

TLI55910 2Go evaluation kit user guide

XENSIV™ linear sensors

About this document

Scope and purpose

This document describes the hardware and software functionality of the XENSIV™ TLI55910 2Go evaluation kit ([TLI55910A6E EVAL KIT](#)).

Intended audience

This document is intended for hardware and software engineers involved in the evaluation of the XENSIV™ TLI55910 tunnel magnetoresistance (TMR)-based linear sensors.

About this product group

Target applications

- Small field linear position and angle sensing
- Gaming applications, e.g., joysticks
- [PC accessories](#)
- Multisensor encoder setup

Product family

Infineon's portfolio of [XENSIV™ linear sensors](#) provides a broad range of solutions for different applications, including high-sensitivity linear tunneling magnetoresistance (TMR) sensors and Hall-effect sensors with integrated signal processing, designed for contactless position sensing.

Evaluation Board

This board is to be used during the design-in process for evaluating the TMR magnetic sensing capabilities of the XENSIV™ TLI55910 linear sensor.

Note: PCB and auxiliary circuits are NOT optimized for final customer design.

Safety precautions

Safety precautions

Note: Please note the following warnings regarding the hazards associated with development systems.

Table 1 **Safety precautions**

	Caution: <i>The heat sink and device surfaces of the evaluation or reference board may become hot during testing. Hence, necessary precautions are required while handling the board. Failure to comply may cause injury.</i>
	Caution: <i>The evaluation or reference board contains parts and assemblies sensitive to electrostatic discharge (ESD). Electrostatic control precautions are required when installing, testing, servicing, or repairing the assembly. Component damage may result if ESD control procedures are not followed. If you are not familiar with electrostatic control procedures, refer to the applicable ESD protection handbooks and guidelines.</i>

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1 The board at a glance

1 The board at a glance

The XENSIV™ TLI55910 linear sensor is a contactless, galvanically isolated magnetic sensor, featuring a non-amplified tunnel magnetoresistance (TMR) bridge, a reduced footprint size, and lower cost.

The TLI55910 2Go evaluation kit capitalizes on the sensor's magnetic sensing features and allows linear position measurements to be performed, with configurable output gain. The compatible software provided is designed to visualize and log data acquired from the TLI55910 sensor, with accessible gain settings and data visualization functions.

The TLI55910 2Go evaluation kit is shown in [Figure 1](#).



Figure 1 TLI55910 2Go evaluation kit

Note: [Figure 1](#) is generic; the latest variant may include modifications.

The evaluation hardware is compatible with the XENSIV™ 3D magnetic sensor add-ons:

- [ROTATE KNOB 3D 2GO KIT](#)
- [LINEAR-SLIDER 2GO](#)

The evaluation hardware can be ordered online from the [Infineon](#) website or via Infineon sales channels. The ordering part numbers are listed in [Table 2](#).

Table 2 TLI55910 2Go evaluation kit list with ordering part numbers

Name	Description	Infineon Sample Request (ISaR) SP number
TLI55910A6E EVAL KIT	TLI55910-A6E-E0001 2Go evaluation kit	SP006201527

2 System and functional description

2 System and functional description

2.1 Description of functional units

The hardware of the TLI55910 2Go evaluation kit V1.1 contains the following main functional units.

Indices in parentheses match the schematic designators for each component.

- **On-board debugger (U3):** The evaluation kit features an on-board debugger implemented via an XMC4200 microcontroller. This auxiliary microcontroller runs a debug probe firmware provided by SEGGER J-Link, which is used for flashing the target microcontroller and for establishing serial communication via USB
- **Target microcontroller (U1):** The main microcontroller is an XMC1100 in a VQFN24 package with 64 KB of flash. This device handles I²C communication with the digital potentiometer, digital conversion of the analog sensor output, and the forwarding of data to USB through the debugger
- **Power supply (U2):** The TLS202B1MBV33 low-dropout voltage regulator (LDO) steps down the 5 V from the USB connector to 3.3 V, supplying the debugger, the target microcontroller, and the sensor
- **Application circuit:**
 - **Sensor under evaluation (B1):** XENSIV™ TLI55910 linear TMR sensor
 - **Digital potentiometer (U5):** The MCP40D17T-104E/LT is a 100 kΩ digital potentiometer that supplies the gain resistance for the instrumentation amplifier (see [Section 2.3](#) for more details)
 - **Instrumentation amplifier (U4):** The INA827AIDGKR converts the differential output of the sensor into a single-ended amplified output, which is fed into the XMC1100 ADC
- **USB connector (J1):** Micro-USB, supplies the board with 5 V and ensures communication with the PC
- **Auxiliary connectors:** PCB side connectors (P1, P2, 2.54 mm headers, not assembled by default) that expose GPIO, UART, SPI, and PWM pins of the XMC1100 microcontroller, allowing the TLI55910 2Go evaluation kit to be connected to other components

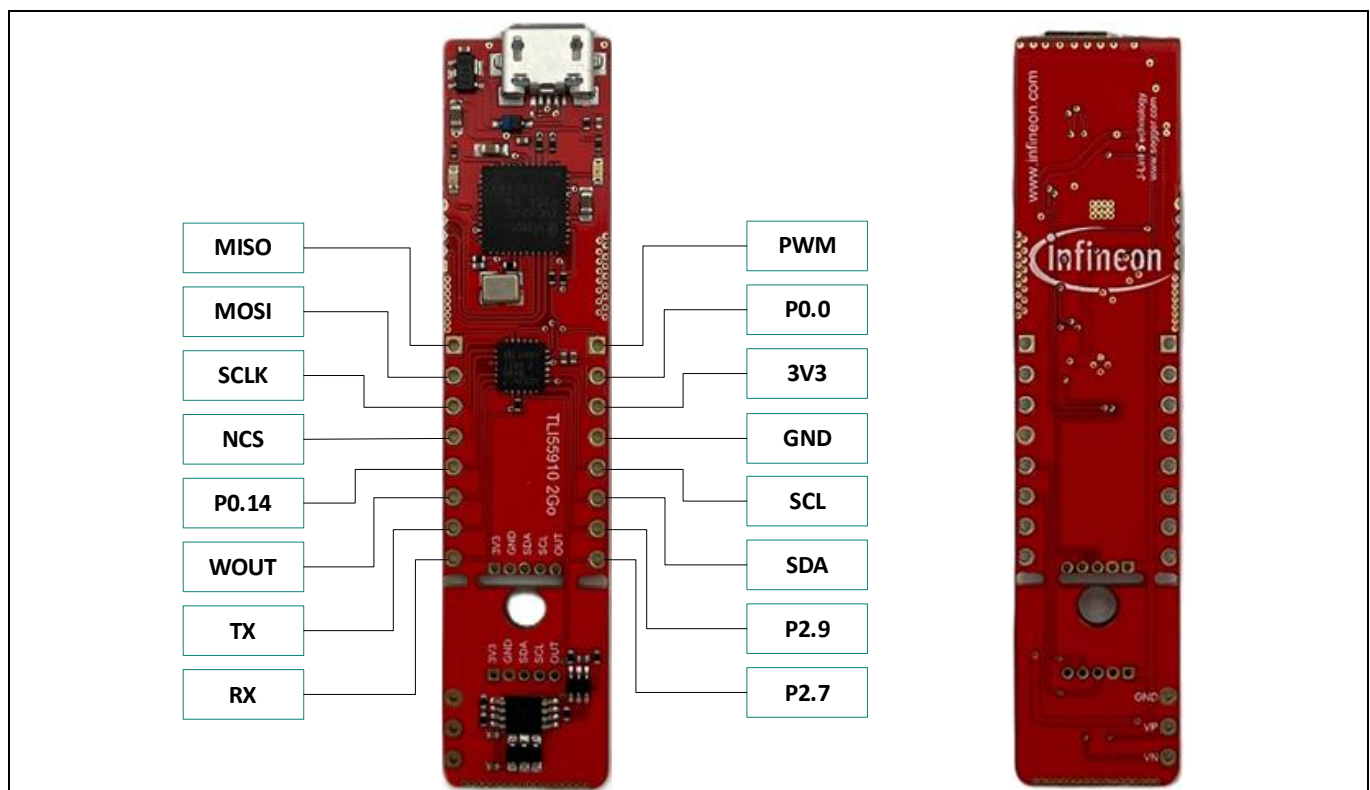


Figure 2 TLI55910 2Go evaluation kit auxiliary connector pinouts

2 System and functional description

2.2 Block diagram

Figure 3 shows the important connections between the main XMC1100 microcontroller, the digital potentiometer, and the instrumentation amplifier. All represented blocks are connected to VDD (3.3 V) and GND. Additional components and connections, such as decoupling capacitors, are not shown. For more detailed information, see the schematic in [Section 3.1](#).

