WÜRTH ELEKTRONIK

SENSOR SHIELD

INTERFACE EXTENSION BOARD FOR ARDUINO

order code	product name
2501000101291	Sensor Shield

VERSION 1.0

NOVEMBER 18, 2020

Revision history

Manual version	HW version	Notes	Date
1.0	2.2	• Initial version	November 2020

Software revision history

Manual version	SW version	Notes	Date
1.0	1.0	• Initial version	November 2020

⋆ For detailed software version history see chapter `Software history`

Abbreviations and abstract

Abbreviation	Description
CS	SPI Chip select
GND	Ground
I^2C	Inter-Integrated Circuit
JTAG	Joint Test Action Group
MISO	Master in, slave out
MOSI	Master out, slave in
SCLK	Serial Clock
SDA	I^2C Serial data line
SPI	Serial Peripheral Interface
SWD	Serial Wire Debug
VDD	Supply voltage

Contents

1 Supported products

The evaluation board described in this manual is a stackable extention board for the Arduino (UNO and DUE) board. It can be used to connect the following Sensor EVAL-Boards:

Sensor	Evaluation board Order code	Sensor order code
Temperature sensor IC	2521020222591	2521020222501
Humidity sensor with integrated temperature sensor	2525020210091	2525020210001
3 axis acceleration sensor	2533203301691	2533020201601
Absolute pressure sensor	2511223013391	2511020213301
Differential pressure sensor	2513254510091 2513254510191 2513254510291 2513254510391 2513254510491	2513130810001 2513130810101 2513130810201 2513130810301 2513130810401

Table 1: Sensor shield compatibility

The following interfaces are supported by the sensors: The corresponding sensors that can be evaluated with this sensor shield are:

Sensors & Sensor Eval Board	Interface			
	3.3V I^2C	3.3V SPI	5V I^2C	5V SPI
Temperature sensor IC	x	x		
Humidity sensor with integrated temperature sensor	x	x		
3 axis acceleration sensor	x	x		
Absolute pressure sensor	x	x		
Differential pressure sensor			x	

Table 2: Supported sensor interface

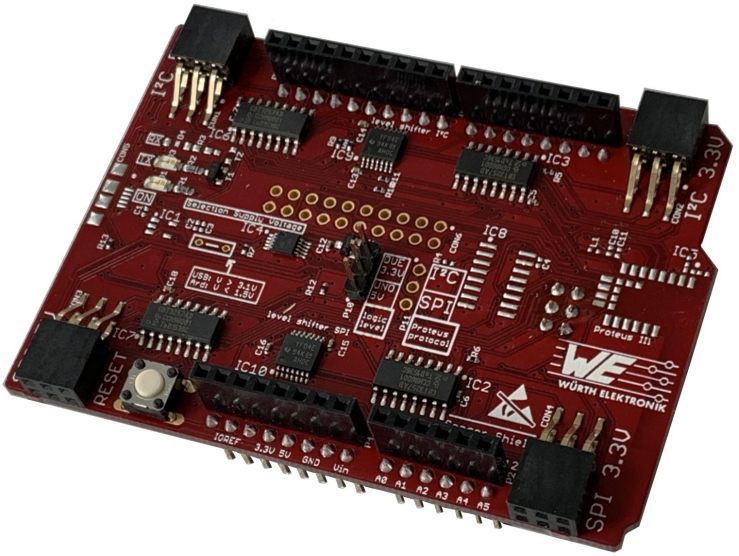


Figure 1: Sensor shield for Arduino

Order code:2501000101291 contents	Quantity
Sensor shield including needed jumpers	1
ESD safe packaging	1
Radio module with individualized firmware	0
Arduino board	0

Table 3: Contents sensor shield EV-kit

2 Overview

2.1 Block diagram

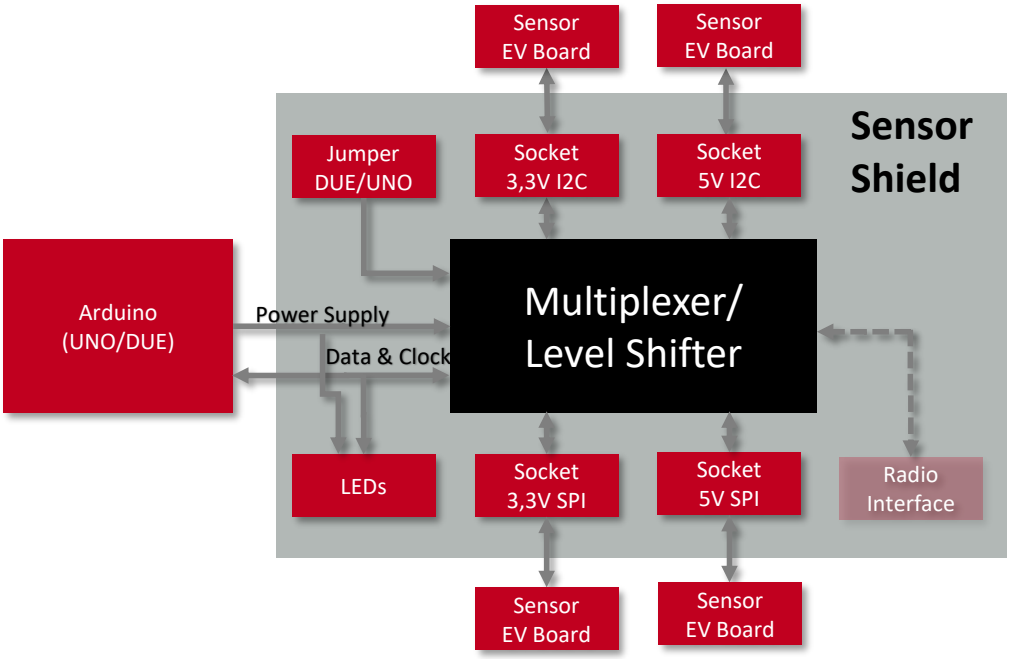


Figure 2: Block Diagramm

2.2 Functional description

The Sensor shield is an interface extension board for Arduino UNO and DUE. It offers the user the possibility to connect sensors with the two different logic levels of 3.3V or 5V to either an Arduino UNO or an Arduino DUE via SPI or I^2C communication interface.

Software libraries for the Arduino platform are also provided for quick software applications. it implements the drivers and example codes to use the Sensor shield with the Würth Elektronik eiSos GmbH & Co. KG Sensor EV-Boards listed in chapter `Supported products`.

On demand there is also a possibility to add a radio module from the Proteus / Thyone family with individualized firmware instead of hosting the sensors with the Arduino. Additional information on the firmware individualisation can be found on the website *here*.

Feel free to check our YouTube channel:
www.youtube.com/user/WuerthElektronik/videos for video tutorials, hands-ons and webinars relating to our products.

2.3 Taking into operation

Sensor shield can either be mounted on Arduino UNO or DUE. For easy orientation of the shield on the Ardiuino board, it follows Arduino board's shape. Match the diagonal bulge one

above the other as shown in Figure 12.

For the proper operation of the Sensor shield, place the jumper (P10) on the correct location based on the Arduino board variant in use (UNO or DUE). Further information can be found in the section 3.1

Connect external power supply to the Arduino board and make sure the VCC is stable and able to reliably supply the module's static and peak current consumption as specified by the Arduino UNO/DUE manual.

The next step is to connect the Arduino board along with the shield to the PC using a USB-cable. In that way a COM port can be detected. Check the device manager to acquire the COM port number of the EV board.

Plug in the sensor evaluation boad that you need to take into operation to the appropriate 6-pin connector (CON1-CON4).

