MB 100

ashtech

BLADE TECHNOLOGY INSIDE
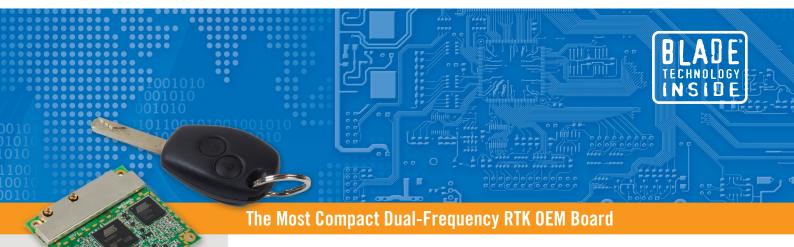
The Most Compact Dual-Frequency RTK OEM Board

Key Features

- **Dual-frequency GPS+SBAS**
- **Single-frequency GPS+GLONASS+SBAS**
- **L1 RTK and L1/L2 RTK**
- **Compact design and low power consumption**
- **Designed for demanding environments**
- **Proven Ashtech BLADE technology**

When power consumption, size and dependable performance such as raw data quality and/or real-time positioning (SBAS up to RTK) are critical, the new Ashtech MB 100 GNSS board simply delivers!

The MB 100 is the only RTK board designed to address equally well L1 GPS+SBAS standard applications, L1/L2 GPS+SBAS and L1 GPS/GLONASS + SBAS applications in the smallest form factor and power consumption available today on the market. BLADE™ Technology and dual-frequency GPS configuration offer amazing, long-range, RTK performance while single-frequency GPS+GLONASS configuration provides more satellites in view for demanding environments.

Ashtech High-End Performance

Embedded BLADE technology secures the best possible measurements from the GPS, GLONASS and SBAS constellations. BLADE perfectly mixes multiple observables without any compromise between quality and availability. This leads to an incredibly robust and dependable measurement processing resulting in optimized field productivity:

- Advanced multi-path mitigation and signal tracking for maximum data reliability
- Fast initialization and centimeter accuracy at long-range in dual-frequency GPS mode
- Full benefit of any available GLONASS satellites to strengthen the GPS solution in single-frequency GPS+GLONASS mode
- The most compact differential/raw data protocol: Ashtech Optimized Messaging (ATOM)

Seamless Integration and Flexibility

The MB 100 features low power consumption in an extremely compact board design, and a variety of output messages and data formats for extensive OEM solution interoperability. The MB 100 works as either a base or a rover and is available in various GNSS modes to adapt customer needs. All these GNSS modes are available in the same hardware and are simply activated by firmware option activation.

MB 100 supports standard and advanced RTK operations such as:

- RTK against a static base, with or without SBAS and GLONASS satellites
- Advanced RTK against an external moving base for relative positioning
- Network RTK using third-party network corrections: VRS, FKP, MAC
- Heading and pitch or roll determination with baseline length auto-calibration between two receivers
- Up to 20 Hz fast RTK and raw data output

In addition to these leading capabilities, the MB 100 features two antenna input connectors, with automatic switching between the two antennas for specific applications such as handheld integration.

GNSS Characteristics

- 45 channels:
  - GPS and GLONASS L1 C/A,
  - GPS L1/L2 P(Y)-code, L2C, L1/L2 full wavelength carrier,
  - SBAS (WAAS / EGNOS / MSAS),
- Fully independent code and phase measurements
- Advanced multi-path mitigation
- Ashtech BLADE technology for optimal performance

Features

- Up to 20 Hz Real-time GPS, GLONASS, SBAS raw data (code and carrier) and position output
- Real-time GPS, GLONASS and SBAS sub-frames output
- Ephemeris and almanac for GPS, GLONASS and SBAS output
- Ionosphere data output
- NMEA0183 messages output (ALM, GGA, GLL, GRS, GSA, GST, GSV, RMC, VTG, ZDA)
- RTK base and rover modes
- Easy-to-use trouble ticket (ATL)

RTK Base

- RTCM-2.3 & RTCM-3.1
- CMR & CMR+
- DBEN & ATOM (Ashtech format)
- Moving base operation

