Compass FAQ

CMPS03 - Compass Module FAQ

Q. Will your compass tell me which direction is north?
A. No.

Q. Ok, will your compass tell me which way the magnetic north pole is?
A. No.

Q. So what does it do?
A. It gives you the direction of the horizontal component of the prevailing magnetic flux. OK, so I'm making a point here and it's this: The magnetic field in a building can vary hugely. Don't expect it to be always pointing north. By walking around my workshop with a standard magnetic needle compass I can make it point in any direction I like by moving past various machines, and I can do the same thing at home by going near the fridge or even the central heating radiators. The compass module will give the same results. It can only provide information about the field at its current location.

Q. Is the Compass affected by Motors, Magnets, Ferrous objects etc?
A. Yes. Anything that affects the local magnetic field will affect the Compass module. Motors in particular contain strong magnets. The only solution is to mount the compass as far away from magnetic/ferrous objects as is practicable. Also see the previous questions and answers above

Q. If the accuracy of the compass is 3-4° , how can you provide a resolution of 0.1° ?
A. Accuracy and resolution are not the same thing. A 3.5 digit multi-meter has a resolution of 1 in 2000 or 0.05%, yet the accuracy on some ranges can be 5% - a hundred time worse. A robot can use the resolution to detect small changes in direction even though there is uncertainty about the absolute direction. Also see previous answer.

Q. How do I select between I2C and PWM outputs?
A. No need to. The PWM output is always present whether you use it or not and does not require a trigger signal. The I2C interface is also always available – just connect it up and start talking.

Q. How many degrees can the module be tilted before the readings become inaccurate?
A. None. Moving the compass off horizontal will result in increasing error. The sensors are sensitive to the vertical component of the Earths magnetic field as well. The angle of the Earths field is not horizontal, it dives into the ground at an angle which varies according to location. It is this which produces an inherent error in the reading, and makes calibration of the compass required at the point where it is to be operated. After calibration you can expect 3-4° accuracy if you keep it horizontal.

Q. When measuring the PWM signal the maximum reading (which should be 359 degrees) is actually 357 degrees (or similar). Why is this?
A. This is because of slight differences in CMPS01/03 and Controller oscillators and the internal software generating and measuring the pulse. If a 359 degree roll-over is important, then you can add a "fiddle factor" to the calculation or alternatively, use the I2C Bus.

Q. Which way up should the Compass be?
A. The Compass module should be horizontal, with the PCB parallel to the earths surface. The IC's should be on top and (for the CMPS01) the Sensors underneath.

Q. What is the difference between the CMPS01 and the CMPS03?
A. For most purposes, not a lot really. The coils around the KMZ10 sensors on the underside were proving way to expensive to assemble and still sell the module at such a low cost. When Philips produced the KMZ51 sensor, an 8 pin surface mount chip with the coils built in, it was time to change. The PCB is the same physical size as the CMPS01 with the same connections and uses the same software. Calibrating the CMPS03 is the same as CMPS01 Rev7.

Q. Can the Compass be mounted near to the speaker on the SP03 speech synthesizer?
A. The speaker magnet will effect the Compass. The effects reduce with distance and are negligible at 10-12 inches

Q. My software master I2C code does not read correct data from the compass, but its works fine with an I2C EEPROM chip. Why is this?
A. The most likely cause is the master code not waiting for the I2C bus hold. This is where the slave can hold the SCL line low until it is ready. When the master releases SCL (remember it's a passive pull-up, not driven high) the slave may still be holding it low. The master code should then wait until it actually does go high before proceeding. If you are writing your own code, have a look at our I2C tutorial by following link at the top of this page.

Information provided courtesy of Robot Electronics