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## PNI V2Xe

### 2-Axis Compass Module

#### General Description

The V2Xe is an integrated 2-axis compass and magnetic field sensing module featuring an on-board microprocessor for control and interfacing. The V2Xe combines PNI Corporation's patented Magneto-Inductive (MI) sensors and measurement circuit technology for unparalleled cost effectiveness and performance. The MI sensor changes inductance by 100% over its field measurement range. This variable inductance property is used in a cost and space efficient ASIC (PNI 11096) which incorporates a temperature and noise stabilized oscillator/counter circuit. The microprocessor controls the ASIC and provides easy access to the V2Xe's heading information as well as magnetic field measurement data via a Motorola compatible SPI interface.

Advantages include 3 V operation for compatibility with new systems, low power consumption, a small footprint, large signal noise immunity under all conditions, and a large magnetic field dynamic range. Resolution and field measurement range are software configurable for a variety of applications. The measurement is very stable over temperature and inherently free from offset drift.

These advantages make PNI Corporation's V2Xe the choice for applications that require a solution that has a high degree of azimuth accuracy, requires little power, and has a small package size.



#### Features

- Low power: draws 2 mA at 3 VDC (continuous output)
- Small size: 25.4 x 25.4 x 11.55 mm
- High resolution compass heading: 0.01 °
- High accuracy compass heading: 2 °
- Non-volatile memory: retains calibration when power is removed
- Multiple measurement modes: compass heading or magnetic field
- Large field measurement range: ±1100 µT (±11 Gauss)
- High resolution field measurement: 0.015 µT (0.00015 Gauss)
- Fully digital interface: SPI protocol at 3V

#### Applications

- Remote terrestrial antenna direction indicators
- High-performance magnetic field sensing
- High-performance solid state navigation equipment
- Survey equipment
- Robotics systems
- Vehicle detection
- Consumer and hobbyist markets
- Security/tamper detection

#### Ordering Information

Name	Part #	MOQ	Package	RoHS Compliant
V2Xe	11862	1	Each	Yes
V2Xe Developers Kit	90025	1	1 kit	Yes

## SPECIFICATIONS

**CAUTION:** Stresses beyond those listed under **Absolute Maximum Ratings** may cause permanent damage to the device. These are stress ratings only. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

### Absolute Maximum Ratings

Symbol	Parameter	Minimum	Maximum
V <sub>DD</sub>	DC supply voltage	-0.3 VDC	4.1 VDC
V <sub>IN</sub>	Input pin voltage	V <sub>DD</sub> - 0.3 VDC	V <sub>DD</sub> + 0.3 VDC
I <sub>IN</sub>	Input pin current	-2.0 mA	2.0 mA
T <sub>STRG</sub>	Storage Temperature	-40 °C	85 °C

### Module Characteristics

Parameter	Minimum	Maximum	Typical
<b>Operating Characteristics</b>			
Supply Voltage			3.0 VDC
Idle Current <sup>a</sup>			0.2 mA
Continuous current <sup>b</sup>			2.0 mA
SCLK frequency (V <sub>CC</sub> = 3V)		3.6864 MHz	
Low-level input (V <sub>CC</sub> = 3V)	V <sub>SS</sub>	V <sub>SS</sub> + 0.6MHz	
High-level input (V <sub>CC</sub> = 3V)	0.8 x V <sub>CC</sub>	V <sub>CC</sub>	
Low-level output (V <sub>CC</sub> = 3V)	V <sub>SS</sub>	V <sub>SS</sub> + 0.25VDC	
High-level output (V <sub>CC</sub> = 3V)	V <sub>CC</sub> - 0.25VDC	V <sub>CC</sub>	
Operating Temperature	-20 °C	70 °C	
Storage Temperature	-40 °C	85 °C	
Weight			3 grams
<b>Magnetometer Mode Characteristics</b>			
Field Measurement Range <sup>c</sup>	-1100 μT	1100 μT	
Gain <sup>d</sup>			32 count/μT
Resolution			1/gain
Linearity (error from best fit straight line at ±300 μT)		1%	0.6%
Sensor Frequency (within free Earth's magnetic field)			175 kHz
<b>Compass Mode Characteristics</b>			
Accuracy <sup>e</sup>		2 ° RMS	1 ° RMS
Resolution			0.01°

- Measurement taken with no sensor activity
- Measurement taken during continuous polling of sensors
- Field measurement range is defined as the monotonic region of the output characteristic curve
- Gain is defined as the change in the number of counts from the ASIC when the period select is set to 2048, per change in the magnetic field in μT. For situations requiring higher gain and less field measurement range, the gain and resolution can be increased by a factor of 2 by setting the ASIC period select to 4096. When setting higher selects, be aware that the ASIC counter can overflow if the field is strong enough to drive the count beyond a signed 16-bit integer. Period select set to 2048 is the highest setting where it is impossible to overflow the counter.
- Requires that built-in calibration be performed. In practical compass applications, a calibration is normally performed when the compass module is in the host system.