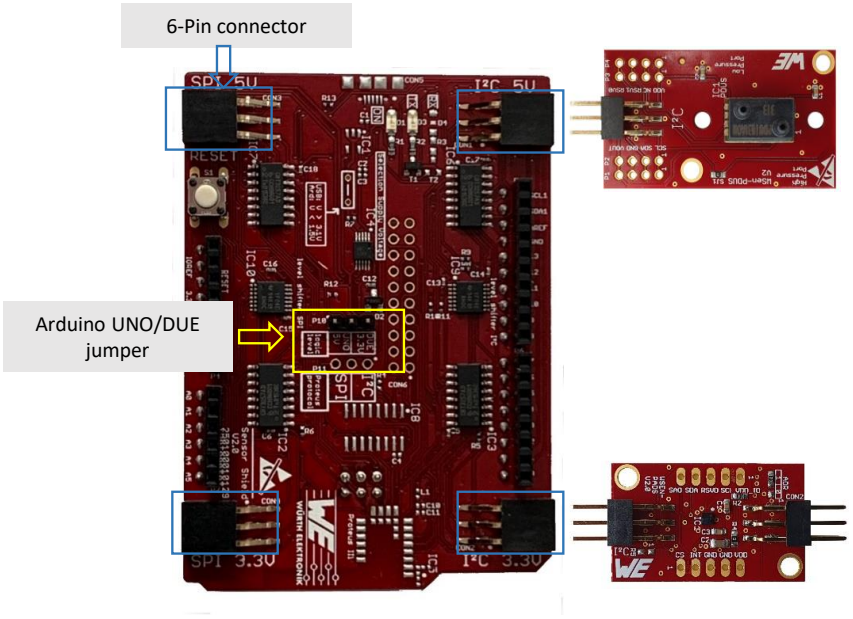


Figure 3: Sensor shield and WSEN-EVAL compatibility

Make sure to connect the sensor EVAL board to the correct connector on the Sensor shield according to the operating voltage and the communication interface of the sensor.

STOP

Connecting the sensor EVAL board to the wrong connector can cause permanent damage to the sensor.

2.4 Sensor libraries for Arduino

The Arduino libraries for I²C are delivered as a compressed zip-file. All codes related to a sensor supported by the Arduino libraries are placed under a sub directory named after the corresponding sensor. Each sensor directory contains three sub-directories, src, examples and Function_Test. The sub-directory src contain the Arduino platform dependent code. The examples folder contains sample applications that can run on the Arduino and the Function_test folder implements the functions to test the library.

The Arduino libraries are available for download at *https://www.we-online.de/katalog/de/wco/sensors/evaluation_boards_wsen*

2.5 Integration into Arduino IDE

The open-source Arduino IDE makes it easy to write code and upload it to the board. This software can be used with any Arduino board. For further information please refer to the installation guide on the Arduino official website: *https://www.arduino.cc/en/Guide*

The sensor libraries can be added in the Arduino IDE software directly as .ZIP file. Select the required sensor library from your PC.

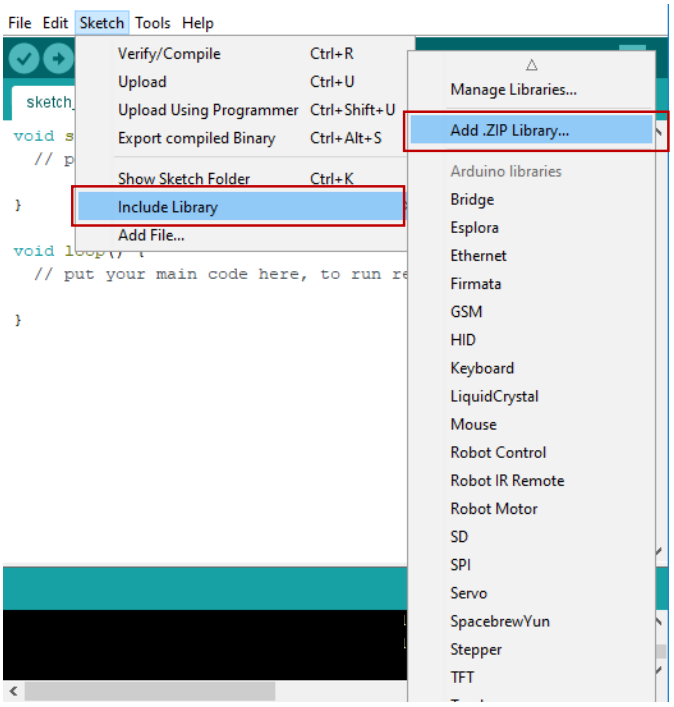


Figure 4: Add sensor libraries to the Arduino software

Successfully included libraries could be found under ’contributed libraries’.

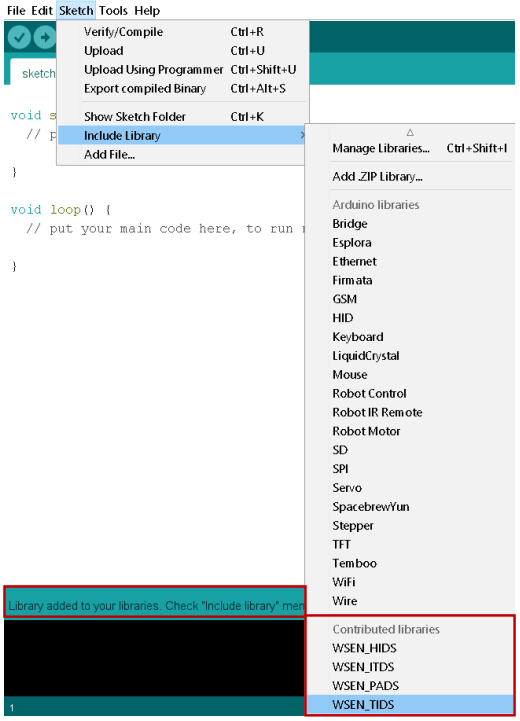


Figure 5: Sensor libraries

The sensor libraries also include some examples for quick start. They are available under File>Examples>Examples from custom libraries.

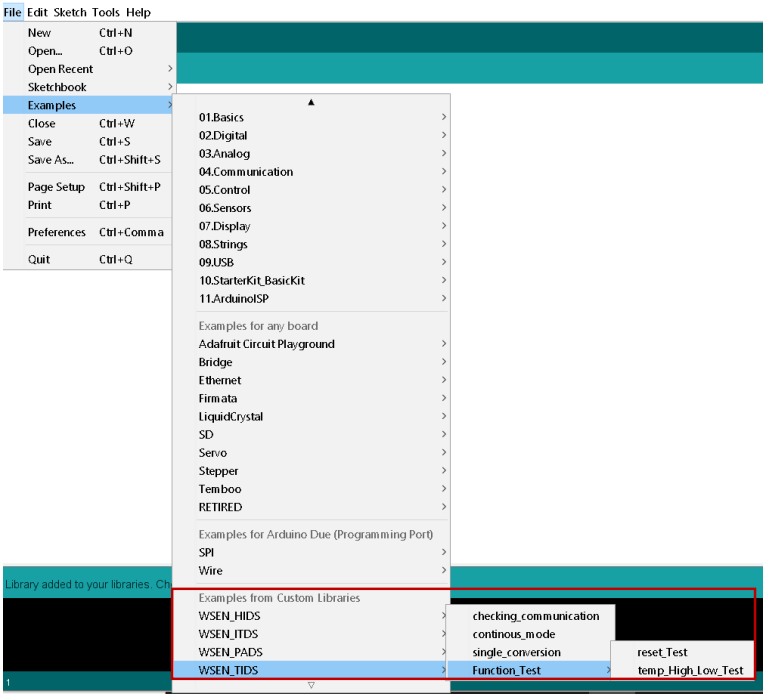


Figure 6: Examples from the sensor libraries

An example code for the temperature sensor WSEN-TIDS (Part number: 2521020222501) in continuous mode is shown in Figure 7

Temperature sensor evaluation board (part no. 2521020222591) must be connected to 3.3V I²C pin header.

