How to use Evaluation Kit Software for TLE4997/98

About this document

Scope and purpose

This is the Infineon Evaluation Kit Software manual. The purpose of this manual is to describe the software installation process and how to use the TLE4997/98 linear Hall evaluation kit.

Intended audience

This document is intended for anyone who wants to use the linear Hall TLE4997/98 evaluation kit.


infineon
PGSISI-2

1 Evaluation kit package

The figure below illustrates all the components that are shipped within the TLE4997/98 evaluation kit.

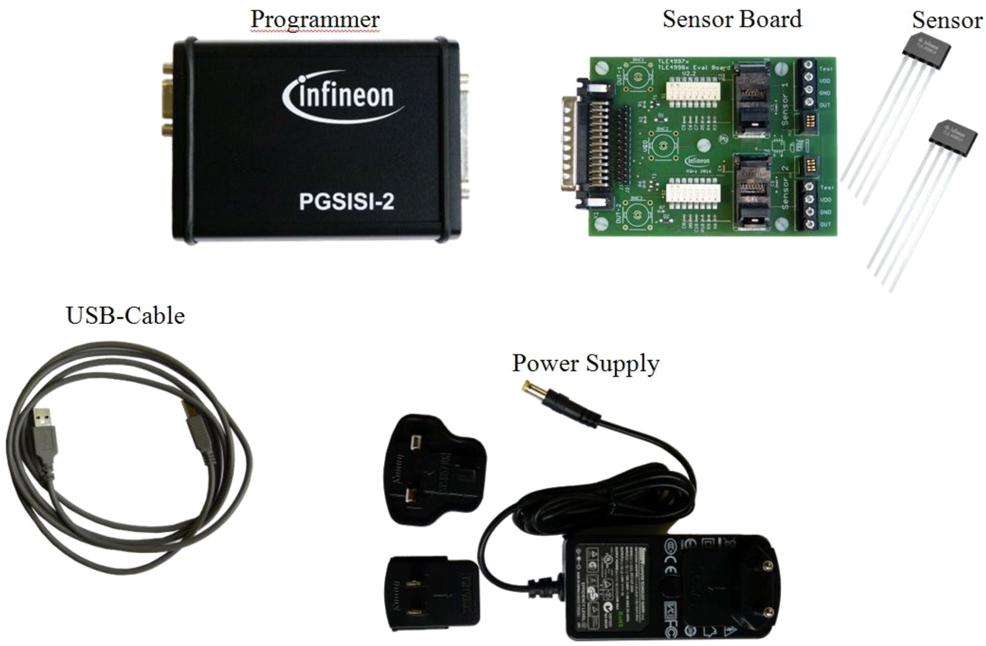

Figure 1-1 Evaluation kit content

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2 Installation

Before connecting the programmer to the PC via the USB cable install the Linear Hall Evaluation Kit Software. The software can be downloaded from **https://www.infineon.com/cms/en/product/sensor/magnetic-sensors/magnetic-position-sensors/linear-halls/#!tools**.

Beside the graphical user interface the software also installs the hardware driver for the programmer hardware. Please be aware that 2 versions are available, one version for 32bit systems and one version for 64bit systems. Select the version accordingly to your operating system. After the installation the programmer can be connected to the PC.

2.1 Software

Start setup

After the download please extract the EvalkitSoftware.msi file inside the zip file to any folder. Start the installation routine of the Linear Hall Evaluation Kit Software by executing the file EvalkitSoftware.msi.

Choose installation directory

During the setup process it is possible to change the installation folder. Accept the default path or select another directory.

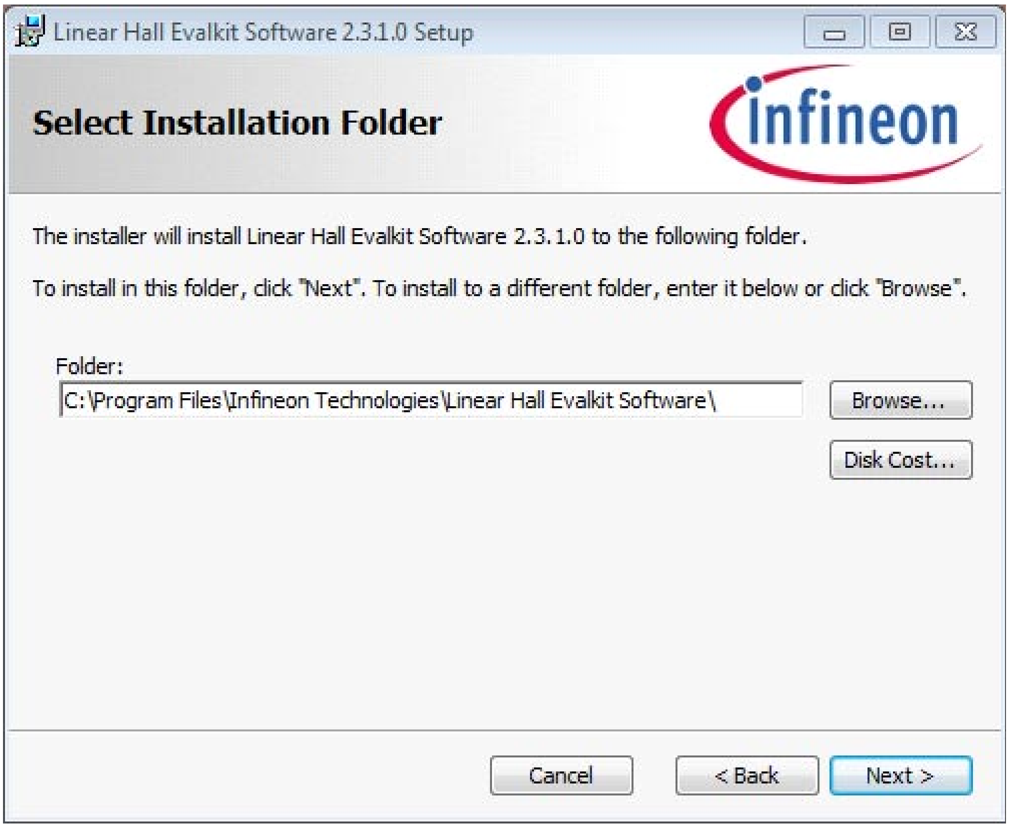

Figure 2-1 Installation folder selection

Start installation

Continue the setup by pressing the "Next" button and then the "Install" button. The further installation will be done automatically. Finally confirm the successful process, when it is finished. With Windows Vista, 7, 8 and 10 an UAC (user account control) confirmation dialog might pop up. Please click on "Yes" to continue with the installation.

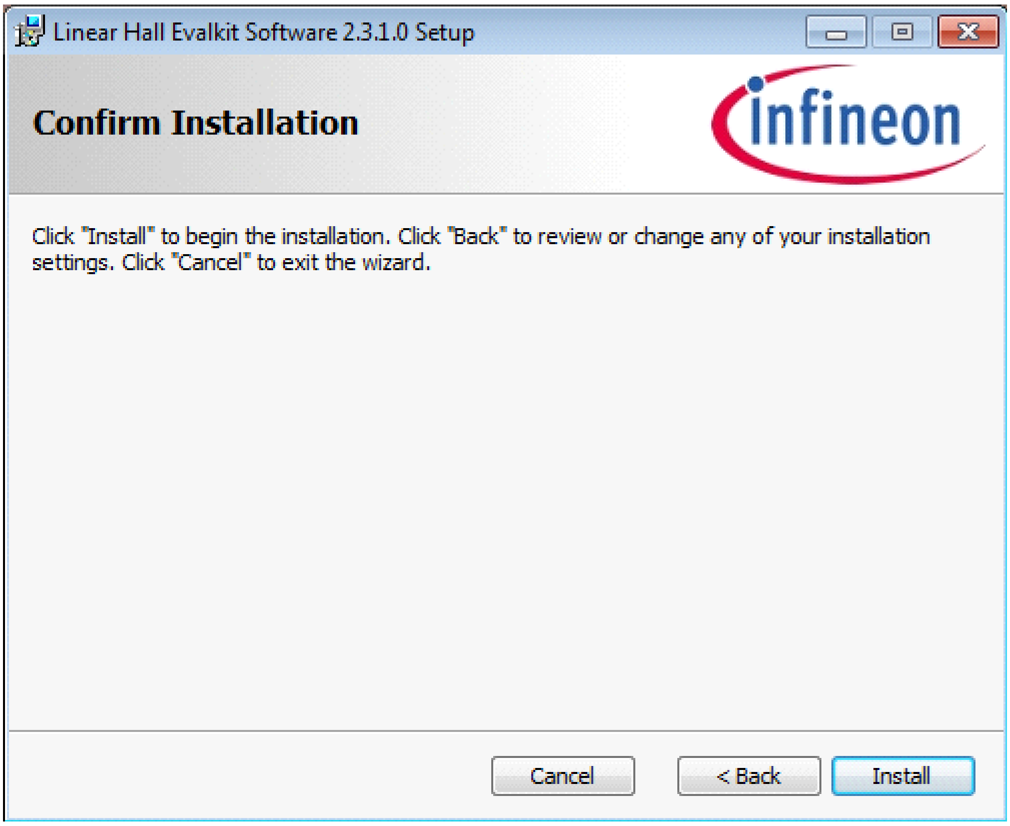

Figure 2-2 Confirm installation

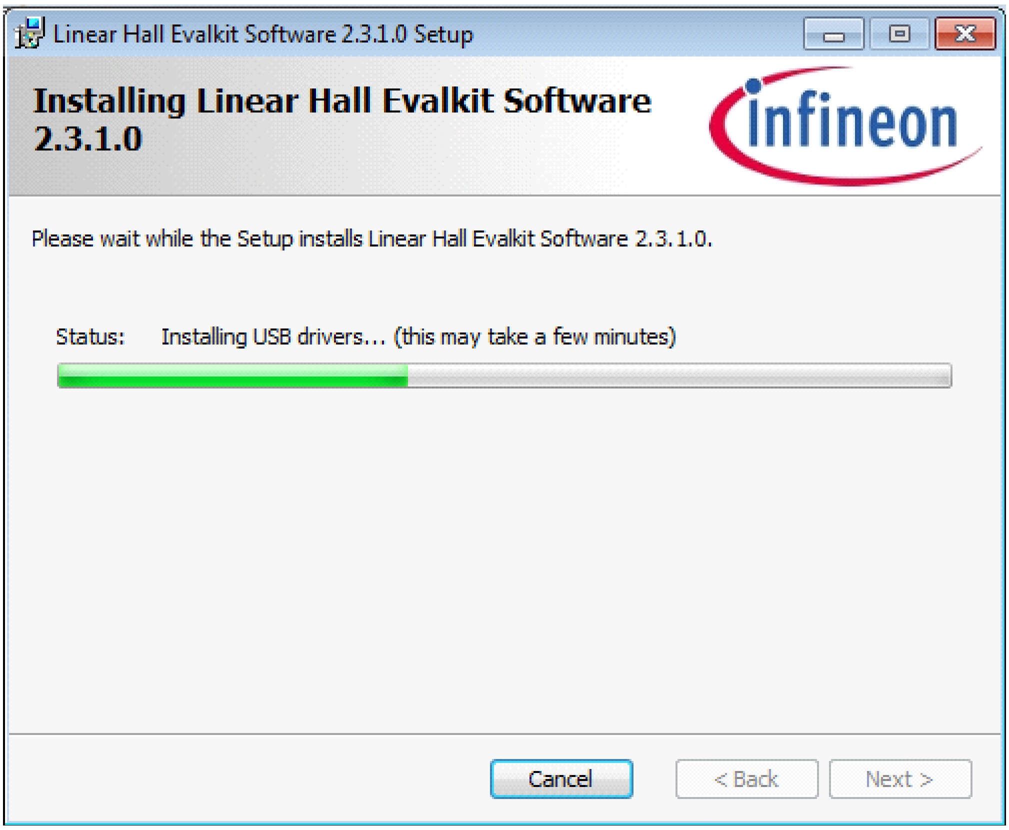

Figure 2-3 Installing application

2.2 Hardware

Please connect the power supply with the programmer. Then configure the DIP-switches of the sensor board depending on the sensor type.

