs and land and marine contractors requiring real time position and or heading information. The Trimble SPS550 Receiver can be combined with either the Trimble SCS900 Site Controller Software for land based rover applications, or Trimble HYDROpro™ for marine positioning solutions.

Location GPS is a term that covers decimeter to sub meter GPS positioning techniques including Satellite Based Augmentation Systems (SBAS e.g. WAAS, EGNOS, etc.), DGPS (reference station and rover operations), OmniSTAR XP and HP services, and Location RTK (decimeter level RTK positioning). In addition it includes moving baseline operations to determine both position and heading of a moving vessel providing the ability to rapidly position objects such as piling rigs, marine dredgers or bridge sections in real time.

The Trimble SPS550 Receiver is capable of operating in all Location GPS modes, and when combined with the Trimble SPS550H Heading Add-on Receiver, it delivers both Location GPS and heading capability.

The systems modularity provides the flexibility to mount the receiver and GPS antenna in a variety of ways, allowing for operation on a pole, backpack, site vehicle, light machinery or marine vessel. The receiver can be mounted in an accessible location where it is easy to configure and is secure from theft and the weather, while the antennas can be mounted in a location that provides clear line of sight to the sky and is free from multi-path.

**Trimble Construction Division, 5475 Kellenburger Road, Dayton, OH 45424, USA**

The receiver has been designed for ease of use, ruggedness to withstand the environment it is used in, and connectivity in mind. The user can configure the receiver and check its status with the front panel display and keyboard without the need for any external computer. The Trimble SPS550 Receiver supports Bluetooth® wireless connectivity for cable-free operation, Internet Protocol (IP) over an Ethernet connection via a web browser, Serial and CAN communications. The Trimble SPS550 Receiver also utilizes industry standard protocols for positioning data communication, making it easy to integrate into any 3D positioning system.

For DGPS and Location RTK operations, the receiver can be used with external radio modems, or be equipped with UHF or 900MHz internal radios capable of both Transmit and Receive operations.

Location RTK operations can be accomplished using CMR outputs from any available RTK base station or VRS (Virtual Reference Station) .

## Standard System Features

- Location GPS capability – decimeter to sub-meter positioning
    - Satellite Based Augmentation System (SBAS) compatible (WAAS, EGNOS & MSAS)
    - DGPS reference station or rover operation
    - OmniSTAR XP/HP capability (requires valid subscription)
    - Location RTK using CMR corrections by radio link, NTRIP or VRS via cell phone
- 24-channel L1/L2 GPS receiver - Single frequency GPS for SBAS and DGPS positioning solutions and dual frequency GPS for OmniSTAR XP/HP, heading and RTK Float solutions
- Long life integrated battery - Provides >10 hrs operation as a base station with internal Transmit/Receive radio, and >13 hrs as a rover.
- Integrated display and keypad for fast system configuration and status checking-without the need for a controller
- Integrated Bluetooth for cable-free configuration and operation with a computer
- Supports IP so that it can be configured and checked remotely over the Internet via an Ethernet port and web browser
- Rubber duck antenna for rover operations, or external radio antenna for a high gain solution in base station operations
- Small, lightweight design – 1.65 kg (3.64 lbs) (receiver only with battery)
- Permanent, semi permanent and mobile quick setup DGPS base station capability

- One base station receiver can broadcast corrections via multiple radio links. For example broadcast corrections via an internal 450 MHz radio, as well as an external 900 MHz radio from the same base station receiver.

- Up to 10 Hz measurement update rate

- Tough aluminum housing

- IP67 environmental rating, withstands submersion in water up to 1m deep.

- -40° C to +65° C (-40° F to +149° F) operating temperature range

- 10.5V to 28V DC input power range with over-voltage protection

## SPS550 Receiver option features

- Internal 450 MHz (3 frequency bands) radio with Transmit and Receive capability (SPS550 only)

- Internal 900 MHz radio with Transmit and Receive capability (SPS550 only)

## SPS550H Heading Add-On Standard Receiver features

- Low-cost heading add-on receiver for the Trimble SPS550, SPS750 or SPS850 Receiver

- Connection to another GPS receiver via Bluetooth or serial port

- 10 Hz  heading update rate in NMEA 0183 and Trimble binary formats

- Configuration and heading display on 2 line display

- Bluetooth for cable free connection to computer

- Includes GA510 rover GPS antenna, mounting bracket and short interconnecting cable

