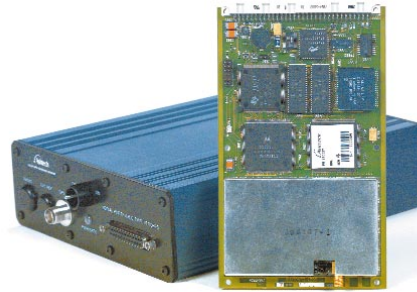


Ashtech G12E-RTK Receiver



Single-frequency GPS RTK
Accuracy better than 20cm

- 12 Channels
- Decimeter positioning using OTF technology



The Ashtech® G12E-RTK™ receivers provide typical accuracy of 20 centimeters or better. Reliable on-the-fly (OTF) initialization algorithms are used so that operation is as easy as DGPS, but with far better accuracy.

The receiver is available in Eurocard OEM format, or in a rugged Sensor housing.

What is RTK?

Real-time Kinematic is a special form of Differential GPS with two major differences:

- RTK can provide up to one hundred times greater accuracy than Differential GPS.
- RTK requires a short initialization period following power-up, during this time the accuracy changes from meter-level down to decimeter-level, and, in good conditions, centimeter-level.

RTK Initialization

RTK initialization is automatic, and does not require the receiver to be stationary. In typical conditions the receiver's accuracy will converge to decimeter-level in a few minutes following startup. In good conditions, the accuracy may continue to converge down to 1cm.

Upgrade to GG-RTK

For even better performance you can upgrade the G12E-RTK to combined GPS+GLONASS RTK. With the addition of the extra satellites from GLONASS, accuracy convergence times drop from minutes to seconds. Upgrades to GG-RTK require a different GPS antenna and a new firmware load. Contact your closest Ashtech distributor for details.

As Easy as DGPS

If you can set up a Differential receiver, you know almost all there is to know about RTK. The G12E-RTK receiver uses all the same commands used by the G12 Differential GPS receiver. You literally need just one extra command to place the receiver in RTK Remote mode.

For greatest accuracy, the G12E-RTK remote unit needs a base station that provides standard RTCM RTK data. If you happen to be operating the G12E-RTK receiver in a region where only RTCM Code Differential GPS corrections are available, then the unit can be operated in DGPS mode, delivering sub-meter accuracy.

Confidence: Real-time Accuracy Measures

The G12E-RTK receiver features real-time calculations of your achieved accuracy, so while your accuracy is still converging you will know what your achieved accuracy is, making your operation safer and more reliable.

Base Station

A G12E-RTK base station can generate RTCM format differential corrections for Differential GPS as well as RTK-data, at the same time. So you can run a single G12E-RTK base station, with any number of remote receivers. Some remote units doing Differential GPS, others doing RTK. Moreover, we don't tie you down with secret proprietary formats. The G12E-RTK uses the RTCM standard for everything, leaving you the freedom to buy remote receivers of your choice in the future without having to change your base station.

Built-in Radio

RTK operation requires a data-link between base and remote receivers. Any radio may be used, but the G12E-RTK Sensor has an optional built-in Spread Spectrum radio receiver. For base stations, an external spread-spectrum radio transmitter is available. These radios, using the 902 to 928 MHz frequencies, are license free in the United States and many other countries.

Development Kits

Development Kits are available, including everything you need to test-drive G12E-RTK. A development kit contains a G12E-RTK Receiver with everything you need to start your system integration: Windows Evaluate™ software, Windows Mission Planning™ software, power supply, ready-made interface cables, antenna, and manuals. Development kit receivers are equipped with both Base station and Remote capability. With this comprehensive kit you'll see RTK performance minutes after taking delivery of your first system.

Compatibility

The G12E-RTK is mechanically and electrically compatible with the Ashtech GG24™ and Z Eurocard™. Therefore, once you've integrated a G12E, you have essentially integrated all Ashtech Eurocard boards.