Both, the TLE4998 and the TLE4997 sensor types are supported by the sensor board. The setting of the two DIP-switches of the sensor board must be set differently for the TLE4998 and TLE4997 sensor types.

Please use the following configuration for the **TLE4998** sensor:

Note: ***DIP-Switch number 1 and 8 switch to on and the others to off***

Please use the following configuration for the **TLE4997** sensor:

Note: ***DIP-Switch number 2 and 6 switch to on and the others to off***

Once the sensor board has been configured it can be connected to the programmer. Afterwards the USB cable can be connected with the PC and the programmer. Depending on the operating system installed on the PC, a message may appear that new hardware has been detected and the corresponding driver will be installed.

The correct installation of the programmer on the PC can be verified by checking the entries in the device manager as illustrated in the following picture.

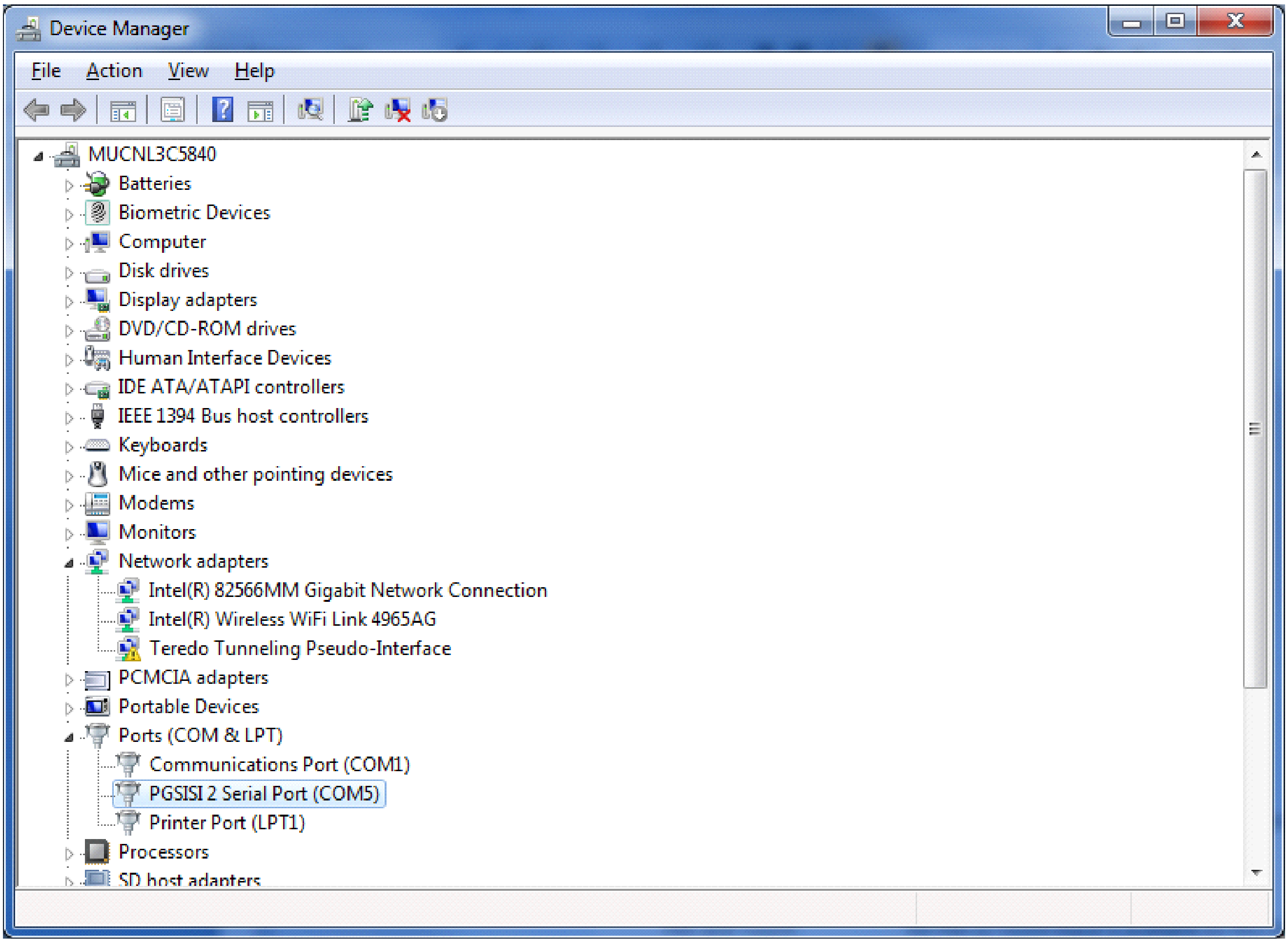

Figure 2-4 Programmer listed in the Device Manager

The device "PGSISI 2 Serial Port (COMxx)" is listed in the Ports section if the programmer has been installed correctly.

3 Starting the application

A shortcut to start the software can be found in the Start Menu -> All Programs -> Linear Hall Evalkit Software -> TLE4997_98 Evalkit Software.

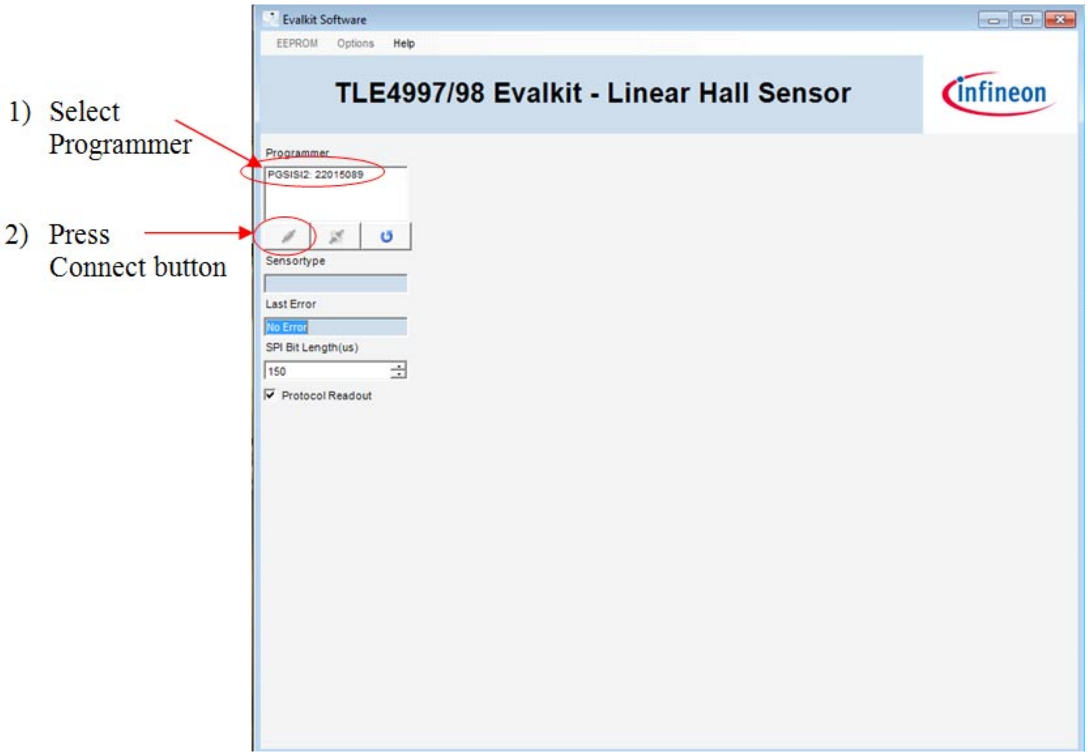

Figure 3-1 Connecting a programmer to the software

On the left side of the window are the controls for the programmer. At the top is a list of available programmers.

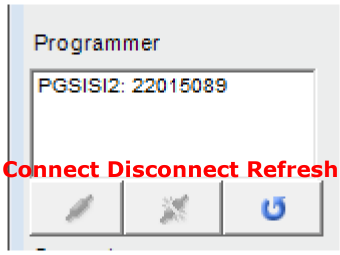

Figure 3-2 Programmer list

The programmer name and the serial number are displayed. The number can be found on the back side of the programmer.

1)To connect the programmer select an entry in the field Programmer

2)Then, click the connect button (left one).

Clicking the middle button disconnects a programmer and clicking the right one refreshes the programmer list.

Note: ***Plug the sensor in the sensor board before the programmer is connected to the software. In case of a TLE4998 the software is also able to read data from the sensor if the EEPROM is locked.***

4 After starting the application

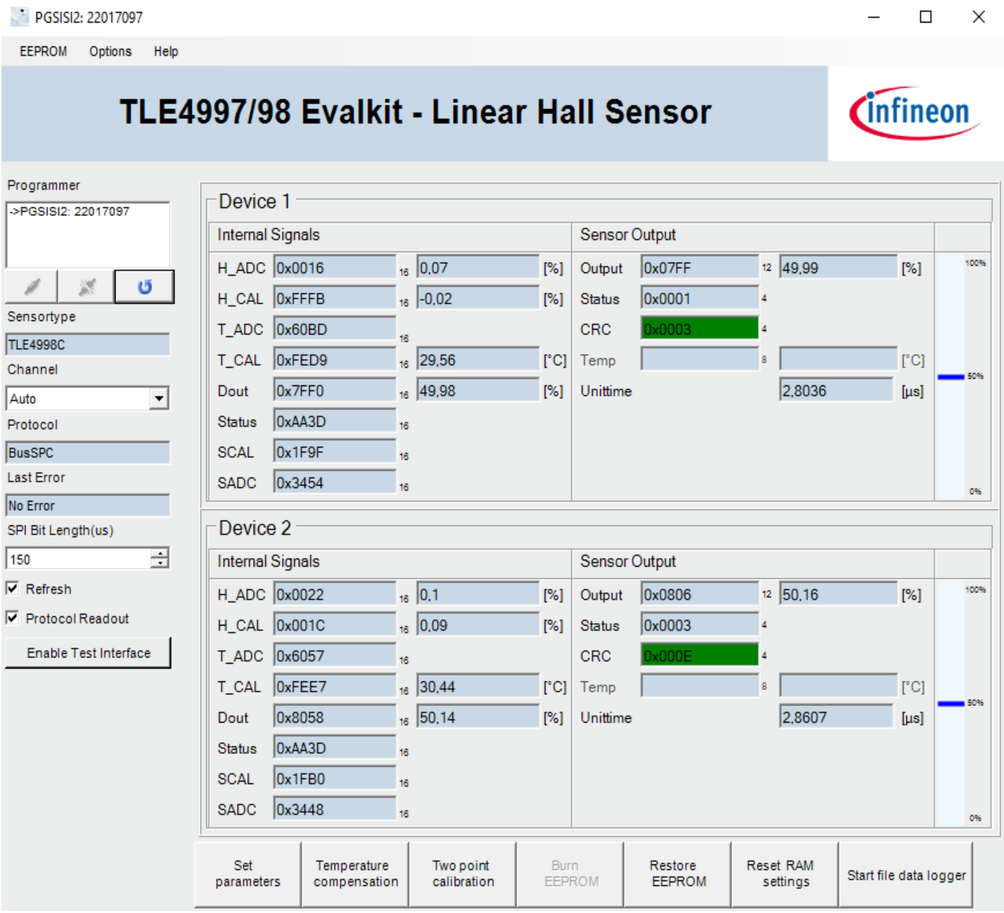

Figure 4-1 Application user interface

The serial number of the connected programmer is shown on top of the window.

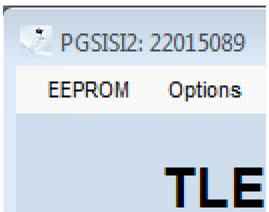

Figure 4-2 Serial number

Below the programmer list the following controls are displayed:

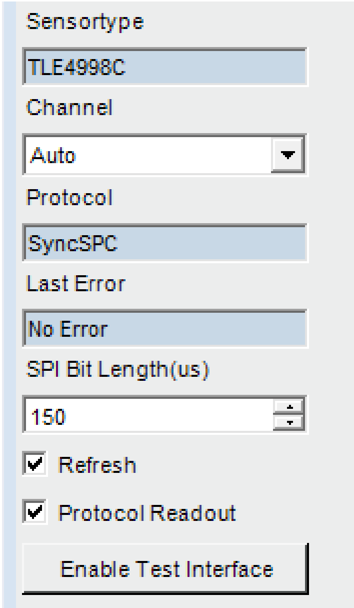

Figure 4-3 Sensor type

The first field shows which sensor type is connected. With the "Channel" pull-down menu the user can select which channel on the sensor board should be connected. This control can also be used to reset the sensors. Below the channel selection the communication protocol of the sensor output is shown.

