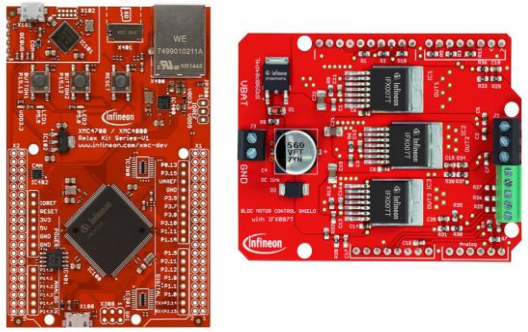
Introduction of XMC for Arduino, Motor Control and 3D Magnetic Sensor

Topic

Montor control

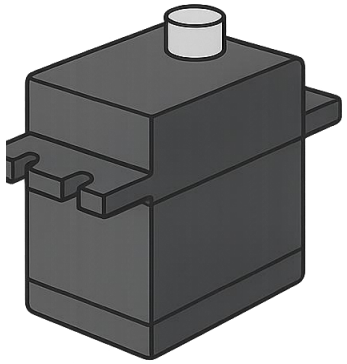


Arduino ecosystem

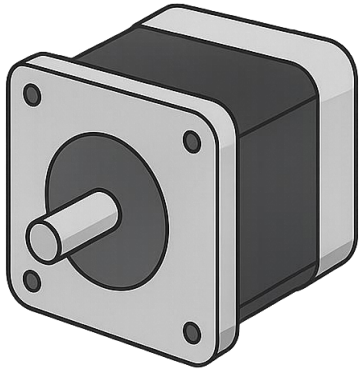
XMC and more!

3D Magnetic Sensor

Motor Control – Some Type of Motors



- Servo
  - complex encoder to calibrate the motor‘s feedback sensor and controller.
  - If a component fails, the motor can risk damage and costly delays.



- Stepper
  - Utilizes a set mechanical tooth design on both the stator and rotor, execute open-loop positioning capability.

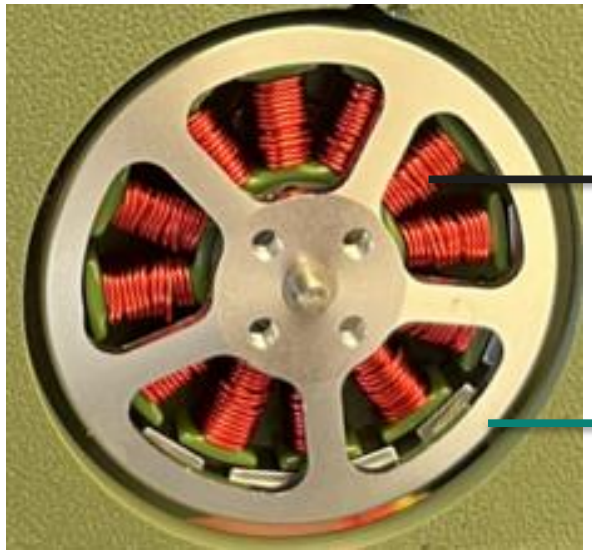
- BLDC
  - Brushless DC Motor.
  - If motion profile requires a consistent rated torque across a speed range, a BLDC is an optimal choice.

Motor Control – Why BLDC?

BLDC offer:

- Higher efficiency
- Longer lifespan
- Smoother and quieter operation
- Precise control