STOP

Make sure to place the Sensor shield jumper on the correct position based on the Arduino board variant in use. Further information is given in the section 3.1

File Edit Sketch Tools Help

continous_mode §

```
#include "WSEN_TIDS.h"

Sensor_TIDS sensor;

//The Output Data Rate in Hz
int ODR = 25;

void setup()
{

  Serial.begin(9600);

  // Initialize the I2C interface
  sensor.init(TIDS_ADDRESS_I2C_1);

  // Set the free run mode with given ODR
  sensor.set_continous_mode(ODR);
}

void loop()
{
  // Read and calculate the temperature
  int temperature = sensor.read_temperature();

  // Print the temperature on the serial monitor
  Serial.print(temperature);
  Serial.println(" Celsius");

  // Waiting time between measurement
  int waitMillis = 1000 / ODR;

  // Wait before continuing with the next measurement
  delay(waitMillis);
}
```

Figure 7: WSEN-TIDS example code (continuous mode)

After the Arduino is connected to the PC through the USB, a connected Arduino device should be visible on a COM port. Select the correct Arduino board, corresponding COM port and upload the code. Once the code is successfully uploaded, the output can be observed on the serial monitor.

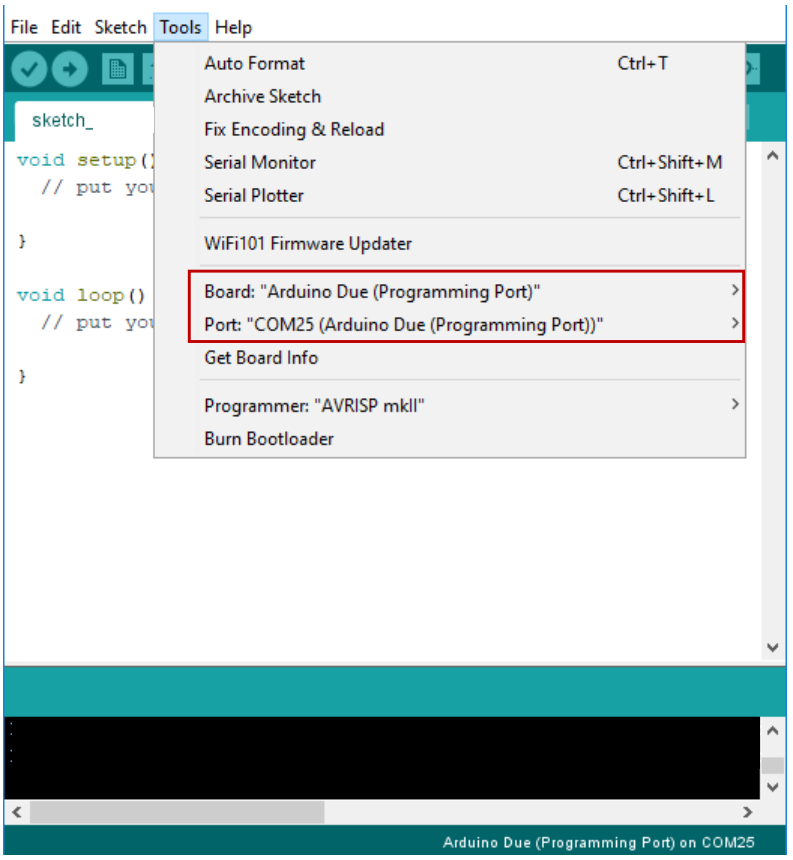


Figure 8: Select Arduino board, COM port and upload the code

3 Sensor shield

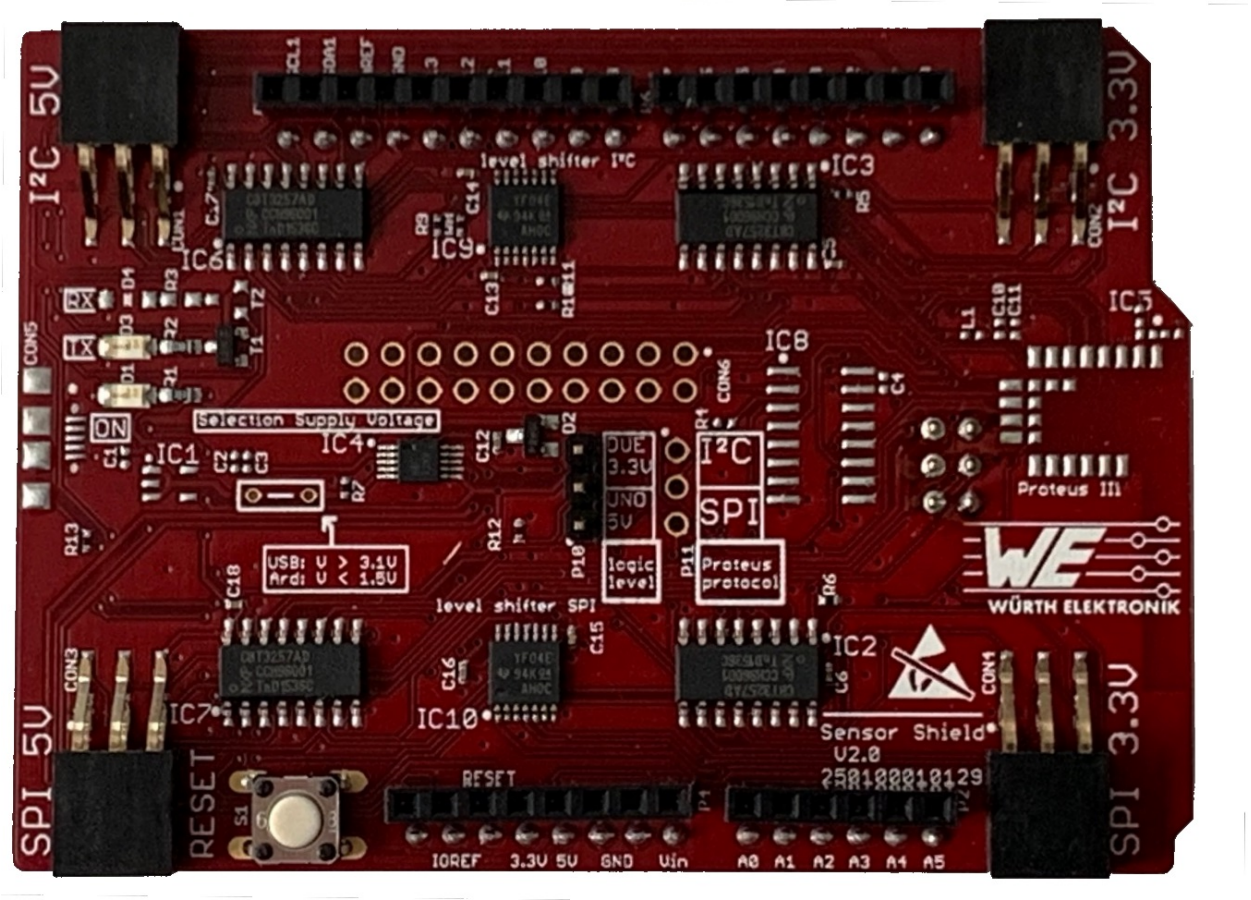


Figure 9: Evaluation board top view

The evaluation board is provided with an informative silkscreen to ease its use.

3.1 Jumpers

Only one jumper is needed to decide about connecting either an Arduino UNO, switching the multiplexer and level shifter in the accordingly function for 5V logic of the Arduino, or connecting an Arduino DUE, switching the multiplexer and level shifter accordingly for 3.3V logic on the Arduino connector. The following figure shows the jumper position to use an Arduino DUE.

