

# The MS2Go & S2Go Kit User Manual

# About this document

#### Scope and purpose

Infineon's magnetic current sensor MS2Go evaluation kit is a low cost 2GO kit which enables the user to quickly evaluate the TLI4971 / TLE4971 current sensor. The TLI4971 Current 2go Evaluation kit is offered in two configurations, such as Magnetic Sensor 2Go (MS2Go) & Shield 2Go (S2Go) kits whereas the TLE4971 is offered in the Magnetic Sensor 2Go (MS2Go) only.

TLx4971 in this document will stand equaliy for TLI4971 as well as for TLE4971. For easier readability TLx4971 was chosen as common name.

The following key aspects are discussed in this document.

- Sensor board description & schematic
- Sensor Shield board description & schematic
- MCU board description & schematic
- Current2Go Evalkit GUI description & installation procedure
- GUI operation with MS2Go kit in electric drive application example
- MS2Go, S2Go kit and companion board order information
- MS2Go and S2Go kit use cases
- Typical application setup using MS2Go kit
  - To modify the current sensor parameters such as operating mode, sensitivity, over-current threshold and filtering time using volatile settings, as well as monitoring sensor signals

The programmer board is CE certified and to be used by the customer solely for the purpose of evaluation and testing. It is not a commercialized product and shall not be used for series production. The programmer board is thus not intended to meet any industrial specifications and must be operated in the room temperature conditions.

Due to the purpose of the system, it is not subject to the same procedures regarding Returned Material Analysis (RMA), Process Change Notification (PCN) and Product Withdraw (PWD) as regular products.

#### Intended audience

**Current Sensor Module Developers** 

Inverter/Converter applications

Industrial Drive applications

Smart Relay and socket applications

Welding machine applications



#### Introduction

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# 1 Introduction

The TLI4971 MS2Go and S2Go kits as well asd the TLE4971 MS2Go kit are budget-priced evaluation kits enabling the possibility to evaluate the Infineon TLx4971 current sensor.



Figure 1 TLx4971 Current Sensor 2GO Kit

# 1.1 TLx4971 MS2Go configuration

The MS2Go kit contains the following components in its order package.

- Sensor board (equipped with M4 screw connectors for high current capabilities), built in thick copper technology (140um copper / dual layer) (see Figure 2).
- MCU board equipped with XMC1100 as target microcontroller and XMC4200 as debugger microcontroller.
   This board implements the application circuit of the sensor (see Figure 2).
- Sensor shield, in addition to the MCU board, the sensor board can be connected to the shield. This PCB only implements sensor application circuit & peripherals with connection pinout to XMC2go platform (see Figure 2). XMC2Go board mounted on the sensor shield board using the pin headers attached in the package.
- Zip lock bag with 2xM4 screws, 1 PCB edge connector (for connecting the sensor board to MCU board/ shield), and pin headers (male & female) to access data lines (see Figure 2).
- Disclaimer for safety precautions.

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#### Introduction

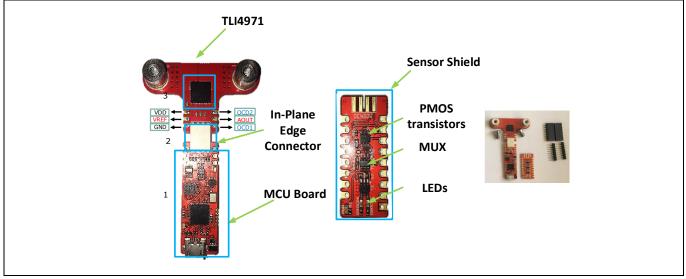


Figure 2 MS2Go kit component list

## 1.2 TLI4971 S2Go configuration

The S2Go kit contains the following components in its order package.

- Sensor board (equipped with M4 screw connectors for high current capabilities), built in thick copper technology (140um copper / dual layer) shown in Figure 3.
- Sensor shield, in addition to the MCU board, the sensor board can be connected to the shield. This PCB only implements sensor application circuit & peripherals + connection pinout to XMC2go platform shown in Figure 3.
- Zip lock bag with 2xM4 screws, 1 PCB edge connector (for connecting the sensor board to MCU board/ shield), pin headers to access data lines (male & female) shown in Figure 3.
- Disclaimer for safety precautions.

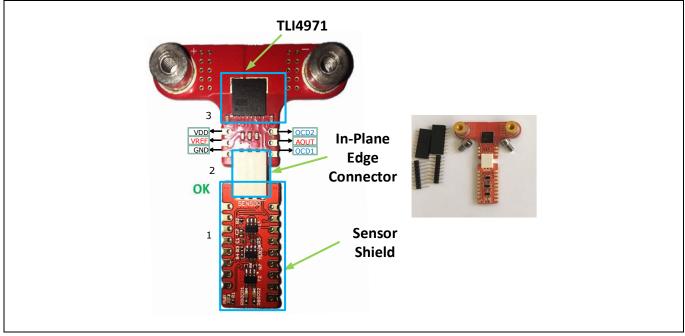


Figure 3 S2Go kit component list

# TLI4971 / TLE4971 Current Sensor The MS2Go & S2Go Kit User Manual



#### Introduction

The MS2Go Kit includes a GUI software that can be downloaded from the Infineon <u>website</u>. Table 1 shows the S2Go & MS2GO kit order information.

Table 1Order Information	
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Type / Name	SP – Number
S2GO_CUR-SENSE_TLI4971	SP005345472
TLI4971_MS2GO	SP005345474
TLE4971_MS2GO	SP005857720

The following chapters describe the different parts of the MS2Go kit, hardware connection, software installation and clarifies how to use the graphical user interface (GUI) to do the first evaluations of the sensor in a particular application. The MS2Go kit design meets the required clearance and creepage distances for high voltage applications according to the TLx4971 specification. The sensor on the sensor board provides a galvanic isolation. Please consider the safety precautions for high voltage applications as described in the enclosed disclaimer document along with the delivered sensor kit. The communication between the current sensor and XMC2GO board is provided through a connector called in-plane edge connector which has shown in the Figure 9.