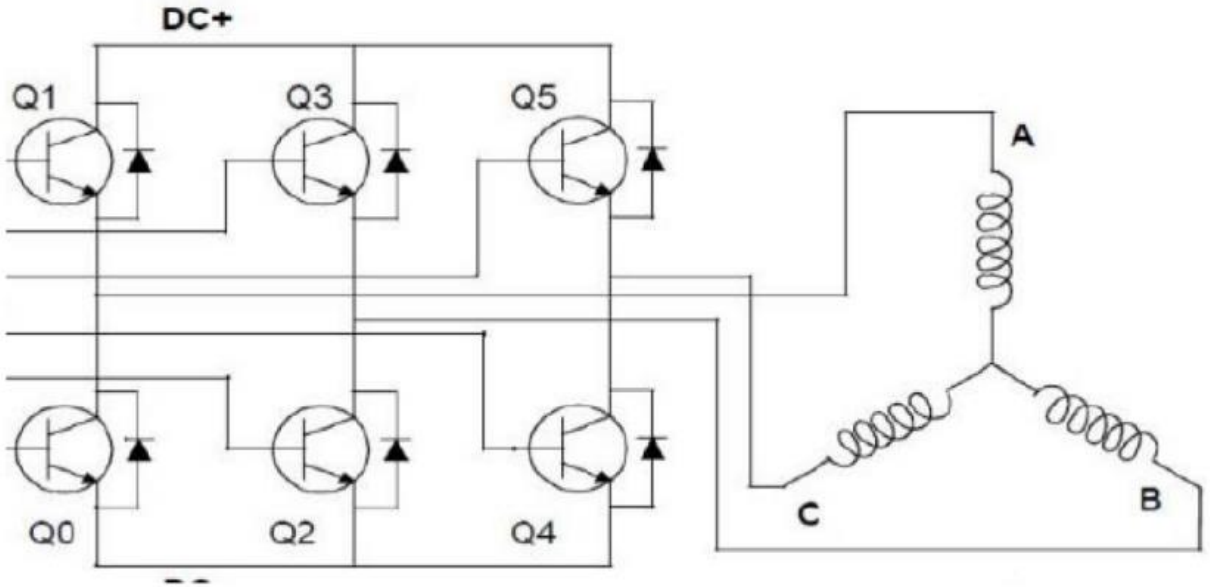
Motor Control – How to control BLDC?

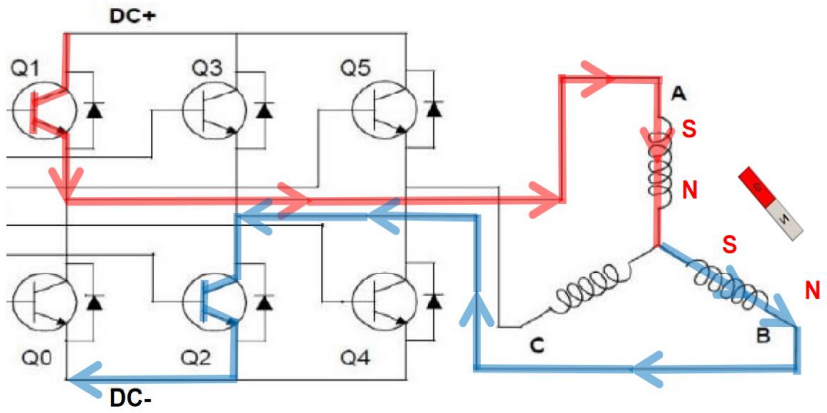


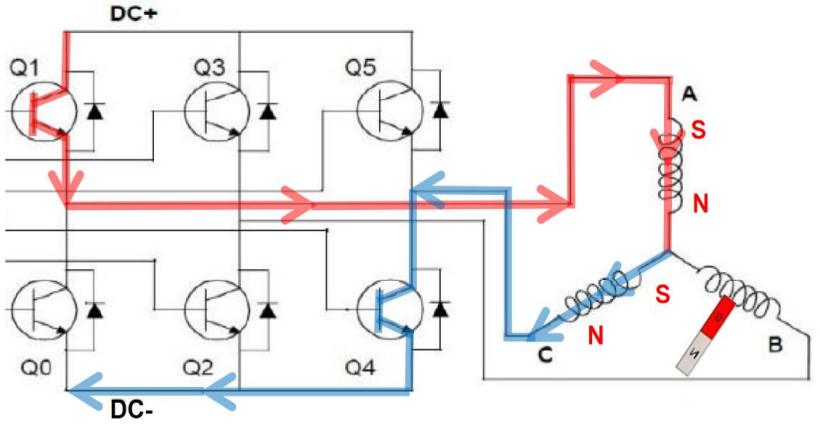
- A BLDC motor is driven by electronically switching stator phase current in sync with the rotor position to generate a rotating magnetic field that drives the permanent magnet rotor.