The differential output of the TLI55910 sensor is connected to the two inputs of the instrumentation amplifier, with the positive output of the sensor connected to the positive input of the amplifier.

The XMC1100 application circuit involves three pins: 2.11 and 2.10 are used by the USIC peripheral to establish communication with the MCP40D17T digital potentiometer through the I²C protocol, while pin 2.7 represents the ADC channel assigned to convert the analog output of the instrumentation amplifier to a digital value.

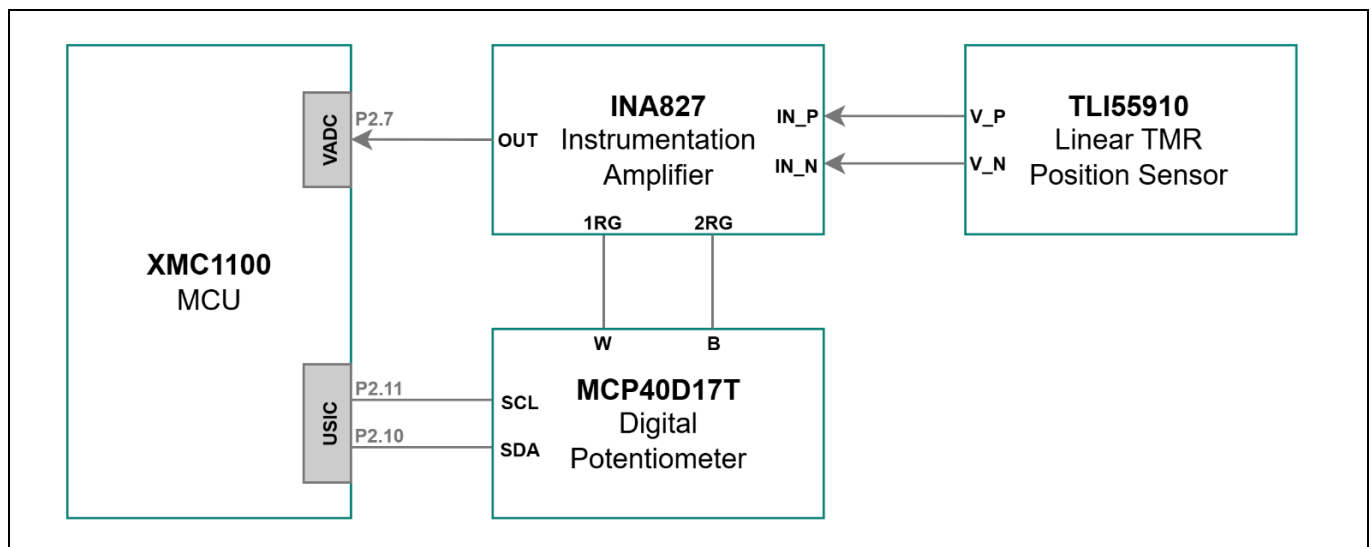


Figure 3 TLI55910 2Go evaluation kit signal block diagram

2.3 Output gain configuration

The output gain of the TLI55910 evaluation kit is software-configurable, through the MCP40D17T-104E/LT 100 kΩ digital potentiometer. Communication with the digital potentiometer is established by the USIC peripheral of the XMC1100 microcontroller, using the I²C protocol.

The 128 available taps provide a typical 787.40 Ω resistance step. When calculating the overall resistance of the digital potentiometer, consider the typical wiper resistance R_W of 100 Ω. The resistance of the potentiometer at a setting of N steps is described by using [Equation 1](#):

$$R_{pot} = \frac{100,000 \times N}{127} + R_W$$

Equation 1

The digital potentiometer is connected between the 1RG and 2RG pins of the INA827 instrumentation amplifier. As the digital potentiometer provides all the resistance, the system gain can be described by using [Equation 2](#):

2 System and functional description

$$Gain = 5 + \frac{80 \text{ k}\Omega}{R_G} = 5 + \frac{80 \text{ k}\Omega}{R_{pot}}$$

Equation 2

Attention: *Evaluation software is designed to work with the TLI55910 2Go evaluation kit out-of-the-box. Adding an external resistor in parallel will increase the gain, but the values calculated and displayed in the evaluation software will not be accurate.*

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3 System design

3 System design

3.1 Schematics

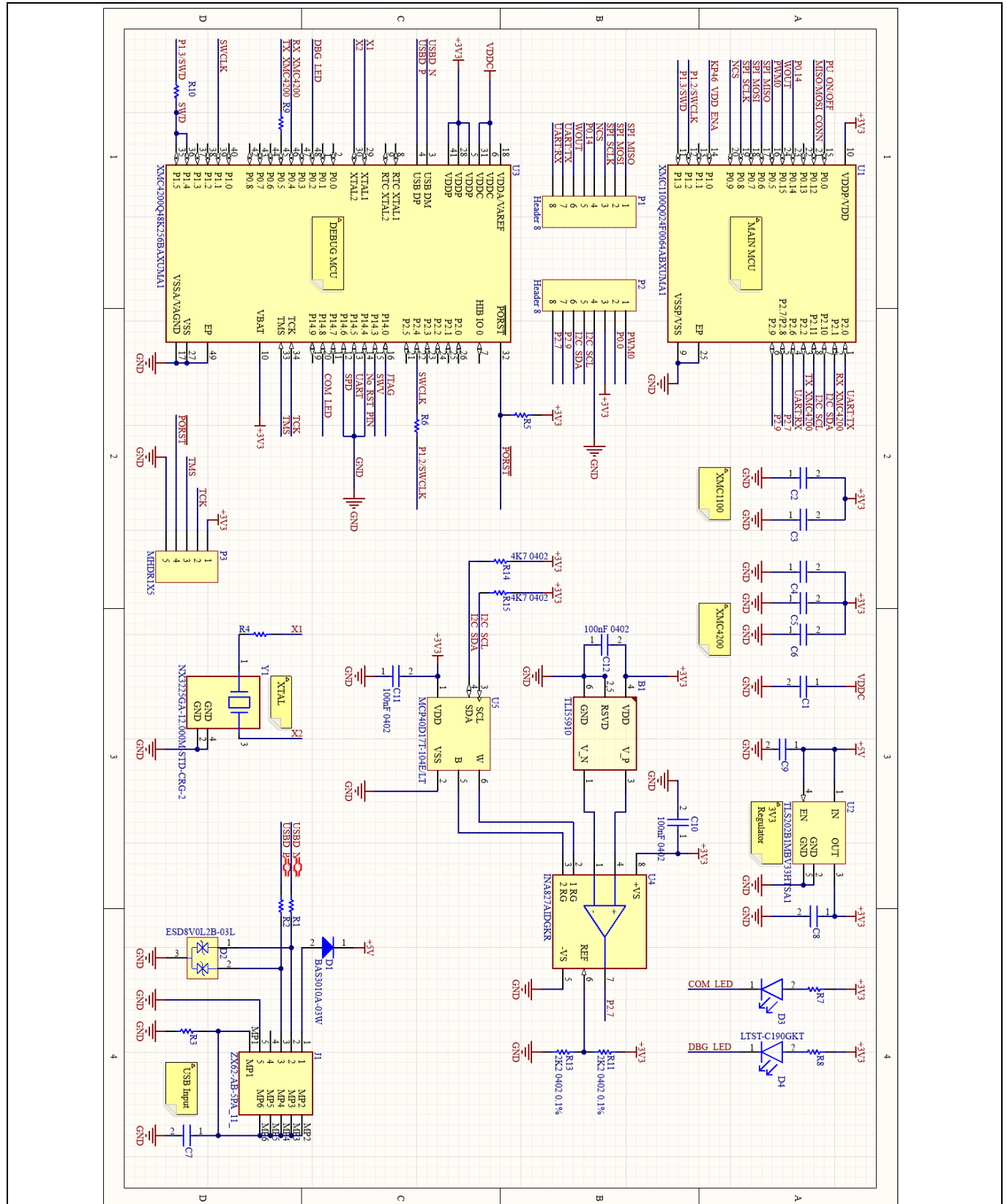


Figure 4 TLI55910 2Go evaluation kit schematic

3 System design

3.2 Layout

The design described in [Section 2.1](#) is physically implemented in PCB technology using a standard process with the following characteristics:

- **PCB material:** FR4
- **Copper:** 2 layers top/bottom, 140 µm thickness each
- 45-degree chamfer on sensor side

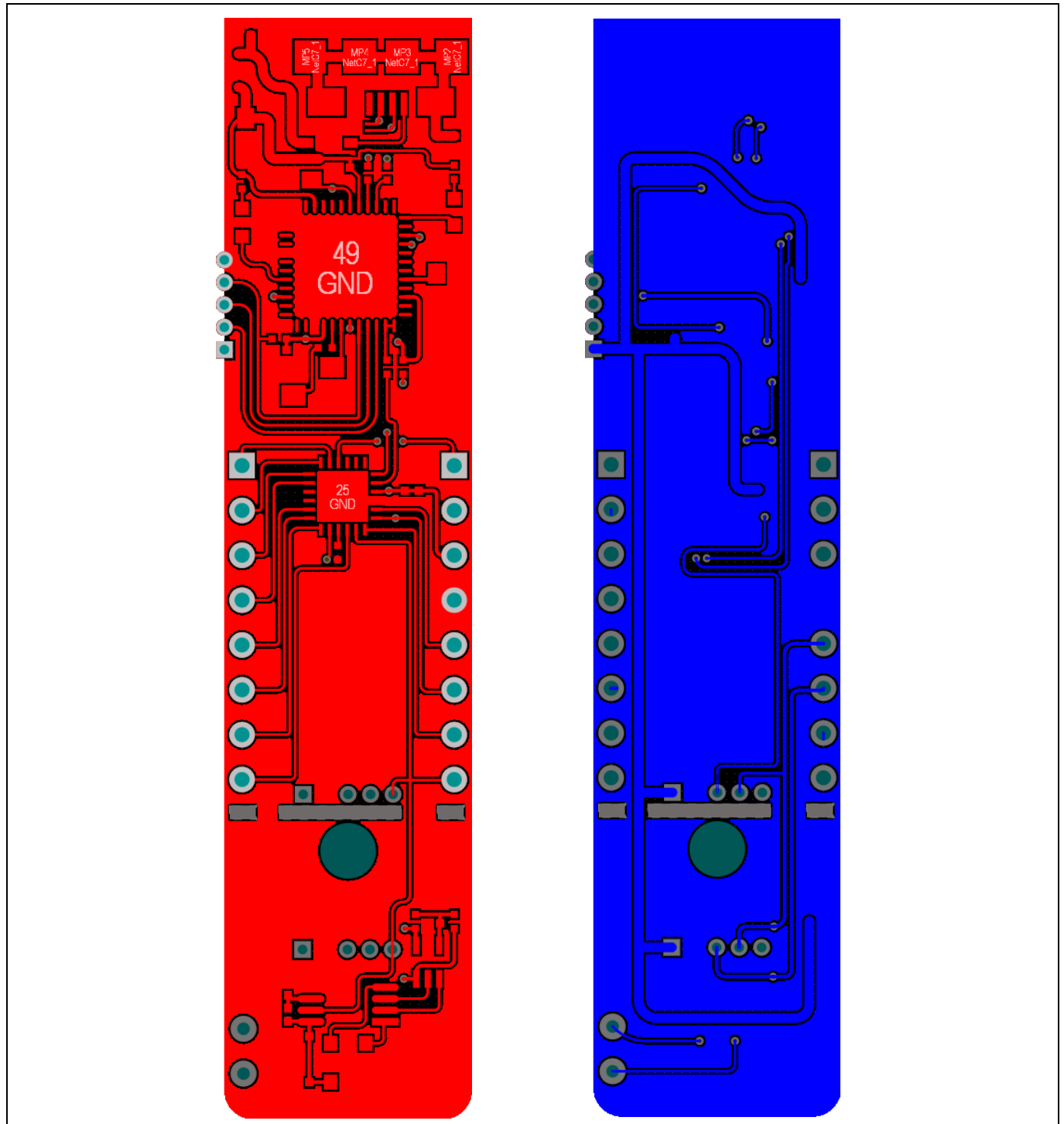


Figure 5 TLI55910 2Go evaluation kit PCB layout – Top (left), bottom (right)

3 System design

3.3 Bill of materials

Table 3 TLI55910 2Go evaluation kit bill of materials

Designator	Description	Quantity	Assembled on PCB	Infineon part
B1	XENSIV™ TLI55910 (evaluated sensor)	1	Yes	Yes
C1	Ceramic 470nF 16V X7R 0603 ±10%	1	Yes	No
C2, C3, C4, C6, C7, C9	Ceramic 0.1uF 16V X7R 0402	6	Yes	No
C5, C8	Ceramic 10uF 6.3V X5R 0603	2	Yes	No
C10, C11, C12	Ceramic 0.1uF 10V X5R 0402	3	Yes	No
D1	BAS3010A-03W	1	Yes	Yes
D2	ESD8V0L2B-03L	1	Yes	Yes
D3	150060RS75000	1	Yes	No
D4	LTST-C190GKT	1	Yes	No
J1	ZX62-AB-5PA_11_	1	Yes	No
P1, P2	Header, 8-pin	2	Yes	No
P3	Header, 5-Pin	1	Yes	No
R1, R2	ERJ2RKF33R0X	2	Yes	No
R3	ERJ-2RKF1004X	1	Yes	No
R4	ERJ-2GEJ511X	1	Yes	No
R5	ERJ2RKF1002X	1	Yes	No
R6, R9, R10	ERJ-2RKF1000X	3	Yes	No
R7, R8	ERJ2RKF6800X	2	Yes	No
R11, R13	2K2 0402 0.1%	2	Yes	No
R14, R15	4K7 0402	2	Yes	No
U1	XMC1100Q024F0064ABXUMA1	1	Yes	Yes
U2	TLS202B1MBV33HTSA1	1	Yes	Yes
U3	XMC4200Q48K256BAXUMA1	1	Yes	Yes
U4	INA827AIDGKR	1	Yes	No
U5	MCP40D17T-104E/LT	1	Yes	No
Y1	NX3225GA-12.000M-STD-CRG-2	1	Yes	No

4 Evaluation software

4 Evaluation software

Download the evaluation software via the [Infineon Development Center](#) online platform or the [Infineon Developer Center Launcher](#) application. It is recommended to install the Infineon Development Center Launcher application.

The software package contains:

- A graphical user interface (GUI) software for sensor evaluation
- SEGGER J-Link debugger software with USB driver

4.1 Requirements

The TLI55910 2Go hardware and software bundle is developed and tested on the following PC configurations:

- **Operating system:** Windows 10/Windows 11 (also compatible with Windows 7)
- **RAM:** 8 GB (maximum RAM usage estimated at 250 MB, when data logging is ON)
- **Storage:** 512 GB (minimum required for installation: 250 MB, including dependencies)
- **CPU:** 3 GHz, 4 cores (lower performance CPUs might impact the performance of the GUI)

4.2 Software download

To access the evaluation software, go to the **Assets** section of your preferred platform and search for “TLI55910” or “TMR Sensor” and it displays as [XENSIV™ TLI559xx 2Go Evaluation App](#).