# 1.3 TLx4971 Current 2Go Evaluation Kit Use Cases

The current 2Go kit can be used for different use cases as shown in the below.

- MS2Go kit use case with MCU Board (See Figure 4)
- S2Go kit use case with XMC2GO Board (See Figure 5)
- Sensor board alone (See Figure 6)

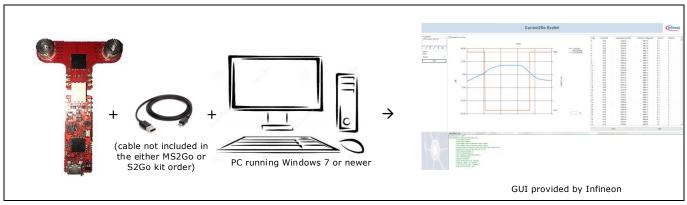


Figure 4 MS2Go kit Use Case with MCU Board

The MS2Go kit can be used as independent evaluation kit by connecting sensor board with MCU board together as shown in the Figure 4. The user has to connect the XMC2GO board with the PC/Laptop using the USB cable, which must have micro USB on one side and standard USB port on the other side of the cable. The provided GUI is plug & play.

The MS2Go kit used with Arduino shield by plugging the sensor board together with the shield board. It is mandatory to have an XMC2go platform, which is not provided in the package. Programming can be done in Arduino IDE by selecting the XMC2go platform.

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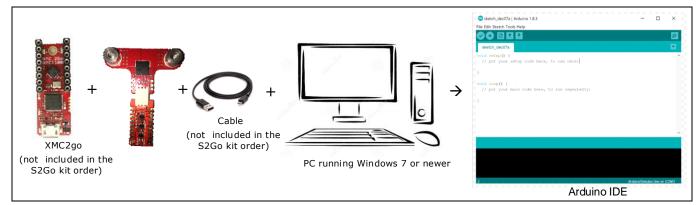


Figure 5 S2Go kit Use Case with XMC2GO Board

The sensor board can also be used as standalone in any customer application (eg. Interfaced with custom MCU platforms, and lab equipment etc...). In Figure 6, M4 screws are used to connect the primary current source and VDD pin to 3.3V.

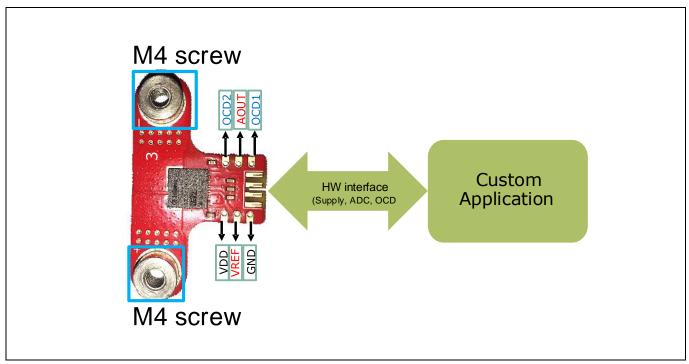


Figure 6 MS2Go or S2GO kit Use Case with Custom Platform

# 1.4 MS2Go & S2Go Kits Features

The Following section describes the main features of the MS2Go evaluation kit.

- USB Interface
- Supply via USB cable
- Oscilloscope functionality
  - Real-time roll-mode
- Support for all TLx4971 different output modes
- RAM programming support, after powering down the sensor, the programming is lost.
- Automatic detection of a sensor board

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Introduction

# 1.5 MS2Go & S2Go Kits Hardware and Software Overview

### **1.5.1** Hardware Overview

The MS2Go and S2Go kit contains the following items:

- The XMC2GO board contains (Neither MS2Go nor S2Go contains this board, needs to order separately)
  - XMC1100 Infineon target micro-controller
  - XMC4200 on-board debugger microcontroller running a SEGGER Jlink debugger
- In-plane edge interface connector
- Sensor shield board
- MCU Board (Not included in the S2Go kit order)
- Isolator board (Not included in the either MS2Go or S2Go kit order): This board might be required if the customer required reinforced HV application s.
- Sensor board
- USB Cable (Not included in the either MS2Go or S2Go kit order)
- Disclaimer and Safety precautions document

### 1.5.2 Software Overview

Please download the required software from Infineon website. For further information about the software installation please refer to the Section 1.5.3.

The software package contains:

- A Graphical User Interface (GUI) software for the sensor evaluation.
- SEGGER Jlink debugger software with USB driver.

This software was designed to be used with Windows 7 and Windows 10. It is compatible with both 32-bit and 64bit systems. Other versions may also work, but have not been tested. The MS2Go & S2Go kit will work with GUI version 1.0.0 and onwards.

### **1.5.3** Software Installation

The following description guides through the installation procedure of the free evaluation software for the MS2Go & S2Go kit through the following steps:

- Before proceeding further, please get the Admin Rights to proceed with the installation
- Download the required software from the Infineon <u>website</u>.
- Connect the MS2Go kit via the USB link to your PC (see Figure 11).
- Extract the GUI software from Current2GoEvalkitX.X.X.zip file to local folder
- To start the installation double click on the "**Current2GoEvalkitX.X.X.exe**" [see folder .../ Current2GoEvalkit**X.X.X**.zip] and proceed as discussed in the Appendix.
- After the successful completion of the installation, to start the GUI software, go to **Windows Start** button and select the "Current2GO".



# 2 MS2Go and S2Go Kits Description

The MS2Go and S2Go kit contains the following main components as discussed in the section 1.1 & 1.2, which are the ready-to-use printed circuit boards (PCBs).

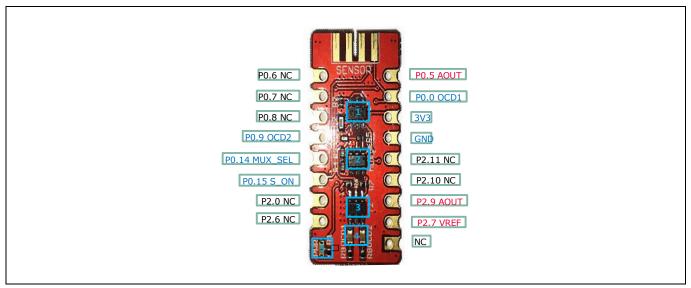
- Sensor board
- Sensor Shield board
- MCU Board
- In-plane edge connector

Note:

The MS2Go & S2Go kit automatically detects the different types of Infineon Current Sensor EVAL boards connected to the programmer

# 2.1 Sensor Shield Pin Description

The sensor shield pins can be used to extend the evaluation board or perform measurements on the TLI4971. Figure 7 shows the sensor shield pin description in the board. The pinning table is also printed onto the bottom side of the PCB. The pin header can be used to access directly the magnetic current sensor pins which are described in Table 2.