Motor Control - Field-Oriented Control (FOC)

Hardware Control:

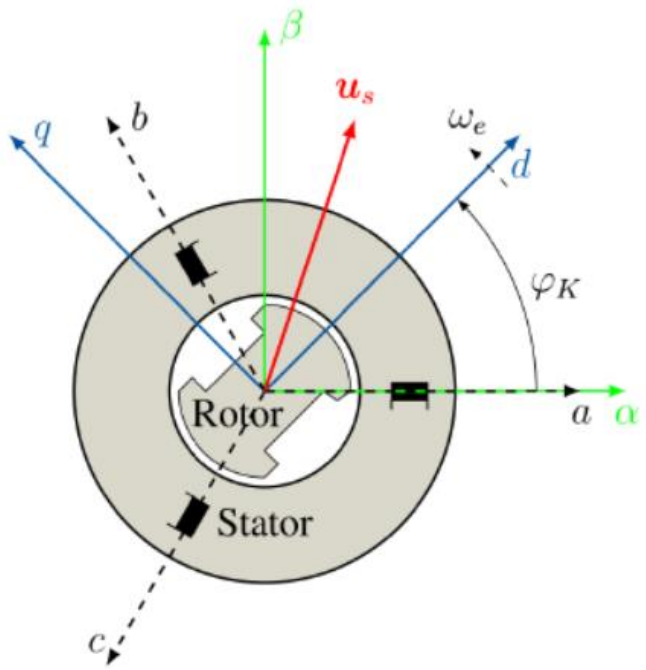


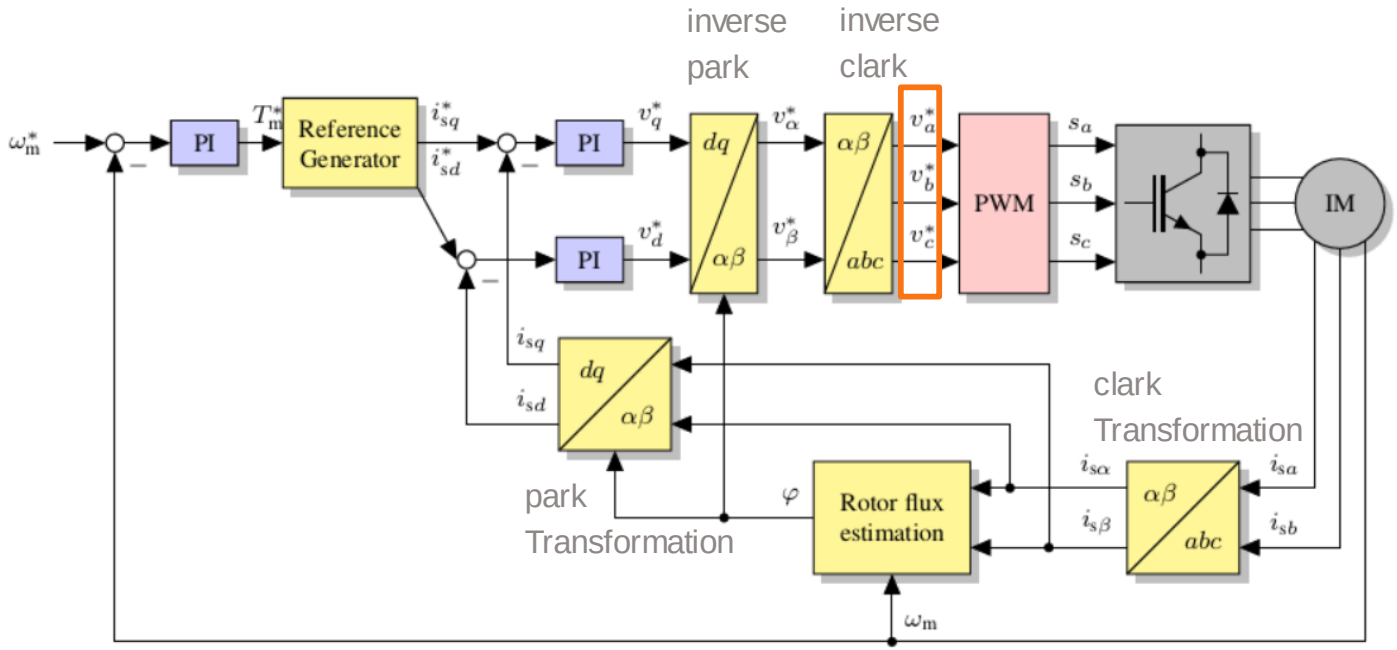




Motor Control - Field-Oriented Control (FOC)

