

### KEY FEATURES

- Location GPS receiver capable of 2 cm vertical and 10 cm horizontal accuracy when in Location RTK mode
- GLONASS capability is available at time of sale or as an upgrade later
- Integrated Bluetooth® wireless technology
- Optional internal 900 MHz or 450 MHz radio
- Up to 13 hours operation on internal battery
- Pulse Per Second (1PPS) output with ASCII time tags
- Ideal for site supervisors on construction and roading projects or marine dredging

### LOCATION GPS RECEIVER WITH PRECISE VERTICAL ACCURACY

The Trimble® SPS651 Modular GPS Receiver is designed for use on a construction supervisor's vehicle—where cost-effective real-time positioning is required. With 10 cm (location) horizontal accuracy and 2 cm (precise) vertical accuracy, site supervisors have cost-effective GPS information, without ever leaving the vehicle.

The Trimble SPS651 receiver can operate in all Location GPS modes, including Satellite Based Augmentation Systems (SBAS), Differential GPS (DGPS), OmniSTAR (VBS, XP, and HP services), and in Location RTK mode. It can also be upgraded to track the GLONASS and Modernized GPS L2C signals, allowing it to operate in areas with obstructed sky visibility or during times of limited GPS availability.

Precise GPS heading is available with the addition of the Trimble SPS551H Heading Add-on Receiver.

#### Flexible Options to Suit Changing Job Site Requirements

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

#### The Positioning Component of the Trimble Site Supervisor System

The Trimble SPS651 Modular GPS Receiver is the essential positioning component of the new vehicle-mounted Trimble Site Supervisor System. When combined with Trimble SCS900 Site Controller Software – Tablet Edition, the Trimble SPS651 GPS Receiver empowers site supervisors to better manage decision-making with portable site plans and designs, precise cut/fill information, and real-time GPS positioning accuracy with precise vertical measurement.

Supervisors in highways, site preparation, earthworks, landfill, marine construction, and mining can use the Trimble SPS651 receiver and Trimble SCS900 Tablet Edition software for:

- Performing initial site measurement and verification of original ground levels
- Measuring and locating existing site features
- Monitoring real-time cut/fill information in a particular location
- Checking finished grade and laid material thickness against design elevations and tolerances
- Computing progress and material stockpile volumes
- Managing, monitoring, and conducting quality control for excavation and grading operations
- Assessing as-built measurements and generating high quality reports for record keeping, client approvals, and payment purposes



# TRIMBLE SPS651 MODULAR GPS RECEIVER AND TRIMBLE SITE SUPERVISOR SYSTEM

## GENERAL

Keyboard and display . . . VFD display 16 characters by 2 rows  
On/Off key for one button start up  
Escape and Enter key for menu navigation  
4 arrow keys (up, down, left, right)  
for option scrolls and data entry  
Dimensions (L x W x D) . . . . . 24 cm x 12 cm x 5 cm  
(9.4 in x 4.7 in x 1.9 in)  
including connectors  
Weight . . . . . 1.65 kg (3.64 lb) receiver  
with internal battery and radio  
1.55 kg (3.42 lb) receiver  
with internal battery and no radio

## Antenna options

L1/L2/L2C GPS operation . . . . . GA510\* or Zephyr™ Model 2  
GLONASS operation . . . . . Zephyr Model 2  
DGPS Base Station . . . . . Zephyr Geodetic™ Model 2  
OmniSTAR operation . . . . . GA510\* or Zephyr Model 2  
\* GA510 provides superior OmniSTAR tracking.  
Supports legacy Trimble antennas. . . . . Single frequency  
antenna for DGPS use  
Dual frequency antenna such  
as Z+, Zephyr, Zephyr Geodetic, and  
Micro-Centered™ for Location RTK applications

## Temperature<sup>1</sup>

Operating . . . . . -40 °C to +65 °C (-40 °F to +149 °F)  
Storage . . . . . -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 (3.3 ft), dustproof

## Shock and vibration

Designed to survive a 1 m (3.3 ft) pole drop onto a hard  
surface  
Shock: non-operating . . . . . To 75 g, 6 ms  
Shock: operating . . . . . To 40 g, 10 ms, saw-tooth  
Vibration . . . . . Tested to Trimble ATV profile (4.5 gRMS):  
10 Hz–300 Hz: 0.04 g<sup>2</sup>/Hz;  
300 Hz–1,000 Hz; -6 dB/octave

## Measurements

- Advanced Trimble Maxwell™ 5 Custom GPS chip
- High-precision multiple correlator for L1/L2 pseudo-range measurements
- Unfiltered, unsmoothed pseudo-range measurements data for low noise, low multipath error, low time domain correlation, and high dynamic response
- Very low noise carrier phase measurements with <1 mm precision in a 1 Hz bandwidth
- L1/L2 signal-to-noise ratios reported in dB-Hz
- Proven Trimble low elevation tracking technology
- 72-channel L1 C/A code, L1/L2 Full Cycle Carrier. Upgradable to L2C and GLONASS L1/L2 Full Cycle Carrier.
- EVEREST™ multipath signal rejection
- 4-channel SBAS (WAAS/EGNOS/MSAS)

## Code differential GPS positioning<sup>2</sup>

Horizontal accuracy . . . . . 0.25 m + 1 ppm RMS  
(0.8 ft + 1 ppm RMS)  
Vertical accuracy . . . . . 0.50 m + 1 ppm RMS  
(1.6 ft + 1 ppm RMS)

