TRIMBLE R4 GNSS SYSTEM

KEY FEATURES

Trimble **R-Track satellite tracking** technology

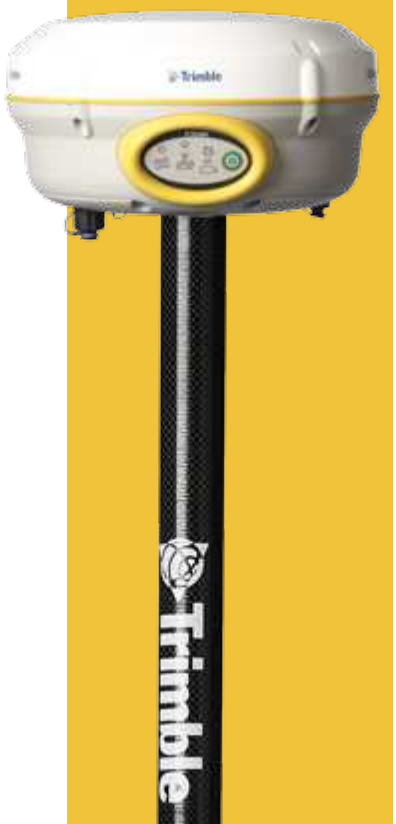
Includes **Trimble Maxwell 6** chip with 220 channels

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[1] 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.

1 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.

Trimble®

TRIMBLE R4 GNSS SYSTEM

DATASHEET

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[1]: L1C/A, L1P, L2C/A, L2P, L3
  - SBAS: L1C/A
  - Galileo[1]: E1, E5A, E5B
  - BeiDou[1] (COMPASS): B1, B2
- SBAS: QZSS, WAAS, EGNOS, GAGAN
- Positioning rates: 1 Hz, 2 Hz, 5 Hz, and 10 Hz

POSITIONING PERFORMANCE[2]

Code differential GNSS positioning

Horizontal	0.25 m + 1 ppm RMS
Vertical	0.50 m + 1 ppm RMS
SBAS differential positioning accuracy[3]	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[4]

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[5]	typically <8 seconds
Initialization reliability[5]	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.

PN 022543-490E (04/13)

HARDWARE

Physical

Dimensions (W×H)	19 cm × 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[6]	
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[7] is 3.2 W in RTK rover mode with internal radio and Bluetooth in use.
- Operating times on internal battery[8]:
  - 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[9]: 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®)[10]
- 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, GSOF, RT17 and RT27 outputs, supports BINEX and smoothed carrier

Supported Trimble Controllers

- Trimble Slate Controller
- Optional[1]: 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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SINGAPORE

Leica SR20
Single Frequency Survey Solution

- when it has to be **right**

Leica Geosystems

The Power of Leica GPS

The SR20 from Leica Geosystems has the power and flexibility to perform a wide range of land surveying tasks in the size of a handheld receiver.

Powerful Features
The Leica SR20 GPS data collector gives you an easy to use, rugged GPS receiver with the power to complete a variety of surveying tasks. The SR20 is capable of accurate static and kinematic surveys, real-time data collection using Satellite Based Augmentation Systems (SBAS) like WAAS and EGNOS, and much more.

- Powerful 12-channel GPS engine that yields centimeter results in post-processing mode
- Flexible to meet your land surveying requirements
- High quality L1 carrier phase measurements
- Comprehensive system includes survey workflow and applications
- Complete solution includes Leica Geo Office Software for powerful post-processing capabilities

Powerful Functionality
The SR20 is designed for the land surveyors and their workflow. The handheld software provides a simple interface with an intuitive workflow making the SR20 easy to learn and use. All this without sacrificing any functionality or configurations a power GPS user requires.

The SR20 comes standard with Leica Geo Office processing software. The most powerful GPS software in the industry today, the user-friendly software provides everything required for managing, visualizing, processing, importing and exporting SR20 GPS data.

Equipped with a high-resolution display, you can use the SR20 in all light conditions. A mobile phone styled keyboard provides intuitive data entry and removable, rechargeable batteries ensure the receiver can stay in the field as long as you do. And because the SR20 is handheld receiver, it is portable and easy to take along to all job sites.
Available in one and two receiver bundles, the SR20 system includes all necessary accessories to start working. Included is Leica's high accuracy antenna. This antenna is very rugged and tracks extremely well in even difficult GPS conditions.

And a Powerful Promise
You know you are getting an industry-leading technology solution because the SR20 comes from Leica Geosystems. Known throughout the world for precision and accuracy, the people at Leica Geosystems have been delivering on the promise of technology excellence for nearly a century.

The SR20 is a simple, yet powerful, GPS receiver

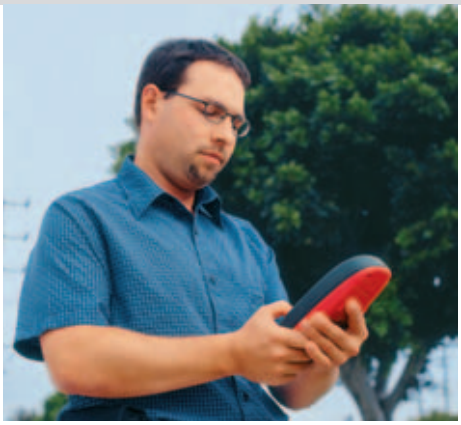
The SR20 is a comprehensive solution to meet the many demands facing today's surveyor. Combining ease of use, durability and powerful features all with proven Leica Geosystems GPS technology, the SR20 is today's answer for smart surveying and GPS data collection.