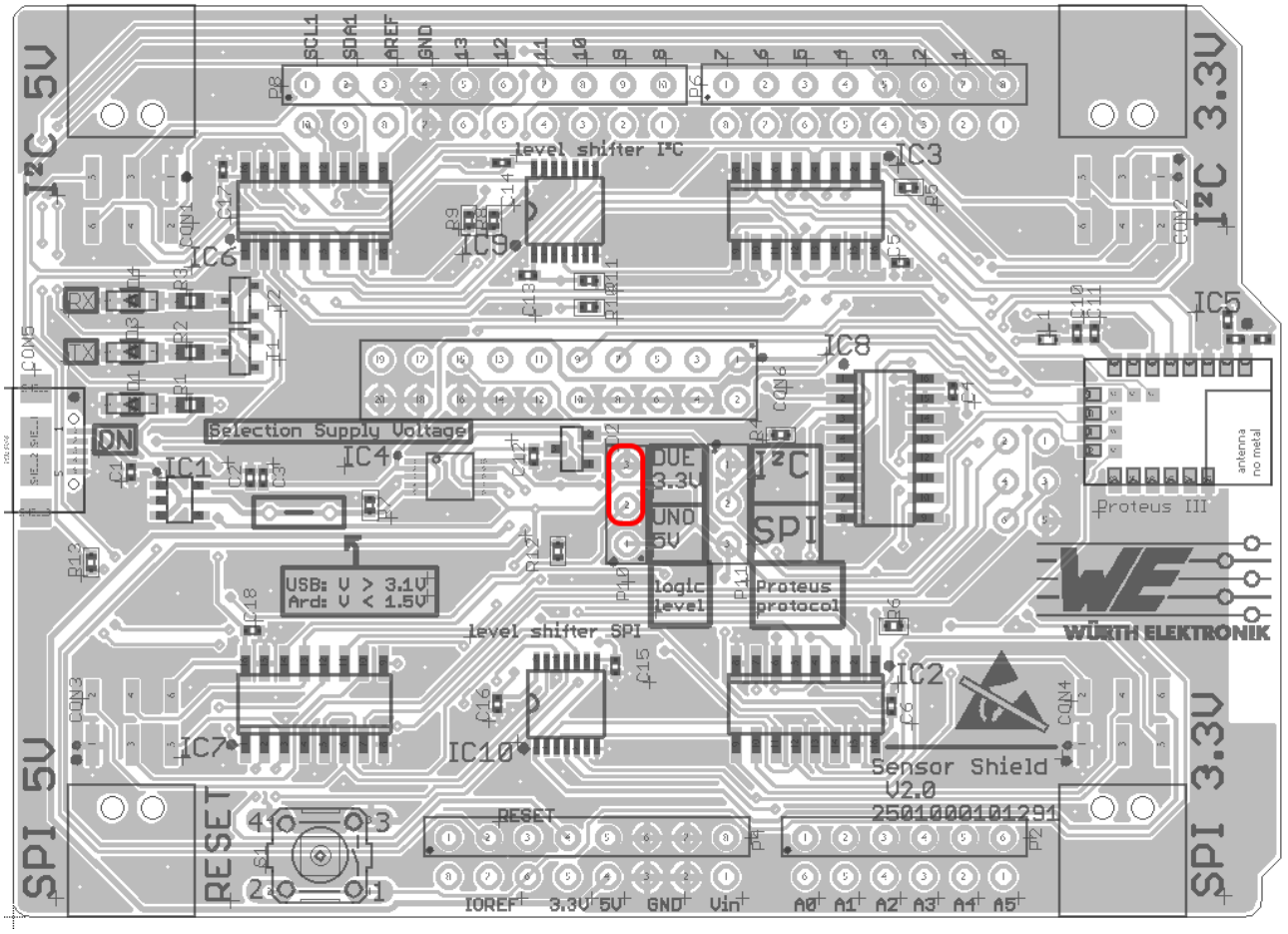


Figure 10: Jumper setting connecting Arduino DUE

3.2 Connectors and pin headers

There are several connectors on the top and bottom side of the sensor shield. They serve to connect the Arduino board, to stack other Sensor shields and to connect sensors via 2.54mm headers or to connect directly the Würth Elektronik eiSos GmbH & Co. KG Sensor EV-Boards.