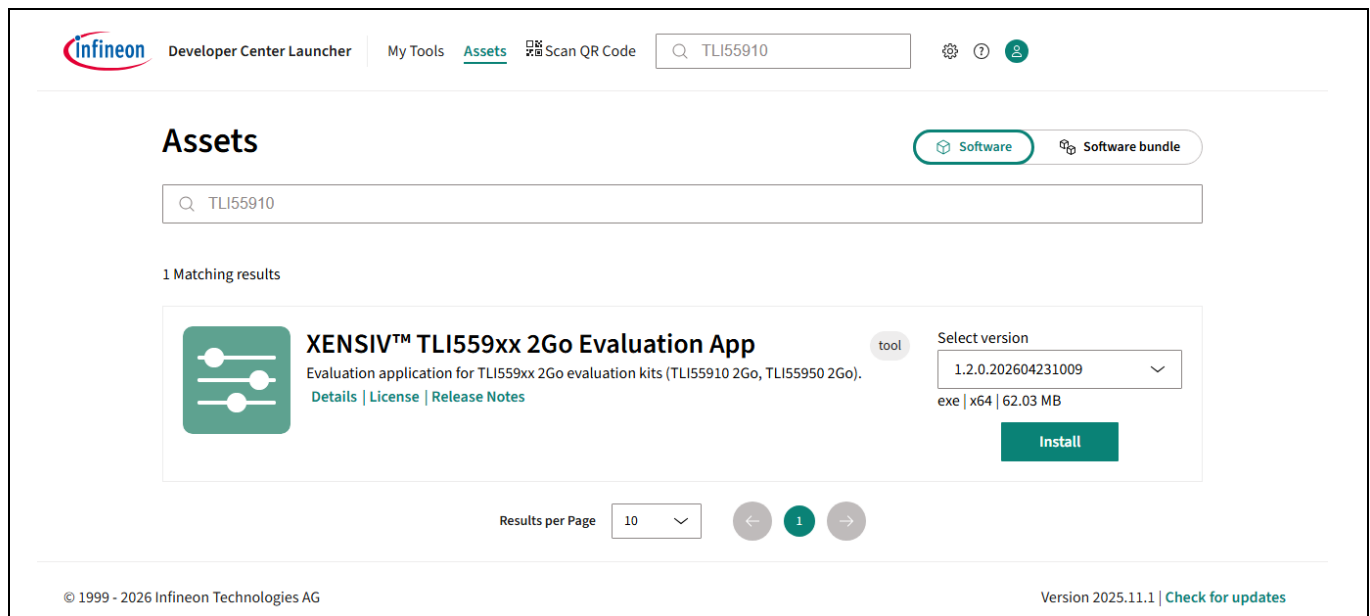


Figure 6 Infineon Development Center – online tools

Note: **XENSIV™ TLI559xx 2Go Evaluation App** is only available for users registered with a myInfineon account.

4 Evaluation software

4.3 Software installation

1. Download the XENSIV™ TLI559xx 2Go Evaluation App installer as mentioned in the previous section and click the **Install** button

Note: Ensure that administrator rights are enabled before installation.

The installer file contains the following:

- Binaries/compiled objects needed for running the GUI
- SEGGER J-Link debugger software with USB driver
- .NET 4.8 online installer (needed only for older versions of Windows, if you do not have this already installed). Requires a stable Internet connection