Software Control:

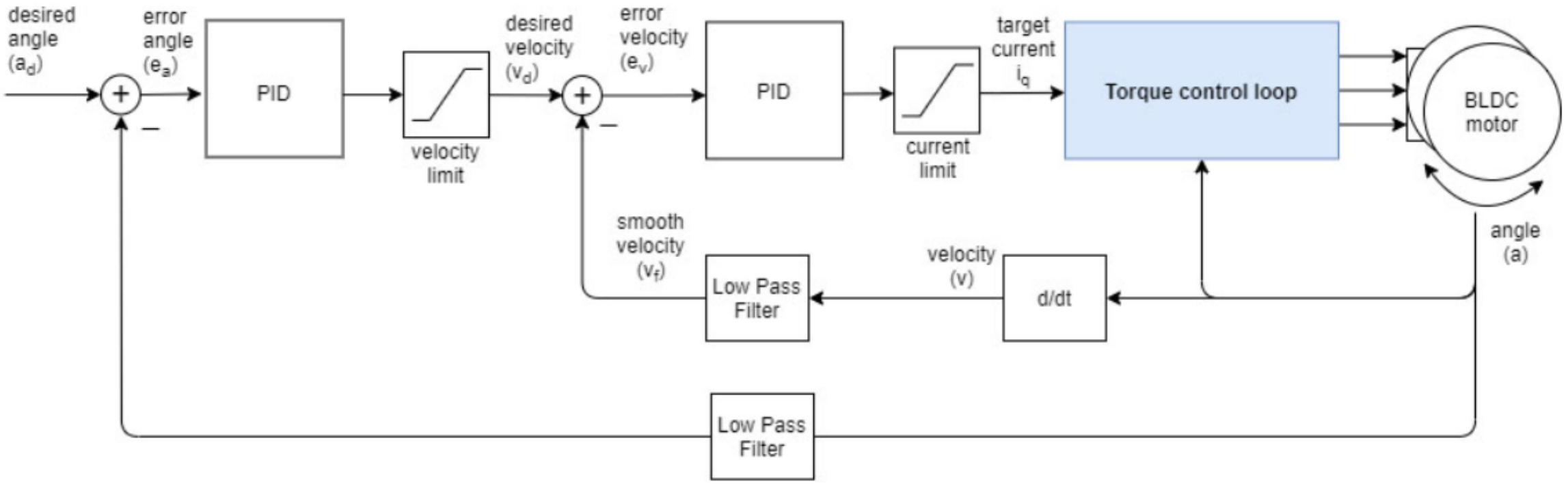




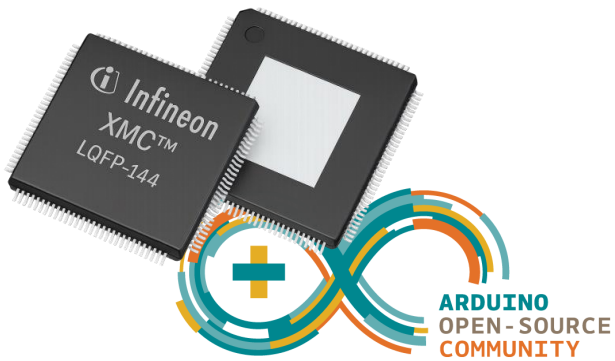
Motor Control – SimpeFOC

https://docs.simplefoc.com/

Simple FOC - Closed Control Loop



Infineon‘s Arduino Ecosystem : XMC for Arduino and more!