- Ideal for projects that require precise heading of vessel or structure

## Specifications

| General Characteristics | Specifications |
|---|---|
| Keyboard and display | VFD display 16 characters by 2 rows<br>On / Off key for one button start up<br>Escape and Enter key for menu navigation<br>4 arrow keys (up, down, left, right) for option scrolls and data entry |
| Receiver type | Modular GPS receiver |
| Antenna type (SPS550) | User selectable:<br>GA510 Antenna or Zephyr Geodetic Model 2<br>Also supports Legacy Trimble antennas:<br><ul><li>Single frequency antenna for DGPS use</li><li>Dual frequency antenna such as Z-Plus, Zephyr, Zephyr Geodetic and Micro Centered for heading applications.</li></ul>For OmniSTAR functionality the GA510 antenna is recommended<br>For DGPS base station functionality the Zephyr Geodetic Model 2 antenna is recommended |
| Antenna Type (SPS550H) | GA510 antenna included in kit |

| Physical characteristics | Specifications |
|---|---|
| Dimensions (LxWxD) | 24cm (9.4 in) x 12cm (4.7 in) x 5cm (1.9 in) including connectors |
| Weight | 1.65 kg (3.64 lbs) receiver with internal battery and radio1.55 kg (3.42 lbs) receiver with internal battery and no radio |
| Temperature[1]<br>　　　Operating<br>　　　Storage | <br>-40° C to +65° C (-40° F to +149° F)<br>-40° C to +80° C (-40° F to +176° F) |
| Humidity | MIL-STD 810F, Method 507.4 |
| Waterproof | IP67 for submersion to depth of 1 m (3.28ft), dustproof |
| Shock and vibration<br><br>　　　Shock - non operating<br>　　　Shock – operating<br>　　　Vibration | Tested and meets the following environmental standards:<br>Designed to survive a 2m (6.6 ft) pole drop onto a hard surface<br>To 75g, 6 ms<br>To 40g, 10 ms, saw-tooth<br>Tested to Trimble ATV profile (4.5 $g_{rms}$):<br>　　　10 – 300 Hz: 0.04 $g^2$/Hz |

| Performance characteristics | Specifications |
|---|---|
| Measurements | Advanced Trimble Maxwell 5 Custom GPS chip |
| | High-precision multiple correlator for L1 and L2 pseudo-range measurements |
| | Unfiltered, unsmoothed pseudo-range measurements data for low noise, low multi-path error, low time domain correlation and high dynamic response |
| | Very low noise L1 and L2 carrier phase measurements with <1mm precision in a 1 Hz bandwidth |
| | L1 and L2 Signal-to-Noise ratios reported in dB-Hz |
| | Proven Trimble low elevation tracking technology |
| | 24 Channels L1 C/A Code |
| | L1/L2 Full Cycle Carrier |
| | EVEREST multipath signal mitigation |
| | SBAS – WAAS, EGNOS etc |
| Code differential GPS positioning[2] | |
|     Horizontal accuracy | ±(0.25 m + 1 ppm) RMS, ± (10 in + 1 ppm) RMS |
|     Vertical accuracy | ±(0.50 m + 1 ppm) RMS, ± (20 in + 1 ppm) RMS |
| SBAS (WAAS / EGNOS / MSAS)[3] | |
|     Horizontal accuracy | Typically <1 m (3.3 ft) |
|     Vertical accuracy | Typically <5 m (16 ft) |
| OmniSTAR Positioning | |
|     XP Service Accuracy | Horizontal 20 cm (8 in), Vertical 30 cm (12 in) |
|     HP Service Accuracy | Horizontal 10 cm (3.9 in), Vertical 15 cm (5.9 in) |
| Location RTK | |
|     Horizontal Accuracy | ±(0.1 m + 1 ppm) RMS, ± (3.9 in + 1 ppm) RMS |
|     Vertical Accuracy | ±(0.15 m + 1 ppm) RMS, ± (5.9 in + 1 ppm) RMS |
| Heading accuracy with additional SPS550, SPS550H, SPS750 Max or SPS850 Extreme | 0.05° RMS (10m antenna separation) |
| | Does not require shore based corrections for heading solution |