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Ashtech G12E-RTK Receiver Specifications

Standard Features

- 12 channels GPS, L1 code & carrier
- Raw data output (code & carrier)
- 2s reacquisition
- Geoid & Magnetic Variation models
- Standard NMEA 0183 V2 output
- 1 PPS output
- Position latency output
- RTCM SC-104 v2.2 Support

Real-Time Position Accuracy¹

Following power-on, the float solution accuracy converges, starting from meter-level and improving with time. Under favorable operating conditions, however, the receiver may fix integers resulting in a quantum improvement in positioning accuracy to the centimeter level.

Autonomous²
3.0 m (CEP)

RTK
10 cm (CEP)

If you set the receiver to floating ambiguity mode, it will not fix integers. Floating ambiguity accuracy typically converges to better than 20 cm in approximately 5 minutes, and better than 10 cm in approximately 10 minutes. Convergence time changes with the number of satellites in view, as well as baseline length.

Velocity Accuracy¹ (knots)

0.1 (95%)

Modes of Operation

Synchronized Mode

This mode provides maximum position update rate of 1 Hz.

Fast Mode

This mode provides position calculated from independent measurements without extrapolation of old positions with typical latency of less than 100ms.

RTK Initialization

- Reliability: up to 99.9%

Initialization times vary with baseline length and the number of satellites. The more satellites in view, the faster the initialization. For example, initialization times can be as fast as one second, or, depending on the environment, up to many minutes. The receiver will take as long as necessary to guarantee the required reliability. The receiver accounts for obstructions, satellite geometry, signal quality, multipath level and many other factors.

Base Unit

All standard features, plus:

- Differential Reference station for DGPS and RTK operation.
- Point position (position averaging, for approximately 3m accuracy, stand-alone)
- Position and raw data update rates user-selectable up to 2Hz.

RTCM Format

Message types: 1,2,3,9,16,18,19,22

Base station can generate these messages, remote station can accept them.

For RTK operation, message types 18 & 19 needed at a rate of once every 5 seconds or faster for remote unit to fix integers. Once integers are fixed, maximum age of 18&19 data is 30 seconds.

Data-link Baud Rate Requirements

Minimum data-link baud rate: 600 bps

For optimal performance send type 18 & 19 once every second, on a fast data link.

Communications

OEM Board

- 2 bi-directional RS-232 serial ports

Sensor

- 3 bi-directional RS-232 serial ports

Environmental and Physical

OEM Board

Operating Temp: -30°C to +70°C

Storage Temp: -40°C to +85°C

Power Consumption: 2.3W (receiver only)
0.3W (typ. antenna)

Input Voltage: 5VDC +/- 5%
100mV p-p ripple

Weight: 8 oz.

Dimensions: 100mm x 167mm

Vibration: 160C level B, N, M
Mil. Std. 810E min. std.

Speed³ (max): 1,000 knots

Altitude³ (max): 60,000 ft.

Sensor

Operating Temp: -30°C to +55°C

Storage Temp: -40°C to +85°C

Power Consumption: 3.2W (receiver only)
0.3W (typ. antenna)

Input Voltage: 6-15VDC

Weight: 3.4 lbs.

Dimensions (mm): 172W x 58H x 225D

Water resistance: Mil. Std. 810E

Vibration: Mil. Std. 810E

Speed³ (max): 1,000 knots

Altitude³ (max): 60,000 ft.

FCC: Class A

CE Mark

G12E-RTK Development Kit

Development kits include a G12E-RTK receiver with base station and remote capability, antenna, power supply, cables, manuals, Ashtech Evaluate™ software and manual, Ashtech Mission Planning™ software and manual.

¹ Accuracy and TTFF specs. based on tests conducted in California. Differential tests performed using Ashtech Z-Sensor™ base station with Geodetic antenna and G12E-RTK GPS Board remote with Geodetic antenna (Marine IV antenna for TTFF). Antenna benchmark locations determined using CORS sites Point Blunt (PBL1) and Pigeon Point (PPT1). Tests at different locations under different conditions may produce different results.

Position accuracy specifications are for horizontal positioning. Vertical error is typically <2 times horizontal error.

²Real-time position accuracies obtained with SA off. With SA on, accuracy of autonomous positioning may degrade up to 100 meters (95%) as specified by the U.S. Department of Defense.

³ Higher altitude and velocities up to 9km/s are available under validated export license.

Specifications are subject to change without notice.

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