2. Accept the License Agreement and click **Next**

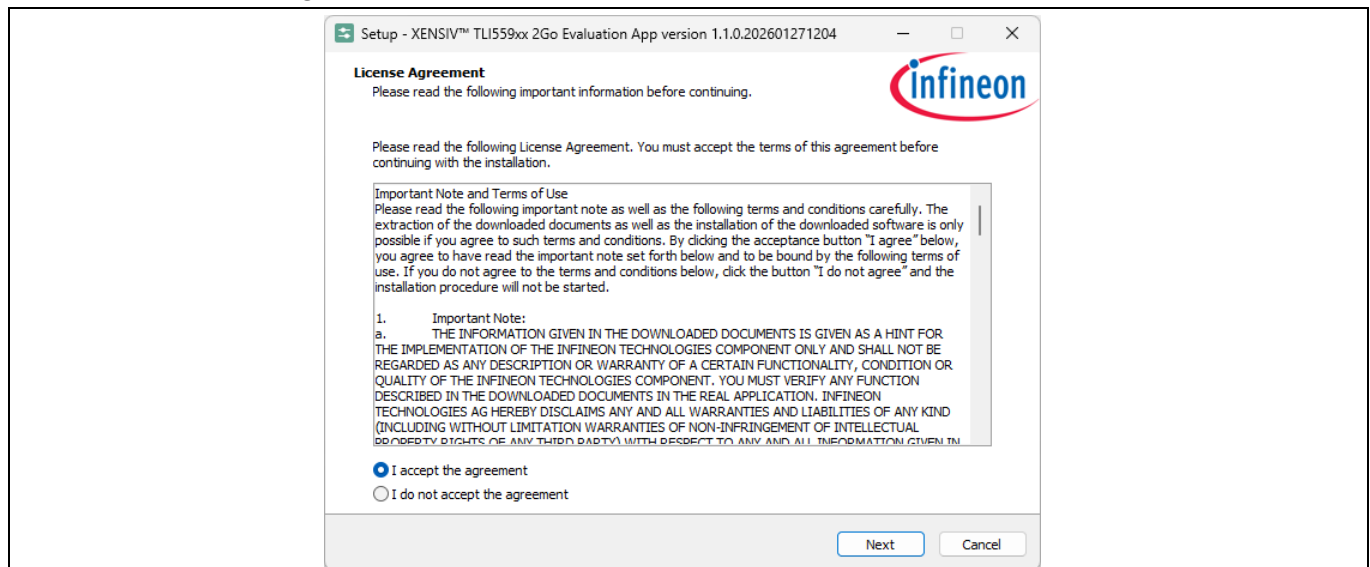


Figure 7 Software installation – license agreement

3. Select **Quick Installation** (recommended) and click **Install** to begin the installation process

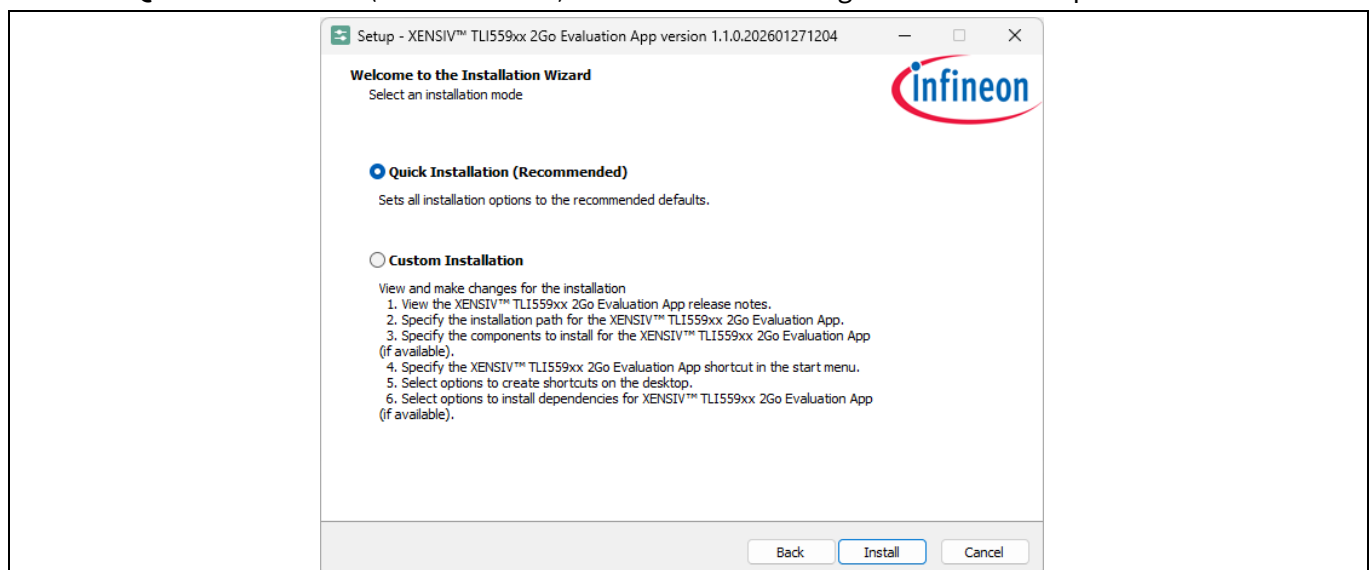


Figure 8 Software installation – quick installation

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4 Evaluation software

4. After the binaries have been copied to the installation folder, install the **SEGGER J-Link driver**. If this driver is already installed on your PC, skip this operation. If this driver is not installed, the USB connection between the PC and the TLI55910 2Go evaluation kit will not function



Figure 9 Software installation – SEGGER J-Link driver installation

5. Install **.NET Framework 4.8**. For operating systems starting from **Windows 10, build 1903** and later, this comes pre-installed. If the framework is not already installed, an active Internet connection is required to complete the installation process

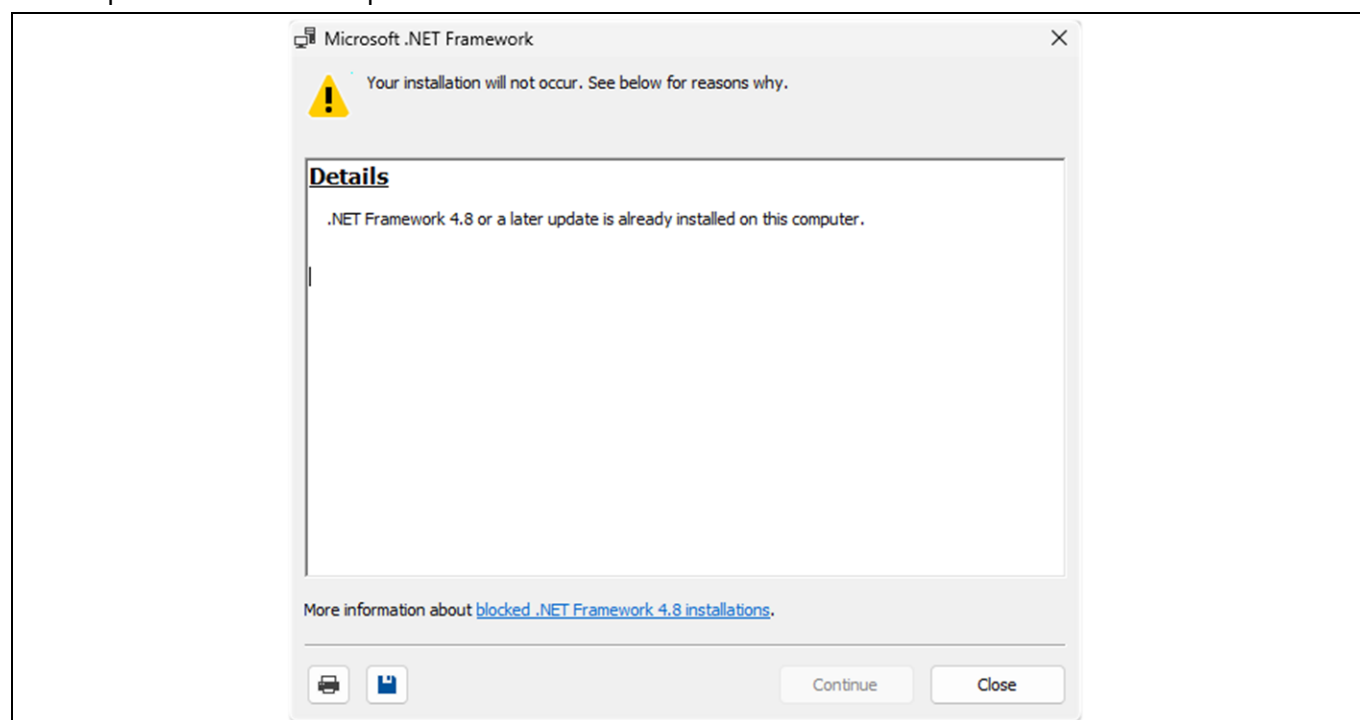


Figure 10 Software installation – .NET 4.8 installation

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4 Evaluation software

6. You are notified when all installer processes are complete and a shortcut is created on the desktop by default. You can choose to run the installed **XENSIV™ TLI559xx 2Go Evaluation App** and click **Finish** to exit the setup

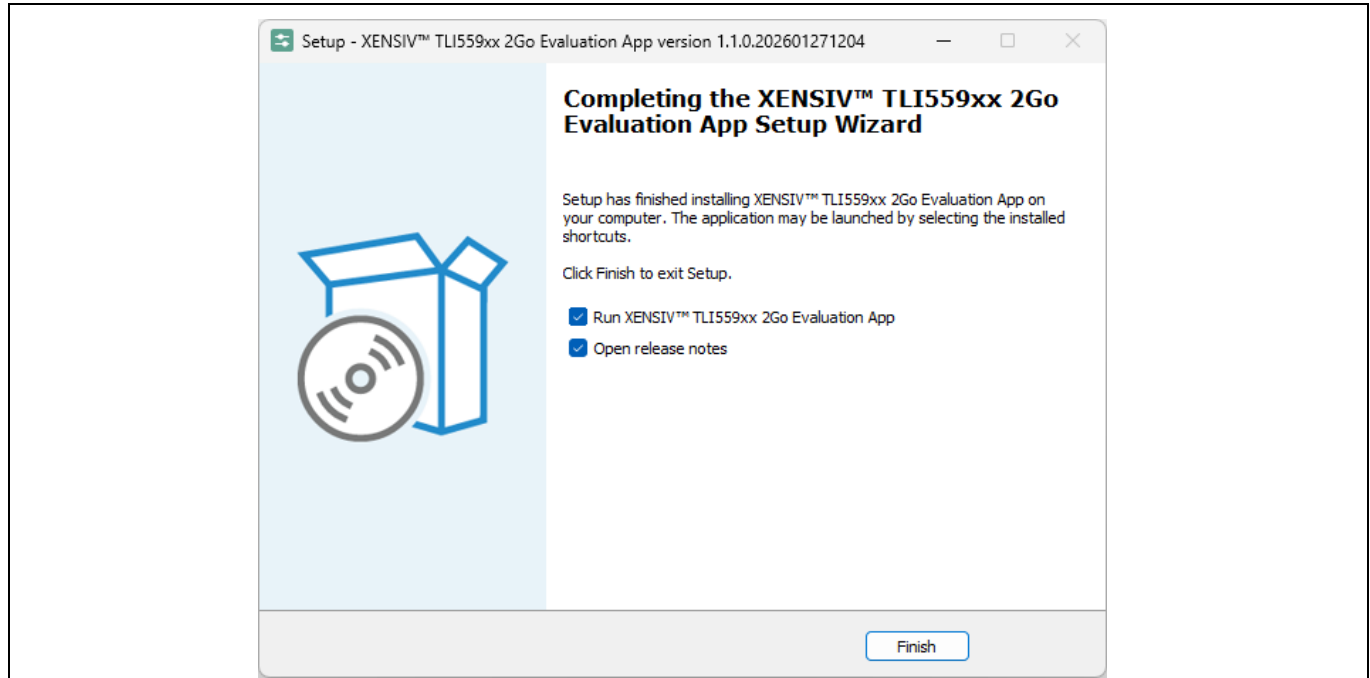


Figure 11 Software installation – completion

4.4 Uninstalling the software

To uninstall the software package, go to **Start > Add or remove programs** and search for the **XENSIV™ TLI559xx 2Go Evaluation App**. Select **Uninstall** to delete the software from your PC.

