

# Trimble ABX-TWO

## HIGH PERFORMANCE COMPACT OEM SENSOR

### HIGH PERFORMANCE RTK, PPP AND 3D ATTITUDE

Trimble has continued to raise the bar in OEM GNSS attitude determination and real time positioning with the new ABX-Two OEM sensor. Built on the strength of its predecessors, ABX-Two delivers unsurpassed accuracy in a compact, rugged system. Powered by two MB-Two boards, the ABX-Two is a comprehensive sensor that will deliver precise heading, pitch and roll along with 3D position solutions up to centimeter-level accuracy. Unlike inertial sensors, ABX-Two provides drift-free, absolute attitude solution. Versatile, lightweight and smart, ABX-Two is the ideal solution for a wide variety of airborne, marine and terrestrial applications.

The ABX-Two allows a wide range of option-upgradeable GNSS configurations from single sensor/single frequency/single GNSS to multi sensor/multi frequency/multi GNSS. Trimble's patented Z-Blade technology drives a powerful GNSS agnostic engine allowing the ABX-Two to use any single GNSS system (or arbitrary GNSS subset) without any dependency on GPS. The GNSS engine utilizes over-the-air satellite corrections via embedded L-Band hardware to achieve centimeter/decimeter PPP accuracy level with Trimble RTX corrections. Worldwide inland availability of RTX corrections allows the ABX-Two to deliver centimeter-level positioning without a dedicated base station.

### PRECISE PLATFORM POSITIONING

- Multi-antenna GNSS raw data
- RTK/PPP + Full Attitude
- Precise 6D sensor

### POWERFUL RTK ENGINE

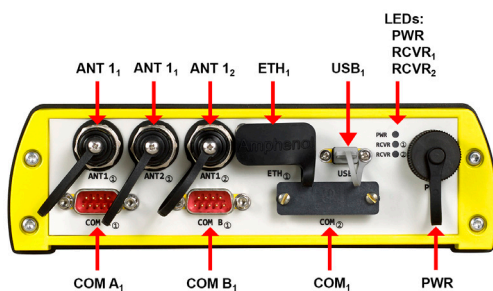
The ABX-Two has a powerful RTK engine that delivers centimeter-level accuracy for systems using corrections from a local base station or RTK network. It also features RTK against a moving base for relative positioning. The network RTK capabilities include third-party network corrections such as VRS,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

### EASY INTEGRATION

The ABX-Two is housed in a small, weatherproof, lightweight and rugged enclosure that is built around the MB-Two modules. It can operate in harsh environments while requiring minimum space for installation. The ABX-Two allows a wide range of input voltage from 9 V DC to 36 V DC and maintains a low power consumption regardless of the input voltage. The variety of interface connections further eases the ABX-Two integration process.

## Key Features

- ▶ Z-Blade Technology
- ▶ 5 Dual-Band GNSS
- ▶ Conventional and Advanced RTK
- ▶ Precise Point Positioning (PPP)
- ▶ Precise Full Attitude
- ▶ Precise Platform Positioning (P-cube)
- ▶ Web User Interface
- ▶ Superior Connectivity
- ▶ Compact, Lightweight Enclosure
  - 190mm x 58mm x 160mm
  - 1.27 kg



## DATASHEET

### TECHNICAL SPECIFICATIONS

THE SENSOR USES TWO INTERCONNECTED MB-TWO BOARDS. THE SAME GNSS ENGINE IS IMPLEMENTED IN EACH OF THE TWO BOARDS.

#### 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<sup>1</sup>
  - GALILEO E1+E5b
  - SBAS L1<sup>2</sup>
- 2 MSS L-Band Tracking Channels

#### FEATURES

- Patented Strobe Correlator™ to reduce GNSS multi path
- Patented Z-tracking to track encrypted GPS P(Y) signal
- 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
- RTX™ PPP engine
- Hot Standby RTK and Flying RTK Algorithms
- RTK with Static & Moving Base corrections supported
- Heading engine with optional baseline length self-calibration
- Full attitude engine with optional baseline 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/ attitude/observables output<sup>3</sup>
- Reference Inputs/Outputs: RTCM 3.2<sup>4</sup>, RTCM2.3, CMR/CMRx<sup>5</sup>, ATOM<sup>6</sup>
- RTK Networks Supported: VRS, FKP, MAC
- Navigation Outputs: NMEA-0183, ATOM
- One-push Trouble Log (ATL)
- Programmable startup protection

#### GNSS SENSOR PERFORMANCE

- Cold start: < 60 seconds
- Warm Start: < 45 seconds
- Hot Start: < 11 seconds
- Signal re-acquisition: < 2 seconds
- Position accuracy (HRMS), SBAS: 0.50 m<sup>7</sup>
- Velocity Accuracy: 0.02 m/sec HRMS
- Update rate: Up to 50 Hz
- Latency: < 10 s<sup>8</sup>
- Maximum Operating Limits<sup>17</sup>
  - Velocity: 515 m/sec
  - Attitude: 18,000 m

#### PRECISE POSITIONING PERFORMANCE

##### RTK<sup>9,10,11</sup>

- 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<sup>12,13</sup>

- 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<sup>10,14,15</sup>

- Accuracy (RMS): 0.2° per 1 m of baseline length
- Initialization time: < 10 sec typical
- Baseline length: < 100 m

##### 3D ATTITUDE<sup>10,14,15</sup>

- Accuracy: 2 x heading accuracy
- Initialization time: < 10 sec typical

#### I/O INTERFACE

- D-Sub 26 pin connector (Positronics WDD26P4C7AT7U/AA)
- 2 x RS232 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)
- 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)	190 mm x 58 mm x 160 mm
Power	9 to 36 VDC
Power Consumption <sup>16</sup>	3 to 5.5 Watt
Weight	1.27 kg
<b>Connectors</b>	
Serial Ports	2 x D-Sub 9-pin male
Ethernet	RJ45
USB	mini USB
Power	4-pin (BINDER USA 99-3431-601-04)
I/O	D-Sub 26-pin connector
Antenna	3 x TNC female connectors
<b>Antenna LNA Power Input</b>	
Input Voltage Range	5.0 VDC, +/-10%
Maximum current	100 mA
Minimum current	5 mA
LNA Gain Range	17 to 47 dB for L1/G1/B1/E1 band 23 to 50 dB for L2/G2/B2/E5 band

#### ENVIRONMENTAL CHARACTERISTICS<sup>17</sup>

Operating Temperature	-30 °C to +60 °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	100% non-condensing
Maximum Acceleration	11 g

#### RECOMMENDED ANTENNAS

- Compact GNSS Machine/Marine/Aviation Antennas: Trimble AV33 & AV34
- GNSS Machine/Marine/Aviation Antennas: Trimble AV59 & LV59

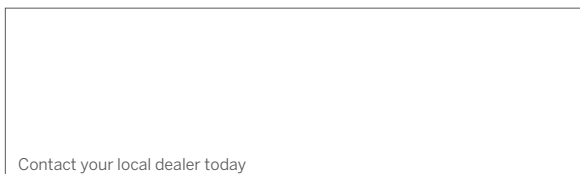
#### ORDERING INFORMATION

Enclosure Part Number	107456-XX
Enclosure	Trimble ABX-Two available in a variety of configurations from SBAS upwards

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. Power consumption depends on the operating mode.
17. As required by the U.S. Department of Commerce to comply with export licensing restrictions.

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.



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