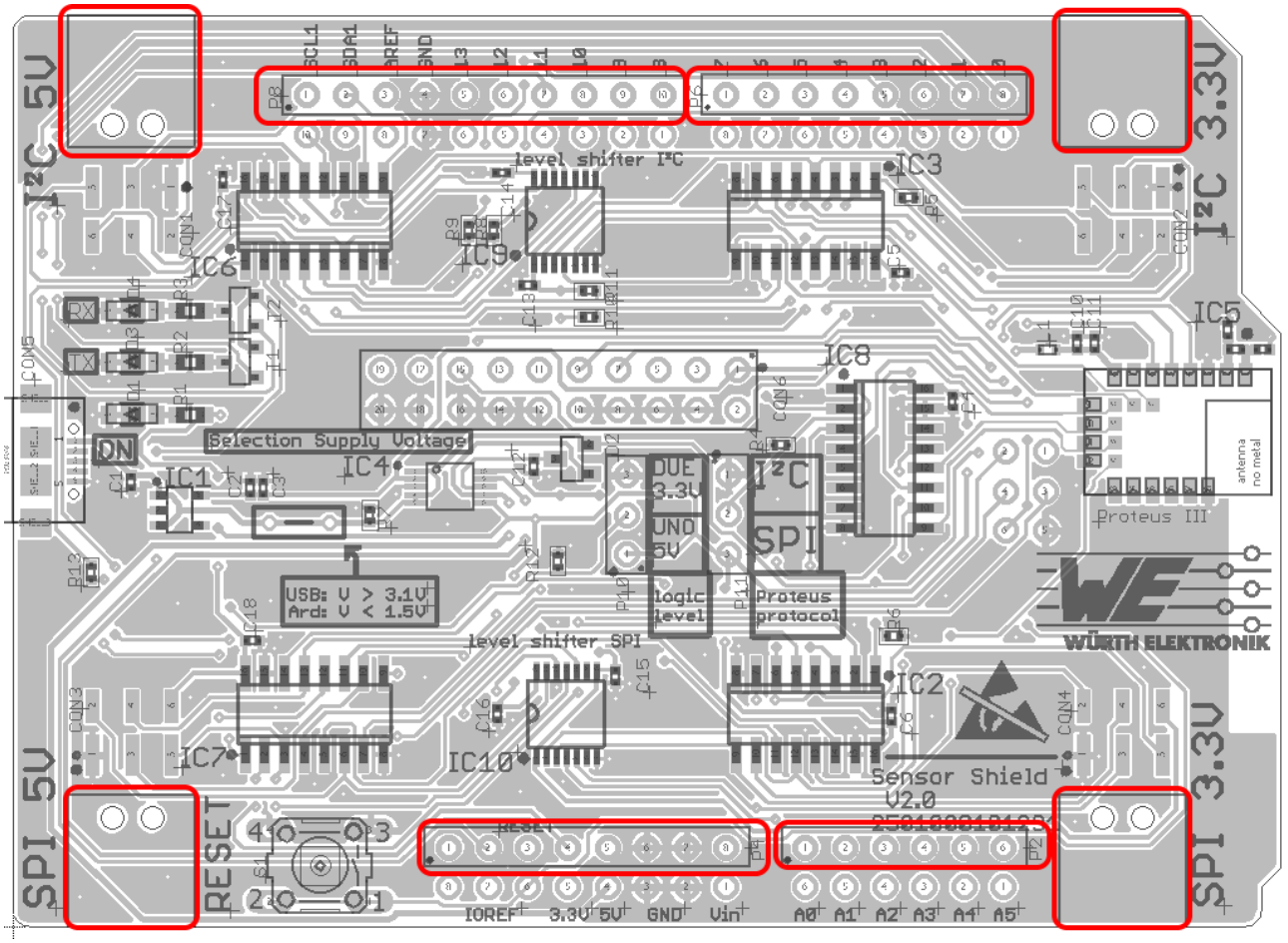


Figure 11: Connectors and pin headers top side

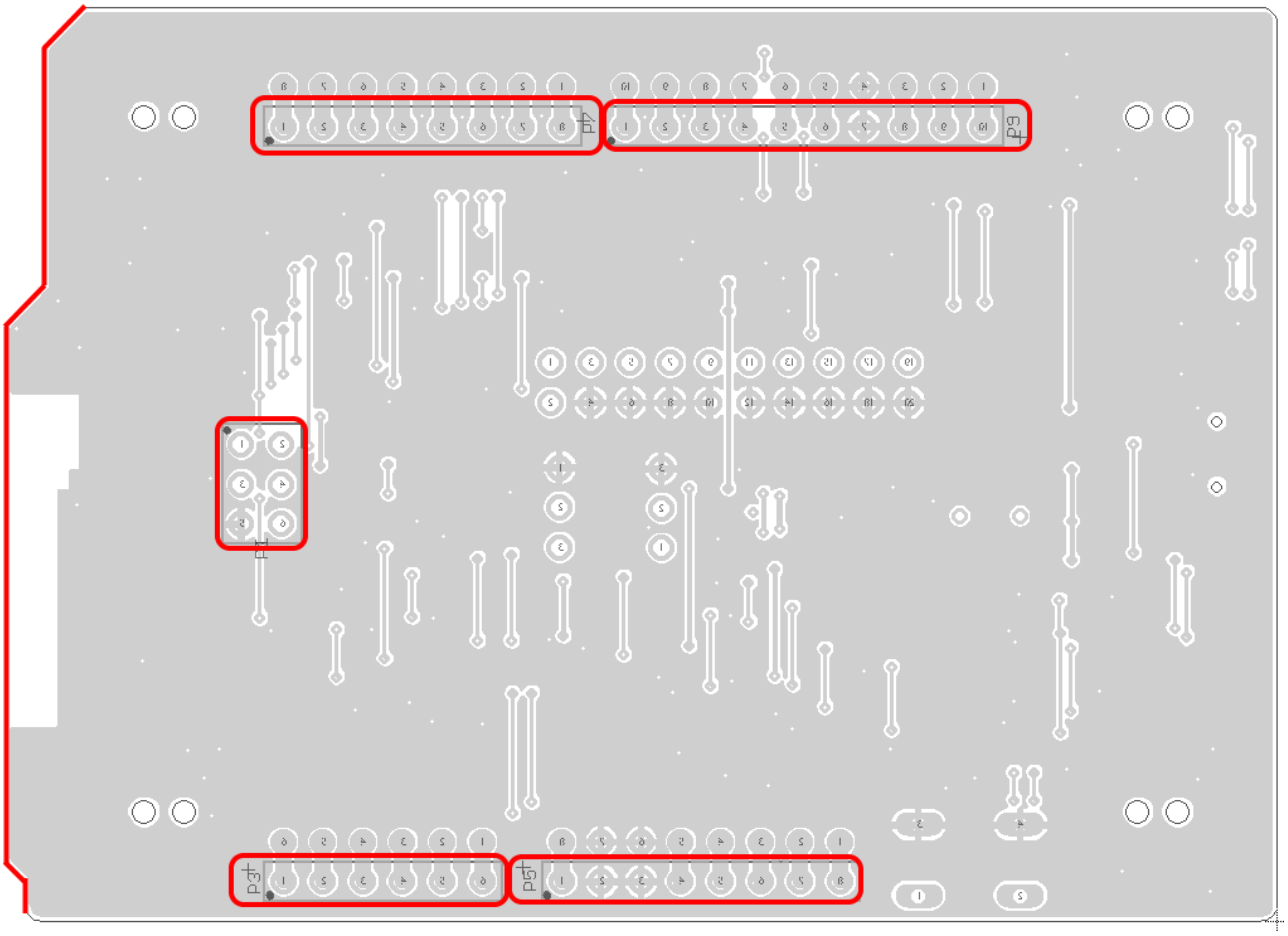


Figure 12: Connectors and pin headers bottom side

header / connector	Description
P2, P4, P6, P8	Socket to stack up another Sensor shield
CON1	I^2C 5V connector
CON2	I^2C 3.3V connector
CON3	SPI 5V connector
CON4	SPI 3.3V connector
P3, P5, P7, P9	header on bottom side to connect the Arduino board
P1	socket on bottom side to connect the Arduino board

Table 4: Connectors and pin headers

For easy orientation of the shield on the Ardiuino board, it follows Arduino board's shape. Match the diagonal bulge one above the other.

3.2.1 CON1 and CON2 I²C connectors

The pinning of connector CON1 and CON2 fits directly to the sensor evaluation boards mentioned in chapter `Supported products`. The connector on the shield is a 2.54mm pitch socket to have the possibility to connect any other I²C device with the most commenly used headers.

Pin	Description
1	GND
2	SCL
3	SDA
4	INT1
5	INT0
6	VDD

Table 5: Pinning I²C connector CON1 and CON2

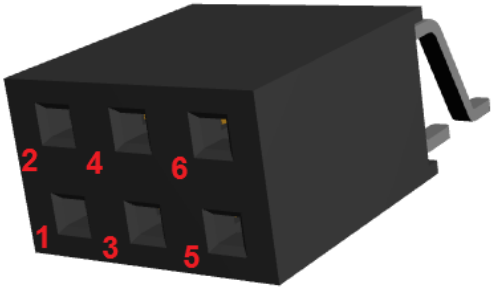


Figure 13: Pinning I²C connector CON1 and CON2

3.2.2 CON3 and CON4 SPI connectors

The pinning of connector CON3 and CON4 fits directly to the sensor evaluation boards mentioned in chapter `Supported products`. The connector on the shield is a 2.54mm pitch socket to have the possibility to connect any other SPI device with the most commenly used headers.

Pin	Description
1	GND
2	SCLK
3	MOSI
4	CS
5	MISO
6	VDD

Table 6: Pinning SPI connector CON3 and CON4

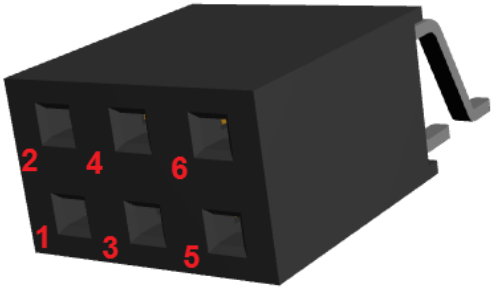


Figure 14: Pinning SPI connector CON3 and CON4

3.3 Buttons

3.3.1 Reset button

The reset button pulls the reset line low to trigger a reset. It is connected to the Arduino header to trigger a reset of the Arduino processor.

3.4 Function blocks

3.4.1 Power supply

The Sensor Shield is powered from the Arduino board via the socket P5.

Powering the Sensor shield via an USB cable through on board USB connector (not mounted) will switch off the I^2C/SPI signal lines between the sensor connectors (CON1-CON4) and the Arduino.

3.4.2 Level shifter

Two level shifters are used to change logic level between 5V logic and 3.3V logic. One IC is used for the SPI lines, the other for the I^2C lines.