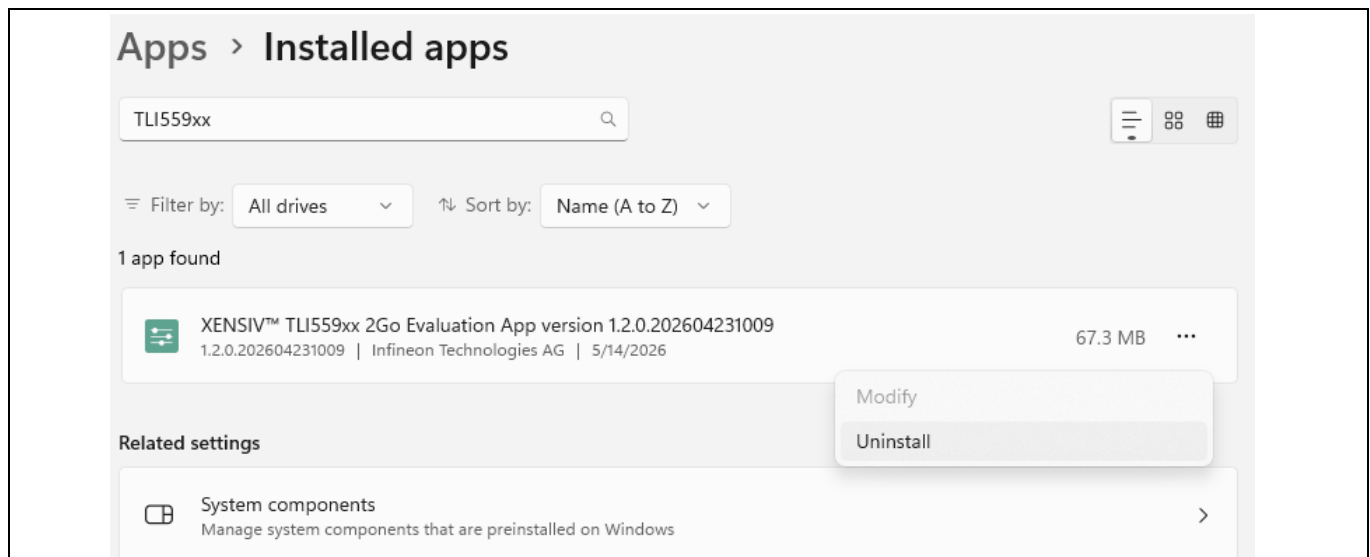


Figure 12 Software uninstall

All installation files are deleted from the system except:

- SEGGER J-Link driver, which can be uninstalled separately if required
- .NET 4.8 dependencies, which in most cases are part of the operating system

5 Using the evaluation software

This section will describe all the functions provided by the evaluation software:

- Continuous readout, in both V and least significant bit (LSB) raw ADC output
- Dynamic gain adjustment
- Zero-input offset correction
- Data logging and visualization

5.1 Startup screen

Start the application by double-clicking the created shortcut, or run the executable file from the installation folder. Connect the TLI55910 2Go evaluation kit to the PC with a Micro-USB cable (not provided in the kit package).

If the evaluation kit is successfully connected, a COM port should be available to connect to. Click on the COM port and wait while the software flashes the firmware into the XMC1100 microcontroller. For subsequent launches of the software, the firmware will be flashed again only if communication errors occur.

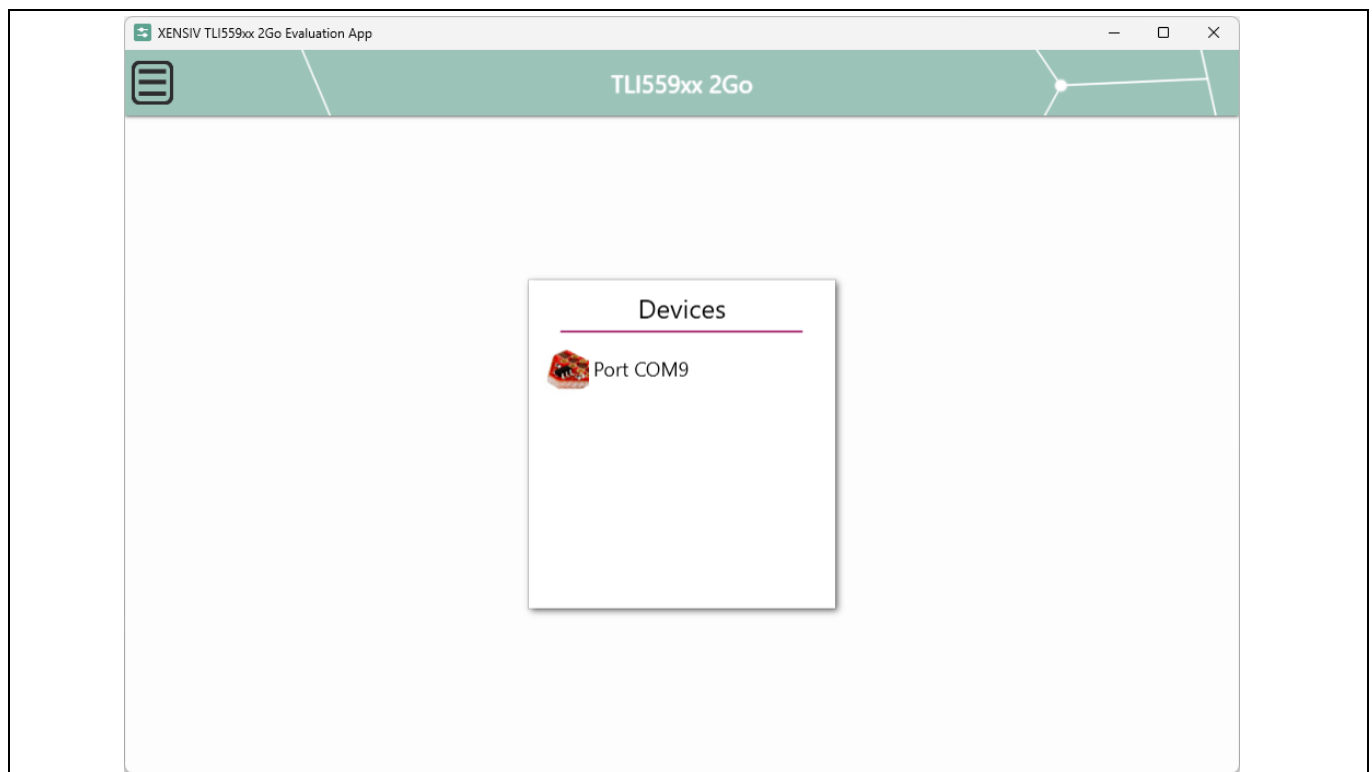


Figure 13 Startup screen with valid COM port connection

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5 Using the evaluation software

5.2 Primary GUI window

After successfully connecting to the TLI55910 2Go evaluation kit, the evaluation software enters the continuous readout scenario. The chart is updated at a rate of **500 samples/second** and represents the amplified sensor output. The continuous readout starts automatically, in **LSB mode**.