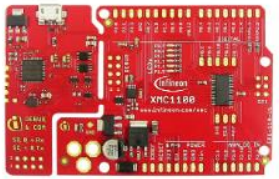
Arduino Core for Infineon's XMC™ Microcontrollers

Compile Examples passing | docs passing | Hil unity library checks passing

This project integrates Infineon's 32-bit XMC™ Industrial Arm® Cortex®-M Microcontroller into the Arduino ecosystem.

The XMC™ microcontroller family from Infineon is a powerful and versatile platform for embedded system development. The XMC for Arduino core provides a comprehensive set of APIs, examples, and tools for developing a wide range of applications, allowing developers to leverage the ease of use and flexibility of the Arduino platform while harnessing the advanced features and performance of the XMC™ microcontrollers.

Supported Microcontroller Boards

			
KIT_XMC14_2GO	KIT_XMC11_BOOT_001	KIT_XMC1400_ARDUINO	KIT_XMC13_BOOT
			
KIT_XMC_PLT2GO_XMC4200	KIT_XMC_PLT2GO_XMC4400	KIT_XMC47_RELAX_5V_AD_V1	

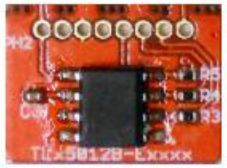
Infineon‘s Arduino Ecosystem: Sensor Shield and Arduino Library

XENSIV™ TLx5012B Angle Sensor

Library of Infineon's highly sensitive XENSIV™ TLx5012B 360° magnetic angle sensor.

Suported Products

Arduino CI passing

		
bulk sensor	*breakout board*	*Sensor2Go kit*

This library supports also all predefined communication variants IIF, PWM, SPC. All of these variants also support the SSC interface.

XENSIV™ 3D Magnetic Sensor TLx493D Arduino Library

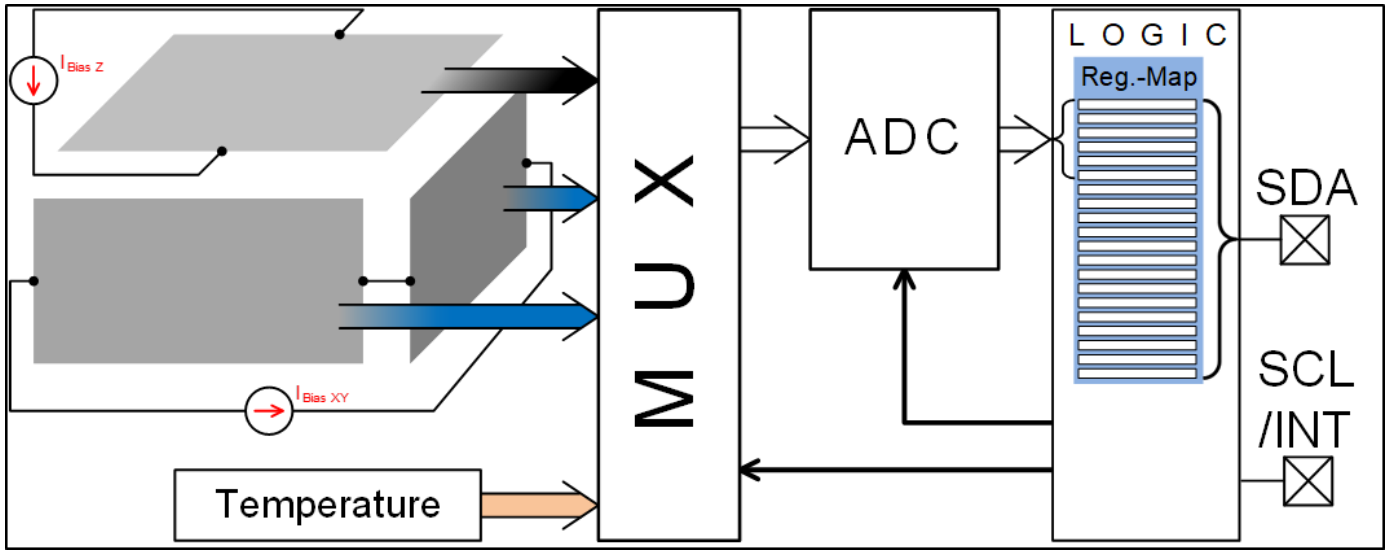
Arduino Library of Infineon's XENSIV™ 3D Magnetic Sensor TLx493D family.