If an error occurred in the firmware the code is shown in the "Last Error" field. Please see **Chapter 16.1** for further information about the error codes.

The "Refresh" check box enables or disables the periodic update of the sensor RAM and output values in the user interface. The "Protocol Readout" check box enables or disables the readout of the protocol. If the readout is disabled only the "Internal Signals" are refreshed.

It is also possible to do a software reset by pressing the "Enable Test Interface" button, this function allows the user to clean previous error states and reinitialize the sensor.

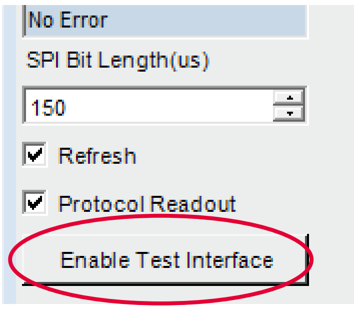

Figure 4-4 Enable Test Interface

5 Sensor RAM values

In the "Internal Signals" section of the user interface the sensor RAM data is summarized. Different registers like the Hall ADC or temperature ADC are shown. See the corresponding datasheet and user manual for details of the respective values.

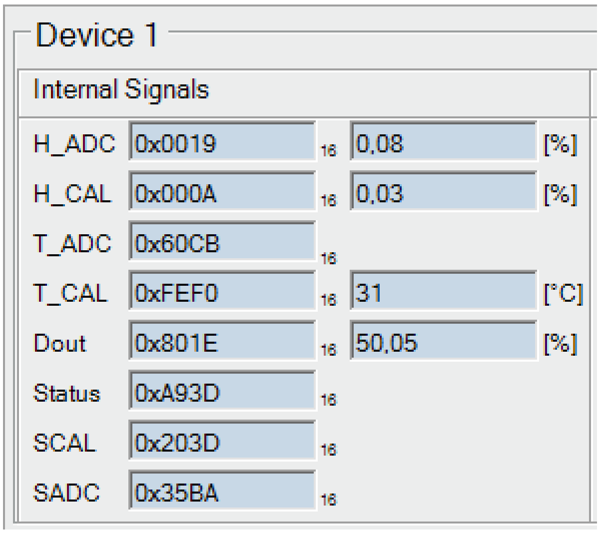

Figure 5-1 Sensor RAM values

As default the register values on the left side are shown in hexadecimal format. The data on the right side of each entry is the register value converted to an easier readable unit.

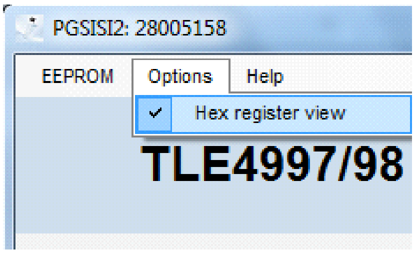

Figure 5-2 Register view

The registers can also be displayed in decimal values by unselecting the menu item Options -> Hex register view.

6 Sensor output

The different sensor types have different sensor output protocols. Regardless of the protocol the sensor output in percent is displayed with this bar.

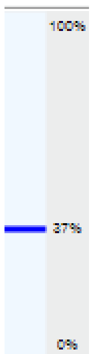

Figure 6-1 Sensor output bar

100% is when the sensor output reached the maximum value, 0% when the sensor output reached the minimum value. If clamping is activated the respective limits are highlighted with red bars.

6.1 TLE4997

The TLE4997 has an analog voltage output. The V_out value is measured with the PGSISI2 and the V_out@5V is related to 5 Volt.

Vdd is the supply voltage and Idd is the supply current of the sensor.

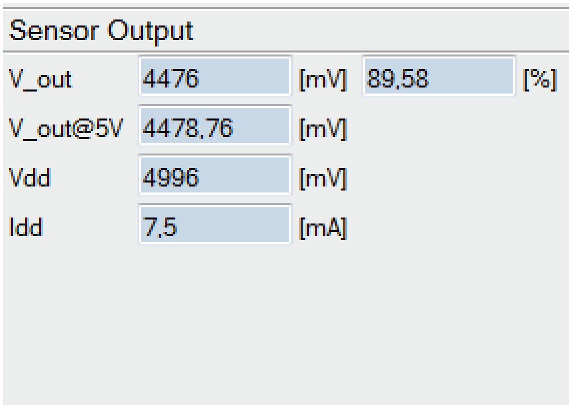

Figure 6-2 TLE4997E sensor output

6.2 TLE4998P

The TLE4998P has a pulse width modulated (PWM) output. The PWM frequency and the current duty cycle is displayed.

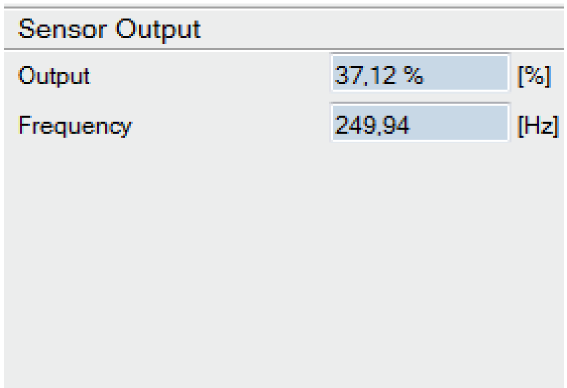

Figure 6-3 TLE4998P sensor output

6.3 TLE4998S

The TLE4998S uses the SENT protocol to send the sensor output. A SENT frame of the TLE4998S3 and S4 consists of 16 bits for the output data, 4 bits for the status of the SENT transmission, 4 bits CRC and 8 bits for the temperature. For the TLE4998S8(D) the protocol is configurable (same as for the TLE4998C, please refer to **Chapter 6.4**). The unit time is the timing granularity of the SENT transmission. The CRC will be also calculated and compared with the sent CRC. If the CRC values match the CRC box is green. In case a CRC missmatch occurs the box is colored red.

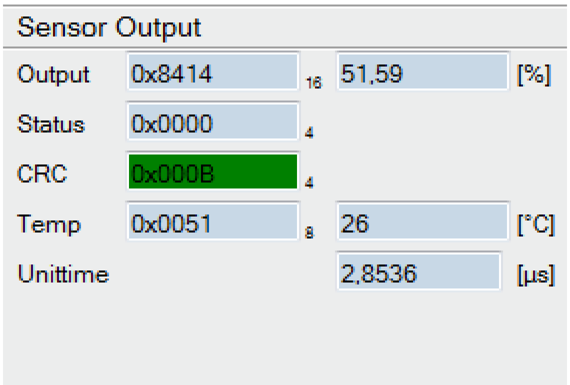

Figure 6-4 TLE4998S sensor output

6.4 TLE4998C

The TLE4998C uses the SPC protocol, which is an extension to the SENT protocol. The data transmission from the sensor is the same as with the TLE4998S. In addition to the SENT sensor it is possible to select what data is sent within a SPC frame. Possible SPC frames are:

Output 16 bits + Temperature 8 bits

Output 16 bits

Output 12 bits + Temperature 8 bits

Output 12 bits

7 Data logging

For analyzing purposes the software offers a function to record the sensor data. The data is stored in a .csv file which can be easily processed programmatically or in tools like Excel. Depending on the setting of the graphical user interface, the data is stored either in hexadecimal or decimal values.

Figure 7-1 Data logger function

The software saves all measurement data which is shown in the graphical user interface. Beside the out signal the internal Hall signals and other information like CRC or temperature is logged.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Evalkit Software for TLE4998												
2	Date: Donnerstag	19. November 2020											
3	Time:11:48:47												
4													
5	H_ADC [LSB]	H_CAL [LSB]	T_ADC [LSB]	T_CAL [LSB]	Dout [LSB]	Status [LSB]	SCAL [LSB]	SADC [LSB]	Sensor output [LSB]	Status [LSB]	CRC [LSB]	Temp [LSB]	Unit time [us]
6	0x0016	0xFFFA	0x60EB	0xFEF1	0x7FED	0xAA3D	0x1F9B	0x343A	0x07FE	0x0001	0x000E		2,8
7	0x0016	0xFFFD	0x60EC	0xFEF3	0x7FF6	0xAA3D	0x1F9C	0x343A	0x07FF	0x0001	0x0003		2,8
8	0x0019	0xFFFD	0x60EB	0xFEF3	0x7FF6	0xAA3D	0x1F9B	0x3439	0x07FF	0x0001	0x0003		2,8
9	0x0016	0xFFFB	0x60EC	0xFEF3	0x7FF0	0xAA3D	0x1F9A	0x3439	0x07FF	0x0001	0x0003		2,8
10	0x0017	0xFFFD	0x60ED	0xFEF3	0x7FF6	0xAA3D	0x1F9A	0x343A	0x07FF	0x0001	0x0003		2,8

Figure 7-2 Measurement data in csv file

8 EEPROM values

To set EEPROM parameters click on the "Set parameters" button.

