Trimble BD992-INS
DUAL-ANTENNA RECEIVER WITH INTEGRATED INERTIAL NAVIGATION SYSTEM AND MSS BAND DEMODULATOR

GNSS AND INERTIAL TIGHT INTEGRATION
Taking advantage of Trimble’s expertise in both GNSS and Inertial technology the Trimble BD992-INS 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 BD992-INS supports triple frequency for the GPS, GLONASS, BeiDou and Galileo constellations. As the number of satellites in the constellations grows the BD992-INS 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 BD992-INS 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 BD992-INS 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 OmniSTAR or RTX services, the BD992-INS delivers varying levels of performance down to centimeter level without the use of a base station.

ROBUST CENTIMETER ACCURATE SOLUTIONS
The Trimble BD992-INS integrates the latest in precision inertial sensors in a compact package. With the BD992-INS you are buying a robust navigation solution, not just a GNSS receiver. Key features include:
- High update rate position and orientation solutions
- Dual antenna for rapid heading alignment
- Continuous positioning in GNSS denied environments
- Lever arm calculation from antenna to navigation point of interest
- Robust Moving Baseline RTK for precision landing on moving platforms

FLEXIBLE INTERFACING
The Trimble BD992-INS 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. 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
- Onboard high accuracy inertial sensor package integrated with GNSS for precise position and orientation
- 336 Channels per antenna 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
Trimble BD992-INS MODULE

**DATASHEET**

**TECHNICAL SPECIFICATIONS**
- **Trimble Maxwell 7 Technology**
- **On-board Advanced MEMS inertial sensors**
- **Position Antenna based on 336 Channel Maxwell 7 chip:**
  - GPS: L1/C/A, L2, L2C, L5
  - BeiDou B1, B2, B3
  - GLONASS: L1 C/A, L2 C/A, L3 CDMA
  - Galileo: E1, E5A, E5B, E5b, BEACON
  - 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, L2, L2C, L5
  - BeiDou B1, B2, B3
  - GLONASS: L1 C/A, L2 C/A, L3 CDMA
  - Galileo: E1, E5A, E5B, E5b, BEACON
  - 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**
- **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+, uCMR, RTCM 2.1, 2.2, 2.3, 3.0, 3.1, 3.2
  - Navigation outputs
    - ASCII: NMEA-0183 GSV, AIVP, RMC, HDT, VTG, GGA, GSA, ZDA, GLL, PVTG
    - Baud rates up to 460,800
- **Input voltage:**
  - 3.3V DC to 5V DC
- **I/O:**
  - 44-pin header
  - 2 x RS232 ports
- **2 x RS232 ports**
- **Control Software:** HTML web browser, Internet Explorer, Firefox, Safari, Opera, Google Chrome

**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

**ENVIRONMENTAL CHARACTERISTICS**
- **Operating Temperature:**
  - -40 °C to +75 °C
- **Storage Temperature:**
  - -55 °C to +85 °C
- **Vibration:**
  - MIL810F, tailored to Random 6.2 g RMS operating
  - ±75 g survival
- **Mechanical Shock:**
  - ±40 g operating
  - ±75 g survival

**PHYSICAL AND ELECTRICAL CHARACTERISTICS**
- **Size:**
  - 100 mm x 60 mm x 11.6 mm
- **Power:**
  - 3.3 V DC +5%/–3%
- **Input voltage:**
  - 3.3V DC to 5V DC
- **Maximum current:**
  - 400 mA
- **Minimum required LNA Gain:**
  - 31.0 dB (> 35 dB Recommended)

**ENVIRONMENTAL SPECIFICATIONS**
- **Position Antenna**
  - N/A
- **SBAS**
  - 100992-XX
- **GNSS**
  - Trilateration INS-Autonomous INS-SBAS INS-DGNSS INS-RTK
- **Europe/EMEA**
  - Sunnyvale, CA 94085
  - 510 DeGuigne Drive
  - TRIMBLE INC.
- **Americas & Asia-Pacific**
  - 100992-XX

**PERFORMANCE SPECIFICATIONS**
- **Time to First Fix (TTFF)**
  - Cold Start: >45 seconds
  - Warm Start: <30 seconds
  - Signal Re-acquisition: >2 seconds

**Velocity Accuracy**
- Horizontal: 0.007 m/sec
- Vertical: 0.020 m/sec

**Roll/Pitch Accuracy**
- Maximum angular rate: ±350 deg/sec

**Inertial Sensors**
- Maximum acceleration: ±16 g
- Maximum angular rate: ±350 deg/sec

**Maximum Operating Limits**
- Velocity: 515 m/sec
- Altitude: 18,000 m
- RTK initialization time: Typically <1 minute
- RTK initialization reliability: >99.9%
- Position latency: <20 ms
- Maximum Position/Altitude Update Rate: 50 Hz

**MODULE SPECIFICATIONS**
- **Evaluation Kit:**
  - Includes interface board, power supply

**POSITIONING SPECIFICATIONS**

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<th>No GNSS Outages</th>
<th>Autonomous</th>
<th>SBAS</th>
<th>DGNSS</th>
<th>RTK</th>
<th>INS-Autonomous</th>
<th>INS-SBAS</th>
<th>INS-DGNSS</th>
<th>INS-RTK</th>
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</thead>
<tbody>
<tr>
<td>Position (m)</td>
<td>1.00 (H) 1.50 (V)</td>
<td>0.50 (H) 0.85 (V)</td>
<td>0.25 (H) 0.50 (V)</td>
<td>0.008 (H) 0.025 (V)</td>
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<td>Heading (deg)</td>
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<td>0.09</td>
<td>0.09</td>
<td>0.09</td>
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<td>0.09</td>
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<table>
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<th>10 second GNSS Outages</th>
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<th>DGNSS</th>
<th>RTK</th>
<th>INS-Autonomous</th>
<th>INS-SBAS</th>
<th>INS-DGNSS</th>
<th>INS-RTK</th>
</tr>
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<tbody>
<tr>
<td>Position (m)</td>
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<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>1.50 (H) 1.80 (V)</td>
<td>1.20 (H) 1.20 (V)</td>
<td>1.00 (H) 1.00 (V)</td>
<td>0.30 (H) 0.20 (V)</td>
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<tr>
<td>Roll/Pitch (deg)</td>
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<td>N/A</td>
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Contact your local Trimble Authorized Distribution Partner for more information on these specifications.

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