

# TRIMBLE R4 GNSS SYSTEM

## KEY FEATURES

Trimble **R-Track** satellite tracking technology

Includes **Trimble Maxwell 6** chip with 220 channels

**Scalable** from postprocessing to VRS to multi-constellation RTK configurations

**Cable-free** for convenience

**Accurate, reliable and rugged** system

Trimble **Slate** controller



## DEPENDABLE WHEN EVERY POINT COUNTS

Designed for surveyors looking for easy-to-use GNSS technology, the Trimble® R4 GNSS System performs under even the most rigorous conditions. GNSS support upgrade options, integrated Trimble R-Track™ satellite tracking technology, and a straightforward system design result in a system that is flexible, reliable, and rugged.

## A COMPLETE GNSS SYSTEM

Lightweight, convenient and cable-free, the Trimble R4 GNSS system with Trimble Access™ field software provides the ease of use of an integrated receiver and everything you need to perform a basic survey campaign.

The dual-frequency antenna enhances tracking capacity and delivers sub-millimeter phase center stability for precise results in demanding conditions. Internally powered with removable batteries, this system provides a full working day of uninterrupted field operation.

## ADVANCED TRIMBLE R-TRACK TECHNOLOGY

The Trimble R4, powered with a Trimble Maxwell™ 6 chip with 220 channels, delivers the accuracy and reliability required for precision surveying with superior tracking and RTK performance. With GPS L2C and the Japanese QZSS support included, you can track more satellites and measure more successfully in challenging environments. L2C provides more than just additional signals – the advanced signal structure provides better strength for more reliable satellite tracking.

Trimble R-Track satellite tracking technology delivers reliable, precise positioning performance. Trimble R-Track with Signal Prediction™ compensates for intermittent or marginal RTK correction signals, enabling extended precision operation after an RTK signal is interrupted.

The CMRx communications protocol provides correction compression for optimized bandwidth and full utilization all of the satellites in view, giving you reliable positioning performance.

## CHOOSE THE LEVEL OF GNSS SUPPORT YOU REQUIRE TODAY

Choose the level of GNSS support you require today with the flexible upgrade options available on the Trimble R4. Founded on proven GNSS technology, the Trimble R4 comes standard with GPS L1, L2, L2C and QZSS. Beyond this standard GNSS support, the Trimble R4 offers upgrades to GLONASS, Galileo, and BeiDou (COMPASS)—just choose what you need.

## FUNCTIONS AS A VRS ROVER, RTK ROVER, OR FIELD BASE STATION

Use as a lightweight rover for static surveying or RTK. The Trimble R4 is also completely compatible with Trimble VRS™ solutions, creating a VRS rover for use inside real-time networks. With a built-in 450 MHz receive-only radio or a fully integrated GSM/GPRS radio, this system can be adapted to meet a variety of needs. As a base station, the Trimble R4 with the integrated UHF transmit option is rugged, weather-resistant and compatible with a range of radio solutions.

## A DEDICATED, RELIABLE GNSS FIELD SOLUTION

Pair the Trimble R4 with Trimble Access and the Trimble Slate Controller<sup>1</sup> for a dedicated GNSS solution that is effective for both real time and postprocessed GNSS surveys.

Powerful, connected, and compact, the Trimble Slate Controller combines the convenience and ease-of-use of a smartphone with the durability for which Trimble is known. Its slim, ergonomic design is easy to grasp and its screen provides superior sunlight readability enabling all-day use by hard-working survey professionals.

Trimble Access field software provides specialized and customized workflows to make surveying tasks quicker and easier while enabling teams to communicate vital information between field and office in real-time.

Survey companies can also implement their unique workflows by taking advantage of the customization capabilities available in the Trimble Access Software Development Kit (SDK).

Need to get data back to the office immediately? Benefit from real-time data sharing via Trimble Access Services, now available with any valid Trimble Access maintenance agreement.

Back in the office, users can seamlessly process data with Trimble Business Center office software.

The Trimble R4 GNSS system – ready and reliable for your everyday surveying needs.

<sup>1</sup> The Trimble R4 can be used with a Trimble TSC3, Trimble CU, or Trimble Tablet Rugged PC with the purchase of an advanced data collector option.

## PERFORMANCE SPECIFICATIONS

### Measurements

- Advanced Trimble Maxwell 6 Custom Survey GNSS chip with 220 channels
- Trimble R-Track technology
- High precision multiple correlator for GNSS pseudorange measurements
- Unfiltered, unsmoothed pseudorange measurements data for low noise, low multipath error, low time domain correlation and high dynamic response
- Very low noise GNSS carrier phase measurements with <1 mm precision in a 1 Hz bandwidth
- Signal-to-Noise ratios reported in dB-Hz
- Proven Trimble low elevation tracking technology
- Satellite signals tracked simultaneously:
  - GPS: L1C/A, L1C, L2C, L2E
  - GLONASS<sup>1</sup>: L1C/A, L1P, L2C/A, L2P, L3
  - SBAS: L1C/A
  - Galileo<sup>1</sup>: E1, E5A, E5B
  - BeiDou<sup>1</sup> (COMPASS): B1, B2
- SBAS: QZSS, WAAS, EGNOS, GAGAN
- Positioning rates: 1 Hz, 2 Hz, 5 Hz, and 10 Hz