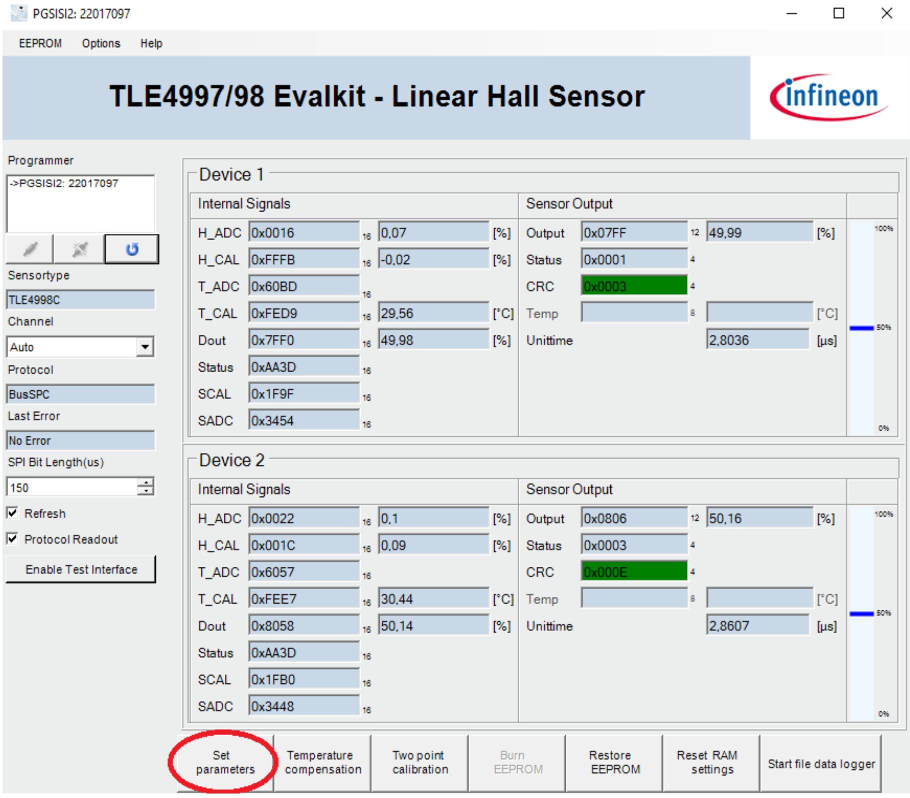

Figure 8-1 Set parameters

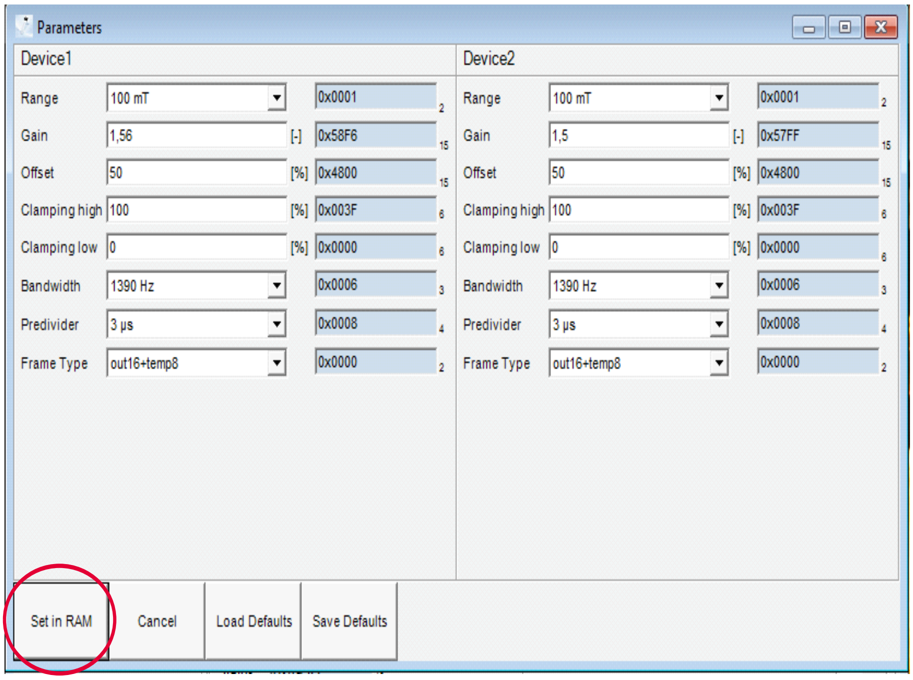

Figure 8-2 Set in RAM

Depending on the sensor type different parameters are shown. The parameters are displayed as register and calculated values. The changes are saved in the RAM when "Set in RAM is pressed". To permanently store the new settings in the sensor, press "Burn EEPROM". Otherwise, the new settings will be lost when the sensor is reset and the previously stored EEPROM settings will be reloaded.

Save and load defaults

In case the user wants to program several sensors in a row with identical parameters, these parameters can be saved as defaults by pressing the “Save Defaults” button.

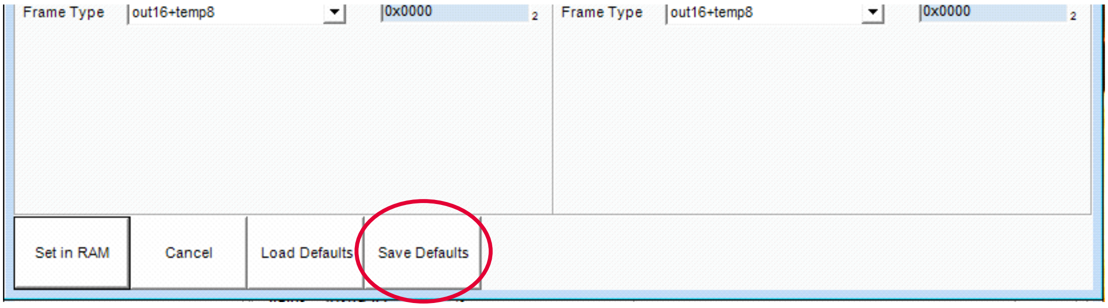

Figure 8-3 Save defaults

After the defaults are saved, they can be loaded in to different sensors by using the “Load Defaults” button.

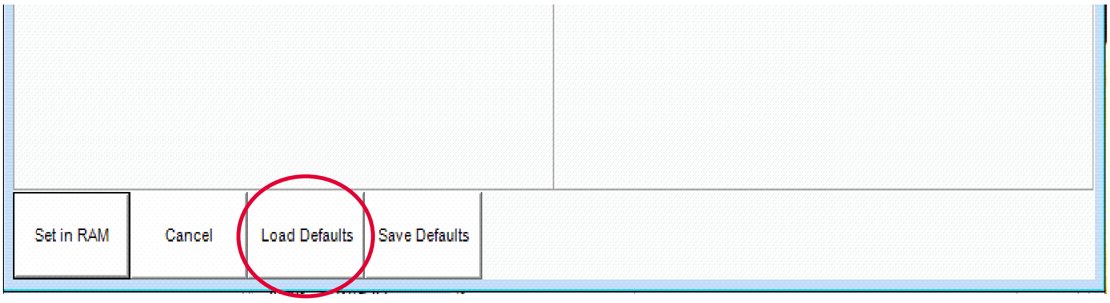

Figure 8-4 Load defaults

9 Set temperature compensation (TC)

This setup should be performed first to guarantee correct temperature behaviour in the target application, where the magnet(s) have certain temperature behaviour. The required temperature coefficient values have to be specified (please refer to the Temperature Compensation chapter on **TLE4997_User Manual.pdf** or **TLE4998_User Manual.pdf** depending on the device type). After that the tool calculates the optimum setup for the device in a single step. The device has now the requested behaviour at a similar error band as the pre-calibrated samples for the "flat" behaviour.

Choose TC parameter

The linear and the quadratic coefficient of the magnet material can be configured manually or predefined materials can be selected via the drop down menu.

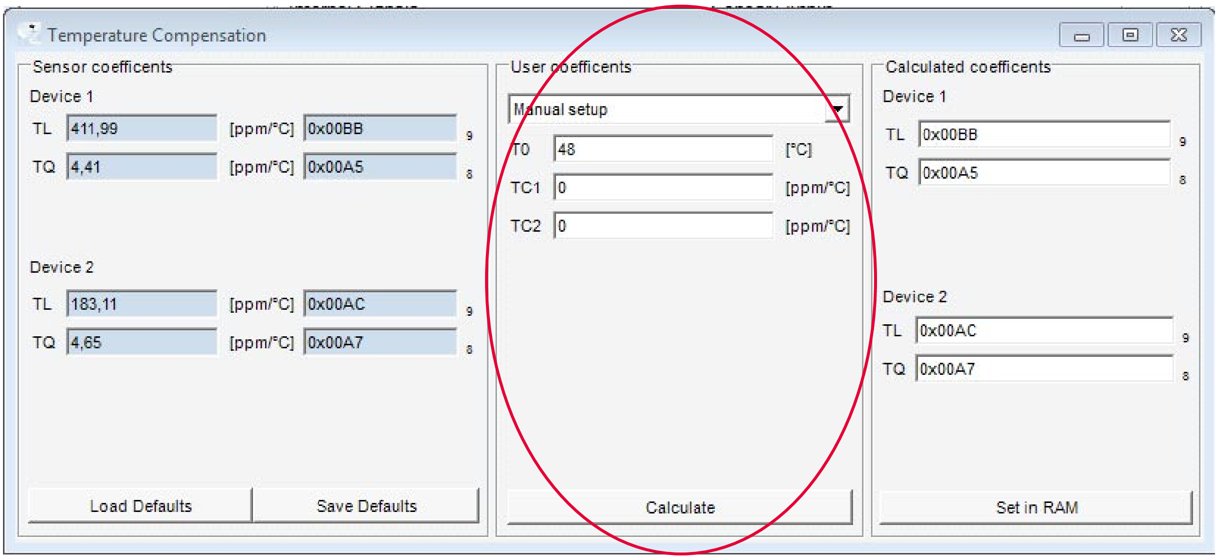

Figure 9-1 TC user coefficients

Calculate TC parameters

Press the "Calculate" button to start the calculation of the final linear "TL" and the final quadratic "TQ" coefficient.

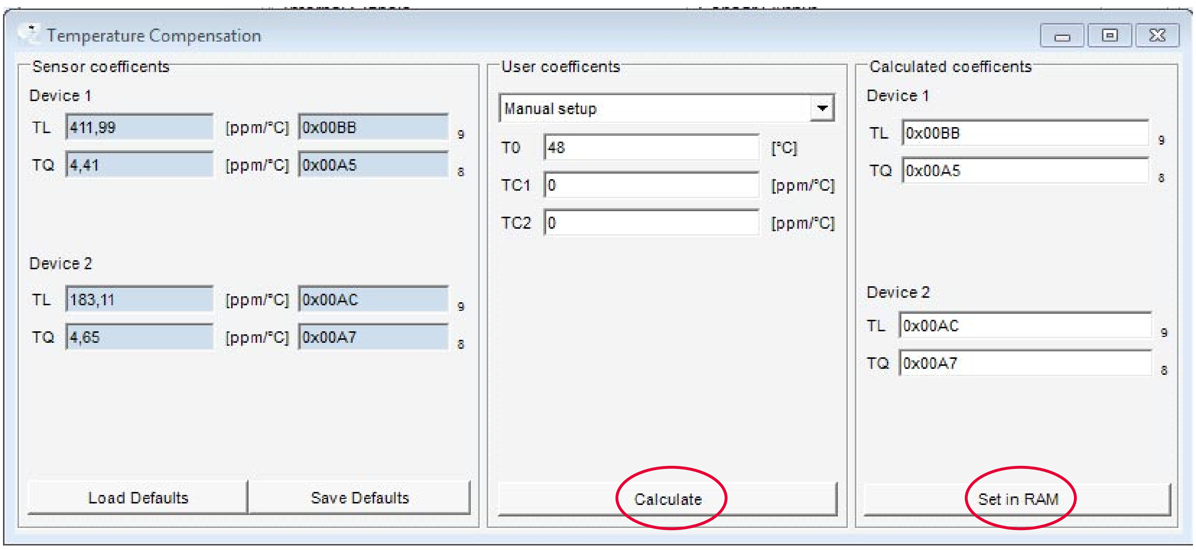

Figure 9-2 TC parameters

Set temperature compensation (TC)

Now the parameters "calc. TL" and "calc. TQ" and the resulting graph are displayed. This sensitivity curve reflects the inverted temperature behaviour of the magnetic setup.

Push "Set in RAM" to save the settings in the sensor RAM.

These fields are not editable anymore to prevent overwriting.

Selecting the devices again (using the device selector) or pressing the "read EEPROM" button reloads the old setting and allows editing again.

Attention: ***This setup requires original, Infineon pre calibrated IC's. On "top" of this data, the used magnet temperature behaviour is included. Therefore it is not possible to do this setup a second time or on an IC where the temperature coefficients are already modified. But it is possible to restore the IC data to its previous state, if it was stored in the tool database during programming. Then it is possible to setup the user TC again.***

Save and load defaults

In temperature compensation menu the save and load defaults funtions are also available. Once the user has defined the parameters to program, these parameters can be saved as the default values by pressing the “Save Defaults” button.

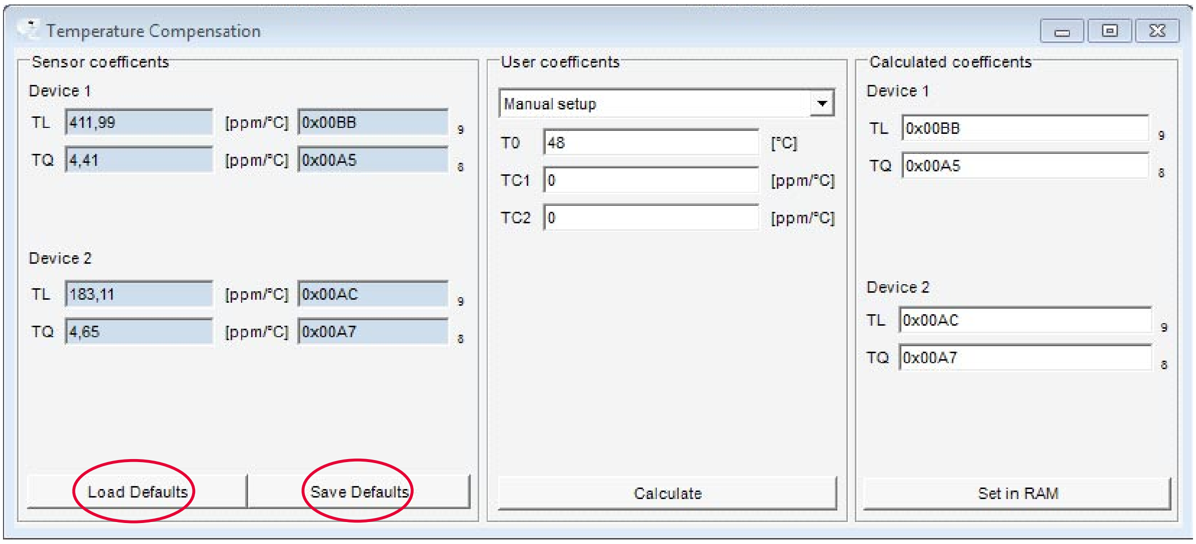

Figure 9-3 Save and load defaults

10 Two point calibration

The next step is the two point calibration by using the "Two point calibration" button (please refer to the Calibration of TLE4997/98 Characteristic chapter in **TLE4997_User Manual.pdf** or **TLE4998_User Manual.pdf**, depending on the device type). This routine allows matching the output values to specific magnetic fields. This is done by specifying two output values and then measuring two magnetic fields. Afterwards the program calculates the optimum setup for the device. Ensure that you have the best fitting range setup adjusted before you start the 2 point calibration.

