M S860
Rugged Dual-Antenna GPS Receiver for Precise Heading and Position

Key Features and Benefits

- 10-Hz precise heading without drift or calibration
- 20-Hz position update rate
- Built for rugged environments
- All-solid-state—no moving parts
- Industry-standard interfacing
- User-defined local coordinates direct from receiver
- Supports industry-standard CAN bus architecture

The Trimble M S860™ receiver delivers a new dimension in GPS receiver technology—Trimble’s patented RTK (real-time kinematic) heading technology—to provide precise position, heading and speed of a dynamic platform. This rugged, dual-antenna receiver addresses a vast range of precise navigation applications in the fields of construction, dredging, marine survey, commercial marine, agriculture, and general machine guidance.

Rugged design
The M S860 receiver is designed for use in the most demanding application environments, such as on construction equipment, farm machinery, and sea-going vessels. The bolt-in unit has been proven in use on construction equipment around the world. The all-solid-state electronics unit contains no moving parts, thus avoiding the need for scheduled maintenance and calibration.

Accuracy and response times
Today’s navigation and guidance applications require virtually instantaneous position and heading reports multiple times per second. The M S860 receiver delivers positions to guidance or control-loop software up to 20 times per second with a latency of less than 20 milliseconds. This responsiveness is matched with horizontal accuracies of two centimeters and vertical accuracies of three centimeters. Heading accuracies of 0.03° RMS are achieved at 10 times per second. The RTK heading technique allows the quoted heading accuracies to be obtained without the need for external differential GPS (DGPS) corrections. Designed for use in a high-speed, dynamic environment, the M S860 receiver offers accurate heading at rates of turn in excess of 90°/sec. For less demanding applications, a DGPS submeter version is available.

Advanced technology
The accuracies, update rates and latencies available in the M S860 receiver are made possible through a GPS architecture specifically designed for demanding dynamic positioning applications. Custom-designed hardware with Super-trak™ multibit GPS signal technology and EVEREST™ advanced multipath suppression provide superior tracking, especially for weaker, low-elevation satellites. These robust, dual-frequency measurements allow reliable, rapid, and fully automatic On-the-Fly (OTF) initializations.

Interfacing and configuration ease
Industry-standard NMEA messages or compact binary data can be output through any of the three bidirectional serial ports. Local datum and transformation parameters can be loaded directly into the receiver. The receiver also includes support for the industry-standard CAN (Control Area Network) architecture. Both the RTCM format for DGPS corrections and Trimble’s published Compact Measurement Report (CMR) differential data can be received simultaneously. The receiver can choose the optimum source at any given time and provide seamless navigation.
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STANDARD FEATURES
The M S860 receiver is a 36-channel L1/L2 RTK GPS receiver with dual-antenna input.
• 10-Hz precise heading
• 20-Hz position updates
• <20-ms position latency
• User-defined local coordinates direct from receiver
• 3 serial I/O ports
• 1-PPS output
• RTCM input/output
• One-year hardware warranty

PHYSICAL CHARACTERISTICS
Size
29cm x 28cm x 9cm
(11.42 in. x 11.02 in. x 3.54 in.)

Weight
4.8 kg (10.56 lbs.)

SizePower
9 VDC to 32 VDC, 15 Watts

ENVIRONMENTAL CHARACTERISTICS
Temperature
Operating: -40°C to +70°C (-40°F to +158°F)
Storage: -55°C to +85°C (-67°F to +185°F)

Humidity
MIL 810 E, Meth. 507.3 Proc III, Aggravated,
100% Condensing

Sealing
Sealed to ±5 PSI

Vibration
MIL 810 D, Tailored
Random 8g RMS Operating

Mechanical Shock
MIL 810 D
Operating: ±40g
Survival: ±75g

EMC
Radiated Emissions: CE Class B
Conducted Emissions: SAE J1113/41
Radiated Immunity: CE Class B 60V/m
ESD: ±15 KV
Input Voltage Transients: ISO 7637-2, Pulses 1 - 5

TECHNICAL SPECIFICATIONS
Tracking
18 channels L1/C/A code, L1/L2 full cycle carrier.
Fully operational during P-code encryption.

Signal processing
Super-trak multibit technology
EVEREST multipath suppression

Positioning

<table>
<thead>
<tr>
<th>Mode</th>
<th>Accuracy</th>
<th>Latency</th>
<th>Max Rate</th>
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</thead>
<tbody>
<tr>
<td>Synchronized RTK</td>
<td>1cm + 2ppm Horizontal</td>
<td>300 ms</td>
<td>10 Hz</td>
</tr>
<tr>
<td></td>
<td>2cm + 2ppm Vertical</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Latency RTK</td>
<td>2cm + 2ppm Horizontal</td>
<td>&lt;20ms</td>
<td>20 Hz</td>
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<tr>
<td></td>
<td>3cm + 2ppm Vertical</td>
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<td></td>
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<tr>
<td>DGPS</td>
<td>&lt;1m</td>
<td>&lt;20ms</td>
<td>20 Hz</td>
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Heading

<table>
<thead>
<tr>
<th>Baseline</th>
<th>Accuracy</th>
<th>Max Rate</th>
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<tbody>
<tr>
<td>10m</td>
<td>&lt;0.03°</td>
<td>10Hz</td>
</tr>
<tr>
<td>5m</td>
<td>&lt;0.08°</td>
<td>10Hz</td>
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</table>

Initialization
Automatic OTF (on-the-fly) while moving

Time required
Typically <1 minute

Start-up
<90 seconds from power-on to positioning
<30 seconds with recent ephemeris

Communications
3 RS-232 ports. Baud rates up to 115,200
2 CAN/J1939 ports.

Configuration
Configuration Toolbox, Remote Controller Software, HYDROpro software, or user-definable application files.

Output Formats
NMEA-0183 words GGK, GGA, HDT, ROT, ZDA, VTG, GST, AVR, PJT and PJK

Other
Trimble Binary Streamed Output

ORDERING INFORMATION
For further information contact your nearest Trimble Authorized Distributor or Trimble Office.

You may also visit our website at: http://www.trimble.com

Specifications and descriptions are subject to change without notice.