#### Figure 7 Sensor Shield pin description

The sensor shield will connect the sensor board to the XMC 2Go microcontroller board or any other compatible platform. The shield contains:

- Two BSL308PE dual package PMOS transistors (1,3) used for:
  - Switching ON/OFF the sensor supply,
  - Switching ON/OFF the sensor supply LED (LED1) (5)
  - Switching ON/OFF the overcurrent indicator LEDs (4).
- MAX4624EUT / STG719STR Analog MUX (2) is used to select an external or internal sensor voltage reference.

The magnetic current sensor pins description and the corresponding sensor shield pins are shown in Table 2. The sensor shield board schematic has shown in the Figure 30 in section 5.



MS2Go and S2Go Kits Description

Table 2	Selisor Silleta Pills D	escription	
TLI4971 pin number	Pin name on board	Header (J6) Pin	Sensor pin description
1	VSENS		Supply Voltage (VDD) pin of TLI4971
2	GND		Ground pin of TLI4971
3	VREF	P2.7	Reference Voltage pin of TLI4971
4	AOUT	P0.5	Analog Output Voltage pin of TLI4971
5	OCD1	P0.0	Over Current Detection (OCD1) pin of TLI4971

#### Table 2Sensor Shield Pins Description

### 2.2 MCU Board

OCD2

S\_ON

MUX\_SEL

6

NA

NA

The micro controller unit (MCU) board can be connected directly to sensor board in order to obtain a plug & play evaluation system. The MCU board contains:

reference.

Over Current Detection (OCD2) pin of TLI4971

To select an external or internal sensor voltage

- One XMC4200 microcontroller running a SEGGER Jlink license for debugging (see '1' in Figure 8)
- One XMC1100 microcontroller used as target MCU (see '2' in Figure 8)

P0.9

P0.14

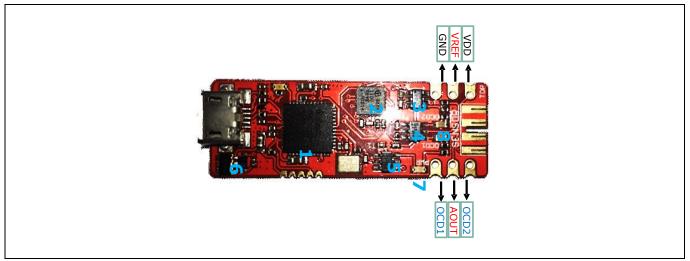
P0.15

 MAX4624EUT / STG719STR Analog MUX (see '3' in Figure 8) is used to select an external or internal sensor voltage reference.

Also, it contains two BSL308PE dual package PMOS transistors (see '4, 5' in Figure 8) used for:

- Switching ON/OFF the sensor supply
- Switching ON/OFF the sensor supply LED (see '7' in Figure 8)
- Switching ON/OFF the overcurrent indicator LEDs (see '8' in Figure 8).

The microcontroller 12 bit ADC sensor reads the analog output / reference signal. This board is connected with an in-plane edge connector to the sensor board. The MCU board schematic has shown in the Figure 30Figure 32 in section 5.







#### MS2Go and S2Go Kits Description

### 2.3 In-Plane Edge Connector

The in-plane edge Connector is used to establish the connection between the sensor shield board and the sensor board. The below figure shows the in-plane edge connector correct and incorrect setup with the sensor shield and sensor boards. Always connect the two PCBs with all components facing the same side as shown in the Figure 9.

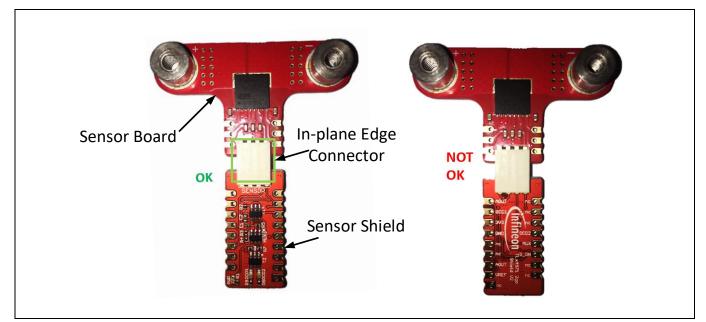
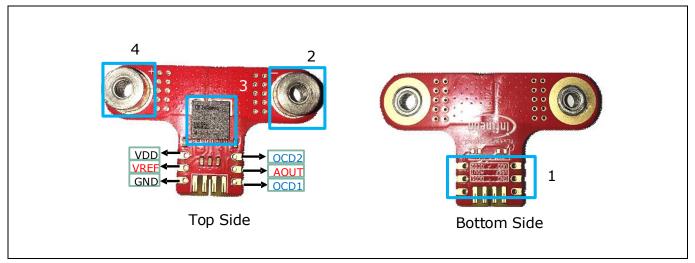


Figure 9 In-Plane Edge Connector Setup with Sensor Shield

## 2.4 Sensor Board

The current sensor (see '3' in the Figure 10) is placed on a board with two M4 screw connectors (see '2 & 4' in the Figure 10) for high current (<20A) applications. The PCB is manufactured in 140 um copper technology and the sensor provides functional galvanic isolation. The sensor inputs/outputs are easily accessible via 2 x 3 pole pin headers with 2.54mm pitch (see '1' in the Figure 10). The sensor board schematic has shown in the Figure 31 in section 5.







