DATASHEET

Trimble BD990

TRIPLE FREQUENCY ON ALL GNSS CONSTELLATIONS WITH INTEGRATED MSS BAND DEMODULATOR

TRIMBLE MAXWELL 7 TECHNOLOGY

The Trimble® BD990 supports triple frequency for the GPS, GLONASS, BeiDou and Galileo constellations. As the number of satellites in the constellations grows the BD990 is ready to take advantage of the additional signals. This delivers the quickest and most reliable RTK initializations for centimeter positioning. With the latest Trimble Maxwell™ 7 Technology, the BD990 provides :

- 336 Tracking Channels
- Trimble Everest Plus multipath mitigation
- Advanced RF Spectrum Monitoring and Analysis
- Proven low-elevation tracking technology

With the option of utilizing OmniSTAR or RTX services, the BD990 delivers varying levels of performance down to centimeter level without the use of a base station.

DESIGNED FOR GROWTH

The Trimble BD990 is part of a family of receivers that support advanced functionality. In the same mechanical footprint and pin-out the Trimble BD992 supports dual antenna GNSS heading while the Trimble BD992-INS supports position and orientation at high update rates. Industry professionals trust Trimble embedded positioning technologies as the core of their precision applications. Moving the industry forward, the Trimble BD990 redefines high-performance positioning.

FLEXIBLE INTERFACING

The Trimble BD990 was designed for easy integration and rugged dependability. Customers benefi t 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.

Different configurations of the module are available. These include everything from a DGPS L1 unit all the way to a four constellation triple frequency RTK unit. All features are password-upgradeable, allowing functionality to be upgraded as your requirements change.

Key Features

- Trimble Maxwell 7 Technology
- 336 Channels for multi-constellation GNSS support
- OmniSTAR/RTX Support
- Compact design for mobile applications
- Flexible RS232, USB and Ethernet interfacing
- Centimeter level position accuracy
- Advanced RF Spectrum Monitoring



www.geospb.ru
ООО "Геоприбор"
Россия, г. Санкт-Петербург
пр. Энгельса, дом 107, корпус 3
(812) 438-33-66, 943-43-25
8-800-200-99-82
e-mail: info@geobox.ru

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Trimble BD990 MODULE

TECHNICAL SPECIFICATIONS[1]

- Trimble Maxwell 7 Technology
- On-board Advanced MEMS inertial sensors
- Position Antenna based on 336 Channel Maxwell 7 chip:
  - GPS: L1 C/A, L2E, L2C, L5
  - BeiDou B1, B2, B3[13]
  - GLONASS: L1 C/A, L2 C/A, L3 CDMA[14]
  - Galileo[2]: E1, E5A, E5B, E5AltBOC, E6[14]
  - IRNSS L5
  - QZSS: L1 C/A, L1 SAIF,L1C, L2C, L5, LEX
  - SBAS: L1 C/A, L5
  - MSS L-Band: OmniSTAR, Trimble RTX
- High precision multiple correlator for GNSS pseudorange measurements
- Trimble Everest Plus multipath mitigation
- 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, 3.1[12], 3.2
- 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
    - > Dynamic DNS
    - > eMail alerts
    - > RDNIS Support
    - > NMEA, GSOF, CMR over TCP/IP or UDP
    - > NTripCaster, NTripServer, NTripClient
    - > mDNS/uPnP Service discovery
    - > Network link to Google Earth
    - > Support for external modems via PPP
- 2 x RS232 ports
  - Baud rates up to 460800
- 1 CAN Port
- Control Software: HTML web browser, Internet Explorer, Firefox, Safari, Opera, Google Chrome

PERFORMANCE SPECIFICATIONS

Time to First Fix (TTFF)[7]	
Cold Start[8]	<45 seconds
Warm Start[9]	<30 seconds
Signal Re-acquisition	<2 seconds
Velocity Accuracy[3,4]	
Horizontal	0.007 m/sec
Vertical	0.020 m/sec
Maximum Operating Limits[10]	
Velocity	515 m/sec
Altitude	18,000 m
RTK initialization time[3]	typically <1 minute
RTK initialization reliability[3]	>99.9%
Position latency[5]	<20ms
Maximum Position/Atitude Update Rate	50 Hz

PHYSICAL AND ELECTRICAL CHARACTERISTICS

Size	100 mm x 60 mm x 11.6 mm
Power	3.3 V DC +5%/–3% Typical 1.5 W (L1/L2 GPS + L1/L2 GLONASS)
Weight	54 grams
Connectors	
I/O	44 -pin header
GNSS Antenna	2 x MMCX receptacle
Antenna LNA Power Input	
Input voltage	3.3V DC to 5V DC
Maximum current	400 mA
Minimum required LNA Gain	31.0 dB (> 35 dB Recommended)

ENVIRONMENTAL CHARACTERISTICS[11]

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 operating ±75 g survival
Operating Humidity	5% to 95% R.H. non-condensing, at +60 °C

ORDERING INFORMATION

Module Part Number	100992-XX
Module	Trimble BD990 GNSS available in a variety of configurations from L1 SBAS upwards
Evaluation Kit	Includes interface board, power supply

1 Trimble BD990 is available in a variety of software configurations. Specifications shown reflect full capibility.
2 Developed under a License of the European Union and the European Space Agency.
3 May be affected by atmospheric conditions, signal multipath, and satellite geometry. Initialization reliability is continuously monitored to ensure highest quality.
4 1 sigma level, when using Trimble Zephyr 2/3 antennas, Add 1 ppm for RTK position accuracies.
5 At maximum output rate.
6 GPS only and depends on SBAS System performance. FAA WAAS accuracy specifications are <5 m 3DRMS.
7 Typical observed values.
8 No previous satellite (ephemerides / almanac) or position (approximate position or time) information.
9 Ephemerides and last used position known
10 As required by the U.S. Department of Commerce to comply with export licensing restrictions.
11 Dependent on appropriate mounting/enclosure design.
12 Input only network correction
13 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.
14 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.
15 RTX and OmniSTAR accuracies depend on correction service chosen. Trimble CenterPoint RTX provides <4cm horizontal accuracy 95% of the time with initializations of less than 30 minutes.

Specifications subject to change without notice.

POSITIONING SPECIFICATIONS[3, 4,15]

	Autonomous	SBAS	DGNSS	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)
Roll/Pitch (deg)	N/A	N/A	N/A	N/A
Heading (deg)	N/A	N/A	N/A	N/A
10 second GNSS Outages				
Position (m)	N/A	N/A	N/A	N/A
Roll/Pitch (deg)	N/A	N/A	N/A	N/A
Heading (deg)	N/A	N/A	N/A	N/A

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www.geospb.ru
ООО "Геоприбор"
Россия, г. Санкт-Петербург
пр. Энгельса, дом 107, корпус 3
(812) 438-33-66, 943-43-25
8-800-200-99-82
e-mail: info@geobox.ru