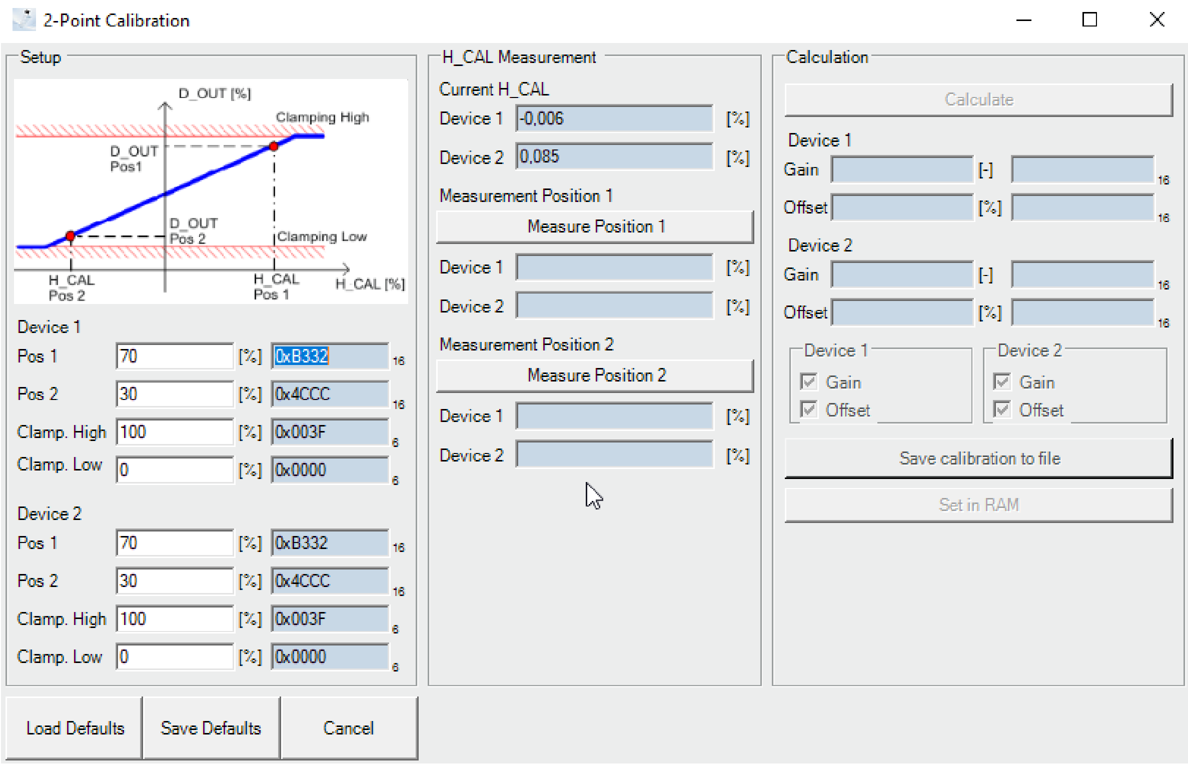

Figure 10-1 Two point calibration

The values of position 1 (in %) and position 2 (in %) depend on the selected range in relation to the magnetic field which is used for the calibration.

For a better understanding see the following example:

Desired Bin range: -20mT … 20mT

Desired Out range:10% … 90%

Desired Offset:50%

Calibration field:-10mT … 10mT

(Magnetic field which is applied during the calibration)

Sensitivity S=(Out1-Out2)/(Bin1-Bin2)=2%/mT

Build the linear equation.

In this example it is: Out [%] = S [%/mT] * Bin [mT] + Offset [%].

Now calculate the values for 10mT and -10mT:

Out1 [%] = 10 [mT] * 2[%/mT]+ 50[%] = 70%

Out2 [%] = -10 [mT] * 2[%/mT] + 50[%] = 30%

Clamping high and clamping low are used for limitation. In this case 22.5mT leads to limitation at 95% and -22.5mT to limitation at 5% of the output value.

Calibrate position 1 and position 2

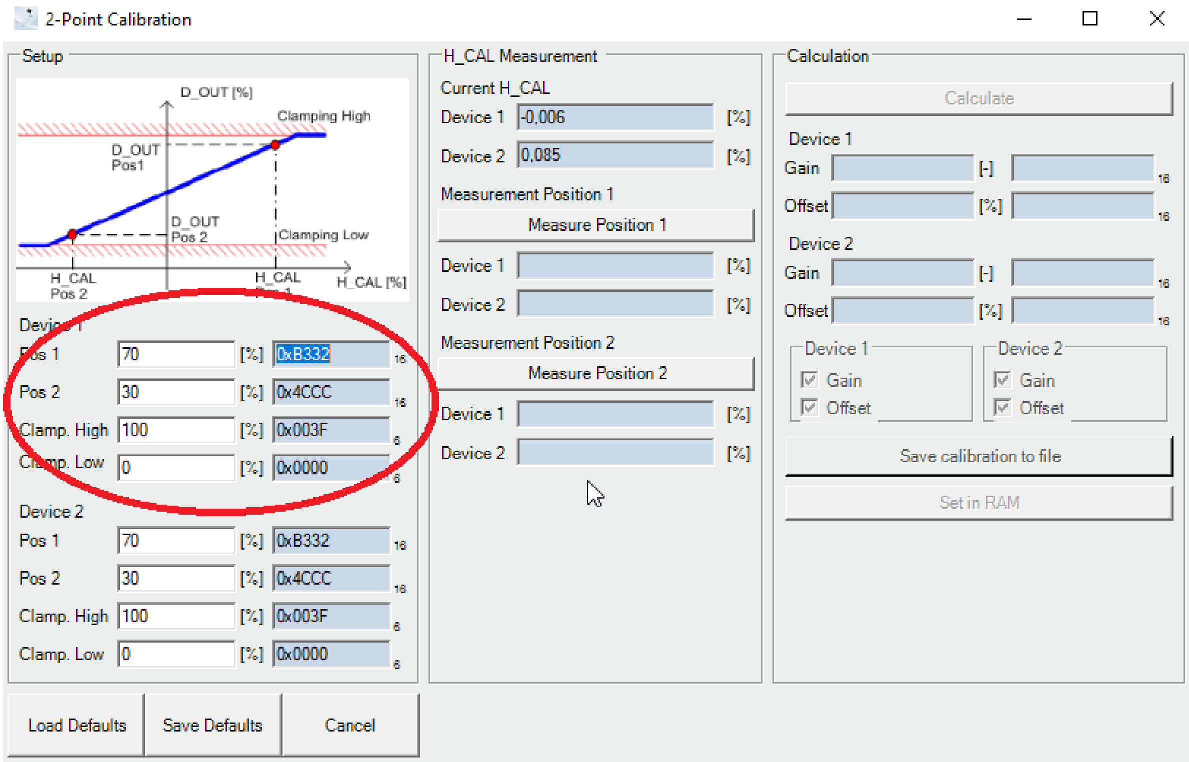

Figure 10-2 Two point calibration settings

Move the magnet to position 1, then press “Measure Position 1”. The measurement needs a couple of seconds. Put the magnet to the second position and press “Measure Position 2” to get the value for this setup.

Calculate two point calibration values and finish calibration

When the measurement is completed the button "Calculate" can be pressed.

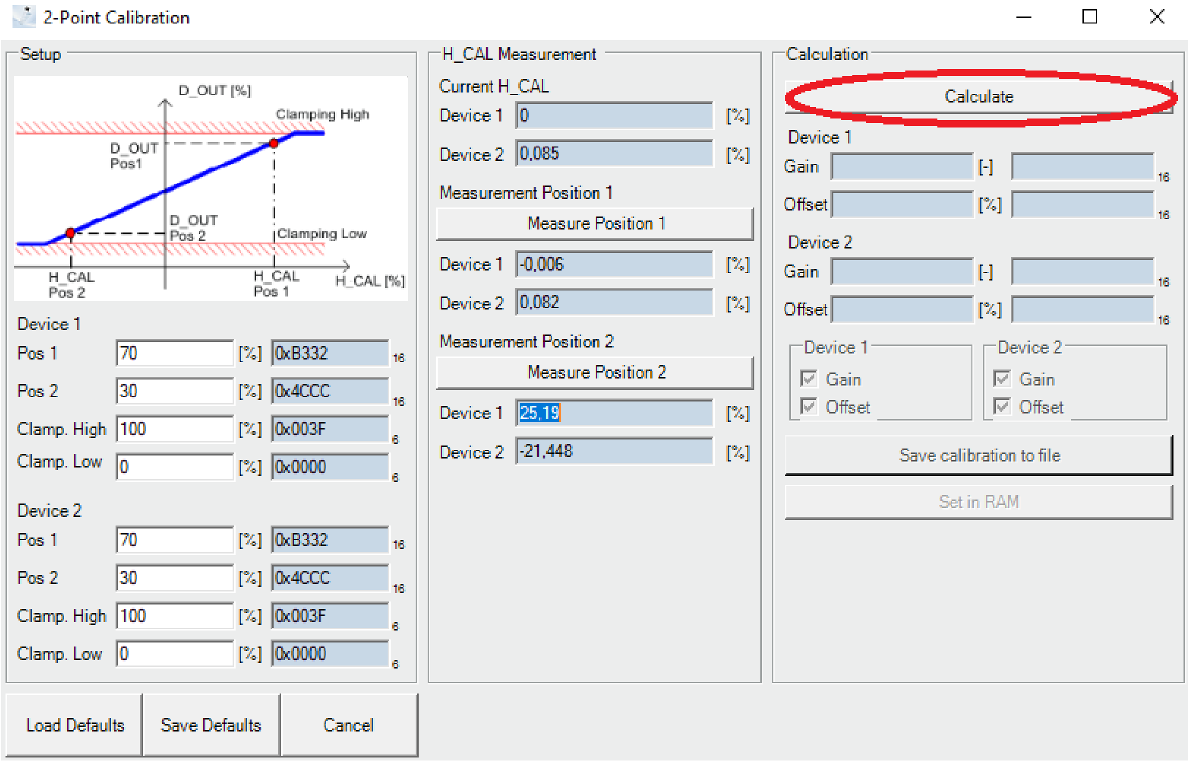

Figure 10-3 Two point calibration calculate

If the calculated gain and offset values are in range, the button "Set in RAM" can be pressed. Furthermore it can be selected if both parameters or only one is set in the sensor.

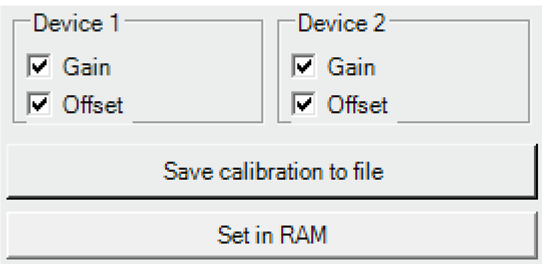

Figure 10-4 Gain and offset selection for RAM programming

In case the calculated calibration data should be stored, the software can save this into a .csv file. If the “Save calibration to file” button is pressed, a destination file can be selected. In case the file is already existing, the software append the current calibration data at the end of the file.

To finish the calibration press the "Set in RAM" button. Now the gain and offset is correctly adjusted. After this action the "Two point calibration” window is closed and the setup is completed.

