

Overview

The TerraNavigator is a portable module that plugs into any portable computer (including WinCE-based PDAs), providing geolocation, heading (digital compass), and altitude information.

Device Description

Cybernet has developed a highly portable position and orientation device called the “TerraNavigator” that can be attached to any handheld or portable computing device via USB. Position is determined by combining GPS coordinates with data from magnetic and MEMS acceleration sensors. Internal tilt sensors compensate bearing information so that the handheld computer can be held at any orientation and still provide accurate data. The result is a single device that provides the user with geolocation and instantaneous bearing. Bearing information is accurate even when the device is stationary. The TerraNavigator is connected to any computing device via the widely available USB interface, or via a RS232 serial connection. The TerraNavigator has been designed to fit into a small volume by using miniaturized MEMS sensors, ASICs, and small footprint microelectronics.

The TerraNavigator consists of 5 main subsystems: A two port USB hub, two USB converters, a microcontroller, an RS232 serial connection, and a sensor suite consisting of a GPS Receiver, Altimeter, Accelerometer, and Magnetometer.

Available Sensors:

Integrated Sensor Suite

1. GPS Receiver

- a. Generates Position (Latitude, Longitude, Altitude) in WGS-84 coordinates
- b. Position accuracy is a function of DOP and measurement accuracy
- c. Generates 3D Velocity and Ground Track (True Heading)
- d. Accurate to < 2m CEP

2. Pressure Sensor

- a. Barometric Pressure Sensor
- b. Temperature Compensated
- c. Accurate to ± 1.5 mbar

3. Accelerometer

- a. MEMS Accelerometer
- b. Measures Force of Gravity (1g) to Compute Tilt
- c. Accurate to within 1°

4. Magnetometer

- a. 3-Axis Measurement of Earth's Magnetic Field
- b. Calibrated for Soft and Hard Iron Errors Using Ambient Field
- c. Accurate to within 1°

(Note: the Magnetometer and Accelerometer correct for Tilt in handheld device.)