## SBAS (WAAS/EGNOS/MSAS)<sup>3</sup> positioning

Horizontal accuracy . . . . . Typically <1 m (3.3 ft)  
Vertical accuracy . . . . . Typically <5 m (16.4 ft)

## OmniSTAR positioning

VBS service accuracy . . . . . Horizontal <1 m (3.3 ft)  
XP service accuracy . . . . . Horizontal 0.2 m (0.66 ft),  
Vertical 0.3 m (1.0 ft)  
HP service accuracy . . . . . Horizontal 0.1 m (0.33 ft),  
Vertical 0.15 m (0.5 ft)

## Location RTK positioning<sup>2</sup>

Horizontal accuracy . . . . . 0.07 m + 1 ppm RMS  
(0.23 ft + 1 ppm) RMS  
Vertical accuracy . . . . . 0.02 m + 1 ppm RMS  
(0.07 ft + 1 ppm) RMS  
Heading accuracy with  
SPS551H or additional SPSx5x . . . . . 0.05° RMS  
(10 m antenna separation)  
Does not require shore-based  
corrections for heading solution

## POWER Internal

- Integrated internal battery 7.2 V, 7800 mA-hr, Lithium-ion
- Internal battery operates as a UPS in the event of external power source failure
- Internal battery will charge from external power source when input voltage is >15 V
- Integrated charging circuitry

## External

- Power input on 7-pin 0-shell Lemo connector is optimized for lead acid batteries with a cut-off threshold of 10.5 V
- Power input on the 26-pin D-sub connector is optimized for Trimble Lithium-ion battery input with a cut-off threshold of 9.5 V
- Power source supply (Internal/External) is hot-swap capable in the event of power source removal or cut off
- 9.5 V to 28 V DC external power input with over-voltage protection
- Receiver will automatically turn on when connected to external power

Power consumption . . . . . 6.0 W in rover mode  
with internal receive radio  
8.0 W in base mode  
with internal transmit radio

## Base station operation times on internal battery

External radio . . . . . 15 hours;  
varies with temperature  
Internal radio (450 MHz, 0.5 W) . . . . . 11 hours;  
varies with temperature

## Rover operation times on internal battery

450 MHz systems . . . . . 13 hours; varies with temperature  
 900 MHz systems . . . . . 13 hours; varies with temperature

## Regulatory approvals

- FCC: Part 15 Subpart B (Class B Device) and Subpart C, Part 90
- Industry Canada: ICES-003 (Class B Device), RSS-210, RSS-Gen, RSS-310, RSS-119
- R&TTE Directive: EN 301 489-1/-5/-17, EN 300 440, EN 300 328, EN 300 113, EN 60950, EN 50371
- ACMA: AS/NZS 4295 approval
- CE mark compliance;
- C-tick mark compliance
- UN ST/SG/AC.10.11/Rev. 3, Amend. 1 (Lithium-ion Battery)
- UN ST/SG/AC. 10/27/Add. 2 (Lithium-ion Battery)
- RoHS compliant (excludes those with an internal 900 MHz radio)
- WEEE compliant

## Communications

Port 1 (7 pin 05 Lemo)  
 Serial 1 . . . . . 3 wire RS232

Port 2 (26 pin D-sub)  
 Serial 2 . . . . . Full 9 wire RS-232  
 Serial 3 . . . . . 3 wire RS232  
 1PPS (pulse per second) . . . . . via adapter cable  
 USB (On the Go) . . . . . via multi-port adapter  
 Ethernet . . . . . via multi-port adapter  
 Bluetooth . . . . . Fully-integrated, fully-sealed  
 2.4 GHz Bluetooth<sup>5</sup> module

Integrated radios (optional) . . . . Fully integrated, fully sealed  
 internal 450 MHz (UHF) Tx/Rx;  
 Internal 900 MHz Tx/Rx

Channel spacing (450 MHz) . . . . .12.5 KHz or 25 KHz  
 spacing available  
 End-user configurable

450 MHz output power . . . . . 0.5 W, 2.0 W  
 (2.0 W available only  
 in certain countries)

Frequency approvals (900 MHz). . . . . USA/Canada (-10)  
 New Zealand/Australia (-20)  
 Australia (-30)

Receiver position update rate . . . . . 1 Hz, 2 Hz, 5 Hz,  
 and 10 Hz positioning

Correction data input . . . . . CMR, CMR+, RTCM 3, RTCM 2.x  
 Correction data output . . . CMR/CMR+ (for Moving Baseline),  
 RTCM 2.x (DGPS only)

Data outputs . . . . . NMEA, GSOFF, 1PPS Time Tags

## Receiver options and upgrades

GLONASS . . . . . Uses GLONASS L1/L2  
 satellite signals

450 MHz Radio 2.0 W. . . . . Available only in certain countries

L2C (upgrade only) . . . . . Uses GPS L2C  
 satellite signals

## Receiver operations capability

SPS651 . . . . . SBAS, OmniSTAR services,  
 DGPS Base or Rover,  
 Moving Base or Heading,  
 Location RTK Rover with Precise vertical measurement

1 Receiver will operate normally to -40°C. Bluetooth module and internal batteries are rated to -40°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 If your receiver has the 2.0 W upgrade, you will experience reduced battery performance compared to the 0.5 W solution.  
 5 Bluetooth type approvals are country-specific. For more information, contact your local Trimble office or representative.

Specifications subject to change without notice.

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