The graphical elements on the left side of the screen are:

- **Back:** Go back to the startup screen
- **Information table:** Displays the evaluation kit name and the associated COM port
- **Start/Stop:** Start/stop the continuous readout
- **Zero Chart:** Correct any zero-input offset of the sensor output
- **Gain Settings table:**
 - Numeric value represents the **immediate gain** of the instrumentation amplifier
 - Move the slider or press the +/- buttons to interact
 - Available gain values range from **~10x** to **~100x**
 - The gain can be modified even when the continuous readout is **on**. The chart will stop updating while the command is processed but will resume automatically (<1 s)

Attention: *Ensure that the sensor is not affected by any magnetic field while pressing the “Zero Chart” button or while changing the gain value, as it corrects the 0-input offset of the sensor output.*

The graphical elements on the right side of the screen are:

- **Show V/Show LSB:** Switch between readout modes
- **Output [LSB/V]:** Updates periodically with the latest received data point
- **?:** Provides additional details about how the two readout modes differ

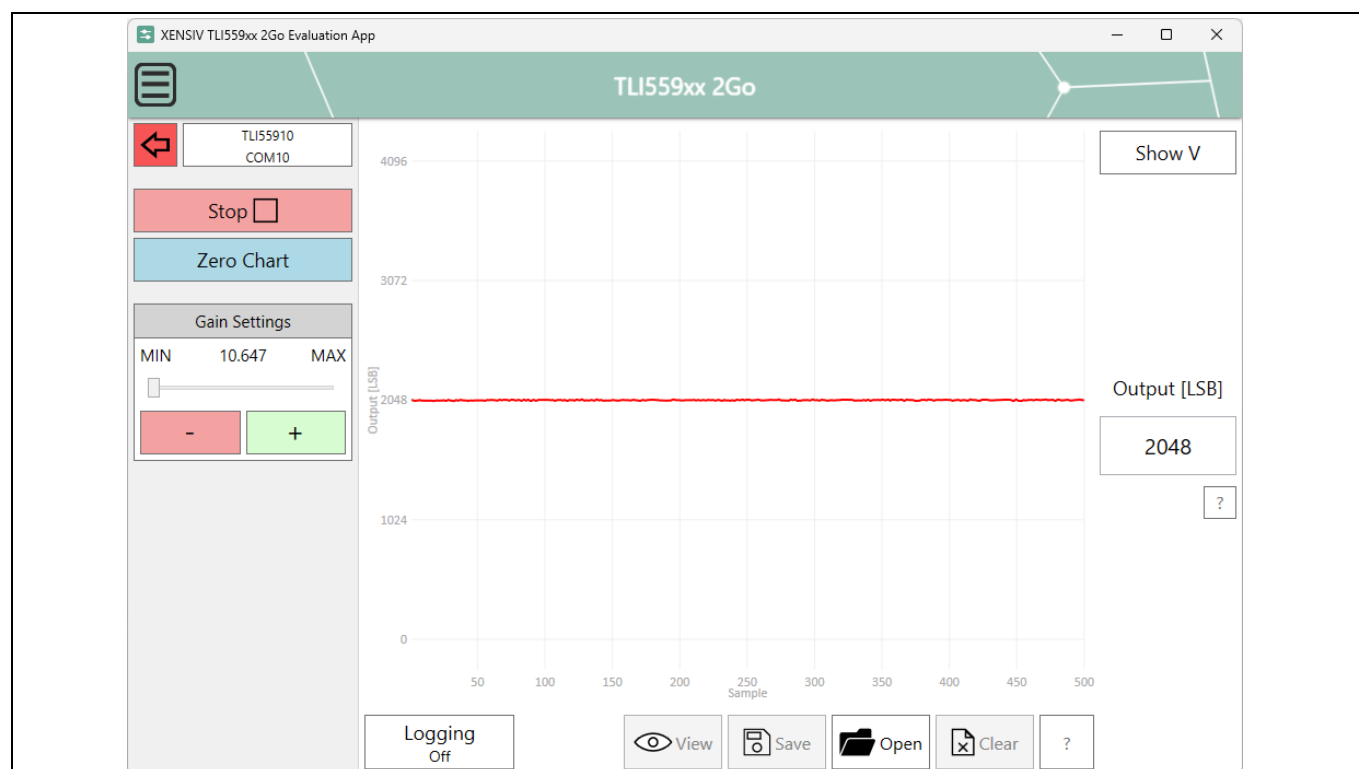


Figure 14 Continuous readout

5 Using the evaluation software

5.3 Data logging

The evaluation software offers an option to log data points. The TLI55910 2Go evaluation kit outputs data to the evaluation software at a rate of **5000 samples/second**, while the continuous readout is down sampled to **500 samples/second**. Data logging allows you to record all the data points transmitted by the TLI55910 2Go evaluation kit, with flexible editing and visualization options.

At the bottom of the screen, a ribbon of buttons is dedicated to the software logging function:

- **Logging On/Off:** Activates the logging function, which will record all incoming data points from the TLI55910 2Go evaluation kit
- **Logged points:** Displays the current number of logged points. This is visible only if there are any points that were logged, but they are not yet saved to a .CSV file or cleared
- **View:** Displays the currently logged points in a new window
- **Save:** Saves the currently logged points in .CSV format with the option to add a comment and to choose the file name and save path
 - **Default name:** Evaluation kit name + timestamp (e.g., *TLI55910_2GO_2026-05-20_11-46-49.csv*)
 - **Default save location:** Desktop
- **Open:** Displays previously logged and saved points in a new window
- **Clear:** Deletes all the currently logged points
- **?:** Displays the same information provided in this section, accessible from the software main window

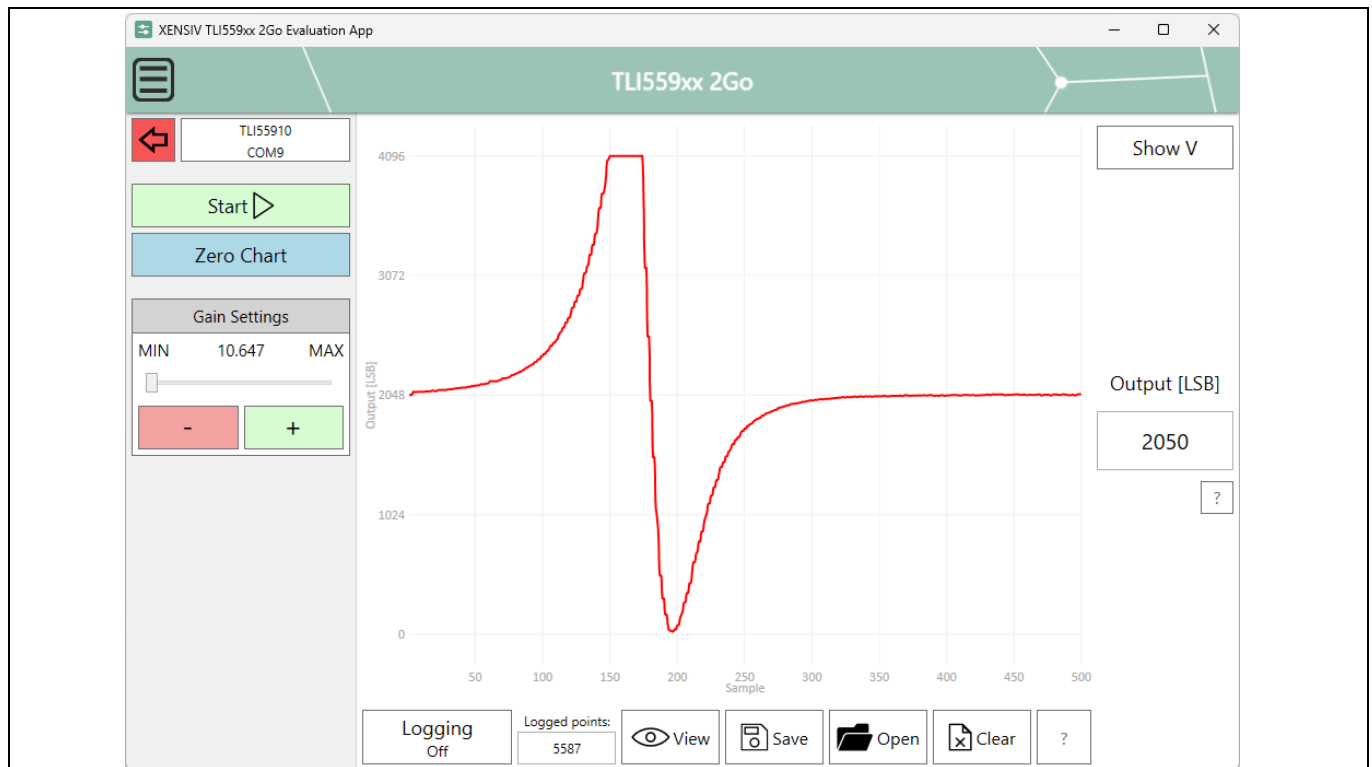


Figure 15 Using the data logging feature

5 Using the evaluation software

5.4 Data Logging Visualization Window

After logging data and pressing the **View** button, or after opening a .CSV file by pressing the **Open** button, a new window is displayed over the main window. As an example, [Figure 16](#) shows the logging data corresponding to the continuous readout data from [Figure 15](#).

