

Trimble BX992

Dual antenna receiver with integrated inertial navigation system and MSS band demodulator

GNSS and inertial tight integration

Taking advantage of the expertise from Trimble in both GNSS and inertial technology the Trimble® BX992 module has been designed for applications requiring continuous centimeter accuracy in a compact package. By integrating inertial sensors on the same module, robust high accuracy positions and orientations are produced in all environments.

Trimble Maxwell 7 technology

The Trimble BX992 supports triple frequency for the GPS, GLONASS, BeiDou and Galileo constellations. As the number of satellites in the constellations grows the BX992 is ready to take advantage of the additional signals. This delivers the quickest and most reliable RTK initializations for centimeter positioning. For applications that do not require centimeter accuracy the BX992 integrated GNSS-inertial engine also delivers high accuracy GNSS, DGNSS positions in the most challenging environments such as urban canyons. With the latest Trimble Maxwell™ 7 technology, the BX992 provides:

- 2 x 336 Tracking Channels
- Trimble EVEREST™ Plus multipath mitigation
- Advanced RF Spectrum monitoring and analysis
- Proven low-elevation tracking technology

With the option of utilizing Trimble OmniSTAR® or Trimble RTX® correction service, the BX992 delivers varying levels of performance down to centimeter-level without the use of a base station.

Robust centimeter accurate solutions

The Trimble BX992 integrates the latest in precision inertial sensors in a compact package. With the BX992 you are buying a robust navigation solution, not just a GNSS receiver.

Trimble ProPoint engine

The Trimble BX992 is now available with the Trimble ProPoint® engine. For optimal performance in GNSS degraded conditions the ProPoint engine delivers premium accuracy, availability and integrity for your application.

Key benefits

- Trimble Maxwell 7 technology
- Trimble ProPoint positioning engine (Optional)
- Onboard high accuracy inertial sensor package integrated with GNSS for precise position and orientation
- 336 channels for multi-constellation GNSS support
- Trimble RTX and OmniSTAR support
- Compact design for mobile applications
- Flexible RS232, USB and Ethernet interfacing
- Centimeter-level position accuracy
- Advanced RF spectrum monitoring
- Rugged IP67 enclosure



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Flexible interfacing

The Trimble BX992 was designed for easy integration and rugged dependability. Customers benefit from the Ethernet connectivity available on the board, allowing high speed data transfer and configuration via standard web browsers. USB, CAN and RS-232 are also supported. Just like other Trimble embedded technologies, easy to use software commands simplify integration and reduce development times. An intuitive 3D interactive graphical web page allows easy input of lever arms. Dynamic and graphic models for various vehicle types can also be selected. Different configurations of the module are available. All features are password upgradeable, allowing functionality to be upgraded as your requirements change.

Technical specifications¹

- Trimble Maxwell 7 technology
- Trimble ProPoint positioning engine (optional)
- Onboard Advanced MEMS inertial sensors
- Position Antenna based on 336 Channel Maxwell 7 chip:
 - GPS: L1 C/A, L2E, L2C, L5
 - BeiDou: B1, B2, B3¹²
 - GLONASS: L1 C/A, L2 C/A, L3 CDMA¹³
 - Galileo: E1, E5A, E5B, E5AltBOC, E6¹³
 - IRNSS: L5
 - QZSS: L1 C/A, L1 SAIF, L1C, L2C, L5, LEX
 - SBAS: L1 C/A, L5
 - MSS L-Band: OmniSTAR, Trimble RTX
- Vector Antenna based on second 336 Channel Maxwell 7 chip:
 - GPS: L1 C/A, L2E, L2C, L5
 - BeiDou: B1, B2, B3
 - GLONASS: L1 C/A, L2 C/A, L3 CDMA¹³
 - Galileo: E1, E5A, E5B, E5AltBOC, E6¹³
 - IRNSS: L5
 - QZSS: L1 C/A, L1 SAIF, L1C, L2C, L5, LEX
- High precision multiple correlator for GNSS pseudorange measurements
- Trimble EVEREST Plus multipath mitigation
- Supports Trimble CenterPoint® RTX, Trimble FieldPoint RTX (only with ProPoint Engine) and Trimble RangePoint® RTX (only with ProPoint Engine)¹⁴
- Advanced RF Spectrum Monitoring and Analysis
- 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
- Proven Trimble low elevation tracking technology
- Reference outputs/inputs:
 - CMR, CMR+, sCMRx, RTCM 2.1, 2.2, 2.3, 3.0, 3.1¹¹, 3.2

Key features include:

- High update rate position and orientation solution
- Dual-antenna for rapid heading alignment
- Continuous positioning in GNSS denied environments
- Lever arm calculation from antenna to reference point of interest
- Robust Moving Baseline RTK for precision landing on moving platforms

- Navigation Outputs:
 - ASCII: NMEA-0183 GSV, AVR, RMC, HDT, VGK, VHD, ROT, GGK, GGA, GSA, ZDA, VTG, GST, PJT,PJK, BPQ, GLL, GRS, GBS and Binary: Trimble GSOF, NMEA2000
- 1 Pulse Per Second Output
- Event Marker Input Support
- Supports Fault Detection & Exclusion (FDE), Receiver Autonomous Integrity Monitoring (RAIM)

