# z250 with Trimble BD940 GNSS receiver

## GNSS Receiver Enclosure with IPv4 NTP Server and Extended Operating Temperature Range

-40°C to +75°C

### KEY FEATURES

**Reduced size aluminum enclosure 108.5 x 84 x 30 mm**

**336 Tracking Channels for multi-constellation**
**GNSS support**

- **GPS: L1 C/A, L2E, L2C, L5**
- **BeiDou: B1, B2**
- **GLONASS: L1 C/A, L2 C/A, L3 CDMA13**
- **Galileo: E1, E5A, E5B, E5AltBOC**
- **IRNSS: L5**
- **QZSS: L1 C/A, L1 SAIF, L2C, L5, LEX**
- **SBAS: L1 C/A, L5**
- **MSS L-Band: OmniSTAR, Trimble RTX**

**IPv4 NTP server**

**Integrated fully EMI shielded module**

**Advanced RF Spectrum Monitoring and Analysis**

**RS232, USB and Ethernet interfaces**

**Centimeter-level position accuracy**

**Trimble Maxwell 7 technology**

**Supports FDE and RAIM**

**TRIPLE FREQUENCY RECEIVER INTEGRATED WITH MSS BAND DEMODULATOR FOR PRECISE POSITIONING APPLICATIONS IN A ROBUST ALUMINIUM ENCLOSURE**


### COMPACT FULL METAL JACKET DESIGN

The z250 product has been designed around the Trimble® BD940 GNSS receiver module, originally for applications requiring high accuracy from multiple GNSS constellations in a very compact enclosure 108.5 x 84 x 30mm form factor.
Designed and manufactured in France, the product come fully tested whatever is the final configuration. This design ensures the high quality GNSS signals are protected from the sources of EMI on the host platform.
It also significantly reduces radiated emissions which speeds compliance certification and time to market.

### MULTI CONSTELLATION/ MULTI FREQUENCY GNSS

The Trimble® BD940 supports both triple frequency from the GPS and GLONASS constellations plus dual frequency from BeiDou and Galileo. As the number of satellites in the constellations grow the BD940 is ready to take advantage of the additional signals. This delivers the quickest and most reliable RTK and RTX initializations for centimeter positioning.
For applications that do not require centimeter accuracy the BD940 contains an advanced kalman filter PVT engine that delivers high accuracy GNSS, DGNSS positions in the most challenging environments.

### DEMONSTRATED PERFORMANCE

Industry professionals trust Trimble embedded positioning technologies as the core of their precision applications. With the latest Trimble-precise Maxwell™ 7 technology, the Trimble BD940 provides assurance of long-term future proofing and trouble-free operation. Moving the industry forward, the Trimble BD940 redefines high-performance positioning:
• On-board multipath mitigation,
• Proven low-elevation tracking technology.

### FLEXIBLE INTERFACING

The z250 product was designed for easy integration and rugged dependability. Customers benefit from the Ethernet connectivity available from RJ45 connection, allowing high speed data transfer and configuration via standard web browsers. USB and RS-232 are directly available from the enclosure.
As the product interface directly the Trimble module BD940, all the easy to use software commands simplify integration and reduce development times.

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## GNSS Receiver Enclosure with IPv4 NTP Server and Extended Operating Temperature Range

### TECHNICAL SPECIFICATIONS [1]

• Trimble Maxwell 7 Technology
• 336 Tracking Channels:
- GPS: L1 C/A, L2E, L2C, L5
- BeiDou: B1, B2
- GLONASS: L1 C/A, L2 C/A, L3 CDMA[13]
- Galileo [2]: E1, E5A, E5B, E5AltBOC
- IRNSS: L5
- QZSS: L1 C/A, L1 SAIF, L2C, L5, LEX
- SBAS: L1 C/A, L5
- MSS L-Band: OmniSTAR, Trimble RTX
• High precision multiple correlator for GNSS pseudo-range measurements
• Trimble Everest Plus multipath mitigation
• Advanced RF Spectrum Monitoring and Analysis
• Unfiltered, unsmoothed pseudo-range 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
  . 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
  . RDNIS Support
• 2 x RS232 ports:
— Baud rates up to 230,400
• Control Software:
— HTML web browser, Internet Explorer, Firefox, Safari, Opera, Google Chrome

### POSITIONING SPECIFICATIONS [3,4,14,15]

Position (m):

| | |
|---|---|
| Autonomous | 1.00 (H) 1.50 (V) |
| SBAS | 0.50 (H) 0.85 (V) |
| DGNSS | 0.25 (H) 0.50 (V) |
| RTK | 0.008 (H) 0.015 (V) |
| INS-Autonomous | N/A |
| INS-SBAS | N/A |
| INS-DGNS | N/A |
| INS-RTK | N/A |

### PERFORMANCE SPECIFICATIONS

| | |
|---|---|
| Time to First Fix (TTFF) [7] | |
| Cold Start [8] | <45 seconds |
| Warm Start [10] | <30 seconds |
| Signal Re-acquisition | <2 seconds |
| Velocity Accuracy [3,4] | |
| Horizontal | 0.007 m/sec |
| Vertical | 0.020 m/sec |
| Maximum acceleration GNSS tracking | +/- 11 g |
| Maximum Position/Altitude Update Rate | 50 Hz |
| Maximum Operating Limits [10] | |
| Velocity | 515 m/sec |
| Altitude | 18,000 m |
| RTK initialization time [3] | Typically < 8 seconds |
| RTK initialization reliability [3] | > 99.9% |

### PHYSICAL AND ELECTRICAL CHARACTERISTICS

| | |
|---|---|
| Size | 108.5 mm x 30 mm x 84 mm |
| | With mounting bracket & connectors : 140.3 mm x 30 mm x 105 mm |
| Power | 9 V DC to 70 V DC |
| | Typical 2.5 W (L1 GPS + L1 GLONASS, with antenna 25mA, no USB) |
| Weight | 280 grams |
| Connectors | |
| Antenna | TNC receptacle |
| RS232 serial ports | 2 x Sub-D9 female |
| | Optional : RS422, TTL or USB |
| PPS | SMA receptacle |
| USB | Type A receptacle |
| LAN | RJ45 receptacle |
| Power | Molex Micro-Fit |
| Antenna connection | |
| Output voltage | 5V DC |
| Maximum current | 400 mA |
| Minimum required LNA Gain with 5dB cable loss | +32.0 dB |

### 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 |
| | ±40g 10ms operating, ±75g 6ms survival |
| Operating Humidity | 5% to 95% R.H. non-condensing, at +60 °C |

### ORDERING INFORMATION

| | |
|---|---|
| Enclosure | Available in as many variety as the Trimble BD940 |
| Power Supply | 110/220 V to 12 Volt, 1A |

*1 Trimble BD940 is available in a variety of software configurations. Specifications shown reflect full capability.*
*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 to 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 There is no public GLONASS L3 CDMA. The current capability in the receivers is based on publicly available information. As such, Trimble cannot guarantee that these receivers will be fully compatible.*
*14 Trimble 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.*
*15 Also available in configurations with RTK accuracies limited to 10 and 30 centimeters.*

Specifications are subject to change without notice.

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