**Current Sensor Evaluation Setup** 

# 3 Current Sensor Evaluation Setup

Figure 11 shows an example measurement setup on how to connect the MS2Go & S2Go kit via USB connector to a PC or laptop in a single phase inverter for motor drive application. The user can vary the sensor parameters for external field and sensitivity compensation using programmer board and GUI software.

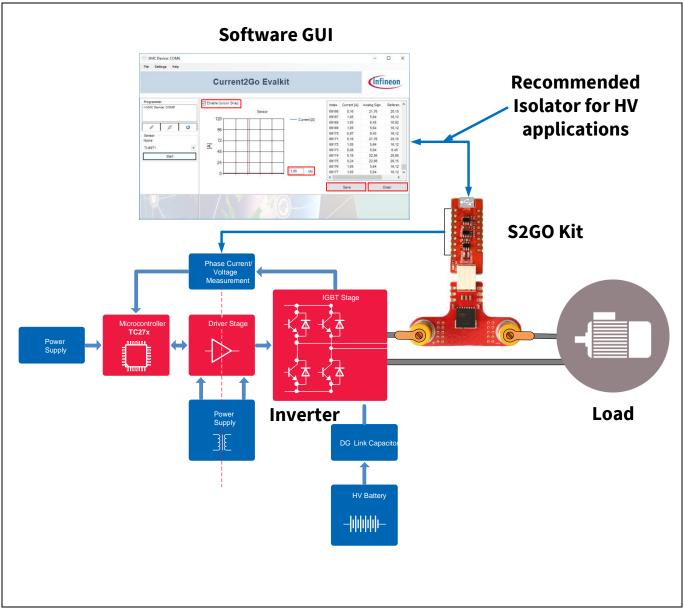


Figure 11 Test Setup Example with MS2Go Kit

# 3.1 Graph View

The GUI for MS2Go kit allows the user to interface and communicate with the connected current sensor. Once the test set up is done as shown in Figure 11, the user has to open the GUI software and it will start communicating with the hardware. If the connection is successful then the XMC Device: COM6 window which has shown in the below will display on the monitor.

• If the MS2Go kit is connected to a PC through the USB cable and the connection is successful, then a window called "TLx4971 Current Sensor Evaluation App" will pop up as shown in Figure 12.

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#### **Current Sensor Evaluation Setup**

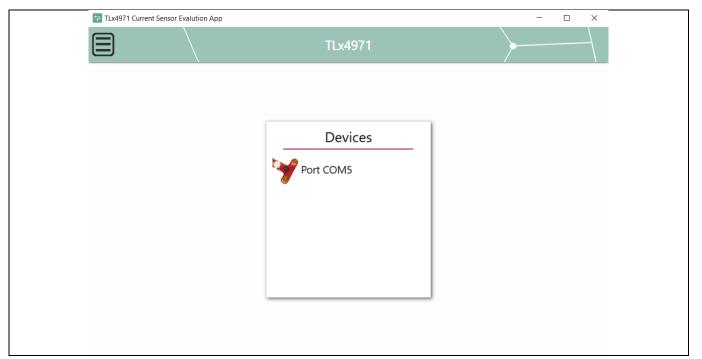


Figure 12 Log and Evalkit Software Window

• Select the "**XMC Device: COM5**" option in the "Programmer" dialogue box as shown in the below Figure 13 which is highlighted with red color box.

📰 TLx4971 Current Sensor Evalution App		- 🗆 X
	TLx4971	
	Select your sensor:	

Figure 13 XMC Device: COM5 window: Sensor Selection

• After that the following window will pop up if the software is successfully installed (see Figure 14). Then click on the "Start" button, which is highlighted in red color box, to perform the measurements on the connected sensor.





### **Current Sensor Evaluation Setup**

🐨 TLx4971 Current Sensor Evalution A	\pp	- 🗆 X
	TLx4971	
Sensor is: TLE4971 Port is: COM5 Start Volatile Settings EEPROM Map Data acquisition settings Read temperature	35 25 15 5 -15 -25 -35 Current [A] Analog Signal Out [mV] Reference Voltage [mV]	High       Clear         High       Clear         OCD1: 0.0 V       OCD1: 0.0 V         OCD2: 0.0 V       Chart settings         Bring to front       OCD2 ?         Manually scale chart       ?         OCD1 [V]       OCD2 [V]
Check product page	Logging Save 🖺 Discard 🖹 View 🔘 Rea	Points ploted on chart are downsampled at 500 points/sec.

Figure 14 XMC Device: COM6 window: successful connection with Sensor

• When the user click on the *"Start"* button then the GUI starts real time graph for plotting the current value(in ampere scale) and OCD line status in the middle pane of the Current2Go Evalkit window, and displays offline acquired values (current computation, AOUT/VREF voltage, OCD states), as shown in the below Figure 15.

Also, either it is possible to save or clear the data by using the "**Save**" or "**Clear**" buttons respectively that are highlighted in red color boxes which are on the bottom right side of the XMC Device: COM6 window.

The user can click on at any point on the plot window and the respective cursor data will be shown in the small box that is highlighted in red color box which has shown in the bottom right corner of the plot window

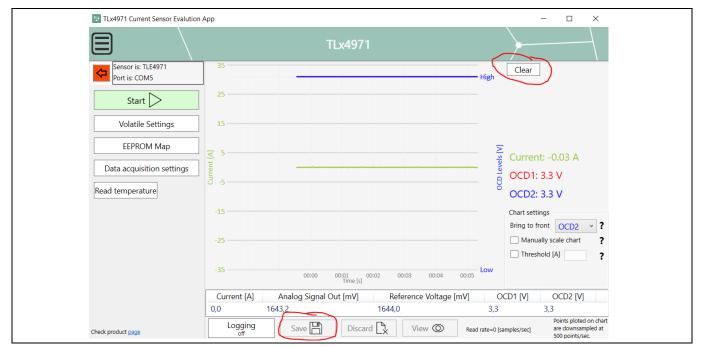


Figure 15 XMC Device: COM6 window: Save and Clear options



#### **Current Sensor Evaluation Setup**

When the data acquisition is stopped, the user can zoom on the chart using the mouse scroll. At the bottom right corner of the *XMC Device: COM5* window, the user has the option to save the acquired data by clicking the "Save" button in the sensor panel. A save menu will pop-up: enter the path & file name as .CSV and save your data. The .CSV file may be open in Microsoft Excel and post processing of data can be done.

