Trimble R12i

GNSS SYSTEM

KEY FEATURES

- Trimble® Inertial Platform™ (TIP) technology. Calibration-free and magnetically immune IMU-based tilt compensation for topo measurements and stakeout.
- Trimble ProPoint™ GNSS positioning engine. Engineered for improved accuracy and productivity in challenging GNSS conditions.
- 672-channel solution with Trimble 360 satellite tracking technology
- CenterPoint® RTX correction service delivers fast, RTK level accuracy worldwide via satellite/IP
- Trimble xFill® correction outage technology
- Optimized for Trimble Access™ field software
- Android™ and iOS platform support
- Cellular, Bluetooth®, Wi-Fi data connectivity
- Military-spec rugged design and IP-67 rating
- Ergonomic form factor
- All day battery with built-in status indicator
- 6 GB internal memory
- Supports augmented reality capabilities through Trimble SiteVision™

Learn more:
geospatial.trimble.com/R12i



Tilt Compensation

Trimble AR Ready

PERFORMANCE SPECIFICATIONS

GNSS MEASUREMENTS

	Constellation agnostic, flexible signal tracking, improved positioning in challenging environments[1] and inertial measurement integration with Trimble ProPoint GNSS technology.	
	Increased measurement and stakeout productivity and traceability with Trimble TIP™ technology IMU-based tilt compensation	
	Advanced Trimble Custom Survey GNSS chips with 672 channels	
	Reduced downtime due to loss of radio signal or cellular connectivity with Trimble xFill technology	
	Signals tracked simultaneously	GPS: L1C, L1C/A, L2C, L2E, L5 GLONASS: L1C/A, L1P, L2C/A, L2P, L3 SBAS (WAAS, EGNOS, GAGAN, MSAS): L1C/A, L5 Galileo: E1, E5A, E5B, E5 AltBOC, E6[2] BeiDou: B1, B1C, B2, B2A, B2B, B3 QZSS: L1C/A, L1S, L1C, L2C, L5, L6 NavIC (IRNSS): L5 L-band: Trimble RTX™ Corrections
	Iridium filtering above 1616 MHz allows antenna to be used up to 20 m away from iridium transmitter	
	Japanese LTE filtering below 1510 MHz allows antenna to be used up to 100 m away from Japanese LTE cell tower	
	Digital Signal Processor (DSP) techniques to detect and recover from spoofed GNSS signals	
	Advanced Receiver Autonomous Integrity Monitoring (RAIM) algorithm to detect and reject problem satellite measurements to improve position quality	
	Improved protection from erroneous ephemeris data	
	Positioning Rates	1 Hz, 2 Hz, 5 Hz, 10 Hz, and 20 Hz

POSITIONING PERFORMANCE[3]

STATIC GNSS SURVEYING

High-Precision Static		
	Horizontal	3 mm + 0.1 ppm RMS
	Vertical	3.5 mm + 0.4 ppm RMS
Static and Fast Static		
	Horizontal	3 mm + 0.5 ppm RMS
	Vertical	5 mm + 0.5 ppm RMS

REAL TIME KINEMATIC SURVEYING

Single Baseline <30 km		
	Horizontal	8 mm + 1 ppm RMS
	Vertical	15 mm + 1 ppm RMS
Network RTK[4]		
	Horizontal	8 mm + 0.5 ppm RMS
	Vertical	15 mm + 0.5 ppm RMS
RTK start-up time for specified precisions[5]		2 to 8 seconds

TRIMBLE INERTIAL PLATFORM (TIP) TECHNOLOGY

TIP Compensated Surveying[6]		
	Horizontal	RTK + 5 mm + 0.4 mm/° tilt (up to 30°) RMS
	Horizontal	RTX + 5 mm + 0.4 mm/° tilt (up to 30°) RMS
IMU Integrity Monitor	Bias monitoring	Temperature, age and shock

TRIMBLE RTX CORRECTION SERVICES

CenterPoint RTX[7]		
	Horizontal	2 cm RMS
	Vertical	5 cm RMS
	RTX convergence time for specified precisions in Trimble RTX Fast regions	< 1 min
	RTX convergence time for specified precisions in non RTX Fast regions	< 15 min
	RTX QuickStart convergence time for specified precisions	< 1 min

TRIMBLE xFILL[8]

	Horizontal	RTK[9] + 10 mm/minute RMS
	Vertical	RTK[9] + 20 mm/minute RMS

TRIMBLE xFILL PREMIUM[8]

	Horizontal	3 cm RMS
	Vertical	7 cm RMS

CODE DIFFERENTIAL GNSS POSITIONING

	Horizontal	0.25 m + 1 ppm RMS
	Vertical	0.50 m + 1 ppm RMS
	SBAS[10]	typically <5 m 3DRMS