Attention: ***This calibration should be performed after setup of the temperature calibration values to avoid errors due to an incorrect sensitivity at the temperature where it is performed.***

Save and load defaults

In case the user wants to program several sensors in a row with identical parameters, these parameters can be saved as defaults by pressing the “Save Defaults” button.

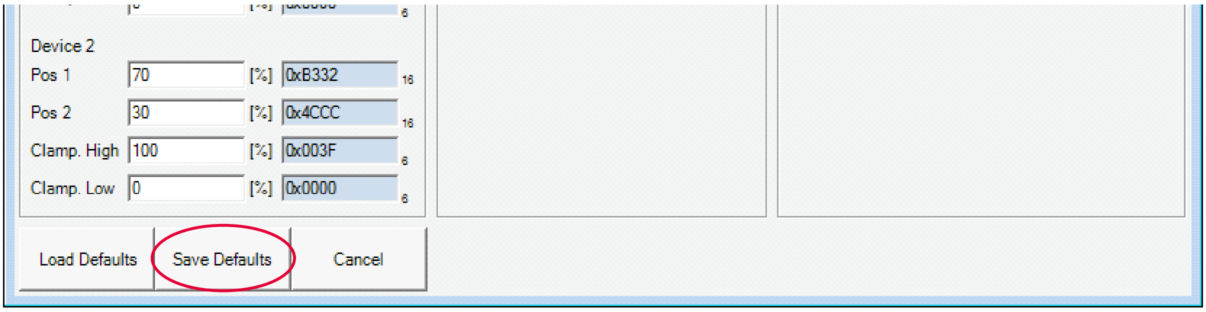

Figure 10-5 Save Defaults

After the default values are saved, they can be loaded in to different sensors by using the “Load Defaults” button.

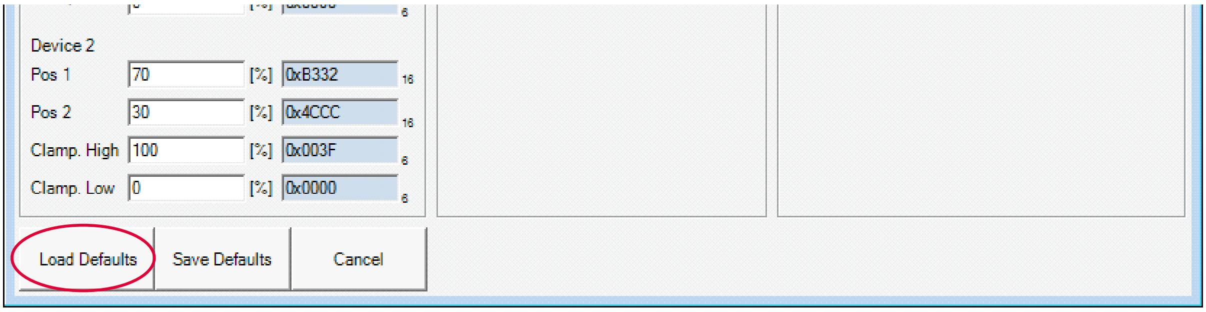

Figure 10-6 Load Defaults

11 Edit the EEPROM map

It is also possible to edit the EEPROM map directly by clicking in the upper menu EEPROM and then select EEPROM Map

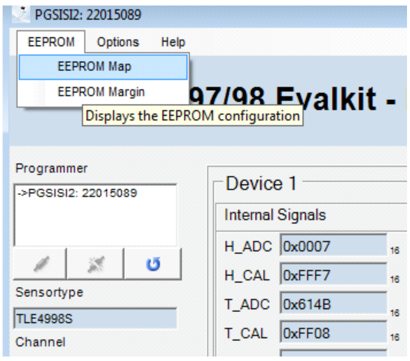

Figure 11-1 Display the EEPROM configuration

The EEPROM configuration is shown and the user can select the address and the register to be changed. The values can be edited in decimal or hexadecimal format while the parity bits are recalculated automatically.

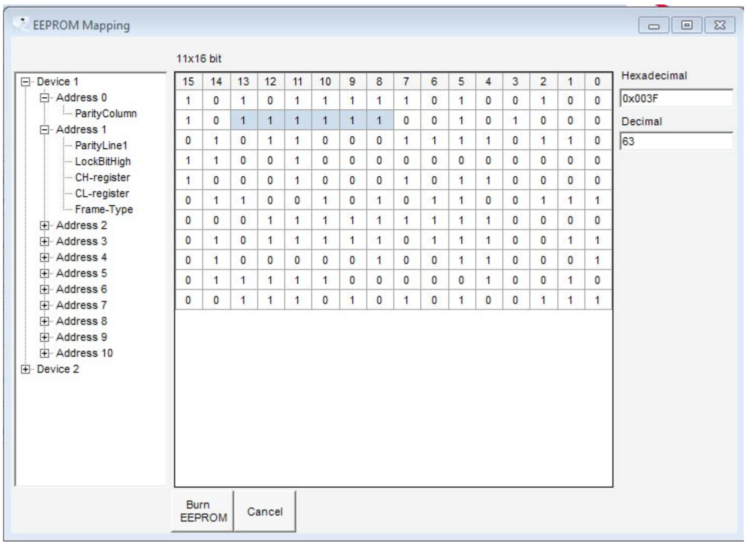

Figure 11-2 EEPROM map

For the EEPROM map of the sensor being programmed please refer to the corresponding product user manual. After editing the EEPROM the user can burn the new EEPROM settings by selecting the "Burn EEPROM" button (for full details in regards to the burn EEPROM feature please please refer to **Chapter 13**).

12 Check EEPROM margin voltage

With the EEPROM margin check it is possible to verify the correct cell voltage of all EEPROM cells. To do this, the test measures all cells and highlights those with out of limit values. This can be used after burning the EEPROM to verify if the programming was performed without any failure. Furthermore this test can be used for EEPROM diagnosis.

When the EEPROM Margin function is selected in the menu the EEPROM content is shown in a new window. In the margin check window the user can select wether to check the margin voltage of the "1" or the "0" cells.

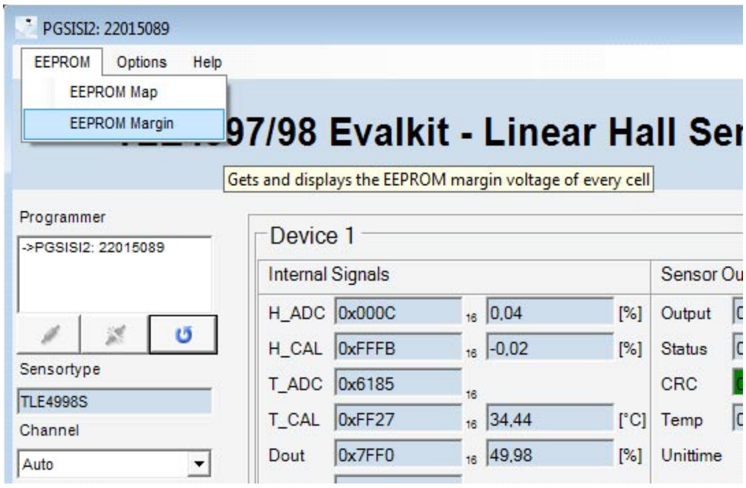

Figure 12-1 EEPROM margin

EEPROM margin test of "1" cells

To perform a margin voltage test for the "1" cells, an upper and lower test limit can be set. Also the step size is adjustable. By clicking "Check margin voltage 1" the test starts and measures the margin voltage of all "1" cells. The result for each cell is noted in the EEPROM table. Please refer to the User´s Manual for more information about the margin voltage values.

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Check EEPROM margin voltage

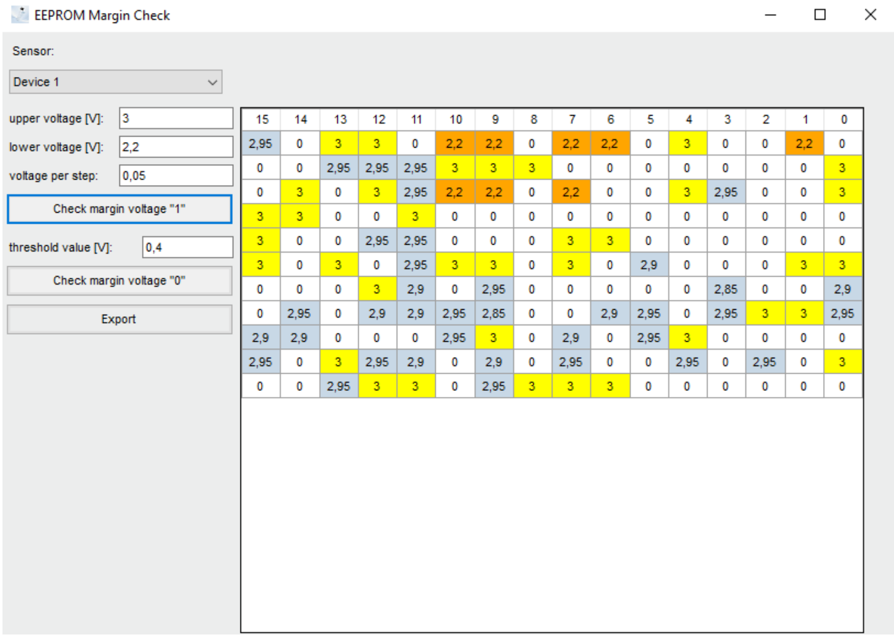

Figure 12-2 EEPROM margin check for “1” cells

Note: ***In case the cell load is out of the given measurement range the cell is highlighted in yellow for the upper limit or orange in case the lower limit is violated. Furthermore the noted voltage value for this cell is then the upper or lower range limit value and not the actual cell voltage.***

EEPROM margin test of “0” cells

With the “Check margin voltage 0" function it is possible to verify the correct voltage level of the “0” cells. By clicking the "Check margin voltage 0"button the test is executed and the result ist displayd in the EEPROM table. In contrast to the “1” check it is only possible to test if the “0” cells are below the given threshold, no actual voltage level is measured. EEPROM cells with a voltage below the threshold are marked green whereas cells with a higher cell voltage are colored read. This helps to identify damaged or falsely programmed cells. Please refer to the User´s Manual for more information about the margin voltage values.

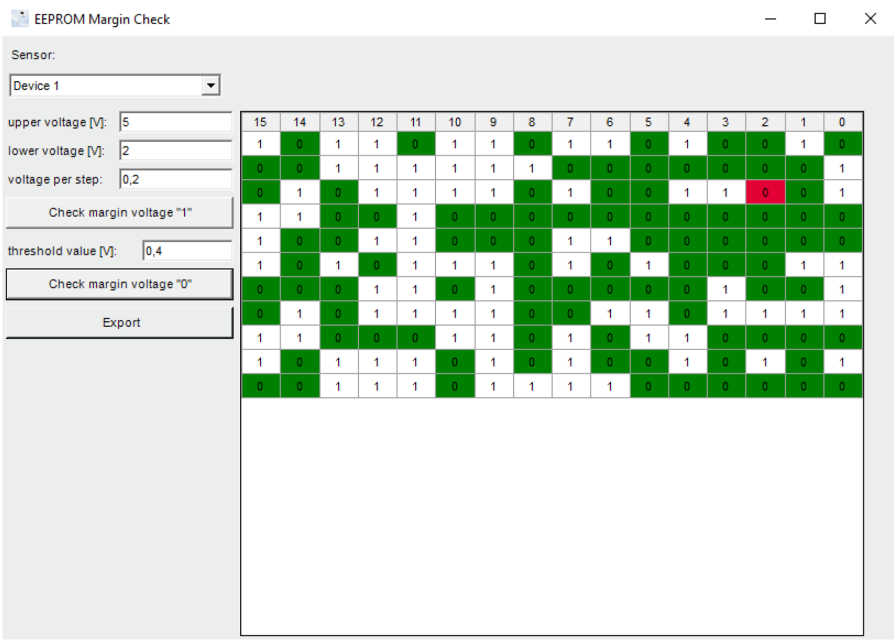

Figure 12-3 EEPROM margin check for “0” cells

Export margin test data

To do further data processing it is posible to export the measurement data from the EEPROM margin check. The data of both tests, the margin “1” check and the margin “0” check, is therefore written in a .csv file. If the “Export” button is clicked, a save dialog is displayed to select the folder and file name.