# 3.2 Volatile Settings

When the user selects the 'VolatileSettings' menu item, the window shown in Figure 16 will open, here, initially the user will find the existing configuration file which is "EEPROMContent\_default.xml". This file is automatically generated by the Software (SW) based on the preprogrammed EEPROM settings in the sensor. This main window components are described as follows.

- "Configuration Files" pane list (Figure 16) all configuration files are automatically stored under Users/<CurrentUser>/AppData/Local/InfineonCurrent2GoTemp\ConfigFiles. All XML files at this location will be parsed by the SW and checked if it is a valid sensor configuration.
- "Configuration Explorer" pane (Figure 16) displays the parameters stored by the configuration file (name, description, sensor parameters).
- "Delete Config File" (Figure 16), by pressing this button, the configuration file will be physically deleted from the disk and from the list.
- "Create New Config File" (Figure 16), by pressing this button, a new window will pop-up allowing the user to create a new configuration file which has shown in Figure 17.
- "Set as Default Config file" (Figure 16), by pressing this button a new configuration file as copy of the selected one, named "default\_config.xml". If this configuration is found at startup, it will be automatically loaded into the sensor RAM.
- "Use Config File" (Figure 16), by pressing this button, the configuration parameters will be set into the RAM of the sensor.

	Change settings		.,,	<b>J</b>	ile registers. ?			
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	Pai	rameter	Value [DEC]	Value [HEX]	Description			^
	OCD1 Enab	ole	1	0x1	Enabled			
	OCD2 Enab	ole	1	0x1	Enabled			
	OCD1 Deg	litch	0	0x0	0 ns (disabled)			
	OCD2 Deg	litch	0	0x0	0 ns (disabled)			
	Operation	Mode	0	0x0	Semi-differential(bidirectional)			
	Measurem	ent range	24	0x18	S6: +/-25A			
	OCD1 hyst	eresis	3	0x3	-			
	OCD1 three	shold	8	0x8	125% of Full Scale			
	OCD2 hyst	eresis	3	0x3	-			
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	Ratiometric	c offset	0	0x0	Disabled			$\sim$
	v config FERROM refe		183B230049					

Figure 16 Volatile Settings Window





#### **Current Sensor Evaluation Setup**

The following Figure 17 shows the new configuration file creation flow to modify the existing current sensor parmeters, where all text fields (name / description) shall have a value in the below shown figure. All selection boxes such as deglitch, Operation mode, measure range, threshold, VREF value shall have a selection. Finally, press "Create Configuration" button to save the parameters into a XML configuration file. This configuration is now accessible in the "Volatile Settings" window.