COGO Inverse – COGO Application

Main Menu – Easy to Use

Data Management – Map Display

One Solution to meet your Surveying Needs



The SR20 being used to collect sub-meter accurate utility features.

Configurable for a variety of jobs tasks, the SR20 can be set up as a reference station, a static and kinematic receiver, a navigator to locate monuments, and can even be upgraded to the GS20, for feature and attribute GIS data collection. In addition, you can expand your functionality anytime by connecting to a variety of external devices via **Bluetooth®** or serial interface. Coast Guard Beacon, GSM mobile phones, and other real-time solutions are optionally available. The SR20 includes several application programs that can be used for a variety of operations to achieve optimal results.

Having this flexibility allows you handle a variety of common tasks such as:

- Control monuments surveys
- Topographic data collection
- Locate monuments
- GPS networks
- Asset Management
- GIS data collection

The SR20 being used to collect centimeter accurate topographic data using kinematic techniques.

Specifications	SR20
Size	21.5 cm L x 9 cm W x 5 cm D: 8.46" x 3.54" x 1.97"
Weight (With Battery)	0.652 kg or 1lb 7oz
Power	2.1 Watt (typical) at 20° C, 7.2 V internal, 12 V external
Receiver	12 channel parallel automatic selection. L1 Code / Phase
Antenna	Internal: Leica AT575 microstrip, built-in groundplane External: Leica AT501 microstrip, built-in groundplane
Casing	Sealed polycarbonite housing; protection against wind driven rain and dust. Sealed battery compartment and sealed compact flash. IP54 Rating
Processor	240 MHz RISC floating point processor
Display	240 x 240 pixel graphical LCD, 16 grayscale with backlight
Internal Radio	**Bluetooth®**
Keypad	Front: Metal dome with high tactile feedback, protected on/off Side: Duplicate up, down and enter keys
Memory	ATA compact flash: Standard 32 MB; Max 2 GB
Data Transfer	RS232 Lemo, ATA compact flash
Internal Ports	RS232 Serial: 7 pin Lemo; Antenna Coaxial Lemo
Operating Temperature	–20° C to 55° C / –4° F to 122° F
Storage Temperature	–40° C to 75° C / –40° F to 167° F
Humidity	99 % non-condensing
Shock	1.2 m drop
Baseline rms (Post-processing)*	L1 Code only: Typically 30 cm (rms) L1 Code and Phase typically 5 to 10 mm + 2 ppm (rms)
DGPS/RTCM	RTCM version 2.1 (9,2 & 1,2) Optional support for Coast Guard Beacon differential correction
Baseline rms (DGPS/RTCM)*	L1 Code only: Typically 40 cm (rms)
Data Recording Rate and Capacity	At 1 Hz measurement; 1 hour runtime = 2 MB, 16 hours continuous measurement per 32 MB standard compact flash
Desktop Software	Leica Geo Office; L1 Code and Phase Post-Processing, ASCII export, import and export to dwg, dxf, dgn and mif
Application	Data Collection, Data Management, Stakeout, COGO
Battery	Lithium-Ion 7.2 Volt 2100 mAH w/microprocessor
Charger	Battery charger

*Baseline rms refers to accuracy in position. Accuracy in height is 2x accuracy in position. Figures are for normal to favorable conditions.

Standard Configurations
Each SR20 is packaged in it's industrial-strength storage and travel case, and is delivered assembled and ready for use. The SR20 GPS Receiver can be purchased in One or Two unit packages. These packages consist of the following pieces:
SR20 Package
SR20 GPS Receiver
External GPS Antenna
Antenna Cable
SR20 Holster
SR20 Pole Bracket
Storage and Travel Case
Li-Ion Batteries
Charger
Data Transfer Cable
Leica Geo Office Software
Set of Documentation

Whether you want to map the location of a power pole, the run of a pipeline, the area of a building or a farm; whether you are downtown or out in the country; whether you want to collect new features, or update and maintain the data from your Enterprise or Geographic Information System: For collecting, verifying and updating geographic data or an as-built of civil infrastructure models, Leica Geosystems offers the right solution – with seamless data exchange between field and office, for GIS or CAD workflow.

When the data really counts, Leica Geosystems offers the right combination of hardware and software: Field-proven sensors use up-to-date technologies including terrestrial and satellite data collection and navigation, distance measurement devices, scanners and airborne sensors. Our wide range of software solutions for field and office usage is compatible, scalable and flexible, with the accuracy and reliability that you need.

When it has to be right.

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TQM
ISO 9001 / ISO 14001

Total Quality Management – Our commitment to total customer satisfaction

Ask our local Leica Geosystems dealer for more information about our TQM program.

Leica GS20 PDM
Product brochure

Leica Geosystems AG
Heerbrugg, Switzerland
www.leica-geosystems.com

- when it has to be **right**

Leica Geosystems