

## Inertial Measurement Unit / Attitude Heading Reference System

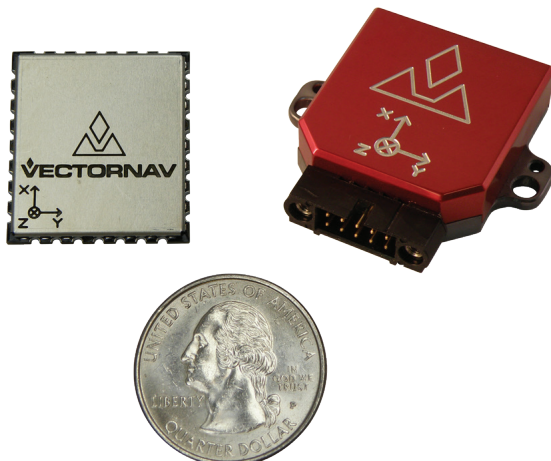
# VectorNav VN-100 IMU/AHRS

## Next Generation Embedded Navigation

### PRODUCT OVERVIEW

The VN-100 is a miniature, light weight, low power, high-performance Inertial Measurement Unit (IMU) and Attitude and Heading Reference System (AHRS) available in a surface mount package or aluminum encased Rugged module. Incorporating the latest in MEMS technology, the VN-100 combines 3-axis accelerometers, gyros, magnetometers, a barometric pressure sensor and a 32-bit microprocessor into an extremely compact design.

The VN-100 computes and outputs a real-time, drift-free attitude solution (i.e. 3D orientation) that is continuous over a complete range of 360° motion. All VN-100 sensors go through a rigorous calibration process at the VectorNav production facility to ensure the highest quality inertial measurements and attitude estimates. The small size, high performance, and cost-effectiveness of the VN-100 provides unprecedented opportunities for embedded navigation.



### HIGHLIGHTS

- ▶ Attitude & Inertial Data at up to 1 kHz
- ▶ Continuous Attitude Solution Over Complete 360° Range of Motion
- ▶ Static Accuracy better than 0.5° in Pitch/Roll, 2° in Heading
- ▶ Individually Calibrated for Bias, Scale Factor, Misalignment, & Gyro G-Sensitivity
- ▶ Available with Full Temperature Compensation (-40°C to +85°C)
- ▶ Surface Mount Package (30-pin LGA)
  - Dimensions: 24 x 22 x 3 mm
  - Weight: 3 grams
- ▶ Rugged Package
  - Dimensions: 36 x 33 x 9 mm
  - Weight: 13 grams

### FEATURES

- ▶ Vector Processing Engine (VPE) 1.0 Toolboxes
  - Real-Time Magnetic & Acceleration Disturbance Rejection
  - Adaptive Signal Filtering
  - Dynamic Filter Tuning
  - On-Board Hard & Soft Iron Compensation
- ▶ On-Board Gyro Drift Compensation
- ▶ Multi-Sensor Synchronization
- ▶ Inputs for External Magnetometers or Velocity Measurements (Airspeed, GPS)
- ▶ Optional Barometric Pressure Sensor

## TECHNICAL SPECIFICATIONS

### Attitude & Heading

Range (Heading/Roll):	±180 °
Range (Pitch):	±90 °
Static Accuracy (Heading):	2.0 °
Static Accuracy (Pitch/Roll):	0.5 °
Angular Resolution:	< 0.05 °
Repeatability:	< 0.2°
Output Rate:	200 Hz*

### Gyro Specifications

Range:	±2000 °/s
In-Run Bias Stability:	< 10 °/hr
Linearity:	< 0.1 % FS
Noise Density:	0.005 °/s /√Hz
Bandwidth:	256 Hz
Alignment Error:	±0.05 °

### Accelerometer Specifications

Range:	±16 g
Linearity:	< 0.5 % FS
Noise Density:	0.4 mg/√Hz
Bandwidth:	260 Hz
Alignment Error:	±0.05 °

### Magnetometer Specifications

Range:	±2.5 Gauss
Linearity:	< 0.1 %
Noise Density:	140 µGauss/√Hz
Bandwidth:	200 Hz
Alignment Error:	±0.05 °

### Pressure Sensor Specifications\*\*

Range:	10 to 1200 mbar
Resolution:	0.042 mbar
Accuracy:	±1.5 mbar
Error Band:	±2.5 mbar
Bandwidth:	200 Hz

### Environment

Operating Temp:	-40°C to +85°C
Storage Temp:	-40°C to +85°C

### Electrical

Input Voltage (Surface Mount):	3.2 V to 5.5 V
Input Voltage (Rugged):	4.5 V to 5.5 V
Current Draw:	50 mA @ 3.3V
Power Consumption:	165 mW
Digital Interface (Surface Mount):	Serial TTL, SPI
Digital Interface (Rugged):	Serial TTL, RS-232

### Physical (Surface Mount Part)

Size:	24 x 22 x 3 mm
Weight:	3 g
Footprint:	30-pin LGA

### Physical (Rugged)

Size:	36 x 33 x 9 mm
Weight:	13 g
Connector:	Harwin M80-5001042

\* Rates of up to 1 kHz available upon request.

\*\* Optional.

## VN-100 DEVELOPMENT



- VN-100 Development Board
  - Pre-Soldered VN-100 Surface Mount Part with USB & RS-232 Interfaces
  - 30-Pin Header for Easy Prototyping



- VN-100 Rugged Development Kit
  - USB & Serial Adapter Cables
  - Connection Tool & Carrying Case

## VN-100 DEVELOPMENT TOOLS

- **Sensor Explorer GUI:** Powerful and user-friendly GUI allows you to display sensor output as a 3D object, graph inertial data, configure sensor settings, perform data-logging, & more.
- **Software Development Kit:** Interface via C/C++, .NET & MATLAB development environments.
- **Online Library:** A large collection of inertial navigation knowledge and application notes is available on our website to help maximize VN-100 performance for your application.
- **Engineering Support:** Dedicated and responsive engineering support team with combined experience in sensing, guidance, navigation, and controls.
- **Custom Solutions Available:** Application-specific modeling & algorithm development; controls & closed-loop navigation solutions; custom form-factors & packaging; integration with other external sensors; displays, GUIs & other software packages; tailored calibrations; custom communication protocols.