The following controls are available in the Data Logging Visualization Window:

- **Series:** Regardless of the continuous readout mode (V/LSB), the logging view captures all the data points from the sensor. You can view the following series on the chart:
 - **Voltage:** Represents the amplified sensor output, in V
 - **LSB:** Represents the ADC conversion of the amplified sensor output
 - **LSB (corrected):** Represents the processed ADC conversion (same as **LSB continuous readout**)
 - **Both LSB:** Superimposes both LSB series to show how the correction affects the measurement
- **Cursor:** Toggles the vertical gray bar and data-point bubble at the mouse position
- **Zoom:** Selects the zoom mode (X axis, Y axis, both, or no zoom) or resets any zoom to default. Zooming and panning are done using the mouse

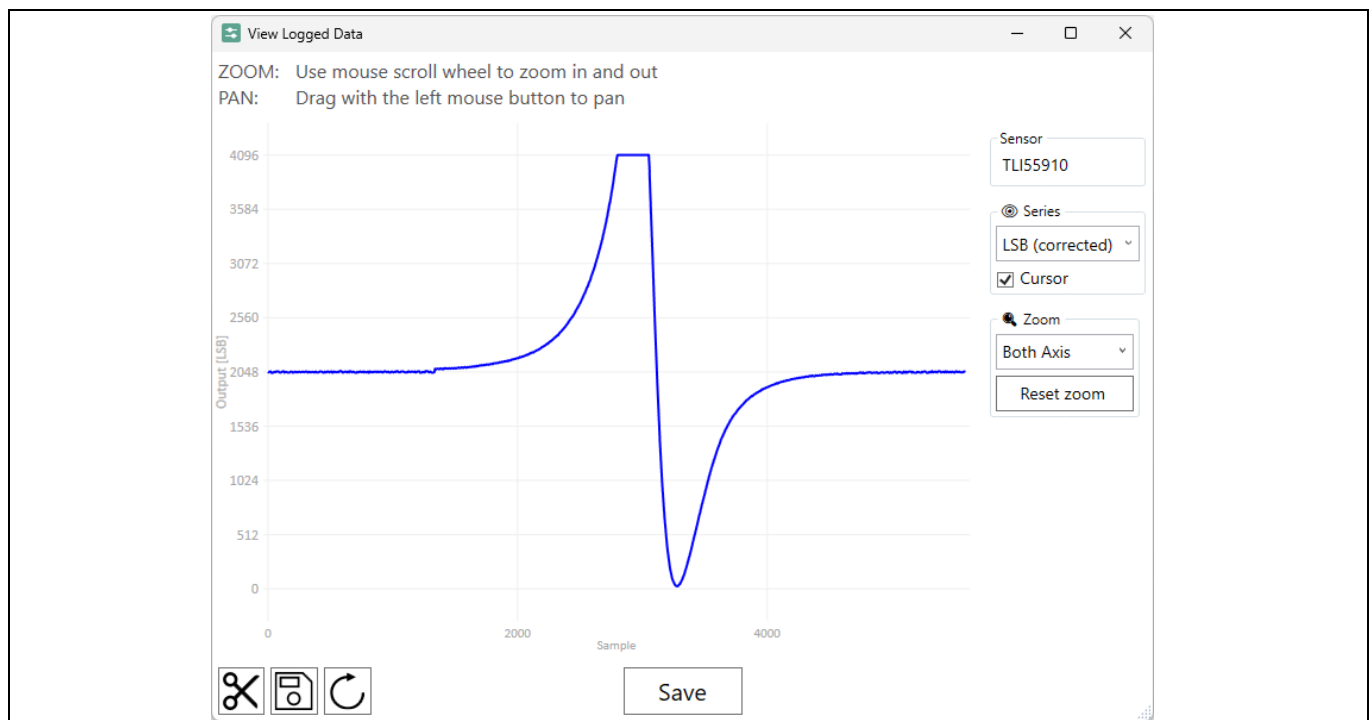


Figure 16 **Logged Data**

The bottom-left section of the screen offers additional data selection tools:

- **Cut:** When you select the Cut button, you can select a collection of points on the chart by holding the left mouse button and dragging the mouse over the area of interest. Upon releasing the left mouse button, the chart zooms in on the selected area
- **Save cut:** Saves the last Cut section of the chart. The other points are temporarily discarded. Closing and opening the data logging visualization window reloads all logged points
- **Reload:** Reloads the last saved section of the chart
- **Save:** Copies the last saved cut of the chart and saves it to .CSV format

6 Related resources

6 Related resources

- Webpage: [XENSIV™ linear sensors](#)
- Infineon Developer Community: [XENSIV™ linear sensors](#) forum
- [XENSIV™ TLI559xx 2Go Evaluation App](#)

References

References

- [1] Infineon Technologies AG: *XENSIV™ TLI55910 TMR-based linear sensor datasheet*; [Available online](#)
- [2] Microchip Technology Inc.: *MCP40D17/18/19 Digital POT datasheet*; [Available online](#)
- [3] Texas Instruments Incorporated: *INA827 Instrumentation Amplifier datasheet*; [Available online](#)

Glossary

Glossary

ADC

analog-to-digital converter (ADC)

COM

communication port (COM)

CPU

central processing unit (CPU)

CSV

comma-separated values (CSV)

ESD

electrostatic discharge (ESD)

GB

gigabyte (GB)

GHz

gigahertz (GHz)

GND

ground (GND)

GPIO

general-purpose input/output (GPIO)

GUI

graphical user interface (GUI)

I²C

inter-integrated circuit (I²C)

IDC

Infineon Developer Center (IDC)

ISaR

Infineon Sample Request (ISaR)

KB

kilobyte (KB)

LDO

low-dropout regulator (LDO)

LSB

least significant bit (LSB)

MB

megabyte (MB)

PCB

printed circuit board (PCB)

Glossary

PC

personal computer (PC)

PWM

pulse-width modulation (PWM)

RAM

random-access memory (RAM)

SPI

serial peripheral interface (SPI)

TMR

tunnel magnetoresistance (TMR)

UART

universal asynchronous receiver/transmitter (UART)

USB

universal serial bus (USB)

VDD

positive supply voltage (VDD)

Revision history

Revision history

Document revision	Date	Description of changes
1.00	2026-07-20	Initial release

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UG100501

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Safety & Operating Instructions:

Customer shall check the Evaluation Board for any physical damage which may have occurred during transport. If customer detects any damages or defects in the Evaluation Board, customer shall not connect the Evaluation Board to a power source. Customer shall contact Infineon for further support. If customer observes unusual operating behavior during the evaluation process, customer shall immediately shut off the power supply to the Evaluation Board and consult Infineon for support.

Customer shall not touch the Evaluation Board during operation and keep a safe distance.

Customer shall not touch the Evaluation Board after disconnecting the power supply, several components may still store electrical voltage and can discharge through physical contact. Several parts, like heat sinks and transformers, may still be very hot. Allow the components to cool before touching or servicing.

The electrical installation must be completed in accordance with the appropriate safety requirements.