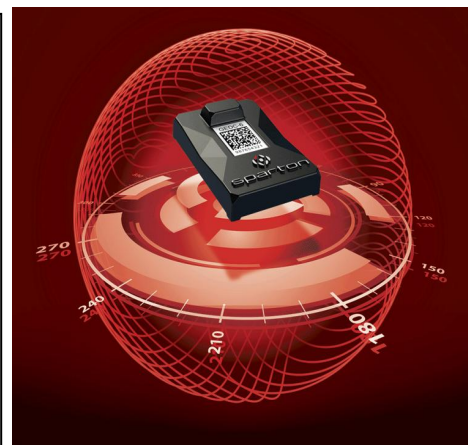# NorthTek™

Programmable Navigation Solutions at Your Direction!

A New Paradigm for Navigation Sensors!

Most orientation sensors only allow the user to modify basic elements, however, with Sparton's NorthTek™ enabled [DC-4, GEDC-6 and AHRS-8], the user can program both basic and advanced features. Sparton's NorthTek™ technology allows the customer to write and execute custom, user-defined, application specific algorithms, right in the sensor! NorthTek™ know-how allows the designer to directly interface with real time sensor data and make custom computations specifically for their application. With NorthTek™ – you possess power unsurpassed in the industry – no other sensor offers this level of customization. Unique solutions for tomorrow's challenges –available today

Features and Benefits
- Full access to all adjustable parameters.
- Real time solutions environment, embedded into the module.
- Allows system designer to embed custom profiles that adapt to changing orientation, varying magnetic fields and other dynamic situations within the host device.
- Gives the user the ability to modify the startup behavior with simple [preloaded] commands.
- Ability to use the secondary sensors for emergency situation monitoring, such as being upside down or in free fall.
- Unlimited user defined capability in a full applications environment.
- Programs may be stored in non-volatile memory

How does it Work?
- The user designs a NorthTek™ program using a plain text editor in the Forth programming language. (Can also be programmed from the host application).
- The program is sent to the DC-4, GEDC-6 or AHRS-8 navigation sensor with a simple terminal emulator.
- A single custom command starts the user application.
- Normal selection of data output continues without interruption.
- NorthTek™ application runs parallel with normal sensor operation.
- The NorthTek™ program can be stopped, unloaded and another NorthTek™ program loaded, as many times as desired.

Want to Learn More?
Additional information on NorthTek™ is available on our web site at www.spartonnavex.com/northtek, where NorthTek™ related Application Notes and the NorthTek™ System Programming Guide reside.

Applications

Available for download are sample Sparton coded NorthTek™ application programs in the "Sparton App Store" on www.spartonnavex.com/northtek . The following list contains examples of currently available NorthTek™ apps, and illustrates the customization potential of this new cutting edge technology built right into each device. As an added benefit, these programs are available at no additional cost to purchasers of Sparton's DC-4, GEDC-6 and AHRS-8!

- **Tare.4th**
  Tare.4th is a NorthTek™ program that allows the end user to mount the DC-4, GEDC-6 or AHRS-8 in any totally arbitrary mounting configuration. The program is downloaded to the sensor while it is positioned in the desired orientation and automatically computes and stores the required settings to use the given orientation as the operational condition.

- **Recal.4th**
  Recal.4th contains programs that allow a user to swap between two Magnetic Field Calibration data sets in real time. The nominal calibration is temporarily stored by command and overwritten with a new set for alternate host configurations at runtime. The program is easily extended to be able to handle multiple sets of calibration data for multiple operating modes of the host device.

- **Cal3d.4th**
  Cal3d.4th contains programs that allow a user to perform a 3D in-field calibration with a simple serial port. The program is interactive and provides helpful prompts to instruct the user at each step of the process. This program serves as a baseline for user expansion for custom user calibration.

- **Turtle.4th**
  Turtle.4th is a sample program that tests for the sensor being upside down. This sample program illustrates how to access the raw sensor data in the sensor and use it to implement a safety or convenience feature in addition to the normal sensor operation.

- **FF.4th**
  FF.4th is a free fall detector program. This program illustrates how to access the raw sensor data and how to access the matrix math library to compute a vector magnitude on the 3D acceleration vector. This vector is compared to a threshold to determine if the sensor is in free fall, and if so, a warning is issued on the serial port.

- **Filter.4th**
  Filter.4th illustrates how to obtain the processed sensor data, make real time decisions based on that data, and output results based on that data. This program reads the current heading at startup and outputs a new heading only if the heading changes by more than 10 degrees. Easily extendable to other criteria, this program serves as a baseline for controlled output data based on conditions, rather than streaming data.

- **NMEArpt.4th**
  The NMEArpt.4th program implements two backward compatibility features to emulate the startup behavior of the SP3004 sensor. This program produces the "BX" baud rate check string at startup and also provides the repeating NMEA output at startup.

- **adaptnavinit.4th**
  The adaptnavinit.4th program provides for environmental noise characterizations used for drift compensation of heading, pitch and roll when in 'noisy' environments. 'Noisy' environments include magnetic materials in proximity of the compass, batteries, electric motors and high-current carrying wires. Also includes select adjustments to AdaptNav™ sensor fusion parameters for improved overall performance. This script is recommended for all GEDC-6 users (this program is not applicable to the DC-4 or AHRS-8).

These apps are only a small sample of the power of NorthTek's™ potential and its benefits. The possibilities of NorthTek™ technology are virtually endless!

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NAVIGATION AND EXPLORATION