## POSITIONING PERFORMANCE<sup>2</sup>

### Code differential GNSS positioning

Horizontal	0.25 m + 1 ppm RMS
Vertical	0.50 m + 1 ppm RMS
SBAS differential positioning accuracy <sup>3</sup>	typically <5 m 3DRMS

## STATIC GNSS SURVEYING

### High-precision static

Horizontal	3 mm + 0.1 ppm RMS
Vertical	3.5 mm + 0.4 ppm RMS

### Static and FastStatic

Horizontal	3 mm + 0.5 ppm RMS
Vertical	5 mm + 0.5 ppm RMS

## POSTPROCESSED KINEMATIC (PPK) GNSS SURVEYING

Horizontal	8 mm + 1 ppm RMS
Vertical	15 mm + 1 ppm RMS

## REAL TIME KINEMATIC SURVEYING<sup>4</sup>

### Single Baseline <30 km

Horizontal	8 mm + 1 ppm RMS
Vertical	15 mm + 1 ppm RMS

## NETWORK RTK

Horizontal	8 mm + 0.5 ppm RMS
Vertical	15 mm + 0.5 ppm RMS
Initialization time <sup>5</sup>	typically <8 seconds
Initialization reliability <sup>5</sup>	typically >99.9%

1 Optional upgrade.

2 Precision and reliability may be subject to anomalies due to multipath, obstructions, satellite geometry, and atmospheric conditions. The specifications stated recommend the use of stable mounts in an open sky view, EMI and multipath clean environment, optimal GNSS constellation configurations, along with the use of survey practices that are generally accepted for performing the highest-order surveys for the applicable application including occupation times appropriate for baseline length. Baselines longer than 30 km require precise ephemeris and occupations up to 24 hours may be required to achieve the high precision static specification.

3 Depends on SBAS system performance.

4 Network RTK PPM values are referenced to the closest physical reference station.

5 May be affected by atmospheric conditions, signal multipath, obstructions and satellite geometry. Initialization reliability is continuously monitored to ensure highest quality.

6 Receiver will operate normally to -40 °C, internal batteries are rated to -20 °C, optional internal GSM modem operates to -30 °C.

7 Tracking GPS, GLONASS and SBAS satellites. Optional upgrade required for GLONASS.

8 Varies with temperature and wireless data rate. When using a receiver and internal radio in the transmit mode, it is recommended that an external 6 Ah or higher battery is used.

9 Varies with terrain and operating conditions.

10 Bluetooth type approvals are country specific.

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## HARDWARE

### Physical

Dimensions (WxH)	19 cm x 10.2 cm (7.5 in x 4.0 in), including connectors
Weight	1.52 kg (3.35 lb) with internal battery, internal radio with UHF antenna 3.04 kg (6.70 lb) items above plus range pole, controller, and bracket
Temperature <sup>6</sup>	Operating: -40 °C to +65 °C (-40 °F to +149 °F) Storage: -40 °C to +75 °C (-40 °F to +167 °F)
Humidity	100%, condensing
Water/dustproof	IP67 dustproof, protected from temporary immersion to depth of 1 m (3.28 ft)
Shock and vibration	Tested and meets the following environmental standards: Shock: Non-operating: Designed to survive a 2 m (6.6 ft) pole drop onto concrete. Operating: to 40 G, 10 msec, sawtooth Vibration: MIL-STD-810F, FIG.514.5C-1

### Electrical

- Power 11 V DC to 28 V DC external power input with over-voltage protection on Port 1 (7-pin Lemo)
- Rechargeable, removable 7.4 V, 2.6 Ah Lithium-Ion battery. Power consumption<sup>7</sup> is 3.2 W in RTK rover mode with internal radio and Bluetooth in use.
- Operating times on internal battery<sup>8</sup>:
  - 450 MHz receive only option: 5.0 hours
  - 450 MHz receive/transmit option (0.5 W): 2.5 hours
  - Cellular receive option: 4.7 hours

### Communications and Data Storage

- Serial: 3-wire serial (7-pin Lemo) on Port 1; full RS-232 serial on Port 2 (Dsub 9 pin)
- Radio modem: fully integrated, fully sealed internal 450 MHz receiver/transmitter option:
  - Transmit power: 0.5 W
  - Range<sup>9</sup>: 3–5 km typical / 10 km optimal
- Cellular: fully integrated, sealed internal GSM/GPRS option
- Bluetooth: fully integrated, sealed 2.4 GHz communications port (Bluetooth<sup>®</sup>)<sup>10</sup>
- External communication devices for corrections supported on Serial and Bluetooth ports
- Data storage: 11 MB internal memory, 188.6 hours of raw observables (approx. 1.4 MB/day), based on recording every 15 seconds from an average of 14 satellites

### Data formats

- CMR: CMR+, CMRx input and outputs
- RTCM: RTCM 2.1, RTCM 2.3, RTCM 3.0, RTCM 3.1 input and outputs
- Other outputs: 23 NMEA outputs, GSOE, RT17 and RT27 outputs, supports BINEX and smoothed carrier

### Supported Trimble Controllers

- Trimble Slate Controller
- Optional<sup>1</sup>: Trimble TSC3 controller, Trimble CU controller, Trimble Tablet Rugged PC

### Certifications

FCC Part 15 (Class B device), 22, 24, 90; CE Mark; C-Tick; 850/1900 MHz; Class 10 GSM/GPRS module; Bluetooth EPL

Specifications subject to change without notice.



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