Supported Sensor Platforms

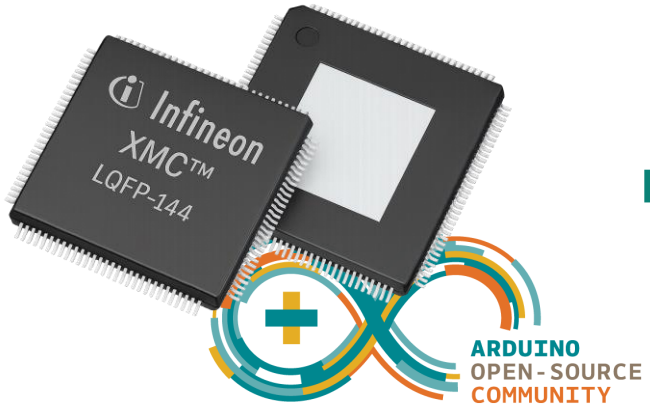
			
XENSIV™ TLV493D-A1B6 Shield2Go	XENSIV™ TLV493D-A1B6 2GO kit	XENSIV™ TLE493D-A2B6	XENSIV™ TLI493D-A2B6
			
XENSIV™ TLV493D-A2BW	XENSIV™ TLE493D-W2B6 Shield2Go	XENSIV™ TLE493D-W2B6 2GO kit	XENSIV™ TLI493D-W2BW Shield2Go

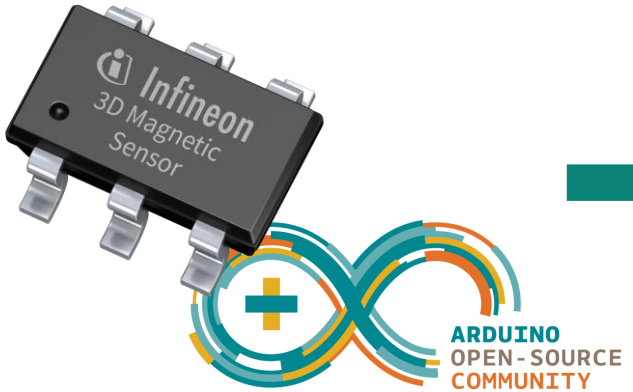
3D Magnetic Sensor

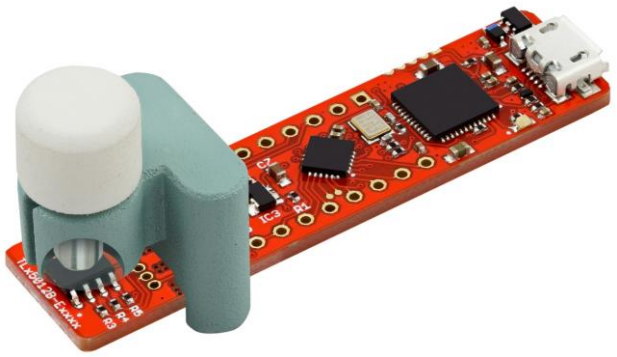
– Infineon offers 3D Hall magnetic sensors which provide absolute magnetic field value at a given point in space and time.



Hands-on Workshop: XMC4Arduino & 3D Mgnetic Sensor







https://xmc-arduino.readthedocs.io/en/latest/index.html

https://arduino-xensiv-3d-magnetic-sensor-tlx493d.readthedocs.io/en/latest/quickstart-guide.html

Hints

- We provide 2 diffrent version of 3D magnetic sensor: **A1B6** and **A2B6,** please check carefully and adjust the example code.
- Use code snippets for (XMC1100) **kit2go boards** and comment out code for other board.
- **A1B6** does not support setSensitivity() function. Please commet it out.

Referece

- https://www.e-jpc.com/servo-stepper-brushless-dc-motors
- https://dengfoc.com/
- https://docs.simplefoc.com/


Infineon