

## KEY FEATURES

Precise Heading + Pitch/Roll

Dual Core Engine with Z-Blade Technology

Configurable from L1 RTK to L1/L2 RTK with Precise Platform Positioning (P<sup>3</sup>)

Easy to use web user-interface

Precise Point Positioning using optional Trimble® RTX Correction Services:

- Trimble® CenterPoint® RTX for sub 4 cm accuracy
- Trimble® RangePoint™ RTX for sub 50 cm accuracy
- No base station or VRS Network required

Superior Connectivity

- Ethernet, USB 2.0, Serial Ports (LVTTTL)

Small form factor

Low power



MB-ONE RECEIVER MODULE

## HIGH PERFORMANCE CENTIMETER LEVEL POSITIONING AND HEADING IN A MINIATURE POWER-SAVING DESIGN

The Trimble MB-One is a next generation GNSS OEM receiver module that combines years of Trimble and Ashtech's expertise in GNSS technology in an advanced industry-standard form-factor for systems integrators and OEMs. Versatile, powerful, compact and smart; the MB-One features impressive GNSS and RTK technology with preferred features such as Ethernet that allow for a wide variety of unique applications.

### ADVANCED FEATURES WITH TRIMBLE'S IMPROVED Z-BLADE TECHNOLOGY

The MB-One allows a wide range of option-upgradable GNSS configurations from GPS L1 to GNSS L1/L2 (GPS, QZSS, GLONASS) and GNSS L1 (Galileo, BeiDou and SBAS). It utilizes over-the-air satellite corrections using L-Band hardware to achieve centimeter/decimeter level accuracy by receiving and decoding Trimble RTX corrections. It uses highly accurate satellite-delivered corrections to deliver centimeter-level real-time position, available worldwide; and does not require a dedicated base station.

### DUAL ANTENNA INPUT FOR HEADING + PITCH OR ROLL

- Very accurate GNSS based heading + pitch or roll for static and dynamic applications
- Two antenna inputs (solo/dual mode)
- Single board delivering RTK, Heading and centimeter level positioning capabilities
- Obviates the need for additional boards or communication equipment
- Hot Standby RTK for a backup RTK position solution

### POWERFUL RTK ENGINE

The MB-One has a powerful RTK engine that employs centimeter-level accuracy for systems using RTK against a static base. It also drives advanced RTK against an external moving base for relative positioning and network RTK using third-party network corrections such as: VRS, FKP, MAC. The advanced RTK Coasting uses all available tracked satellites on the rover side along with heading and pitch or roll determination with baseline length auto-calibration. Ashtech's patented Z-blade technology drives a powerful GNSS agnostic engine giving the MB-One the ability to position independently using any GNSS system; without any dependency on GPS.

### NEXT GENERATION HARDWARE DESIGN

- Low-power consumption in an extremely compact board design.
- The dual core offers distinct advantages such as a dedicated core for GNSS tracking that optimizes power consumption and ensures low power use while maintaining performance.
- Leverage the Ethernet capability and easy to use Web user interface to create unique Ethernet based GNSS applications.



# TRIMBLE MB-ONE RECEIVER MODULE

## GNSS CHARACTERISTICS

- 240 Tracking Channels
  - GPS L1+L2
  - QZSS L1+L2
  - GLONASS G1 + G2 FDMA (HW ready for G1 and G2 CDMA<sup>1</sup>)
  - BeiDou B1<sup>2</sup>
  - GALILEO E1
  - SBAS L1
- 2 L-Band Tracking Channels

## FEATURES

- Ashtech patented Strobe Correlator Z-blade Technology for reduced GNSS multi-path
- Up to 250 MB of internal memory for data logging (including Ashtech Trouble LOG ATL files)
- GPS-only, GLONASS-only, Galileo-only (when possible) or BeiDou-only solution (Autonomous to full RTK)
- Fast Search Engine to improve TTFF
- Multi-dynamic mode (static/moving Base and Rover functions simultaneously)
- Adaptive velocity filter to meet specific dynamic applications
- One push Ashtech Trouble Log (ATL)
- Onboard memory for various applications
- Ashtech Hot Standby RTK Algorithms
- Position in local datums and projections with RTCM-3 transformation data

## I/O DATA FORMATS

- Up to 50 Hz position/velocity/heading/observables output
- RTK with Static & Moving Base corrections supported
- Reference Inputs/Outputs<sup>8</sup>: RTCM 3.2, RTCM 2.3, CMR/CMR+, ATOM (Ashtech Format)
- RTK Networks Supported: VRS, FKP, MAC
- Navigation Outputs: NMEA-0183, Ashtech ATOM format

## PHYSICAL CHARACTERISTICS

Size	71 mm x 46 mm x 11 mm
Power	3.2 to 4.5 V DC
Power Consumption <sup>9</sup>	<1.2 Watt
Weight	24 grams
Connectors	
I/O	28 pin dual-row male header
Antenna	2 x MMCX female connectors
Antenna LNA Power Input	
Input Voltage Range	4.0 to 12.0 V DC on I/O connector pin 5 <sup>11</sup>
Maximum current	150 mA
Minimum current	5 mA
LNA Gain Range (minus signal loss)	17 to 47 dB (for L1 band) 23 to 50 dB (for L2 band)