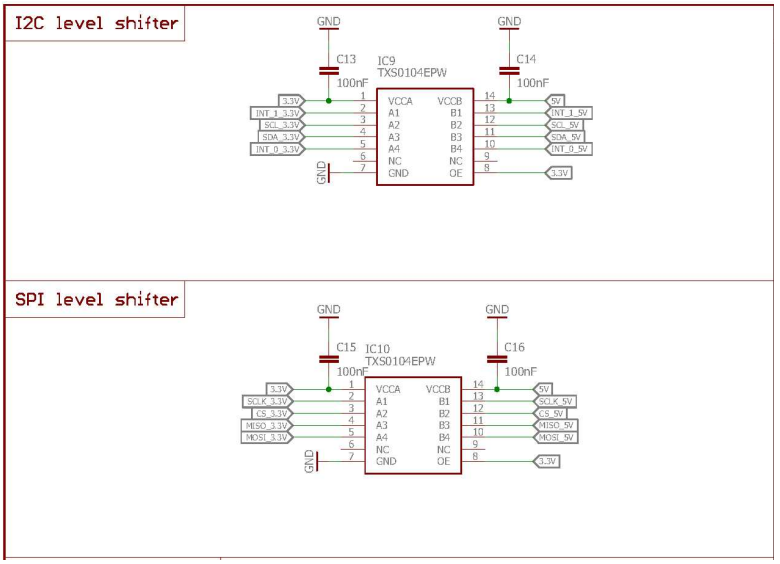


Figure 15: Level shifter

3.4.3 Multiplexer

The multiplexers serve the purpose of splitting the 3.3V logic level signals from Arduino DUE towards connector CON2 and CON4 and through the level shifter towards CON1 and CON3. Similarly in case of Arduino UNO, the multiplexer split the 5V logic level signals from the Arduino UNO directly toward CON1 and CON3 and through level shifter towards CON2 and CON4.

By setting the jumper based on the Arduino variant (UNO or DUE) on the three pin header P10 (as already described in section 3.1), the logic level on P1 - P9 can be selected.

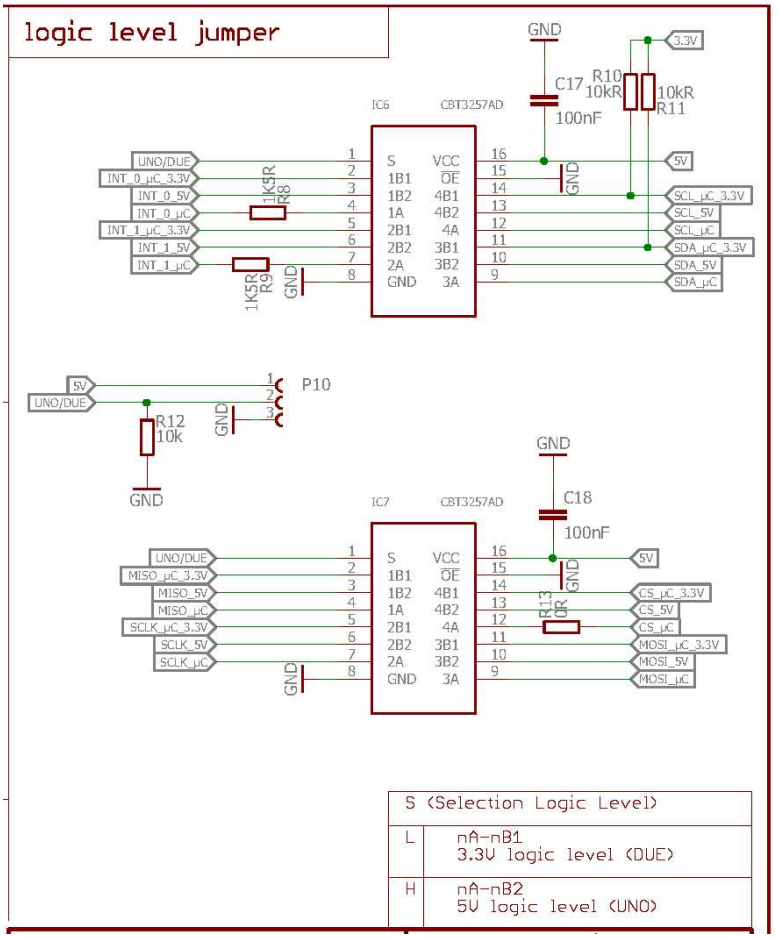


Figure 16: Multiplexer

3.4.4 Radio interface with firmware individualization on demand

There is a dedicated place holder for a radio module of the type Proteus or Thyone-I on the Sensor shield. With an individualized Firmware this radio module could independently collect sensor data and send them via radio protocol to a remote station. For this feature no Arduino board is used and the Sensor shield operates stand alone.

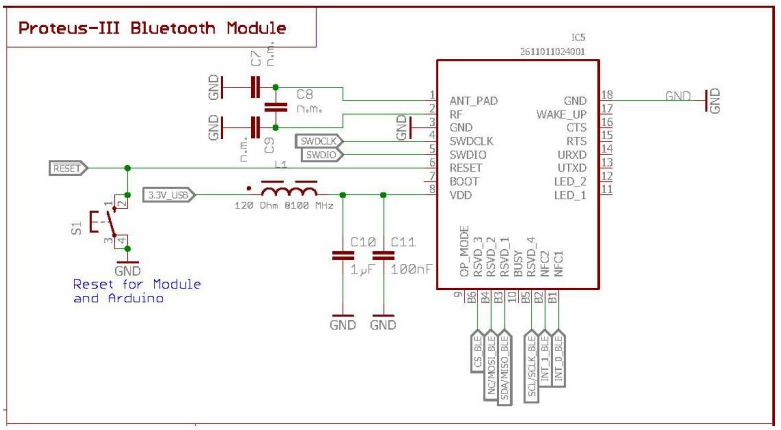


Figure 17: Radio module

The modules Proteus-I, Proteus-II, Proteus-III and Thyone-I standard firmware does not support this independent solution.

Please contact your local field sales engineer (FSE) or wireless-sales@we-online.com for further information.

3.4.4.1 Switching SPI and I²C interface to radio module

When connecting an USB cable directly to the Sensor shield, 5V from the USB is used to switch on the IC2 and IC3 multiplexers to connect the interface from the sensor connectors to the radio module. Without USB connection, pull down resistors switch off the multiplexers so that the sensor connectors are connected to the Arduino.

