Vernier GPS Sensor

(Order Code VGPS)

The Vernier GPS Sensor collects real-time latitude, longitude, and altitude data when connected to a LabQuest or to a computer running Logger *Pro*. When used in conjunction with other sensors, the location data are saved along with the sensor data. This is particularly useful for environmental studies where you want to know the location of your sampling sites, or when studying motion, velocity, or acceleration over long distances.

Inventory of Items Included with the GPS Sensor

Check to be sure that each of these items is included in your GPS package:

- Vernier GPS Sensor
- USB extension cable
- Suction cup
- Vernier GPS Sensor booklet (this document)

Data-Collection Software

This sensor can be used with the following data-collection software.

- **Logger *Pro* 3** Version 3.8.3 or newer required.
- **LabQuest App** Version 1.4 or newer required. This program is used when LabQuest is used as a stand-alone device.

Collecting Data with the GPS Sensor

GPS Sensor Only

1. Connect the GPS Sensor to the LabQuest or computer's USB port. Note: Some computers will cause interference in the GPS signal. In this case, use the included USB extension cable to move the GPS Sensor away from the computer.
2. Start the data-collection software.
3. Latitude and longitude will be displayed. Note: The first time the GPS Sensor is connected, it may take several minutes to determine its location. Subsequent connections will lock the location in less time. Altitude, speed, and direction over ground will also be collected once data collection has begun. These data will be available in the data table.
4. The default data-collection mode is Time Based.
5. You are now ready to collect data.

GPS Sensor with an Environmental Sensor

1. Connect the environmental sensor, such as pH or temperature, to the interface and the GPS Sensor to the LabQuest or computer's USB port. Note: Some computers will cause interference in the GPS signal. In this case, use the included USB extension cable to move the GPS Sensor away from the computer.
2. Start the data-collection software.
3. Latitude, longitude, and the live sensor readout will be displayed. Note: The first time the GPS Sensor is connected, it may take several minutes to determine its location. Subsequent connections will lock in the location in less time. Altitude will also be collected in the data table once data collection has begun.
3. The default data-collection mode is Selected Events. In this mode, data will be collected on command rather than over time, making it easy to collect single points of data at specific sampling sites. See Figure 1 for sample results after mapping in Google™ Maps.
4. You are now ready to collect data.

GPS Sensor with other Sensors

1. Connect the sensor, such as an accelerometer, to the interface and the GPS Sensor to the LabQuest or computer's USB port. Note: Some computers will cause interference in the GPS signal. In this case, use the included USB extension cable to move the GPS Sensor away from the computer.
2. Start the data-collection software.
3. Latitude, longitude, and the live sensor readout will be displayed. Note: The first time the GPS Sensor is connected, it may take several minutes to determine its location. Subsequent connections will lock in the location in less time. Altitude, speed, and direction over ground will also be collected once data collection has begun. These data will be available in the data table.
3. The default data-collection mode is Time Based. See Figure 2 for sample results after mapping in Google™ Maps.
4. You are now ready to collect data.

Units

The Vernier GPS Sensor can display units of Decimal Degrees (hddd.ddddd°), used as the default and when importing into most GIS software; Degree Decimal Minutes (hddd°mm.mmmmm'); or UTM (Universal Transverse Mercator). When in UTM, the grid number and letter will be displayed in brackets after each Easting and Northing value.

NOTE: This product is to be used for educational purposes only. It is not appropriate for industrial, medical, research, or commercial applications.

Mapping Data Collected by the GPS Sensor

LabQuest App Data collected in LabQuest App will need to be transferred to Logger *Pro* for mapping at this time.

Logger Pro Two options are available by choosing Export from the File menu:

- GIS Format: Choosing this option saves the data as a tab delimited text file specially tailored for GIS software such as ArcGIS or the free ArcExplorer Java Edition for Education (AEJEE). The file can then be imported into the GIS application as a table of x,y data. Note: Some GIS applications have file name limitations. To avoid this problem, keep the file name to fewer than ten

characters with no spaces. For more information on these programs, visit www.esri.com/k12.

- Google™ Maps: If connected to the internet, this option will launch Google Maps in your browser. Two styles of mapping are available:

  1. Mapping discrete points. Use this style for water quality or other environmental monitoring sites as shown in Figure 1.

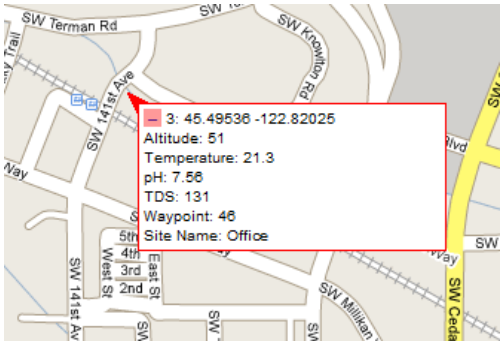

Figure 1 Water quality data in Google Maps

  2. Mapping a line. Use this style for mapping a sensor column of data such as acceleration of a car in a parking lot as shown in Figure 2.

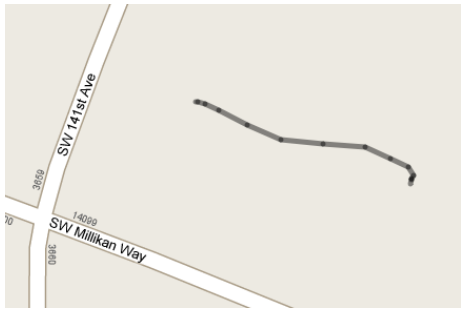

Figure 2 Acceleration data in Google Maps

How the GPS Sensor Works

The GPS Sensor contains a chip that receives radio signals from several of 24 GPS satellites. Knowing the time the signal left each satellite and the time it was received by the GPS Sensor, it uses triangulation to calculate its location. The more satellites it can "see," the more accurate the data. Because of this, readings cannot usually be obtained indoors and may be limited when under heavy tree cover or in a deep canyon.

This sensor is equipped with circuitry that supports auto-ID. When used with LabQuest or Logger *Pro*, the software identifies the sensor and uses pre-defined parameters to configure an experiment appropriate to the recognized sensor.

Do I Need to Calibrate the GPS Sensor?

No. The GPS Sensor does not need to be calibrated.

Warranty

Vernier warrants this product to be free from defects in materials and workmanship for a period of five years from the date of shipment to the customer. This warranty does not cover damage to the product caused by abuse or improper use.

GPS Sensor Specifications

Channels:	16
Update Rate:	1 Hz
Acquisition Times:	
• Hot start, open sky	4 s (typical)
• Cold start, open sky	42 s (typical)
WAAS Capable:	yes
Position Accuracy:	
• Autonomous	2.5 m CEP[1]
• WAAS enabled	2.0 m CEP
Max. Altitude:	18,000 m
Max. Velocity:	515 m/s

Vernier
Measure. Analyze. Learn.™
Vernier Software & Technology
13979 S.W. Millikan Way • Beaverton, OR 97005-2886
Toll Free (888) 837-6437 • (503) 277-2299 • FAX (503) 277-2440
info@vernier.com • www.vernier.com

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[1] CEP (Circular Error Probable) means that half of the data points fall within a circle of this radius.