

Ashtech ADU2™



**Fully Integrated Real-Time,
3-Dimensional GPS Position
and Attitude Determination Unit**



We take attitude determination to the next level with our advanced ADU2™. The ADU2 sets the standard in three-dimensional GPS-based real-time position and attitude determination. The new ADU2 is built on the strength of its precursor, the 3DF™-ADU, and delivers unsurpassed accuracy in a rugged full-function system. By providing precise real-time heading, pitch and roll, along with three-dimensional position and velocity for static or dynamic platforms, the ADU2 is the ideal solution for a wide array of nautical, aerial and land-based applications.

Advanced Performance

GPS-based attitude determination technology is based on differential carrier phase measurements between four antennas connected to a receiver, which provide heading, pitch and roll angles along with three-dimensional position and velocity. Because the ADU2 employs a 4 antenna/12 channel configuration over the 3DF-ADU's 4 antenna/6 channel formation, performance is significantly improved due to enhanced satellite tracking. The primary bank of 12 channels computes position and velocity and the 3 secondary banks are then used for attitude determination based on differential phase measurements made relative to the primary bank. The ADU2 employs "on-the-fly" ambiguity resolution techniques based

on its fixed antenna array. Alternatively, the ADU2 features an optional precalibrated portable antenna array kit. The winning result of the ADU2's advanced technology is a sophisticated 48-channel receiver with the ability to select the best 8 of 12 channels to use in PDOP (Position Dilution of Precision) - based satellite searching and tracking, thereby improving solution integrity and allowing close to 100% attitude availability.

Smart GPS

The ADU2 offers unparalleled accuracy as a real-time attitude sensor in high-precision GPS applications such as gyrocompass calibration, open-pit mining, seismic exploration and oceanographic research. In dynamic nautical operations, real-time differential is available as an option and provides 1–3 meter position accuracy. With this option, the system can accept RTCM-104 differential corrections while simultaneously outputting the corrected position. The Photogrammetry/Event Marker available as an option with the ADU2 enables it to receive a TTL level pulse (event mark) from an external device and tag it with position and time.

The ADU2 capably compensates for a variety of antenna configurations in order to accommodate diverse vehicle mounting

requirements and cable lengths. Antennas do not need to be on the same horizontal plane, and no calibration is needed for antenna cable delay. In ADU2 installations, the unit requires that relative positions need only be determined once per installation. In stationary conditions, for example, an airplane on a runway, Ashtech's processing software may be used. Alternatively, CALI3DF™ dynamic calibration software is available for dynamic usages, such as a ship at sea. The ADU2 then saves the values and begins navigation and vehicle attitude computations.

Interface Features

Packaged in robust housing, the ADU2 can also be integrated into existing navigation system racks. The ADU2 supplies all GPS raw data, including carrier phase, code phase and Doppler measurements, as well as satellite, position and attitude measurements in real-time. Measurement data is available through either of the ADU2's RS-232 ports at rates up to 115,200 baud. All information is available via the RS-232 ports in NMEA 0183, ASCII data format and binary format. In addition, a Windows®-based software interface is provided as a standard accessory in order to view attitude, position and velocity, log data, monitor accuracy and communicate with the ADU2.

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An Orbital Company

Ashtech
PRECISION PRODUCTS

Ashtech ADU2 Specifications

Real-Time Position Accuracy¹

Autonomous
5.0 m (CEP)

Differential
1.0 m (CEP)

Velocity Accuracy (knots)
0.3 (95%)

Real-Time Attitude Accuracy²

- 1/2 Sec update, unsmoothed
- 1 meter square antenna array

Static Heading

- 0.4° rms

Static Pitch & Roll

- 0.8° rms

Dynamic Heading

- 0.2° rms

Dynamic Pitch and Roll

- 0.4° rms

Standard Accessories

- Installation/Calibration Software
- 2 RS-232 Interface cables
- PC-based Windows software interface for set-up and monitoring
- Receiver Operating & Installation Manual

Environmental

Temperature Ranges

Receiver

- Operating: -20°C to +55°C
- Storage: -30°C to +75°C
- Receiver weight: 5.1 lbs

Antenna

- Operating: -40°C to +65°C
- Storage: -55°C to +75°C
- Weight: 0.25 lbs
- Dimensions: 8.46W x 3.74H x 7.67"D
- Speed³: Not to exceed 1,000 knots
- Altitude³: Not to exceed 60,000 feet

Standard Features

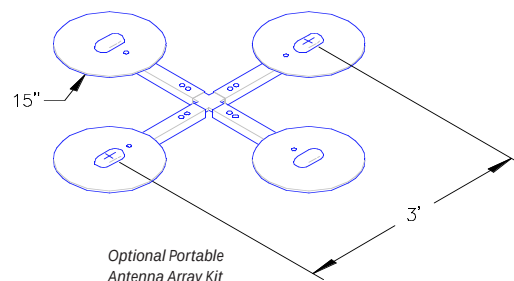
- 1/2 second update rate
- 48 channel operation
- 4 antennas
- < 3 minute cold start to first attitude data
- Real-time measurement output
- 14 Watt power consumption
- 10 to 36 VDC input
- 2 RS-232 serial ports
-115,200 Baud (maximum)
- 1 PPS timing signal output

Optional Features

- Real-Time Differential Remote RTCM-104 V2.1 Message Types 1,2,3,6,9,16
- Separate Real-Time Differential Remote and Position on Antenna 1 and Antenna 2
- Photogrammetry/Event Marker Input

Optional Accessories

- 10, 30 and 60-meter antenna cables
- In-line antenna cable amplifier
- Marine Antenna Kit
- Aircraft Antenna Kit
- TNC/Type N Adapter
- 1 meter square precalibrated antenna array kit



¹Position and velocity accuracy are for horizontal errors based on tests conducted in California.

²Attitude accuracy increases with antenna separation; for example, doubling the antenna separation makes the accuracy twice as good.

³Higher altitude and velocities up to 25,000 knots are available under validated export license.

Specifications are subject to change without notice.

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