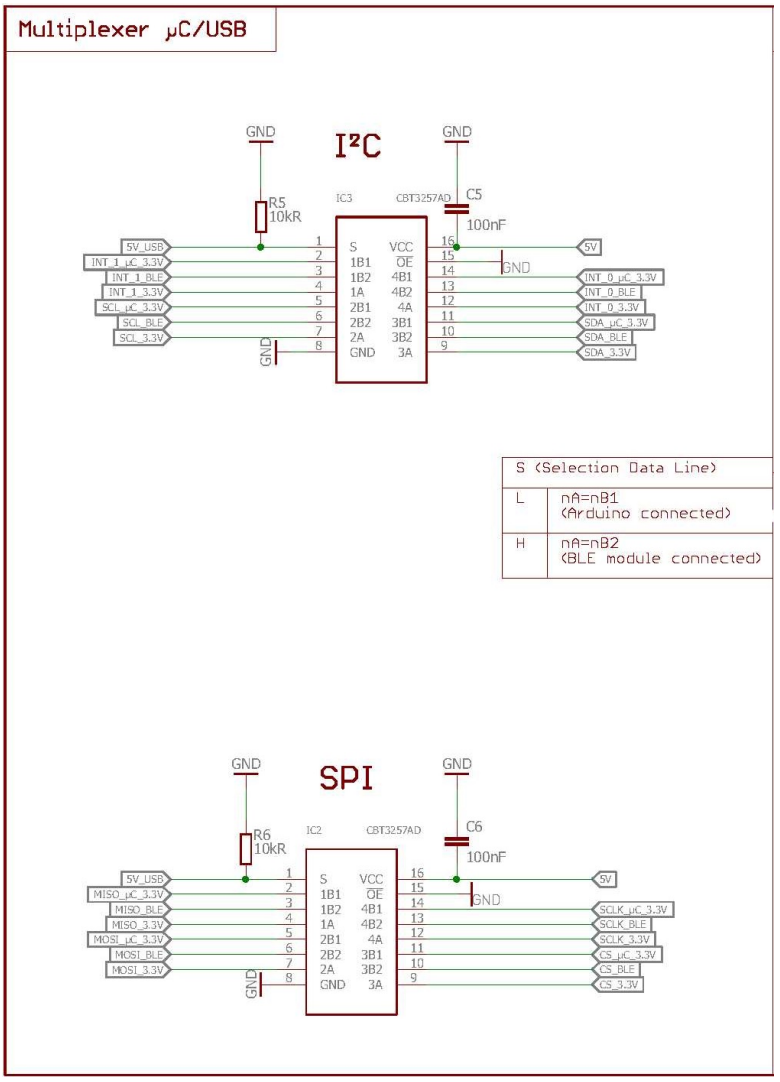


Figure 18: Radio module connection

3.4.4.2 Programming interface

The evaluation board provides a 2 x 10 pin connector to connect directly a JTAG or SWD flash adapter used for development. Please take care of the correct mounting of the flash adapter (Pin 1 is marked as such). Depending on your flash tool an additional adapter may be required.
The recommended flash adapter is one from the "Segger J-Link" family.

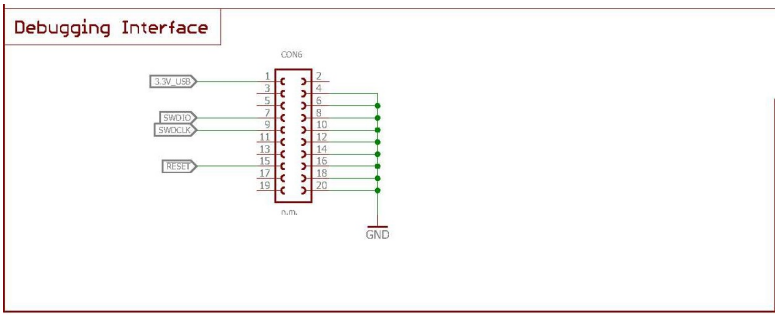
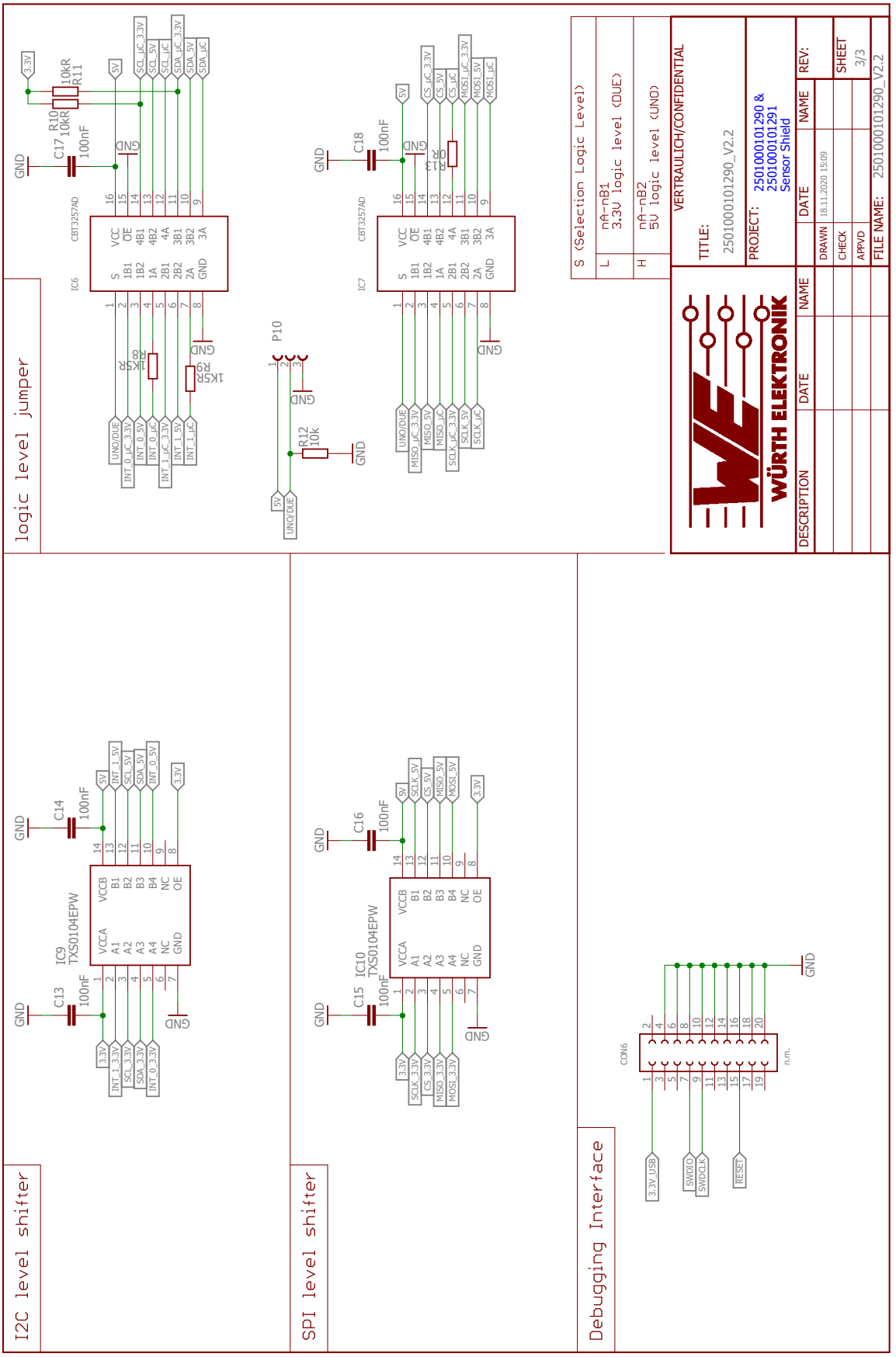
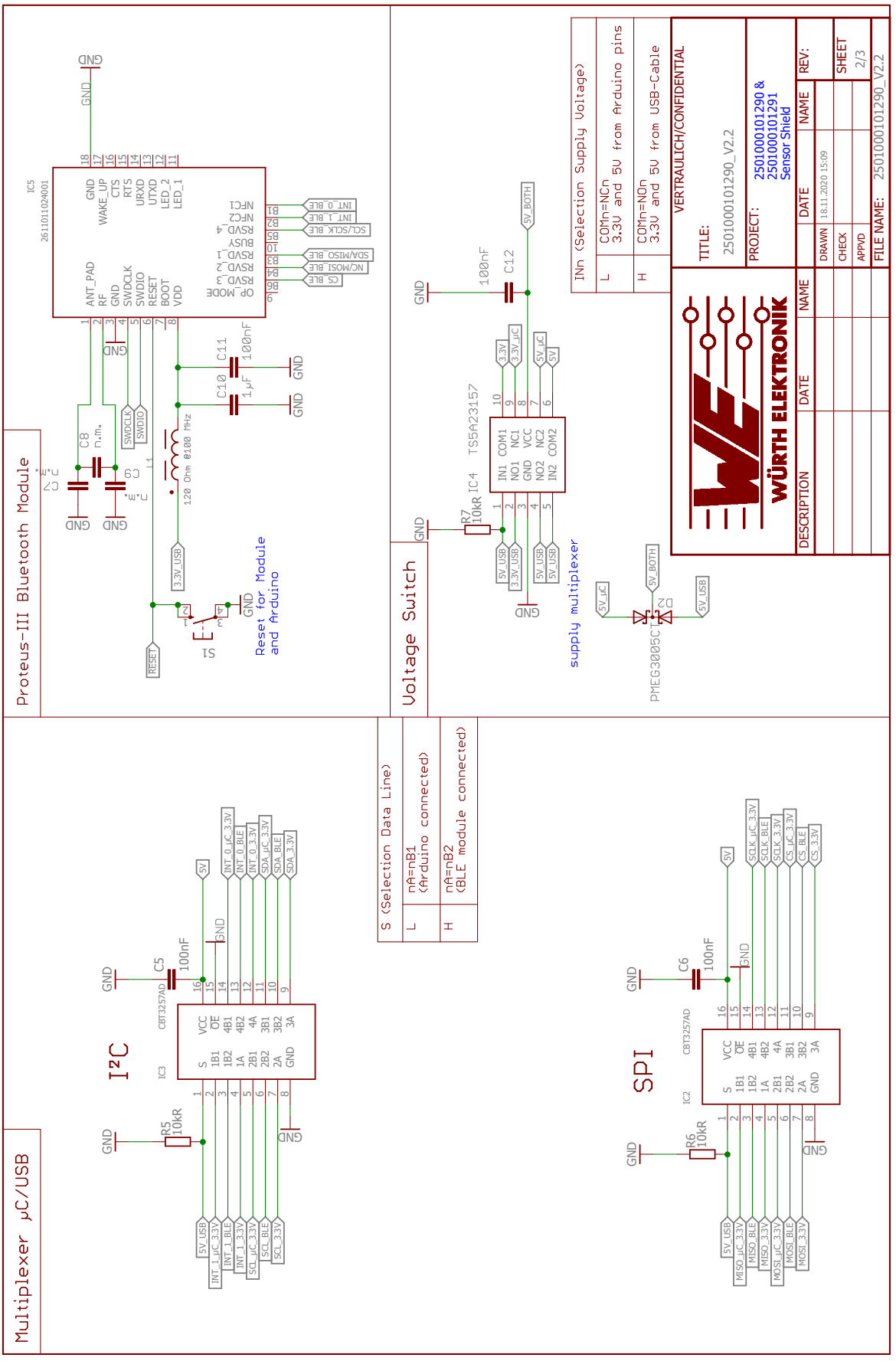