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Configuration Configuration Configuration Cont Disable: Cont D	Configuration File Name:	TestFullyDifferential	
CCD Deplich:       1000hs       2000hs         Measurement Range:       2000hs       View         CDD Threshold:       125% of Full Scale       50% of Full Scale         CDD Dysterzis:       OCD12 Commator Hysterzis       15% of Full Scale       5% of Full Scale         Ratio offset/ginal in enable       Ratio offset/ginal in enable       Ratio offset/ginal in enable       Ratio offset/ginal in enable         Vielloctings       -       -       -       -         Vielloctings       -       -       -	Configuration description:	testing full differential capabilities of the sensor	
CCD Deglith: Depration Mode Measurements Ratio CCD Threshold: CCD Dysterezia: CCD Dysterezia: C	OCD Enable:	OCD1 Enable OCD2 Enable	
Measurement Range:       S5. 4/25A         OC D Threshold:       T25% of Full Scale         Verloo power:       Enable         C reate Configuration       Cancel         Verloo power:       Enable         <	OCD Deglitch:		
OCD Threshold:       125% of Full Scale       \$50% of Full Scale         OCD hysterizis:       OCD/J2 Comarator hysterizis [0.15]:       7         Ratio offset/gain       Ratio offset enable       Ratio offset enable         vtVb5_sd:       Enable       Veltative full of the scale         Voltative full oppower:       Enable       Veltative full oppower:         External VREF value:       If SD         Create Configuration       Cancel         Voltative full oppower:       Terful/yOfferenda and         Terful of Offer in a copiete       Terful op Offerenda and         Voltative full offerenda and       Terful op Offerenda and         Voltative full offerenda and       Terful op Offerenda and         Voltative full offerenda and       Terfull op Offerenda and         Voltative full offerenda and       Terfull op Offerenda and         Voltative full offerenda copieties       Terfull op Offerenda and         Voltative full offerenda copieties of the sense degree       Self+v25N         OCCD Stable       1       Enabled         OCCD Stable       1       Enabled         OCCD Stable       1       Self+v25N         OCCD Stable       1       Self+v25N         OCCD Stable       1       Self+v25N         OCCD Stable			
OCD hysterezis:       OCD1/2 Contrastor Hysterzis [0.15]:       7         Ratio offset/gain       Galo offset/gain       Galo offset/gain         OCD2 fault only       Enable       Ratio gain enable         OCD2 fault only       Enable       Cancel         Vef low power:       Enable       Cancel         Vef low power:       Enable       Cancel         Vef low power:       Fast Full Offerential xml       Fast Full Offerential xml         Vef low power:       Fast Full Offerential xml       Fast Full Offerential xml         Vef low power:       Fast Full Offerential xml       Fast Full Offerential xml         Vef low power:       Fast Full Offerential xml       Fast Full Offerential xml         Vef low power:       Test Full Offerential xml       Fast Full Offerential xml         Vef low power:       Test Full Offerential xml       Fast Full Offerential xml         Vef low power:       Test Full Offerential xml       Fast Full Offerential xml         Vef low power:       Test Full Offerential xml       Fast Full Offerential xml         Vef low power       Test Full Offerential xml       Fast Full Offerential xml         Vef low power       Test Full Offerential xml       Fast Full Offerential xml         Vef low power       Test Full Offerential xml       Fast Full Offerent			After configuring to new settings
Patio offset/gain       Ratio_offset enable       Ratio gain enable         OCD2 fault only       Enable         Verflow power:       Enable         External VREF value:       ESS         Create Configuration       Cancel         Valuids-settings       Configuration engoter         regraded in file       TestFully Officered al and         Pation offset (gain       Configuration engoter         Table (DEC)       Decorption         Pation of file       TestFully Officered al and         Pation of file       TestFully Officered al and         Pation of file       TestFully Officered al and         Pation of file       Decorption         Pation of file       TestFully Officered al and         Pation of officered al and       TestFully Officered al and         Pation of officered al and       TestFully Officered al and         Pation of officered al and       TestFully Officered al couplities of the sensor @25A         Pation officered al and       TestFully Officered al couplities of the sensor @25A         OCDD Explain       TestFully Officered al couplities of the sensor @25A         OCDD Explain       TestFully Officered al and         Notation of file       TestFully Officered al and         OCDD Explain       Station of the sensod			Alter comparing to new settings
OCD2 fault only       Enable         Vivisiesting       Enable         Create Configuration       Cancel         VolatileSettings       Crefusation explore         Test Violation Rese       Configuration explore         Test Violation Rese       Configuration explore         Test Violation Rese       Configuration explore         Test Violation Rese       Test Violation Rese         Configuration Rese       Test Violation Rese         Configuration explore       Test Violation Rese         Configuration Rese       Test Violation Rese         Configur			
Verifice prover:       Enable         External VREF value:       ESS         Create Configuration       Cancel         VolutileSettings       -         Configuration Regime       -         VolutileSettings       -         Configuration Regime       -         VolutileSettings       1         VolutileSettings       2         VolutileSettings       2         VolutileSetting			
External VREF value:       Image: Create Configuration         Create Configuration       Cancel         Volate/Settings       Image: Create Configuration explore         Transfer or proving of explore in a proving of the ennor @25A       Image: Configuration explore         Parameter       Value (DEC)       Description         Parameter       Value (DEC)       Description         Config View       1       Enabled         COLD Enable       1       Enabled         COLD Enable       1       Enabled         COLD Enable       1       Flagsterntal and the enabled         Cold transfer of the control of t			
Create Configuration       Cancel         VolutiliSettings       ×         ordiguration Rels       ×         Test-fullyOfferential.xml       ×         Parenter       VolutiliSetting         CDD Enshite       1         CDD Enshite       2         CDD Enshite       5         Community       7         Baseled       5         Community       7         Baseled       5         Community       7			
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Parameter       Value (DEC)       Description         OCD1 Enable       1       Enabled         OCD2 Enable       1       Enabled         OCD2 Enable       1       Enabled         OCD2 Enable       1       Enabled         OCD2 Enable       1       Enabled         OCD1 Degitch       2       1000m         OCD2 Degitch       2       2000m         Operation Mode       1       Fully-differential         Measument range       24       S6 [1-/25A]         OCD1 firesandd       9       OCD1 firesandd         OCD2 Firesandd       6       OCD comparator hyste.         Patientific open       0       Deabled       >         Patientific open       0       Deabled       >         Conting File       EP reference       >       >	nfiguration Files Confi ault_config.xml PROMContent_default.xml	iguration explorer FullyDifferential.xml	× · · · · · · · · · · · · · · · · · · ·
Conternation of the content of the c		ig i un umeren van Capacinues on the Benson (±204	
Deteta Config File EEP reference:	OCC OCC OCC OCC OCC OCC OCC OCC OCC Rat Rat	D1 Enable 1 Enabled D1 Enable 1 Enabled D1 Degitch 2 1000ms D2 Degitch 4 2000ms sauremet range 24 56 [+/.25A] D1 freeshold 9 D2 threashold 6 D2 threashold 6 D0 comparator hym 7 iometric offset 0 Disabled ♥♥	
		Use Config File Cancel	1
	-		

Figure 17 New Configuration File Creation



#### **Current Sensor Evaluation Setup**

After creating the new configuration file, user can select it as '*Use Config File*', which means it is stored in the RAM and deleted once the GUI is closed, or '*Set as Default Config file*', which means it acts as stored in the EEPROM and retains the new configuration data even the GUI is closed. The newly created file called default\_config.xml is displayed in the '*Configuration Files*' pane of the '*VolatileSettings*' window as shown in the above figure.

Please be aware there are different mapping of EEPROM-content in "Address 1" as described in a separate document provided on <u>https://www.infineon.com/cms/en/product/sensor/current-sensors/</u> in the "TLE4971 addendum to TLI4971 programming and user manual".

## 3.3 EEPROM Map

In EEPROM mapping each address contains 16 bits and group of bits are assigned to different variables as shown in Figure 18. The EEPROM Memory map pane is highlighting the programmed EEPROM content bit by bit, field by field or line by line. No modifications are allowed in this window as the volatile settings shall be used to modify these parameters listed in the EEPROM Map.

For further information about *Address 0 …. Address 17*, which are shown in the EEPROM Mapping Window, please refer to application note AN\_TLI4971\_ProgGuide and the addendum for TLE4971: "TLE4971 addendum to TLI4971 programming and user manual".

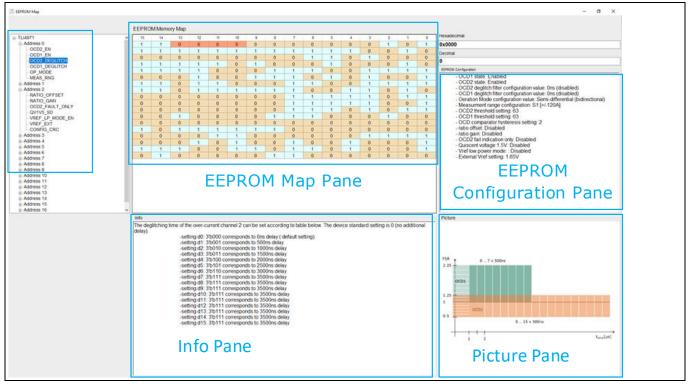


Figure 18 EEPROM Mapping Window

Appendix I

# 4 Appendix I

• The following initial setup window will display. Click "Next" button to continue with the installation

