

# TLE5501 Eval Kit

## **Scope and purpose**

This document describes the Evaluation Kit for the TLE5501 TMR based angle sensor.

The purpose of this manual is to describe the software installation process and how to use the TLE5501 angle sensor Evaluation Kit.

## **Intended audience**

This document is intended for anyone who wants to use the TLE5501 Evaluation Kit



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## General description

### 1 General description

The Eval Kit consists of:

- an Infineon XMC1100 Boot Kit (microcontroller)
- the TLE5501 Angle Shield which can be plugged onto the Boot Kit
- a “magnetic knob” that can be mounted on top of the shield



Figure 1 Infineon XMC1100 Boot Kit

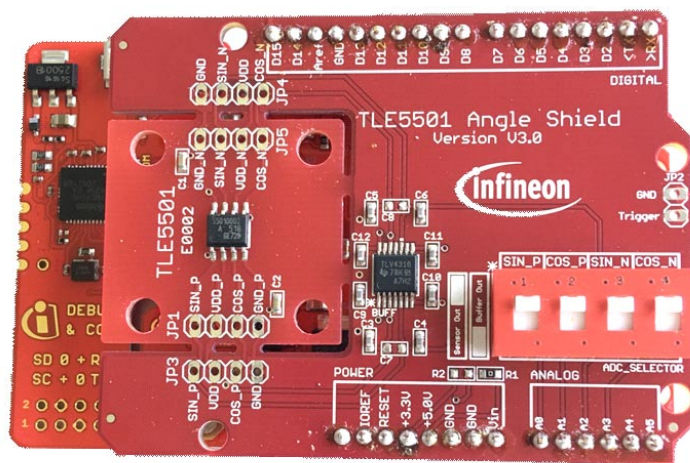


Figure 2 TLE5501 Angle Shield

The Eval Kit is complemented by the TLE5501 Eval Kit GUI (Evaluation Kit for Angle Sensors window, see [Figure 3](#)).

For connection to the PC a micro USB cable is required.

#### Notes

1. The Eval Kit assumes that the sensor gets 5 V via USB and the integrated regulator on the XMC Boot Kit.
2. All calculations are made with the above assumption! If you create your own setup please also take into account VDD monitoring. Please respect the instructions in the TLE5501 E0002 Safety Manual.

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## General description

### TLE5501 Angle Shield description

The TLE5501 Angle Shield has to be plugged onto the Boot Kit. Care has to be taken that the pins are correctly aligned.

The TLE5501 sensor is soldered on the shield in a “breakout” area that can be easily broken of the shield and used in another application if needed.

The shield has mounting holes for a magnetic knob that can be used to demonstrate the functionality of the sensor.

The shield has also a voltage buffer available on board, and the output of the sensor can be optionally buffered by selecting the correct DIP switch settings.

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## Installation

### 2 Installation

1. Connect the Eval Kit with an USB cable to an USB port on your computer.
2. Install the programmer software by double-clicking on the file: **TLE5501\_EvalKit\_vx.msi**.
3. If you do not have installed Segger Driver & .NET 3.5 included with this installer, install them.
4. Start the installed software TLE5501 – Eval Kit.

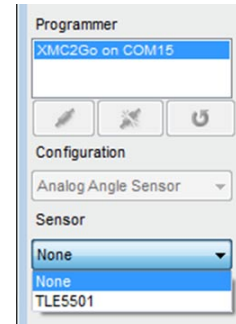
## 3 Evaluation Kit for Angle Sensors

### 3.1 Connection to PC

After starting the software, a device should appear in the Programmer list, click the **Connect** button to connect the Eval Kit.



In the **Sensor** drop-down list select the sensor **TLE5501** and click **Start**.



The Evaluation Kit for Angle Sensors window shows the real time angle read-out of the sensor and other related information (see [Figure 3](#)).

Evaluation Kit for Angle Sensors

3.2 Sensor readout

The Evaluation Kit for Angle Sensors window displays the uncalibrated differential angle with the angle gauge. It also reports the voltage for each output (SinP, CosP, SinN, CosN).

