

# CMPS03 - Compass Module

For documentation on CMPS03 revisions prior to Rev14, [click here](#)

Earlier versions can be identified by the presence of the silver 8MHz ceramic resonator in the middle of the PCB, this has been removed on new modules.

Rev14 was released March 2007

## Overview

This compass module has been specifically designed for use in robots as an aid to navigation. The aim was to produce a unique number to represent the direction the robot is facing. The compass uses the Philips KMZS1 magnetic field sensor, which is sensitive enough to detect the Earth's magnetic field. The output from two of them mounted at right angles to each other is used to compute the direction of the horizontal component of the Earth's magnetic field. We have [examples](#) of using the Compass module with a wide range of popular controllers.

## Connections to the compass module



- Pin 9 - 0v Ground
- Pin 8 - No Connect
- Pin 7 - No Connect
- Pin 6 - Calibrate
- Pin 5 - Calibrating
- Pin 4 - PWM
- Pin 3 - SDA
- Pin 2 - SCL
- Pin 1 - +5v

## Connections

Pin 1, +5v. The compass module requires a 5v power supply at a nominal 25mA.

There are two ways of getting the bearing from the module. A PWM signal is available on pin 4, or an I2C interface is provided on pins 2,3.

Pins 2,3 are the I2C interface and can be used to get a direct readout of the bearing. If the I2C interface is not used then these pins should be pulled high (to +5v) via a couple of resistors. Around 47k is ok, the values are not at all critical.

Pin 4. The PWM signal is a pulse width modulated signal with the positive width of the pulse representing the angle. The pulse width varies from 1mS (0°) to 36.99mS (359.9°) in other words 100uS/° with a +1mS offset. The signal goes low for 65mS between pulses, so the cycle time is 65mS + the pulse width - ie. 66ms-102ms. The pulse is generated by a 16 bit timer in the processor giving a 1uS resolution, however I would not recommend measuring this to anything better than 0.1° (10uS). Make sure you connect the I2C pins, SCL and SDA, to the 5v supply if you are using the PWM, as there are no pull-up resistors on these pins.

Pin 5 is used to indicate calibration is in progress (active low). You can connect an LED from this pin to +5v via a 390 ohm resistor if you wish.

Pin 6 is one of two ways to calibrate the compass, the other is writing 255 (0xFF) to the command register.

# Cmps03 Compass Module

**RS Peters**



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## **Table of Contents Cmps03 Compass Module**

1. Understanding the eBook Cmps03 Compass Module
  - The Rise of Digital Reading Cmps03 Compass Module
  - Advantages of eBooks Over Traditional Books
2. Identifying Cmps03 Compass Module
  - Exploring Different Genres
  - Considering Fiction vs. Non-Fiction
  - Determining Your Reading Goals
3. Choosing the Right eBook Platform
  - Popular eBook Platforms
  - Features to Look for in an Cmps03 Compass Module
  - User-Friendly Interface
4. Exploring eBook Recommendations from Cmps03 Compass Module
  - Personalized Recommendations
  - Cmps03 Compass Module User Reviews and Ratings
  - Cmps03 Compass Module and Bestseller Lists
5. Accessing Cmps03 Compass Module Free and Paid eBooks

- Cmps03 Compass Module Public Domain eBooks
  - Cmps03 Compass Module eBook Subscription Services
  - Cmps03 Compass Module Budget-Friendly Options
6. Navigating Cmps03 Compass Module eBook Formats
    - ePub, PDF, MOBI, and More
    - Cmps03 Compass Module Compatibility with Devices
    - Cmps03 Compass Module Enhanced eBook Features
  7. Enhancing Your Reading Experience
    - Adjustable Fonts and Text Sizes of Cmps03 Compass Module
    - Highlighting and Note-Taking Cmps03 Compass Module
    - Interactive Elements Cmps03 Compass Module
  8. Staying Engaged with Cmps03 Compass Module
    - Joining Online Reading Communities
    - Participating in Virtual Book Clubs
    - Following Authors and Publishers Cmps03 Compass Module
  9. Balancing eBooks and Physical Books Cmps03 Compass Module
    - Benefits of a Digital Library
    - Creating a Diverse Reading Collection Cmps03 Compass Module
  10. Overcoming Reading Challenges
    - Dealing with Digital Eye Strain
    - Minimizing Distractions
    - Managing Screen Time
  11. Cultivating a Reading Routine Cmps03 Compass Module
    - Setting Reading Goals Cmps03 Compass Module
    - Carving Out Dedicated Reading Time
  12. Sourcing Reliable Information of Cmps03 Compass Module
    - Fact-Checking eBook Content of Cmps03 Compass Module
    - Distinguishing Credible Sources
  13. Promoting Lifelong Learning
    - Utilizing eBooks for Skill Development

- Exploring Educational eBooks
14. Embracing eBook Trends
- Integration of Multimedia Elements
  - Interactive and Gamified eBooks

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