Trimble MB-TWO

HIGH PERFORMANCE COMPACT OEM MODULE

RTK/PPP AND HEADING IN A SINGLE OEM MODULE

The Trimble MB-Two is the successor to the Trimble MB-One OEM receiver module. The MB-two maintains the identical form-factor as its predecessor and offers customers a drop-in replacement to utilize the latest GNSS design innovations. Versatile, powerful, compact and smart, the Trimble MB-Two provides faster dual-frequency-based heading acquisition and an improved RTK/PPP positioning engine with multiple GNSS signals. In addition, two MB-Two modules can be easily connected to each other to build a Precise Platform Positioning module (no firmware upgrade required), utilizing up to four dual-band GNSS antennas for multisensory raw data output, precise position and attitude simultaneously.

The MB-Two allows a wide range of option-upgradable GNSS configurations from single antenna/frequency (GPS) to dual antenna/frequency (GPS, QZSS, GLONASS, Beidou, Galileo). Ashtech's patented Z-Blade technology drives a powerful GNSS agnostic engine allowing MB-Two to use any single GNSS system for positioning (or any combination of them) without relying on GPS. The GNSS engine utilizes over-the-air satellite corrections via embedded L-band hardware to achieve centimeter/decimeter level accuracy with PPP Trimble™ RTX corrections removing the dedicated base station/Network and communication link.

DUAL ANTENNA/SENSOR

- Heading + Pitch/Roll
- Accurate/Fast Heading using dual-frequency multi-GNSS algorithms
- Dual GNSS sensor raw data with common clock
- Single board for RTK/PPP and heading simultaneously

POWERFUL RTK ENGINE

The MB-Two has a powerful RTK engine that delivers centimeter-level accuracy for systems using corrections from a local base or an RTK network. It also features RTK against a moving base for relative positioning. The network RTK capabilities include third-party network corrections such as VRS, FKP, and MAC. When two or more alternative RTK correcting data are available, MB-Two runs the Ashtech Hot Standby RTK algorithm allowing it to use them simultaneously in the positioning process

NEXT GENERATION HARDWARE DESIGN

- Low power consumption in a compact size
- Dual-core CPU for optimal performance
- Web User Interface for ease of use and evaluation
- Two tightly integrated dual-band GNSS engines
- L-band RF/digital with up to two MSS channels

Key Features

- ► Z-Blade technology
- ► 5 dual-band GNSS
- ► Conventional and Advanced RTK
- ► Precise Point Positioning
- ► Heading + Pitch/Roll
- ► Full Attitude
- ► Web User Interface
- ► Superior Connectivity
- ► Standardized form factor and interfaces
- ► Low power consumption
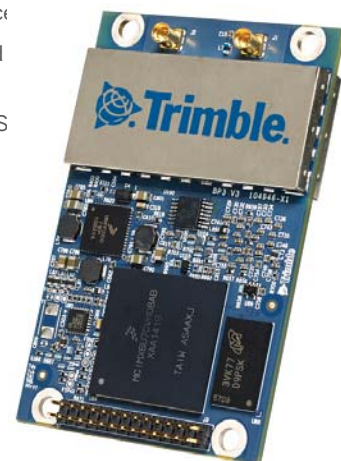
NavtechGPS

+1-703-256-8900 or 800-628-0885
info@NavtechGPS.com
www.NavtechGPS.com

TECHNICAL SPECIFICATIONS

TRIMBLE MB-TWO module

GNSS ENGINE
- 240 Tracking Channels
- Two tightly coupled, all-in-view GNSS sensors delivering simultaneously:
  – GPS L1+L2
  – QZSS L1+L2
  – BeiDou B1+B2
  – GLONASS G1+G2 FDMA [1]
  – GALILEO E1+E5b
  – SBAS L1[2]
- 2 x MSS L-Band Tracking Channels

FEATURES
- Ashtech patented Strobe Correlator™ to reduce GNSS multi path
- Ashtech patented Z-tracking to track encrypted GPS P(Y) signal
- Ashtech patented Z-Blade technology to process multi-GNSS data
- GPS-only, GLONASS-only or BeiDou-only solutions possible (from Autonomous to RTK)
- Fast Search Engine to improve TTFF
- Position in local datums and projections with RTCM-3 transformation data
- Trimble RTX™ PPP engine
- Ashtech Hot Standby RTK Algorithms
- Ashtech Flying RTK Algorithms
- Full attitude engine with two MB-Two boards connected
- RTK with Static & Moving Base corrections supported
- Heading engine with optional baseline length self-calibration
- Multi-dynamic mode (static/moving Base and Rover functions simultaneously)
- Adaptive velocity filter to meet specific dynamic applications
- Up to 250 MB of internal memory for data logging; on-board memory for various applications
- Up to 50 Hz position/velocity/heading/observables output[3]
- Reference Inputs/Outputs: RTCM 3.2[4], RTCM2.3, CMR/CMRx [5], ATOM[6]
- RTK Networks Supported: VRS, FKP, MAC
- Navigation Outputs: NMEA-0183, ATOM
- One-push Ashtech Trouble Log (ATL)
- Programmable startup protection