Communication

- 1 USB 2.0 Device port
- 1 LAN Ethernet port:
 - Supports links to 10BaseT/100BaseT auto-negotiate networks
 - All functions are performed through a single IP address simultaneously—including web GUI access and raw data streaming
 - Network Protocols supported:
 - HTTP (web GUI)
 - NTP Server
 - NMEA, GSOF, CMR over TCP/IP or UDP
 - NTripCaster, NTripServer, NTripClient
 - mDNS/uPnP Service discovery
 - Dynamic DNS
 - eMail alerts
 - Network link to Google™ Earth
 - Support for external modems via PPP
 - RNDIS Support
- 2 x RS232 ports:
 - Baud rates up to 460,800
- 1 CAN Port
- WebUI for configuration, status and data transfer
- ROS 1 and ROS 2 drivers available

Ordering information

Enclosure Part Number X08567-XX
 Enclosure Trimble BX992 GNSS available in a variety of configurations from L1 SBAS upwards

Trimble BX992

Performance specifications

Time to First Fix (TTFF)⁶

- Cold Start⁷ <45 seconds
- Warm Start⁸ <30 seconds
- Signal Re-acquisition <2 seconds

Velocity Accuracy^{2,3}

- Horizontal 0.007 m/sec
- Vertical 0.020 m/sec

Maximum acceleration GNSS tracking ±11 g

Inertial Sensors

- Maximum acceleration ±6 g
- Maximum angular rate ±125 deg/sec

Maximum Operating Limits⁹

- Velocity 600 m/sec
- Altitude 18,000 m
- RTK initialization time² typically <8 seconds
- RTK initialization reliability² <99.9 %
- Position Latency⁴ <20 ms

Maximum Position/Attitude Update Rate. 100 Hz

Physical and electrical characteristics

Size 185 mm × 93 mm × 43 mm

Power 9 VDC to 30 VDC
Typical 3.0 W (L1/L2 GPS + L1/L2 GLONASS)

Weight 0.76 kg

Connectors

- I/O D-sub DE9 and DA26
- GNSS Antenna 2 x TNC (Female)

Antenna LNA Power Input

- Input voltage 3.3 VDC to 5 VDC
- Maximum current 400 mA
- Minimum required LNA Gain 32.0 dB

Environmental characteristics¹⁰

Temperature

- Operating -40 °C to +75 °C
- Storage -55 °C to +85 °C

Vibration MIL810F, tailored

- Random 6.2 gRMS operating
- Random 8 gRMS survival

Mechanical shock MIL810D

- ±40 g 10ms operating ±75 g 6ms survival

Operating Humidity 5% to 95% R.H.
non-condensing, at +60 °C

IP Rating IP67

- Trimble BX992 is available in a variety of software configurations. Specifications shown reflect full capability.
- May be affected by atmospheric conditions, signal multipath, and satellite geometry. Initialization reliability is continuously monitored to ensure highest quality.
- 1 sigma level, when using Trimble Zephyr™ 2/3 antennas, Add 1 ppm for RTK position accuracies.
- At maximum output rate.
- GPS only and depends on SBAS System performance. FAA WAAS accuracy specifications are <5 m 3DRMS.
- Typical observed values.
- No previous satellite (ephemerides / almanac) or position (approximate position or time) information.
- Ephemerides and last used position known.
- As required by the U.S. Department of Commerce to comply with export licensing restrictions.
- Dependent on appropriate mounting/enclosure design.
- Input only network correction.
- The hardware of this product is designed for Beidou B3 compatibility (trial version) and its firmware will be enhanced to fully support such new signals as soon as the officially published signal interface control documentation (ICD) becomes available.
- There is no public GLONASS L3 CDMA or Galileo E6 ICD. The current capability in the receivers is based on publicly available information. As such, Trimble cannot guarantee that these receivers will be fully compatible.
- Detailed specifications are available at oemgnss.trimble.com
- Also available in configurations with RTK accuracies limited to 10 and 30 centimeters.
- Pitch and roll available in INS positioning modes. Pitch or roll in non INS modes.

Specifications subject to change without notice.

Positioning specifications ^{2,15}	Autonomous	SBAS ⁵	DGNSS	RTK	INS-Autonomous	INS-SBAS	INS-DGNSS	INS-RTK
No GNSS Outages								
Position (m)	1.00 (H) 1.50 (V)	0.50 (H) 0.85 (V)	0.25 (H) 0.50 (V)	0.008 (H) 0.015 (V)	1.00 (H) 1.50 (V)	0.50 (H) 0.85 (V)	0.40 (H) 0.60 (V)	0.05 (H) 0.03 (V)
Roll/Pitch (deg) ¹⁶	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Heading (deg) on 2 m Baseline	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
10 second GNSS Outages								
Position (m)	N/A	N/A	N/A	N/A	1.50 (H) 1.80 (V)	1.20 (H) 1.20 (V)	1.00 (H) 1.00 (V)	0.30 (H) 0.20 (V)
Roll/Pitch (deg)	N/A	N/A	N/A	N/A	0.10	0.10	0.10	0.10
Heading (deg) on 2 m Baseline	N/A	N/A	N/A	N/A	0.50	0.50	0.50	0.50

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