



Sparton Digital Compass SP3004D

Key New Features

- **2-D Manual Calibration Capability**
 - Allows accurate, rapid, in-field, on-equipment calibration
- **Enhanced 3-D Adaptive Calibration Algorithm – an industry leader!**
- **Selectable Baud Rate**
- **Selectable Dynamic Filter**
- **RoHS Compliant Product**

Standard Features

- 0.3° Heading Accuracy / 0.1° Resolution
- True Heading Output
- Compact Robust Design
- Full 360° Rollover Capability
- Adaptive Magnetic Distortion Calibration
- Motion Compensation Algorithms
- Bi-directional RS232 and SPI Interfaces
- NMEA Communication Capable



Description

The Sparton SP3004D digital compass incorporates next generation software enabling optimized performance. A revolutionary 2-D calibration algorithm has been developed to allow accurate, in-field calibration for platform-based applications. Enhancements to the adaptive 3D calibration have been implemented to improve calibration speed and stability. Additional enhancements include a user selectable communication baud rate and a selectable dynamic filter to maximize product flexibility. The 3-axis, tilt-compensated digital compass provides 3-dimensional absolute magnetic field measurement and full 360° tilt compensated bearing, pitch, and roll. Proprietary adaptive algorithms provide calibration even in presence of magnetic fields and distortions due to ferrous objects positioned on the mounting platform. Automatic heading stabilization employed under motion conditions enables platforms or vehicles to maintain heading accuracy. Further, the SP3004D corrects for declination enabling true heading to be provided. The Sparton digital compass can be integrated into any system using a UART or SPI interface. The digital compass is delivered as a potted module ready to meet the requirements of your design application and environment. Sparton also offers product integration, DFM, DFA and production services.

Applications

- Weather Data and Ocean Surveillance
- Enhanced GPS Navigation with Compass Integration
- Electro-Optical Target Designation Sensors
- Accurate Vehicle Attitude Position and Orientation Sensing
- Precision Autonomous Vehicle Guidance

Additional Information

- For more information, please visit www.thedigitalcompass.com or contact the Business Development professionals at Sparton Government Systems at 386.985.4631.
- To place an order, please call 386.740.5472 or visit www.thedigitalcompass.com.

IMPORTANT NOTE: It is important to note that operating environments can adversely affect magnetic compasses. Any devices operating in the vicinity of a magnetic compass that produce a time-varying magnetic field may degrade compass performance. In addition, any magnetic material that causes severe magnetic distortions in the vicinity of the compass may also degrade compass performance. It is recommended Sparton be included at the front-end of your design to assist with compass integration.



Specifications (3.3V, 25°C, 0g acceleration unless otherwise noted)

Mechanical

PARAMETER	CONDITIONS	TYPICAL	UNITS
Dimensions (L x W x H)	Potted Assembly	3.9 x 3.9 x 1.9	cm
Weight	Potted Assembly	30	grams
Mounting Options	Connectors or Soldered	Horizontal or Vertical	---

Environmental

PARAMETER	CONDITIONS
Operating Temperature	-40°C to 85°C
Storage Temperature	-40°C to 125°C
Humidity	95% Humidity, 70°C, 240 Hours Meets MIL-STD-202G - Method 103A, Test Condition A
Shock	1500g, 1ms Pulse, Half-Sine Wave Meets MIL-STD-202G - Method 213B, Test Condition F
Vibration	.06 dB Power Spectral Density, 9.26 Grms Meets MIL-STD-202G - Method 214A, Test Condition I/C

Calibration

PARAMETER	AVAILABILITY
Hard-Iron Calibration	Yes
Soft-Iron Calibration	Yes
Manual Calibration	Yes
Auto Calibration	Yes

Bearing

PARAMETER	CONDITIONS	TYPICAL	UNITS
Accuracy ¹	Static/Level, 3-D Cal	0.3°	Deg RMS
Accuracy ²	Static/After 3-D Cal	0.5°	Deg RMS
Accuracy ³	Static/After 2-D Cal	1.0°	Deg RMS
Resolution	360° / 2 ¹²	0.1°	Deg
Repeatability	Level	0.05°	Deg RMS

X-Y-Z Acceleration

PARAMETER	CONDITIONS	TYPICAL	UNITS
Dynamic Range	Each Axis	+/- 1.7	g
Noise Density	@ 25°C	200	µg/√Hz
Pitch Accuracy	0-90 Deg	<0.2°	Deg RMS
Pitch Resolution	90° / 2 ¹²	0.02°	Deg
Roll Accuracy	0-180 Deg	<0.2°	Deg RMS
Roll Resolution	180° / 2 ¹²	0.04°	Deg
Tilt Range	---	+/- 90° Pitch, +/- 180° Roll	Deg

Magnetics

PARAMETER	CONDITIONS	TYPICAL	UNITS
Calibrated Range	Each Axis	+/- 0.9	Gauss
Resolution	---	+/- 0.2	milliGauss
Repeatability	---	+/- 1.0	milliGauss

Electrical

PARAMETER	CONDITIONS	TYPICAL	UNITS
Input voltage ³	Regulated	3.3V	Volts DC
Input voltage ³	Unregulated	5V-20V	Volts DC
Current	Vcc = 3.3V	11	mA
Power	Vcc = 3.3V	36	mW
Data Update Rate	Max	10	Hz
Power-Up Time ⁴	Max	600	msec
Temperature Accuracy	-40 to +85	+/- 3	°C

Digital Interface

PARAMETER	CONDITIONS	TYPICAL	UNITS
SPI_EN	Slave Only	3.3	V
SPI_MOSI	Input	Logic 0: 0	V
		Logic 1: 3.3	
SPI_CLK	Input	Logic 0: 0	V
		Logic 1: 3.3	
		Frequency = 4.0 (Max)	
SPI_MISO	Output	Logic 0: 0	V
		Logic 1: 3.3	
UART	8 Data Bits, 1 Stop Bit No Parity	Selectable 1200-115200	Baud
UART: URXD0	Input	Logic 0: 0	V
		Logic 1: 3.3	
UART: UTXD0	Output	Logic 0: 0	V
		Logic 1: 3.3	
UART RXD/TXD	Fully Compliant With RS-232-C Standard		

Notes: 1. Factory calibration accuracy is valid for both horizontal and vertical mounting options. This applies for Pitch angles of +/- 90° and Roll angles of +/- 180°.

2. Compass accuracy under dynamic motion conditions is dependant on the specific design application.

3. Voltage can be applied to either 3.3V (Connector 1, pin 17) at 3.3V regulated or +VIN (Connector 1, pin 19) at 5-20V unregulated but not both.

4. This is the total time until the first output, which includes reset time, boot time, and latency until first output.

5. Results will vary depending on geographic location, calibration method, and the quality of in-field calibration.

(Specifications subject to change without notice)

