ASHTECH MB-ONE

DATASHEET

KEY FEATURES

Precise Heading + Pitch/Roll

Precise Point Positioning using L-Band services like Trimble RTX™

Dual Core Engine with Ashtech Z-Blade Technology

L1-only RTK and L1/L2 RTK with Precise Platform Positioning (P^3) including Heading

Ethernet Support for web based applications

Small form factor power saving and rugged design for easy integration and demanding environments

MB-ONE RECEIVER MODULE

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

The Ashtech MB-One is a next generation GNSS OEM receiver module that combines years of 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 ASHTECH'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 Precise Point Positioning (PPP) services to output a highly accurate position solution that obviates the need for a local 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 module delivering centimeter-decimeter level Precise Platform Positioning (P^3) with accurate heading without needing 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.

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 board's Ethernet capability and easy to use Web browser interface to form your own Ethernet based GNSS applications.

ASHTECH 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[1])
  - BeiDou B1 Phase II (HW ready for B1 Phase III[2])
  - GALILEO E1
  - SBAS L1
- 2 L-Band Tracking Channels

FEATURES

- Ashtech patented Strobe Correlator Z-blade Technology for reduced GNSS multi-path
- 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 20 Hz position/velocity/heading/observables output
- RTK with Static & Moving Base corrections supported
- Reference Inputs/Outputs[8]: RTCM 3.2, RTCM 2.3, 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[9]	<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[12]
Maximum current	150 mA
Minimum current	5 mA
LNA Gain	
47 dB > LNA gain - coaxial cable loss > 23 dB	

ENVIRONMENTAL CHARACTERISTICS[5]

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[3,4]

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), Automomous	1.70 m
Velocity Accuracy[3]	0.005 m/sec HRMS
Maximum Operating Limits[6]	
Velocity	515 m/sec
Altitude	18,000 m

POSITIONING SPECIFICATIONS[3,4]

Mode	Accuracy	Latency[11]	Maximum Rate
Single Baseline RTK	0.008 m + 1 ppm Horizontal	<10 ms	20 Hz
Flying RTK	0.05 m (5 cm) + 1 ppm horizontal (steady state) for baselines up to 1000 km	<10 ms	20 Hz
Precise Point Positoning (PPP)[10]	0.05 m Horizontal to 0.30 m Horizontal[10]	<10 ms	20 Hz
SBAS	0.50 m Horizontal 0.85 m Vertical	<10 ms	20 Hz

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[3,4,7]

Baseline	Accuracy (degrees)	Maximum Rate
3 m	0.06° RMS	20 Hz
10 m	0.02° RMS	20 Hz

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 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 simutaneously-including web GUI access and raw data streaming
  - Network Protocols supported
    - HTTP (web GUI)
    - NTP Server
    - NTripCaster, NTripServer, NTripClient
    - mDNS/uPnP Service discovery
    - Dynamic DNS
    - eMail alerts
    - Network link to Google Earth
    - Support for external modems via PPP

RECOMMENDED ANTENNAS

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

ORDERING INFORMATION

Module

- Ashtech 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

** Ashtech 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. Vertical error is typically <2 time's horizontal error.

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 Depends on type of PPP service.

11 Latency figures for position correspond to Master/ primary sensor only. Heading latency is dependent on primary sensor latency.

12 This will be used if greater than main power input voltage.

Z-BLADE TECHNOLOGY INSIDE

Specifications and descriptions are subject to change without notice.

AMERICAS
TRIMBLE NAVIGATION LIMITED
Integrated Technologies
510 DeGuigne Drive
Sunnyvale, CA 94085 USA
+1-408-481-8000 Phone
Email: americasales-intech@trimble.com

EUROPE & MIDDLE EAST
TRIMBLE NAVIGATION LIMITED
Integrated Technologies
Germany
+49 (6142) 2100-348 Phone
France
+33 2 28 09 3800 Phone
Email: emeasales-intech@trimble.com

CHINA
TRIMBLE NAVIGATION LIMITED
Integrated Technologies
Email: chinasales-intech@trimble.com

ASIA - PACIFIC
TRIMBLE NAVIGATION LIMITED
Integrated Technologies
Email: asiasales-intech@trimble.com

RUSSIA
TRIMBLE NAVIGATION LIMITED
Integrated Technologies
+49 (6142) 2100-348 Phone
Email: rusales-intech@trimble.com

ashtech
Intech.trimble.com