

Instructions to setting up the

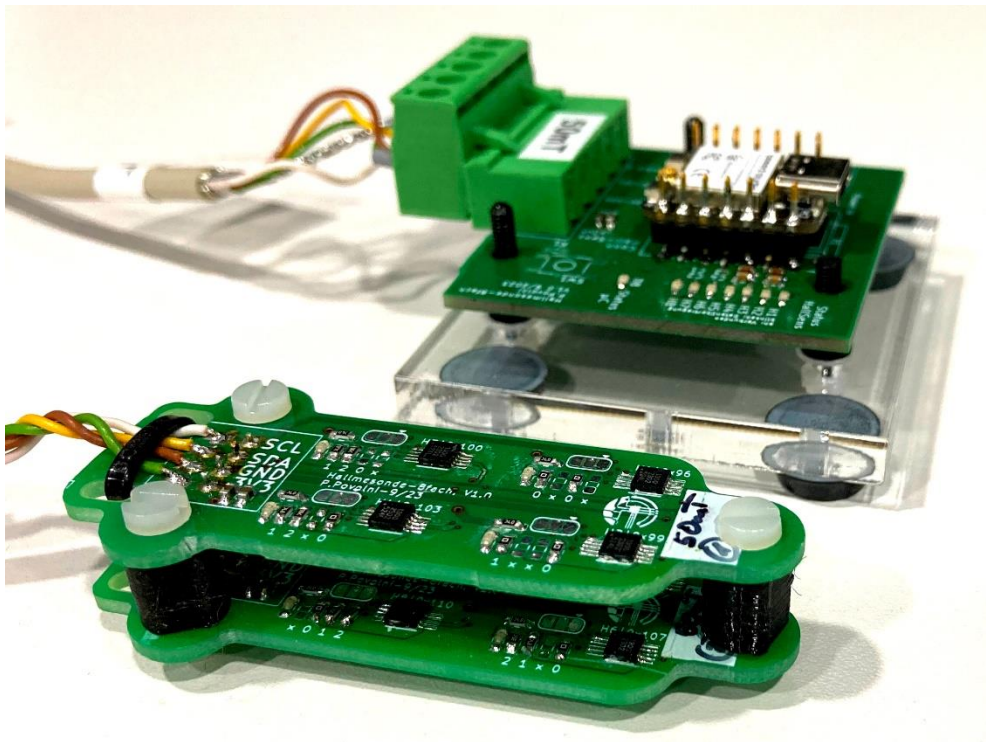
# Hallsensor

Project

Easy Scalable, Low-Cost Open Source Magnetic Field Detection System for Evaluating Low-Field MRI Magnets using a Motion Tracked Robot

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# 1 Preamble

This manual is still a work in progress and will be completed in the next few weeks.  
If you have any questions in the meantime, please feel free to ask

## 2 Hardware

### 2.1 Assembly PCB's

#### 2.1.1 General

#### 2.1.2 Addressing IC's

#### 2.1.3 Connectors

### 2.2 Mechanical Assembly

#### 2.2.1 Sensor Head

#### 2.2.2 Main CPU

## 3 Embedded Software

### 3.1 C++ Code using Arduino IDE

#### 3.1.1 General

#### 3.1.2 Installation ESP32 Environment

#### 3.1.3 Flash

#### 3.1.4 Speed of I2C Transmission (check if adjustment needed)

## 4 Calibration

### 4.1 Software to calculate magnetic field

#### 4.1.1 Analytical Solution using Biot Savart

##### 4.1.1.1 *General*

##### 4.1.1.2 *calculate winding pattern of second layer*

#### 4.1.2 FEM Simulation using free Software FEMM & Python

### 4.2 Calibration Run

#### 4.2.1 SetUp

#### 4.2.2 Run Calibration Measurements

### 4.3 Evaluate Calibration & get Calibration Parameter