HARDWARE

PHYSICAL

Dimensions (W×H)	11.9 cm x 13.6 cm (4.6 in x 5.4 in)	
Weight	1.12 kg (2.49 lb) with internal battery, internal radio with UHF antenna, 3.95 kg (8.71 lb) items above plus range pole, Trimble TSC7 controller & bracket	
Temperature[11]		
	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
Ingress protection		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 to 24 V DC external power input with over-voltage protection on Port 1 and Port 2 (7-pin Lemo)	
	Rechargeable, removable 7.4 V, 3.7 Ah Lithium-ion smart battery with LED status indicators	
	Power consumption is 4.2 W in RTK rover mode with internal radio[12]	
Operating times on internal battery[13]		
	450 MHz receive only option	6.5 hours
	450 MHz receive/transmit option (0.5 W)	6.0 hours
	450 MHz receive/transmit option (2.0 W)	5.5 hours
	Cellular receive option	6.5 hours

COMMUNICATIONS AND DATA STORAGE

Serial	3-wire serial (7-pin Lemo)	
USB v2.0	Supports data download and high speed communications	
Radio modem	Fully Integrated, sealed 450 MHz wide band receiver/transmitter with frequency range of 403 MHz to 473 MHz, support of Trimble, Pacific Crest, and SATEL radio protocols:	
	Transmit power	2 W
	Range	3–5 km typical / 10 km optimal[14]
Cellular[15]	Integrated, 3.5 G modem, HSDPA 7.2 Mbps (download), GPRS multi-slot class 12, EDGE multi-slot class 12, Penta-band UMTS/HSDPA (WCDMA/FDD) 800/850/900/1900/2100 MHz, Quad-band EGSM 850/900/1800/1900 MHz, GSM CSD, 3GPP LTE	
Bluetooth	Fully integrated, fully sealed 2.4 GHz communications port (Bluetooth)[16]	
Wi-Fi	802.11 b,g, access point and client mode, WPA/WPA2/WEP64/WEP128 encryption	
I/O ports	Serial, USB, TCP/IP, IBSS/NTRIP, Bluetooth	
Data storage	6 GB internal memory	
Data format	CMR+, CMRx, RTCM 2.1, RTCM 2.3, RTCM 3.0, RTCM 3.1, RTCM 3.2 input and output	
	24 NMEA outputs, GSOF, RT17 and RT27 outputs, 1 PPS output	

WEBUI

	Offers simple configuration, operation, status, and data transfer
	Accessible via Wi-Fi, Serial, USB, and Bluetooth

SUPPORTED CONTROLLERS & FIELD SOFTWARE

	Trimble TSC7, Trimble T10, Trimble T7, Android and iOS devices running supported apps
	Trimble Access 2020.10 or later

AUGMENTED REALITY

	Supports outdoor augmented reality capabilities through Trimble SiteVision running on the Trimble TSC7 controller

CERTIFICATIONS

	FCC Part 15 (Class B device), 24, 32; CE Mark; RCM; PTCRB; BT SIG

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1 Challenging GNSS environments are locations where the receiver has sufficient satellite availability to achieve minimum accuracy requirements, but where the signal may be partly obstructed by and/or reflected off of trees, buildings, and other objects. Actual results may vary based on user's geographic location and atmospheric activity, scintillation levels, GNSS constellation health and availability, and level of multipath and signal occlusion.
2 The current capability in the receivers is based on publicly available information. As such, Trimble cannot guarantee that these receivers will be fully compatible with a future generation of Galileo satellites or signals.
3 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.
4 Network RTK PPM values are referenced to the closest physical base station.
5 May be affected by atmospheric conditions, signal multipath, obstructions and satellite geometry. Initialization reliability is continuously monitored to ensure highest quality.
6 TIP references the overall positioning error estimate at the tip of the surveying pole throughout the tilt compensation range. RTK refers to the estimated horizontal precision of the underlying GNSS position, which is dependent on factors that affect GNSS solution quality. The 5 mm constant error component accounts for residual misalignment between the vertical axes of the receiver and the built-in Inertial Measurement Unit (IMU) after factory calibration, assuming the receiver is mounted on a standard 2 m carbon fiber range pole which is properly calibrated and free from physical defects. The tilt-dependent error component is a function of the quality of the computed tilt azimuth, which is assumed here to be aligned using optimal GNSS conditions.
7 RMS performance based on repeatable in field measurements. Achievable accuracy and initialization time may vary based on type and capability of receiver and antenna, user's geographic location and atmospheric activity, scintillation levels, GNSS constellation health and availability and level of multipath including obstructions such as large trees and buildings.
8 Accuracies are dependent on GNSS satellite availability. xFill positioning without an xFill Premium subscription ends after 5 minutes of radio downtime. xFill Premium will continue beyond 5 minutes providing the solution has converged, with typical precisions not exceeding 3 cm horizontal, 7 cm vertical. xFill is not available in all regions, check with your local sales representative for more information.
9 RTK refers to the last reported precision before the correction source was lost and xFill started.
10 Depends on SBAS system performance.
11 Receiver will operate normally to –40 °C, internal batteries are rated to –20 °C.
12 Tracking GPS, GLONASS and SBAS satellites.
13 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.
14 Varies with terrain and operating conditions.
15 Due to local regulations, the integrated cellular modem cannot be enabled in China, Taiwan, or Brazil. A Trimble controller integrated cellular modem or external cellular modem can be used to obtain GNSS corrections via an IP (Internet Protocol) connection.
16 Bluetooth type approvals are country specific.

Specifications subject to change without notice.

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