EvalKit fo Sensor	EvalKit for TLI4971 Current Sensor		
>Welcome	The installer will guide you through the steps required to install Current 2Go Evalkit 1.0.0 on your computer.		
>License			
>Directory			
>Confirm			
>Install	WARNING: This computer program is protected by copyright law and international treaties. Unauthorized duplication or distribution of this program, or any portion of it, may result in severe civil or criminal penalties, and will be prosecuted to the maximum extend possible under the law.		
>Finish	Exit < Back Next >		

Figure 19 EvalKit Installer 1.0.2 – Welcome

• Read through the license agreement carefully and continue the installation by selecting the check box of "*I* accept the terms in the license agreement", see orange color box in Figure 20. If the license agreement is not accepted, then the installation will not continue to further steps. Click "**Next**" button to continue with the installation

EvalKit for Sensor	EvalKit for TLI4971 Current Sensor		
>Welcome	Important Note and Terms of Use         ^           Please read the following important note as well as the following terms         ^		
>License	and conditions carefully. The extraction of the downloaded documents as well as the installation of the downloaded software is only possible if you agree to such terms and conditions. By clicking the acceptance button "I agree" below, you agree to have read the important note set forth below and to be bound by the following terms of use. If you do not		
>Directory	agree to the terms and conditions below, click the button "I do not agree" and the installation procedure will not be started.		
>Confirm	Important Note:           a.         THE INFORMATION GIVEN IN THE DOWNLOADED           DOCUMENTS IS GIVEN AS A HINT FOR THE IMPLEMENTATION OF           THE INFINEON TECHNOLOGIES COMPONENT ONLY AND SHALL           NOT BE REGARDED AS ANY DESCRIPTION OR WARRANTY OF A		
- Install	CERTAIN FUNCTIONALITY, CONDITION OR QUALITY OF THE		
>Finish	Exit < Back Next >		

Figure 20 EvalKit Installer 1.0.2 – License Agreement

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#### Appendix I

• Then the installer will prompt for the installation folder. Accept the default one or use another directory by selecting the "**Browse**" button as shown in orange color box of Figure 21. Also, select the check boxes of "Add Desktop Shortcut" and "Install Jlink". Click "**Next**" button to continue with the installation

EvalKit fo Sensor	r TLI4971 Current
>Welcome	The installer will install Current 2Go Evalkit 1.0.0 to the following folder. To install in this folder, click "Next". To install to a different folder, enter it below or click "Browse".
>License	C:\Program Files (x86)\Infineon Technologies\Current 2Go Evalkit Browse
>Directory	Add Desktop Shortcut
>Confirm	✓ Install JLink ○ INET Framework Version 4.5 or later already installed
>Install	
>Finish	Exit < Back Next >

Figure 21 EvalKit Installer 1.0.2 – Select the installation folder

• Click "**Install**" to begin the installation which shown in Figure 22 (Red Color box). The installation will continue if you have the **admin rights** otherwise the installation might be aborted without completing the installation.

EvalKit fo Sensor	r TLI4971 Current
>Welcome	Click "Install" to begin the installation. Click "Back" to review or change any of your installation settings. Click "Cancel" to exit the wizard.
>License	
>Directory	
>Confirm	
>Install	
>Finish	Exit < Back Install

Figure 22 EvalKit Installer 1.0.2 – Confirm Installation



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#### Appendix I

EvalKit for TLI4971 Current Sensor		infin		
>Welcome	Setup Wizard has successfully finished Click "Finish" to exit.			
>License				
>Directory				
>Confirm				
>Install				
>Finish		Exit < Back	Finish	

Figure 23 EvalKit Installer 1.0.2 –Installation Completed

• The software installation will only complete if the user install the SEGGER Jlink debugger software in parallel to the GUI software installation. Automatically, the software will prompt the welcome window to install the Jlink software as shown in the below Figure 24. Click "**Next**" button to continue with the installation.



Figure 24 SEGGER JLINK Drivers – Welcome

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• Read through the license agreement carefully and continue the installation by accepting it (see orange color box of Figure 25). If the license agreement is not accepted, then the installation will be aborted. Click **"Next"** button to continue with the installation.

SEGGER - J-Link V6.00e Setup License Agreement Please review the license terms before installing SEGGER - J-Link V6.004	 2,		× J Link
Press Page Down to see the rest of the agreement. from any cause beyond its reasonable control. (g) The relationship between Licensor and Licensee is that of independ and neither Licensee nor its agents shall have any authority to bind Lic (h) If any SEGGER professional services are being provided, then such services are provided pursuant to the terms of a separate professional agreement between the parties. The parties acknowledge that such se acquired independently of the product licensed hereunder, and that pr services is not essential to the functionality of such product. © 2004-2014 SEGGER Microcontroller GmbH & Co. KG	ensor in a professi services rvices ar	any way ional e	
If you accept the terms of the agreement, click I Agree to continue. Yo agreement to install SEGGER - J-Link V6.00e.	u must ac	ccept the	e
< Back I Ag	ree	Car	ncel

Figure 25 SEGGER JLINK Drivers – License Agreement

• Select the check boxes as shown in the highlighted orange color box of Figure 26 and click **"Next"** button to continue with the installation.

🔜 SEGGER - J-Link V6.00e Setup	_		×
Choose optional components Choose optional components to be installed.			J Link
Choose optional components that should be installed:			
Choose options for creating shortcuts: Create entry in start menu Add shortcuts to desktop			
< Back	Next >	Ca	ncel

Figure 26 SEGGER JLINK Drivers – USB Driver Installation



#### Appendix I

• Then the installer will prompt for the installation folder. Accept the default one or use another directory by selecting the "**Browse**" button as shown in orange color box of Figure 27. Click "**Next**" button to continue with the installation.

🔜 SEGGER - J-Link V6.00e Setup		_		×
Choose Install Location				
Choose the folder in which to install SEGG	ER - J-Link V6.00e.			Link
Setup will install SEGGER - J-Link V6.00e in click Browse and select another folder. Clic			ferent fo	older,
Destination Folder C:\Program Files (x86)\SEGGER\JLink	V600e	Brov	vse	
Space required: 63.6MB				
Space available: 141.1GB				

Figure 27 SEGGER JLINK Drivers – Confirm Installation

• Click "Ok" button to complete the Jlink driver installation which has shown in the below Figure 28.