GNSS SENSOR PERFORMANCE
- 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), SBAS: 0.50 m[7]
- Update rate: Up to 50 Hz
- Latency: < 10 s [8]
- Velocity Accuracy: 0.02 m.sec HRMS
- Maximum Operating Limits [19]:
  – Velocity: 515 m/sec
  – Attitude: 18,000 m

PRECISE POSITIONING PERFORMANCE
RTK[9,10,11]

L1 only (fixed ambiguity):
- Accuracy (HRMS): < 12 mm + 1.5 ppm
- Initialization time: < 10 min typical
- Operating range: < 10 km

L1/L2 (fixed ambiguity):
- Accuracy (HRMS): < 8 mm + 1 ppm
- Initialization time: < 1 min typical
- Operating range: > 40 km

RTX[12,13]

CenterPoint
- Accuracy (H95): 4 cm
- Initialization time: < 30 min. typical
- Operating range (inland): Almost unlimited

RangePoint
- Accuracy (H95): < 50 cm
- Initialization time: < 5 min.
- Operating range (inland): Almost unlimited

HEADING [10,14,15]
- Accuracy (RMS): 0.2° per 1 m of baseline length
- Initialization time: < 10 sec typical
- Baseline length: <100 m

I/O INTERFACE
- SAMTEC 28 Pin I/O Connector (TMM-114-03-G-D)with backward compatibility for current industry standards
- 3 x LVTTL (UART types) serial ports allowing up to 921,600 bps
- USB 2.0 OTG 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)
    > NTP Server
    > NTripCaster, NTripServer, NTripClient
    > Dynamic DNS

PHYSICAL AND ELECTRICAL CHARACTERISTICS
Size (W x H x D) . . . . .71 mm x 46 mm x 11 mm
Power. . . . . .3.2 to 4.5 V DC
Power Consumption[16]. . . . .<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[17]
    Maximum current . . . . .150 mA
    Minimum current . . . . .5 mA
    LNA Gain Range (minus signal loss). . . . . 17 to 37 dB

ENVIRONMENTAL CHARACTERISTICS [18]
Operating Temperature . . . . −40 °C to 85°C
Storage . . . . −40 °C to +70 °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

RECOMMENDED ANTENNAS
- Compact GNSS Machine/Marine/Aviation Antennas: Trimble AV33 & AV 34
- GNSS Machine/Marine/Aviation Antennas: Trimble AV59 & LV 59

ORDERING INFORMATION
Module Part Number 106960-XX
Module . . . . Trimble MB-Two available in a variety of configurations from SBAS upwards
Evaluation Kit. . . . . Includes interface board and power supply

1. Hardware ready for G1 and G2 CDMA. 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. In some modes, SBAS L1 is available only for single sensor.
3. At 50 Hz, a limited set of messages can be generated simultaneously through a single port.
4. RTCM-3.2 Multiple Signal Messaging (MSM) guarantees compatibility with 3rd party for each GNSS data.
5. A Trimble proprietary format. CMRx output is not supported.
6. ATOM: Open Ashtech format.
7. VRMS for Autonomous/SBAS positions are usually twice as high as HRMS.
8. Heading latency is usually twice as high.
9. VRMS = 2 x HRMS
10. Accuracy and TTFF specifications may be affected by atmospheric conditions, signal multipath, satellite geometry and corrections availability and quality.
11. Same for single base and network.
12. Requires L1/L2 GPS+GLONASS at a minimum.
13. Accuracy and TTFF specifications may be affected by atmospheric conditions, signal multipath, satellite geometry and L-band service availability. Trimble RTX correction services are only available on land.
14. L1/L2 data required.
15. Figures of pitch accuracy are twice as high.
16. Typical power consumption for single antenna L1 GPS/GLONASS.
17. This will be used if greater than the main power input voltage.
18. Dependent on appropriate mounting / enclosure design
19. As required by the U.S. Department of Commerce to comply with export licensing restrictions.
20. Typical power consumption for a 12V input source

NOTE: All performance values are given assuming a minimum of five satellites are used, and following the procedures recommended in the product manual. High multipath areas, high PDOP values and periods of severe atmospheric conditions may degrade performance.

Specifications subject to change without notice.

InTech.trimble.com

Trimble.