| Electrical characteristics | Specifications |
|---|---|
| Power | |
|     Internal | Integrated internal battery 7.2V, 7800 mA-hr, Li-Ion |
| | Internal battery operates as a UPS in the event of external power source outage |
| | Internal battery will charge from external power source when input voltage is >15V |
| | Integrated charging circuitry |
|     External | Power input on7 pin 0 shell Lemo connector is optimized for lead acid batteries with a cut off threshold of 10.5V |
| | Power input on the 26 pin DSub connector is optimized for Trimble Li Ion battery input (PN 49400) with a cut off threshold of 9.5V |
| | Power source supply (Internal / External) is hot swap capable in the event of power source removal or cut off. |

| Electrical characteristics | Specifications |
|---|---|
| | 10.5V to 28V DC external power input with over-voltage protection |
| | Receiver will Auto Power On when connected to external power |
| Power consumption | 6.3W, in rover mode with internal receive radio |
| | 8.5W, in base mode with internal transmit radio |
| Base station operation times on internal battery<br>    External radio<br>        450 MHz 0.5W systems*<br>        900 MHz 1.0W systems<br>*Users who purchase the 2.0w upgrade will experience battery degradation compared to the results listed here for a 0.5W solution. | <br><br>15 hrs; varies with temperature<br>11 hrs; varies with temperature<br>10 hrs; varies with temperature |
| Rover operation times on internal battery<br>    450 MHz 2.0W systems<br>    900 MHz 1.0W systems | <br>13 hrs; varies with temperature<br>13 hrs; varies with temperature |
| Regulatory Compliance | FCC: Part 15 Subpart B (Class B Device) and Subpart C, Part 90<br><br>Industry Canada: ICES-003 (Class B Device), RSS-210, RSS-Gen, RSS-310, RSS-119<br><br>R&TTE Directive: EN 301 489-1/-5/-17, EN 300 440, EN 300 328, EN 300 113, EN 60950, EN 50371<br>ACMA: AS/NZS 4295<br>CE mark<br> C-tick mark<br>UN ST/SG/AC.10.11/Rev. 3, Amend. 1 (Li-Ion Battery)<br>UN ST/SG/AC. 10/27/Add. 2 (Li-Ion Battery)<br><br>WEEE Compliant |

| Communications Characteristics | Specifications |
|---|---|
| Communications<br>Port 1 (7-pin 0S Lemo)<br>Port 2 (DSub 26-pin)<br><br>USB<br>Ethernet<br>Bluetooth | <br>3-wire RS-232 CAN<br>Full RS-232 (Via multi-port adapter)<br>3-wire RS-232 CAN<br>USB (On the Go) (Via multi-port adapter)<br>Ethernet (Via multi-port adapter)<br>Fully integrated, fully sealed 2.4 GHz Bluetooth[4] |
| Integrated Radios<br><br><br>Channel spacing (450MHz) | Fully integrated, fully sealed internal 450 MHz, TXRX<br>Fully integrated, fully sealed internal 900 MHz, TXRX<br><br>12.5 or 25KHz spacing available<br>End user configurable |

| Communications Characteristics | Specifications |
|---|---|
| Frequency approvals (900MHz) | USA (-10), Australia (-20), New Zealand (-30) |
| 450MHz Transmitter radio power output<br>900MHz Transmitter radio power output | 0.5W / 2.0W (2.0W upgrade only available in some countries)<br>1.0 W(30 dBm) |
| Receiver position update rate | 1, 2, 5 and 10 Hz positioning |
| Correction Data Input and Output | RTCM 2.1, RTCM 2.3(DGPS only), RTCM 3.0 input(Location RTK only), CMR 5, 10Hz(Moving Base only), CMR+ input(Location RTK only) |
| Data Outputs | NMEA 0183 and GSOF |

## Receiver operations capability

| Receiver | Specifications |
|---|---|
| SPS550 | SBAS, OmniSTAR XP/HP, DGPS Base or Rover, Heading Base, Heading Rover, Location RTK Rover |
| SPS550H | Heading Add-on only (Heading Rover) |

1. Receiver will operate normally to -40°C. Bluetooth module and internal batteries are rated to -20°C
2. Accuracy and reliability may be subject to anomalies such as multipath, obstructions, satellite geometry and atmospheric conditions. Always follow recommended practices
3. Depends on SBAS system performance
4. Bluetooth type approvals are country-specific. Contact your local Trimble office or representative for more information

*Specifications are subject to change without notice*