In case a margin “1” value is within the given limits the margin voltage is noted otherwise the cell is marked with an additional “ERROR” to signal the threshold violation. The “0” cells of the margin “0” check which are below the threshold are marked as “OK”. An “ERROR” indicates that the cell voltage is above the “0” limit.

EvalKit Linear - Margin Test:																
Date:	Freitag, 14. Februar 2020															
Time:	######															
Sensor I	TLE4998C															
Margin Voltage Matrix 1`s:																
Upper v	4,5	V														
Lower v	2,25	V														
Step:	0,2	V														
	Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Line 0	3,05	0	3,25	3,25	0	2,25	2,25	0	2,25	2,25	0	3,25	0	0	2,25	0
Line 1	0	0	3,05	3,05	3,05	3,05	3,05	3,25	0	0	0	0	0	0	0	3,25
Line 2	0	3,05	0	3,25	3,05	2,25	2,25	0	2,25	0	0	3,25	3,05	0	0	3,25
Line 3	3,05	3,25	0	0	3,25	0	0	0	0	0	0	0	0	0	0	0
Line 4	3,05	0	0	3,05	3,05	0	0	0	3,25	3,25	0	0	0	0	0	0
Line 5	3,25	0	3,05	0	3,05	3,25	3,25	0	3,05	0	3,05	0	0	0	3,25	3,25
Line 6	0	0	0	3,05	3,05	0	3,05	0	0	0	0	0	3,05	0	0	3,05
Line 7	0	3,05	0	3,05	3,05	3,05	3,05	0	0	3,05	3,05	0	3,05	3,05	3,25	3,05
Line 8	3,05	3,05	0	0	0	3,05	3,05	0	3,05	0	3,05	3,05	0	0	0	0
Line 9	3,05	0	3,05	3,05	3,05	0	3,05	0	3,05	0	0	3,05	0	3,05	0	3,05
Line 10	0	0	3,05	3,25	3,25	0	3,05	3,05	3,25	3,25	0	0	0	0	0	0
All voltage levels are in range (2.23V to 4.5V)																
Margin Voltage Matrix 0`s:																
ERROR indicates a value higher than threshold value																
Thresho	0,4	V														
	Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Line 0	1	OK	1	1	OK	1	1	OK	1	1	OK	1	OK	OK	1	OK
Line 1	OK	OK	1	1	1	1	1	1	OK	OK	OK	OK	OK	OK	OK	1
Line 2	OK	1	OK	1	1	1	1	OK	1	OK	OK	1	1	ERROR	OK	1
Line 3	1	1	OK	OK	1	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Line 4	1	OK	OK	1	1	OK	OK	OK	1	1	OK	OK	OK	OK	OK	OK
Line 5	1	OK	1	OK	1	1	1	OK	1	OK	1	OK	OK	OK	1	1
Line 6	OK	OK	OK	1	1	OK	1	OK	OK	OK	OK	OK	1	OK	OK	1
Line 7	OK	1	OK	1	1	1	1	OK	OK	1	1	OK	1	1	1	1
Line 8	1	1	OK	OK	OK	1	1	OK	1	OK	1	1	OK	OK	OK	OK
Line 9	1	OK	1	1	1	OK	1	OK	1	OK	OK	1	OK	1	OK	1
Line 10	OK	OK	1	1	1	OK	1	1	1	1	OK	OK	OK	OK	OK	OK
Bit flip detected!																

Figure 12-4 csv file export of the margin check data

13 Burn EEPROM

In case sensor parameters were changed in the RAM and should be permanently saved in the sensor, these has to be programmed in the EEPROM. Otherwise the values are only kept in the programmer hardware and the volatile device registers (RAM) and are discarded in case of a sensor reset.

By pressing the "Burn EEPROM" button, a window appears that allows entering a description and the filename for the restore data of this sensor. Pressing the “Burn EEPROM” or “Burn and Lock EEPROM” button writes the current sensor settings from the RAM registers to the EEPROM.

If “Burn and Lock EEPROM” is clicked the programming interface is not accessible anymore and the sensor remains in operating mode.

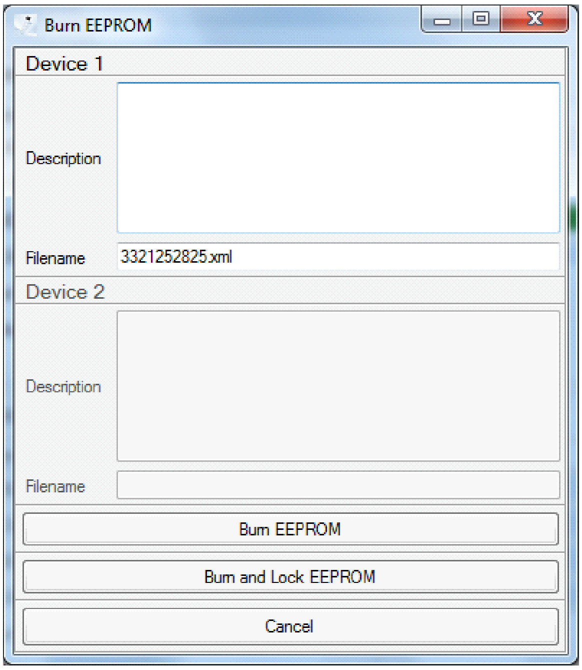

Figure 13-1 Burn EEPROM

After EEPROM programming an information window pops up. It shows the margin voltage of the lowest “1” cell of the EEPROM. Continue by pressing the "OK" button.

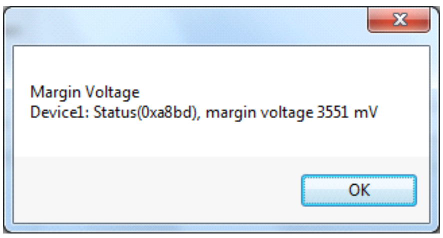

Figure 13-2 Lowest margin voltage of “1” cells after EEPROM programming

14 Restore EEPROM

By pressing the "Restore EEPROM" button, a window appears allowing to restore the previous EEPROM data. The programming software compares the given EEPROM setting with the data stored in the database.

Note: ***An EEPROM can only be restored in case it is not locked.***

Restore EEPROM

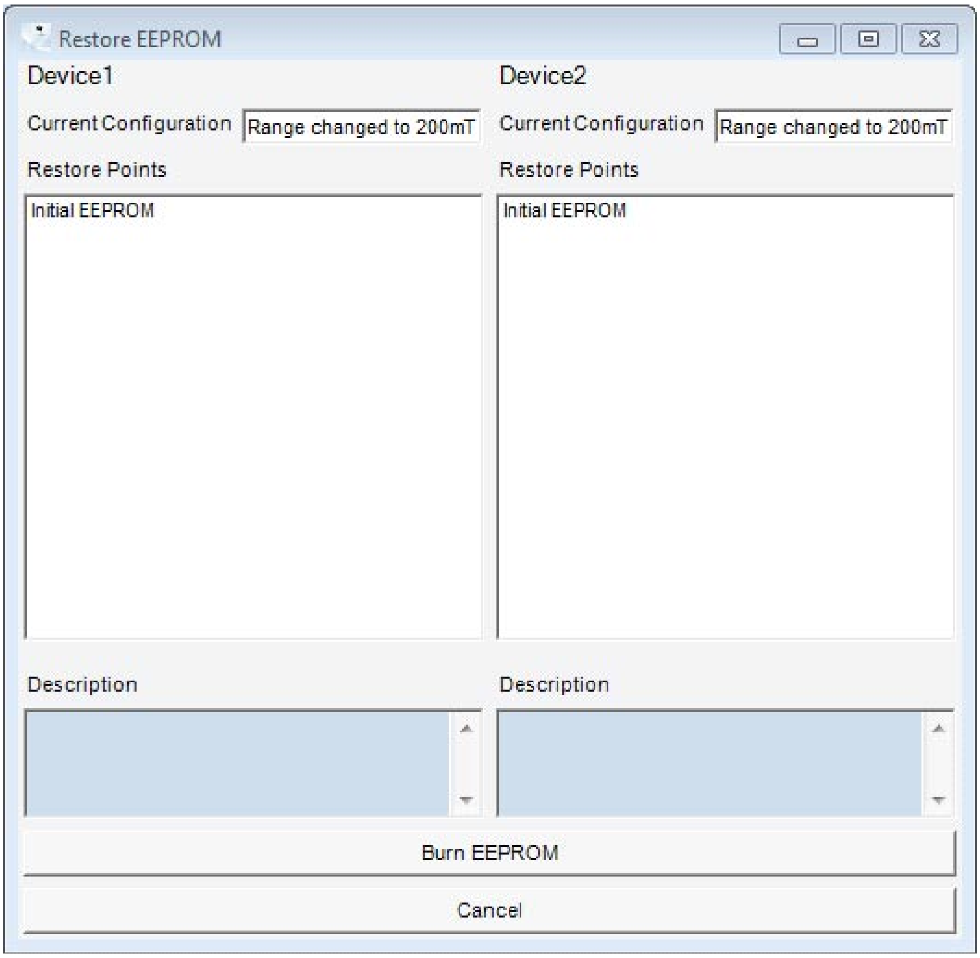

Figure 14-1 Restore EEPROM

After pressing the "restore" button the previous EEPROM values are burned into the EEPROM again. "Initial EEPROM" is the content of the EEPROM before the first burn.

14.1 Restore database

Every sensor has its own file for database. The files are located in:

"ProgramData\Infineon Technologies\Linear Hall Evalkit Software\RestoreData".

15 Warnings and error messages

15.1 No sensor detected

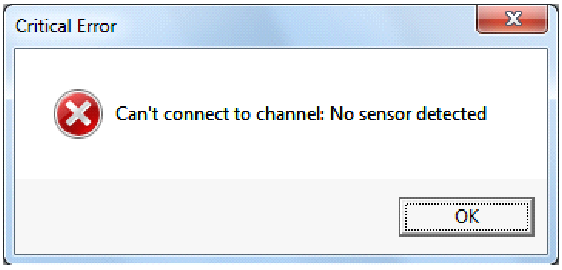

Figure 15-1 No sensor detected

This error message appears if no sensor has been connected to the sensor board. This message also appears in case a locked TLE4997 is attached to the PGSISI.

15.2 No TC- setup done

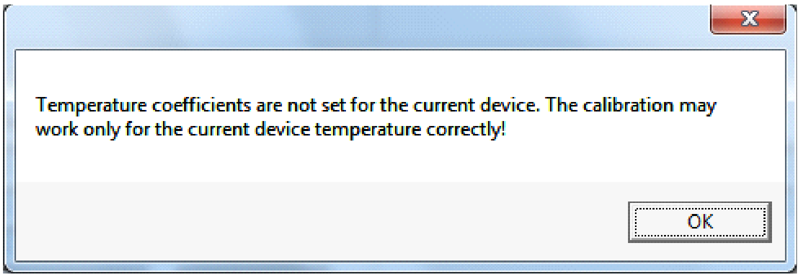

Figure 15-2 No TC-setup

This error message appears if you start the two point calibration without having done the TC-setup before.

The temperature coefficients should be calculated and set before the two point calibration because it will increase the accuracy of the calibration.

15.3 Set lock bits

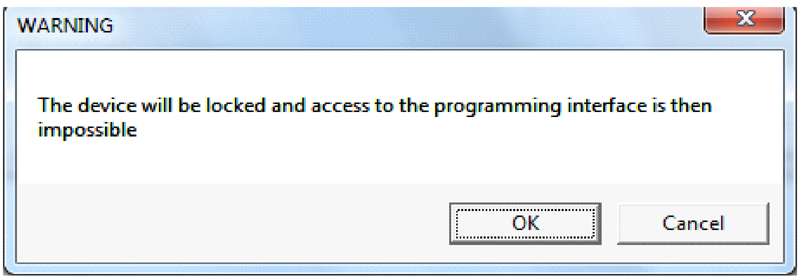

Figure 15-3 Set lock bits

If the button "Burn and Lock EEPROM"is pressed, the user is asked before the EEPROM will be programmed and the sensor is locked permanently. After locking, the programming interface is not accessible anymore.