RTK Rover

- Up to 20 Hz Fast RTK
- RTCM-2.3 & RTCM-3.1
- CMR & CMR+
- DBEN, LRK & ATOM (Ashtech formats)
- Networks: VRS, FKP, MAC
- NMEA0183 messages output
- RTK with moving base operation
- Heading and pitch or roll determination with auto-calibration (against another board or sensor)

Accuracy Specifications (RMS)[1]

SBAS
- < 50 cm typical Horizontal

DGPS
- < 30 cm + 1 ppm typical Horizontal[2,3]

Flying RTK
- 5 cm + 1 ppm typical Horizontal for baselines < 50 km[2,3]
- 20 cm + 1 ppm typical Horizontal for baselines > 50 km[2,4]

RTK
- Horizontal: 1 cm + 1 ppm[2,3]
- Vertical: 2 cm + 1 ppm[2,3]

Heading, Pitch/Roll

- Heading: 0.2 deg/baseline (m)[2,5]
- Pitch/roll: 0.4 deg/baseline (m)[2,5]

RTK Initialization

Range
- 40 km and more in dual frequency mode
- Up to 10 km typical in single frequency mode

Time to First Fix[1,7]
- Re-acquisition: 3 sec
- Hot start: 11 sec
- Warm start: 35 sec
- Cold start: 45 sec

Reliability
- Up to 99.9% typical (user configurable)

I/O Interface

- SAMTEC 26 pins I/O connector (SAMTEC FTS-113-01-F-DV-A (pin out allocation compatible with DG14)
- 1 RS232 up to 921.6 kbits/sec (RxD, TxD, CTS and RTS signals)
- 1 RS232 up to 115.2 kbits/sec (RxD and TxD signals)
- 1 USB 2.0 Device "Serial Port" up to 12Mbits/sec
- 1 PPS output
- 1 Event marker input
- Radar-simulated pulse output on the I/O connector for accurate ground speed
- Onboard LED + output to drive external LED
- Antennas: 2 female MMCX straight connector[6]

Physical Characteristics

- Size (WxHxD): 58x56x11 mm (2.3x2.2x0.4 in)
- Weight: 22g / 0.78oz

Power Characteristics

- Power input:+3.3V DC±10% power input
- Power consumption:
  - < 0.8W in GPS L1
  - <0.95W in GPS L1/L2 or GPS+GLONASS L1
- Back-up power: 2.6 to 3.3V DC[7]
- Antenna(s) LNA power output: +5 VDC (±10%), Max current 100mA, Min current 5mA

Environmental Characteristics

- Operating temperature: -40° to +85°C (-40° to +185°F)
- Storage temperature: -40° to +85°C (-40° to +185°F)
- Humidity: 95% non-condensing
- Shock: MIL-STD 810F, Fig. 516.5-10 (40g, 11ms, saw-tooth)
- Vibration: MIL-STD 810F, Fig. 514.5C-17

Recommended Ashtech Antennas

- L1 GPS/GLONASS Survey Antenna (38dB gain)
- GNSS Survey Antenna (38dB gain)
- GNSS Machine/Marine Antenna (38dB gain)

Configuration Tool

Ashtech Communicator is a GNSS utility for boards and sensors evaluation and configuration.

- Preset of commands
- Real-time data logging
- Real-time data visualization

(*) Including all available options

(1) Accuracy and TTFF specifications may be affected by atmospheric conditions, signal multipath, satellite geometry and corrections availability and quality. Position accuracy specifications are for horizontal positioning. Vertical error is typically < 2 time's horizontal error.

(2) 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.

(3) Steady state value for baselines < 50 km after sufficient convergence time.

(4) Typical values after 3 minutes of convergence for baselines > 50 km.

(5) Typical values for properly installed antenna on vehicle body.

(6) For internal and external active antennas with automatic switch to external antenna when connected.

(7) Back-up battery may be used for RTC (Real Time Clock) to improve hot start TTFF performances. Because of non volatile memory on the board, it is not mandatory for configuration saving.