## ENVIRONMENTAL CHARACTERISTICS<sup>5</sup>

Operating Temperature	-40 °C to +85 °C
Storage	-40 °C to +85 °C
Vibration	MIL-STD 810F, Fig. 514.5C-17 Random 6.2 gRMS operating Random 8 gRMS survival
Mechanical Shock	MIL-STD 810F, Fig. 516.5-10 (40g, 11ms, saw-tooth)
Operating Humidity	95% non-condensing
Maximum Acceleration	11 g

## PERFORMANCE SPECIFICATIONS<sup>3,4</sup>

Time to First Fix (TTFF)	
Cold Start	<60 seconds
Warm Start	<45 seconds
Hot Start	<11 seconds
Signal Re-acquisition	<2 seconds
Position Accuracy (HRMS), Autonomomous	1.70 m
Velocity Accuracy <sup>3</sup>	0.005 m/sec HRMS
Maximum Operating Limits <sup>6</sup>	
Velocity	515 m/sec
Altitude	18,000 m

## POSITIONING SPECIFICATIONS<sup>3,4</sup>

Mode	Accuracy <sup>12</sup>	Latency <sup>10</sup>	Maximum Rate
Single Baseline RTK	0.008 m + 1 ppm Horizontal	<10 ms	50 Hz
Flying RTK	0.05 m (5 cm) + 1 ppm horizontal (steady state) for baselines up to 1000 km	<10 ms	50 Hz
SBAS	0.50 m Horizontal 0.85 m Vertical	<10 ms	50 Hz

## TRIMBLE RTX SPECIFICATIONS<sup>3,4</sup>

Mode	CenterPoint <sup>®</sup> RTX	RangePoint <sup>™</sup> RTX
Accuracy	4 cm horizontal (95% / 2 sigma)	50 cm horizontal (95% / 2 sigma)
Convergence Time	<30 minutes	<5 minutes

## RTK SPECIFICATIONS

Range	
Dual Frequency Model	greater than 40 km
Single Frequency Model	up to 10 km
RTK Initialization Time	typically < 1 min

## HEADING SPECIFICATIONS<sup>3,4,7</sup>

Baseline	Accuracy (degrees)	Maximum Rate
3 m	0.06° RMS	50 Hz
10 m	0.02° RMS	50 Hz

## I/O INTERFACE

- SAMTEC 28 Pin I/O Connector (TMM-114-03-G-D) with backward compatibility for current industry standards
- 3 x LVTTTL (UART types) serial ports allowing up to 921,600 bps
- USB 2.0 host and device port allowing up to 12Mbps (USB/Serial Link, USB Memory Stick, Onboard Memory Access)
- CAN bus interface (hardware ready)
- 1 PPS out / Event In
- 1 LAN Ethernet port
  - Supports links to 10BaseT/100BaseT 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)
    - ▶ NTripCaster, NTripServer, NTripClient
    - ▶ Dynamic DNS

## RECOMMENDED ANTENNAS

- Compact GNSS Machine/Marine/Aviation Antennas: Trimble AV33 & AV 34
- GNSS Machine/Marine/Aviation Antennas: Trimble AV59 & LV 59
- Communicator GNSS utility (Preset of commands, Real-time data logging, Real-time data visualization)

## ORDERING INFORMATION

- Module
  - Trimble MB-One available in a variety of configurations from SBAS upwards in a single hardware flavor which is software field upgradable.
- Evaluation Kit
  - Includes interface board and power supply

\* Trimble MB-One is available in a variety of software configurations. Specifications shown reflect full capability.

- 1 This is based on the assumption that these new signals will be transmitted within natural GLONASS L1, L2 or within GPS L1/L2 frequency bands.
- 2 This is based on the assumption that this new signal will be transmitted within GPS L1 frequency band.
- 3 Accuracy and TTFF specifications may be affected by atmospheric conditions, signal multipath, satellite geometry and corrections availability and quality. Typical range for vertical error is about twice as much as the horizontal error specification.
- 4 Performance values assume minimum of five satellites, following the procedures recommended in the product manual. High multi-path areas, high PDOP values and periods of severe atmospheric conditions may degrade performance.
- 5 Dependent on appropriate mounting / enclosure design
- 6 As required by the U.S. Department of Commerce to comply with export licensing restrictions.
- 7 Typical initialization time <30 seconds regardless of baseline length for up to 100 meters relative distance between two antennas.
- 8 RTCM-3.2 Multiple Signal Messaging (MSM) guarantees compatibility with 3rd party for each GNSS data
- 9 Typical power consumption for single antenna L1 GPS/ GLONASS.
- 10 Latency figures for position correspond to Master/ primary sensor only. Heading latency is dependent on primary sensor latency.
- 11 This will be used if greater than main power input voltage.
- 12 1 sigma level, when using Trimble Zephyr 2 antenna5



Specifications and descriptions are subject to change without notice.

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