15.4 Choosing different derivates

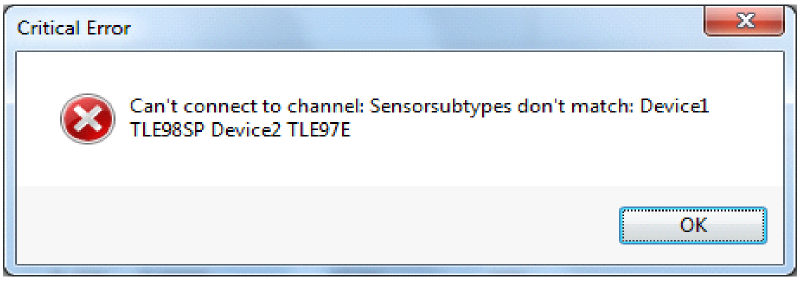

Figure 15-4 Sensor different subtypes

This message appears if you use two sensors from different derivates or with different protocol types programmed. "no device" is automatically selected after pressing the "OK" button.

16 Annex I

16.1 Error code list

The following is a list of errors which could appear in the main window as indicated below, their meaning and how to react to them.

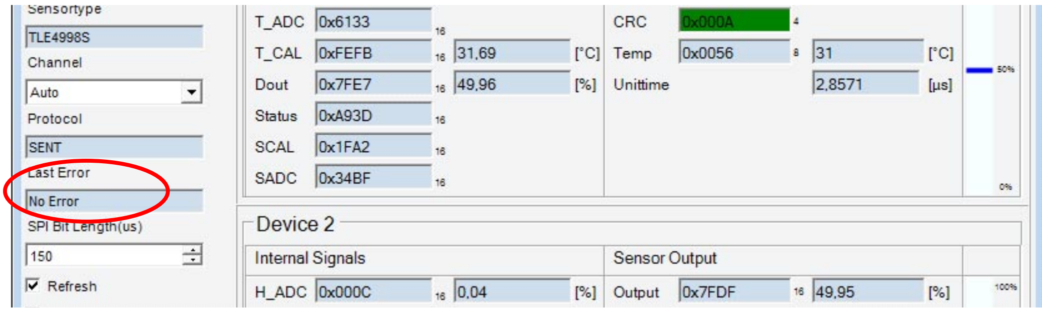

Figure 16-1 Error window

Error codes

Table 16-1 Differentiation of error classes by value range of error variables

Error code	Alias	Explanation	Reaction
0x0000	no error		
0x4000	0x4000 is added to the error code if there was already an error saved before (which is now overwritten)		

Annex I

Table 16-2 Errors in PGSIS-2 Box

Error code	Alias	Explanation	Reaction
0x0001 - 0x0FFF	errors in PGSISI-2 box		
0x0012	ERR_CS_STUCK0		please contact Infineon Technologies
0x0013	ERR_CS_STUCK1		
0x0020	ERR_NOTCALIBRATED	detected during PGSIS-2 initialization	
0x0028	ERR_CALCRCFAIL		
0x0030	ERR_VOUTx_STUCK0	detected by hw checking routine	
0x0031	ERR_VOUTx_STUCK1		
0x0032	ERR_VOUT1_TOOLOW		
0x0033	ERR_VOUT1_TOOHIGH		
0x0034	ERR_VOUT2_STUCK0		
0x0035	ERR_VOUT2_STUCK1		
0x0036	ERR_VOUT2_TOOLOW		
0x0037	ERR_VOUT2_TOOHIGH		
0x0038	ERR_VOUT3_STUCK0		
0x0039	ERR_VOUT3_STUCK1		
0x003a	ERR_VOUT3_TOOLOW		
0x003b	ERR_VOUT3_TOOHIGH		
0x003c	ERR_VOUT4_STUCK0		
0x003d	ERR_VOUT4_STUCK1		
0x003e	ERR_VOUT4_TOOLOW		
0x003f	ERR_VOUT4_TOOHIGH		
0x0040	ERR_PORT0_STUCK0		
0x0041	ERR_PORT0_STUCK1		
0x0042	ERR_PORT1_STUCK0		
0x0043	RR_PORT1_STUCK1		
0x0050	ERR_DC_WRONGPORT	errors of misc. general routines	
0x0051	ERR_DC_WRONGPORT		
0x0052	ERR_SV_WRONGPORT		
0x0054	ERR_GV_WRONGPORT		
0x0055	ERR_GC_WRONGPORT		
0x0056	ERR_SO_WRONGPORT		
0x0057	ERR_GO_WRONGPORT		
0x1000 - 0x1FFF	device basic routines		
errors of data receive routine			

Annex I

Table 16-2 Errors in PGSIS-2 Box

Error code	Alias	Explanation	Reaction
0x1010	ERR_D1_NOSFRAME	in SPI communication, LSB of device 1/2 could not be read as '1'	try a slower SPI clock setting (tab Extras in the GUI) and/or a lower capacitance at the output pin use an oscilloscope to check the SPI communication on the EvalBoard
0x1011	ERR_D2_NOSFRAME		
0x1012	ERR_D1_NOEFRAME	in SPI communication, MSB of device 1/2 could not be read as '1'	
0x1013	ERR_D2_NOEFRAME		
0x1014	ERR_D1_WRONGADR	address in answer of device 1 does not match therequested address	
0x1015	ERR_D2_WRONGADR		
0x2000 - 0x2FFF	enhanced device routines		
errors at device detection			
0x2010	ERR_VDD_SHORTCUT	5V supply voltage from PGSISI-2 could not be measured as "5V"	check supply voltage of devices with a multimeter
0x2011	ERR_VDD_OVERDRIVE		
0x2012	ERR_VDD_OUTOFRANGE		
0x2020	ERR_D1_MISSED	an explicit device was selected in the GUI, but could not be detected by the PGSISI-2	use "autoselect" in the GUI
0x2022	RR_D2_MISSED		
0x2021	ERR_D1_UNKNOWN	the PGSISI-2 could not detect the ROM version of the device	please contact Infineon Technologies for an update
0x2023	ERR_D2_UNKNOWN		
errors at misc. enhanced routines			
0x2030	ERR_GR_ILADR	an illegal address was specified while trying to read the RAM/the EEPROM/write the EEPROM	please contact Infineon Technologies
0x2031	ERR_GE_ILADR		
0x2032	ERR_SE_ILADR		
errors at programing			
0x2040	ERR_PE_D1ABORTED	EEPROM programming of device 1/2 was aborted because of the device being already locked or CRC errors in device ROM	please contact Infineon Technologies
0x2041	ERR_PE_D2ABORTED		
0x2050	ERR_PE_NOALGO	no programming algorithm was specified	please contact Infineon Technologies
0x2054	ERR_PE_READERR	EEPROM could not be read during programming	

Annex I

Table 16-2 Errors in PGSIS-2 Box

Error code	Alias	Explanation	Reaction
0x210y	ERR_PE_VERIFAILED	EEPROM verify failed in address 'y' during programming	
0x2800	ERR_ME_READERR	EEPROM could not be read during margin test errors at PWM/SENT/SPC communication	
errors at PWM/SENT/SPC communication			
0x2900		no falling edge at output pin of device 1/2 was detected	check if (at both DIP switches) switch 1 is ON and 2 is OFF use an oscilloscope to check the digital output of the devices on the EvalBoard
0x2901	ERR_D2_SENT_NOINT		
0x2902	ERR_SENT_NODEVICE	no device/no protocol type was specified while trying to receive the digital output of device 1/2	please contact Infineon Technologies
0x2903			
0x2905	ERR_SENT_CRC		
0x2911	ERR_PWM_NODEVICE		
0x2920	ERR_NOPROTOCOL		

17 Annex II

Sensor Board Schematics

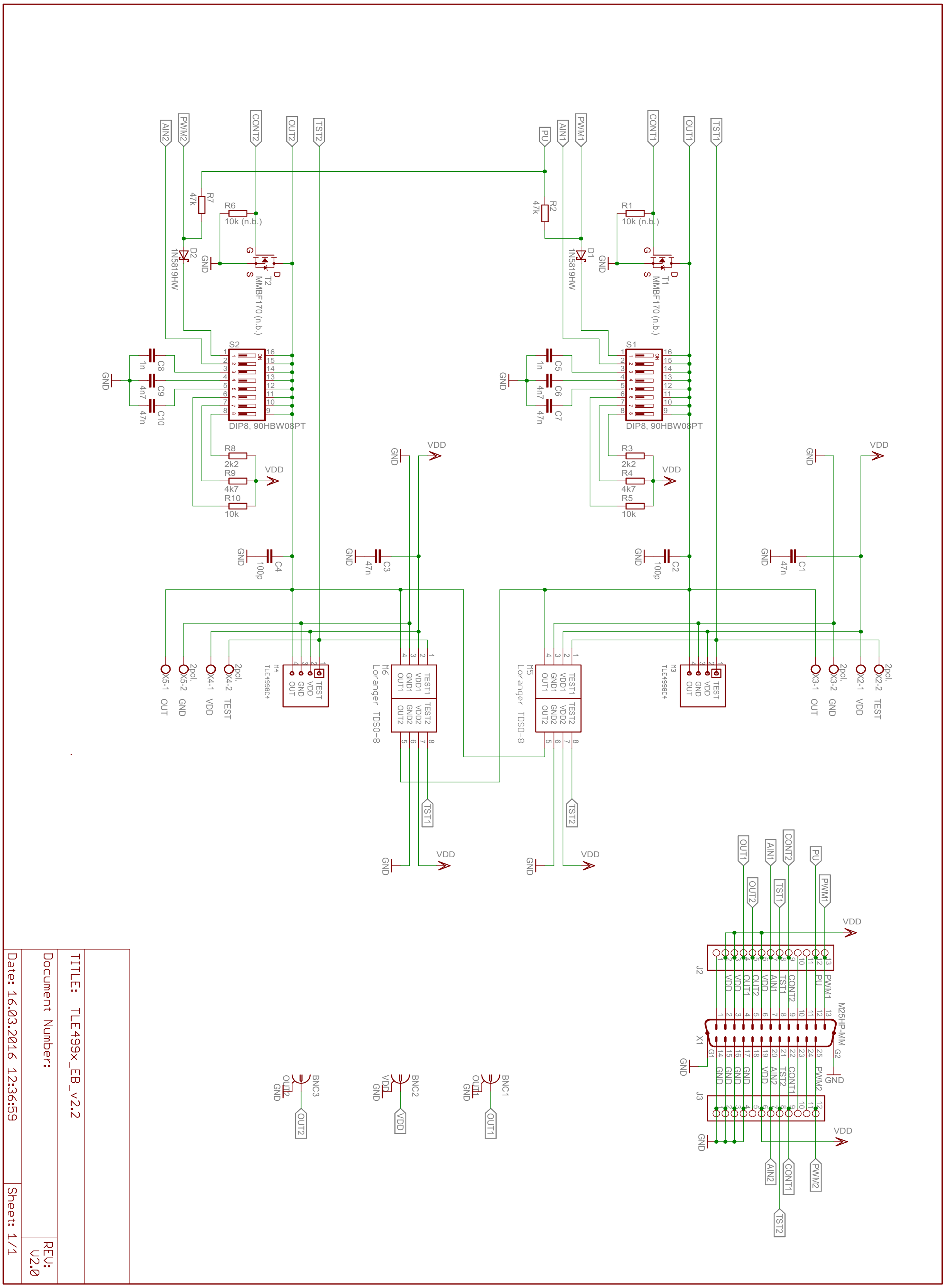

Figure 17-1 Sensor Board Schematics

18 Revision History

Revision	Date	Changes
2.2	2017-12	**Page 3**, updated EvalKit content picture (removed CD Rom picture).
		Page 1, added link to download software on **Installation**.
2.3	2020-02	Minor editorial updates.
		Page 4, added note that locked TLE4998 sensors can be read.
		Page 16, update two point calibration and limitation for small gains between -0.5 to 0.5 removed.
		Page 18, update EEPROM margin check and added export function.
2.5	2020-11	**Page 9**, output and register data logging
		Page 16, two point calibration data logging
2.7	2020-12	Update of margin 0 test function

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