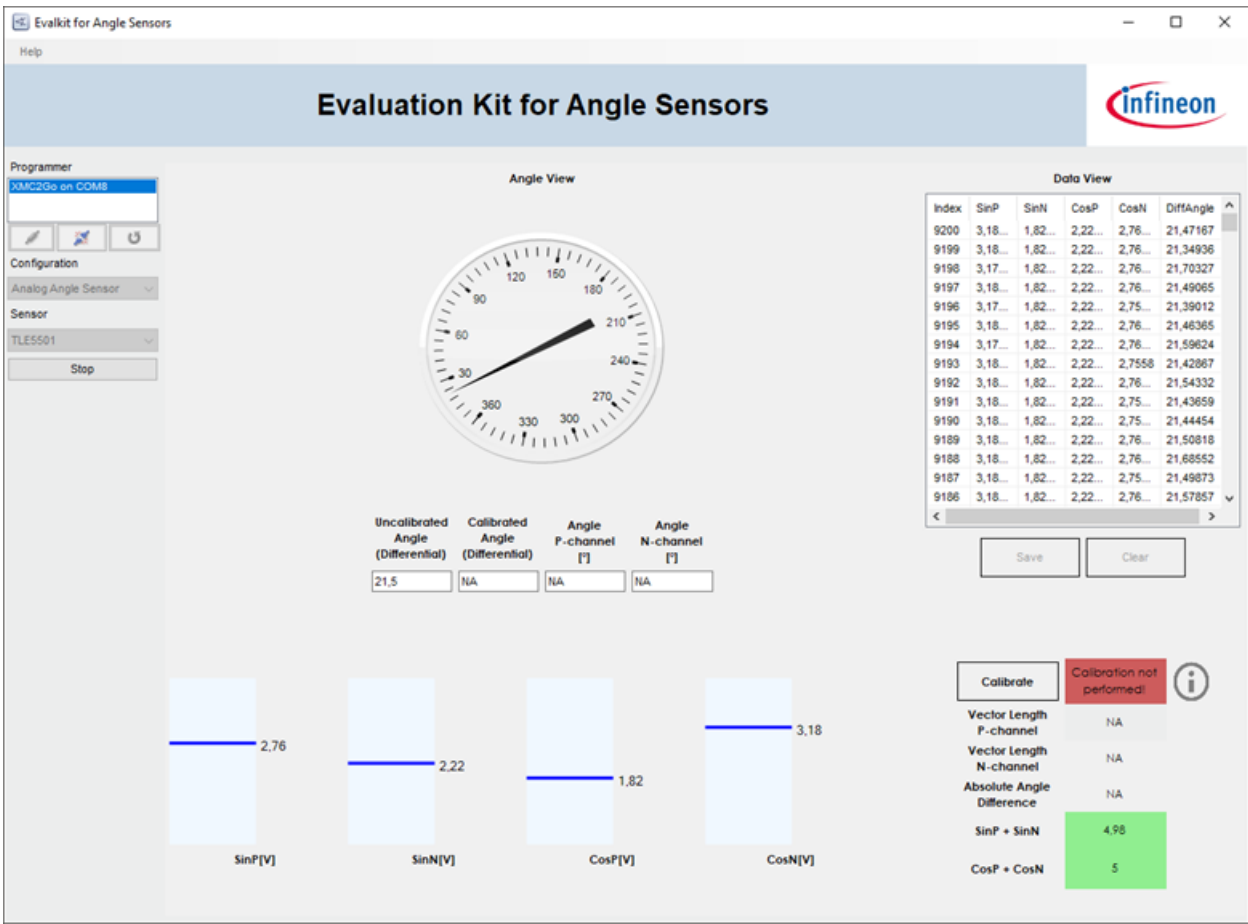


Figure 3 Evaluation Kit for Angle Sensors window

## Evaluation Kit for Angle Sensors

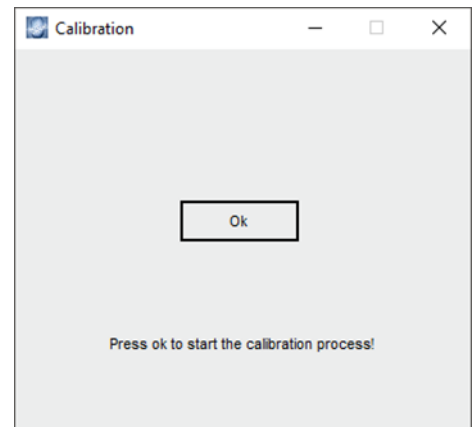
### 3.3 How to calibrate

For analog angle sensors, the offset, amplitude and orthogonality of the raw signals sin and cos has to be calibrated to achieve high angular accuracy. This calibration procedure can be performed as described below:

Click **Calibrate**. The calibration window appears.



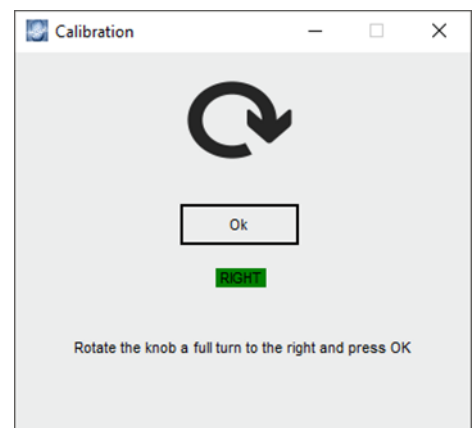
In the calibration window click **Ok**.



Rotate the magnet 360° in the direction shown in the calibration window. If the red label turns green, press **Ok**.



Repeat the process for the other direction, press **Ok**.



## Evaluation Kit for Angle Sensors

## 3.4 Safety features

- The right-down area of the Evaluation Kit for Angle Sensors window displays information that is related to the safety concept for TLE5501 described in the Product Safety Manual.
- To get all the safety fields populated a calibration is required.
- The external safety mechanisms were implemented in the Eval Kit and violations of the expected values are presented in red.

|                           |                        |                                                                                     |
|---------------------------|------------------------|-------------------------------------------------------------------------------------|
| Calibrate                 | Calibration performed! |  |
| Vector Length P-channel   | 1                      |                                                                                     |
| Vector Length N-channel   | ,99                    |                                                                                     |
| Absolute Angle Difference | 4,17                   |                                                                                     |
| SinP + SinN               | 5                      |                                                                                     |
| CosP + CosN               | 5,01                   |                                                                                     |

- If you hover with the mouse over the I icon after performing a calibration you will see more information about the calibration parameters.

|                 |                                                                                                                                                                                      |                                                                                      |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Calibrate       | Calibration performed!                                                                                                                                                               |  |
| Vector P-ch     | Calibration values found<br>Mean amplitude CosP = ,73<br>Mean amplitude SinP = ,76<br>Mean offset CosP = 2,51<br>Mean offset SinP = 2,51<br>Mean orthogonality error P channel = ,21 |                                                                                      |
| Vector N-ch     |                                                                                                                                                                                      |                                                                                      |
| Absolute Differ |                                                                                                                                                                                      |                                                                                      |
| SinP + SinN     |                                                                                                                                                                                      |                                                                                      |
| CosP + CosN     |                                                                                                                                                                                      |                                                                                      |
|                 | 5,02                                                                                                                                                                                 |                                                                                      |
|                 | 5                                                                                                                                                                                    |                                                                                      |

### 3.5 Output buffer

On the sensor shield, there are 4 DIP switches which allow to select an output buffer for the analog raw signal sin and cos. With this buffer enabled, a low output impedance is provided.

For special application, e.g. which high capacitive load, this option is preferred as it avoids the high impedance of the TMR bridge.

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**Revision history****4 Revision history**

| Revision | Date       | Changes           |
|----------|------------|-------------------|
| Rev. 1.0 | 2018-08-01 | Initial creation. |

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## Document reference

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