SEGGER J-Link DLL Updater V6.00e	×
The following 3rd-party applications using JLinkARM.dll have been found:	
Select <u>All</u> Select <u>N</u> one	
Select the ones you would like to replace by this version. The previous version will be renamed and kept in the same folder, allowing manual "undo".	
In case of doubt, do not replace existing DLL(s). You can always perform this operation at a later time via start menu.	Cancel

Figure 28 SEGGER JLINK Drivers – End of Installation



#### Appendix I

• Click "Finish" button which has shown in the below Figure 29 to complete the Jlink driver installation.



Figure 29 SEGGER JLINK Drivers – End of Installation

• Click **"Finish"** button which has shown in the below Figure 23 to complete the Evalkit software GUI installation.

Appendix II



# 5 Appendix II

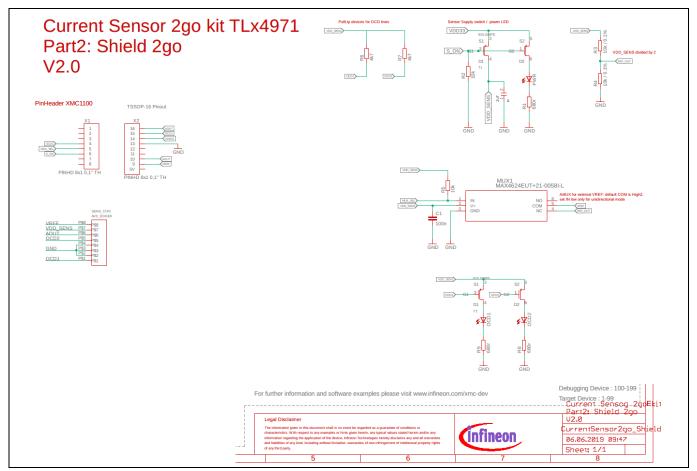


Figure 30 Sensor Shield Board Schematics

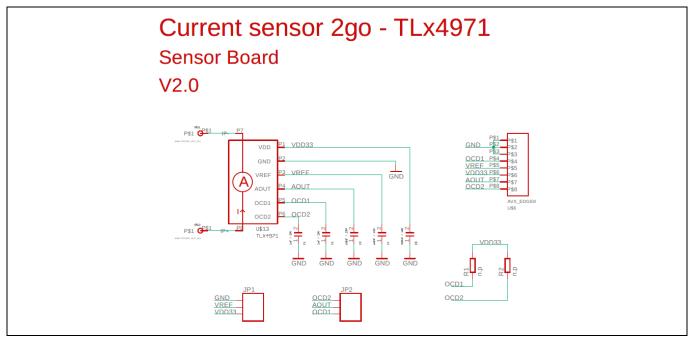
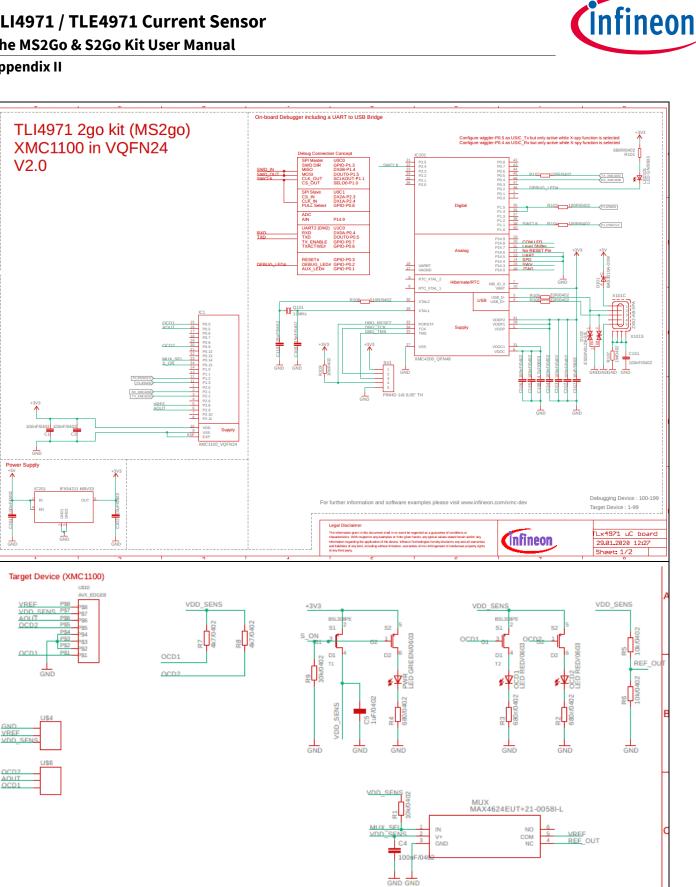


Figure 31 Sensor Board Schematic







VRE



# 6 Glossary

Abbreviation	Description		
S2Go PROGRAMMER	Shield to Go Programmer		
MS2Go	Magnetic Shield to Go		
PCB	Printed Circuit Board		
GUI	Graphical User Interface		
EEPROM	Electrically Erasable Programmable Read-Only Memory		
OCD	Over Current Detection		
USB	Universal Serial Bus		
DUT	Device Under Test		
HV	High Voltage		
LED	Light Emitting Diode		
MCU	Micro-Controller Unit		
EXT	Exit		
AN	Application Note		
SW	Software		

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#### References



# 7 References

- [1] A Reference. See the code examples at **www.infineon.com**
- [2] AN\_TLI4971\_ProgGuide User Manual
- [3] Current sensor TLE4971 addendum to TLI4971 programming and user manual



# **Revision history**

Document version	Date of release	Description of changes
V 1.1	2023-05-01	Adding MS2Go-variant for TLE4971
V 1.0	2019-04-05	Initial version

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Edition 2023-05-01

Published by

Infineon Technologies AG

81726 Munich, Germany

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Document reference AppNote TLI4971 / TLE4971 MS2Go & S2Go

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