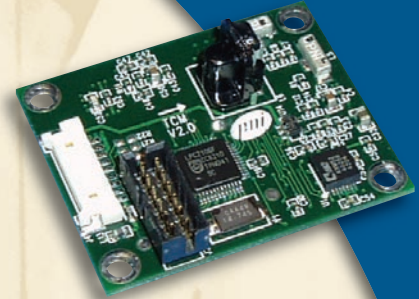


# TCM<sup>TM</sup> 5

## Tilt Compensated 3-Axis Compass Module



The TCM5 is the **ultimate** in compass modules, providing **ultra precise** heading information in any orientation. The first of its kind, this small, compact module provides for a **full 360° rotation** and complete flexibility, allowing it to be mounted in multiple orientations and positions. These advantages make the TCM5 the choice for applications that require the highest accuracy and performance anywhere in the world.

The TCM5 combines 3-axes of PNI Corporation's patented Magneto-Inductive (MI) magnetic sensors and a 3-axis MEMS accelerometer in a single module, offering unparalleled cost effectiveness and performance. MI sensors change inductance by 100% over the wide field measurement range. This variable inductance property is used in a cost and space efficient ASIC, incorporating a temperature and noise stabilized oscillator/counter circuit which is inherently free from offset drift.

### Applications

- High performance solid state navigation equipment
- IMU system integration
- 3-axis magnetic field sensing
- Targeting systems
- Drilling applications
- Laser range finders
- Robotics systems

### Features

- **Ultra precise compass heading accuracy:** 0.3°
- High resolution compass heading: 0.1°
- High repeatability: 0.05°
- **Full 360° rotation:** +/- 90° pitch; +/- 180° roll
- Multiple measurement modes: compass heading, magnetic field and 2-axis tilt
- Calibrated magnetic field measurement range: +/- 80  $\mu$ T (+/- 0.8 Gauss)
- High resolution magnetic field measurement: 0.05  $\mu$ T (0.0005 Gauss)
- Extended temperature range: -40° to 85°C
- Low Power: < 20 mA typical current draw
- Small size: 3.5 x 4.3 x 1.3 cm
- Advanced user calibration: hard-iron, soft-iron and tilt compensation
- Binary digital interface: RS-232
- **Flexible mounting options:** horizontal or vertical

### Ordering Information

NAME	PART NUMBER
TCM5 Module	12405
TCM5 Interface Kit	90014
TCM5 Evaluation Kit	90021

Interface kit includes: module, manual, evaluation software and 18" pigtail cable

Evaluation kit includes: module, manual, evaluation software, 18" pigtail cable and 6ft finished DB-9 cable with power supply



# TCM5 Specifications

Parameter	Typical	Units
<b>Heading Specifications</b>		
Accuracy with < 70° of tilt	0.3°	Deg RMS
Accuracy with > 70° of tilt	0.5°	
Resolution	0.1°	Deg
Repeatability (1)	0.05°	Deg RMS
Max Dip Angle	85°	Deg
<b>Magnetometer Specifications</b>		
Calibrated Field Measurement Range	± 80	µT
Magnetic Resolution	± .05	
Magnetic Repeatability	± .1	
<b>Tilt Specifications</b>		
Pitch Accuracy	0.2°	Deg RMS
Roll Accuracy	0.2° for pitch < 65° 0.5° for pitch < 80° 1.0° for pitch < 86°	
Tilt Range	± 90° pitch ± 180° Roll	Deg
Tilt Resolution	< 0.01°	
Tilt Repeatability (1)	0.05°	
<b>Calibration</b>		
Hard Iron Calibration	Yes	
Soft Iron Calibration	Yes	
Limited Tilt User Calibration	Yes	
<b>Mechanical Specifications</b>		
Dimensions (L x W x H)	3.5 x 4.3 x 1.3 *	cm
Weight	12	grams
Mounting Options	Screw Mounts/Standoffs horizontal or vertical	
Connector for RS-232 Interface	9-pin	
<b>I/O Specifications</b>		
Latency from Power-On	< 50	mSec
Latency from Sleep Mode	< 1	
Maximum Sample Rate	20	samples/sec
RS-232 Communication Rate	300 to 115200	baud
Output Formats	Binary High Performance Protocol	
<b>Power Specifications</b>		
Supply Voltage	3.6 to 5 V (Unregulated)	VDC
Typical Current Draw (Continuous Output)	Maximum	22
	Typical	< 20
Idle Mode (2)	14-18	mA
Sleep Mode	0.6	
<b>Environmental Specifications</b>		
Operating Temperature	-40° to 85°	C
Storage Temperature	-40° to 125°	
Shock	50–2500 G's, Half Sine Wave Shock with 2 drops at each level	
Vibration	Z-Axis, Skewed Block, at 1, 2 & 4 Grms @ 10–1000 KHz for 30 min. per level	
Humidity	70°C with 95% R.H. for 168 hrs.	

(1) Repeatability is based on statistical data at ± 3 sigma limit about the mean. (2) Based on user settings \* Additional form factors may be available.

These specifications are preliminary and are subject to change without notice.  
For the most current specifications, please visit our website at [www.pnicorp.com](http://www.pnicorp.com).