Figure 19: Debugging interface of the optional radio module

3.5 Schematic


logic level jumper
I2C level shifter
SPI level shifter
Debugging Interface
S (Selection Logic Level)
L nA-nB1 3.3V logic level (DUE)
H nA-nB2 5V logic level (UNO)
VERTRAULICH/CONFIDENTIAL
TITLE:
2501000101290_V2.2
PROJECT: 2501000101290 & 2501000101291 Sensor Shield
WÜRTH ELEKTRONIK
DESCRIPTION DATE NAME
DRAWN 18.11.2020 15:09
CHECK
APPVD
REV:
SHEET 3/3
FILE NAME: 2501000101290_V2.2


Proteus-III Bluetooth Module
Voltage Switch
Multiplexer µC/USB
I²C
SPI
Reset for Module and Arduino
supply multiplexer
S (Selection Data Line)
L nA=nB1 (Arduino connected)
H nA=nB2 (BLE module connected)
INn (Selection Supply Voltage)
L COMn=NCn 3.3V and 5V from Arduino pins
H COMn=NOn 3.3V and 5V from USB-Cable
VERTRAULICH/CONFIDENTIAL
TITLE:
2501000101290_V2.2
PROJECT:
2501000101290 & 2501000101291 Sensor Shield
WÜRTH ELEKTRONIK
DESCRIPTION
DATE
NAME
DRAWN 18.11.2020 15:09
CHECK
APPVD
REV:
SHEET 2/3
FILE NAME: 2501000101290_V2.2

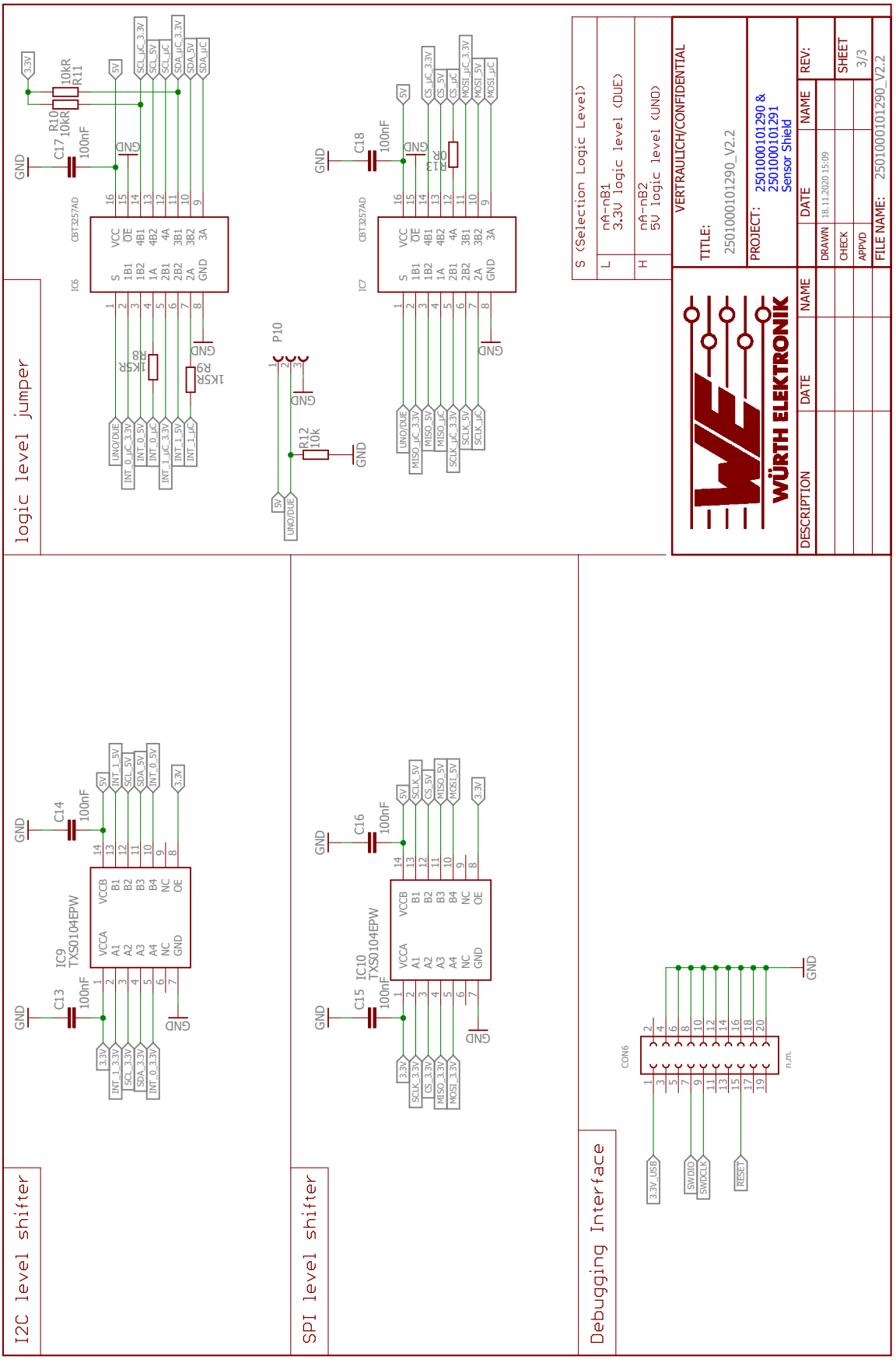


Figure 20: Circuit diagram

3.6 Full layout

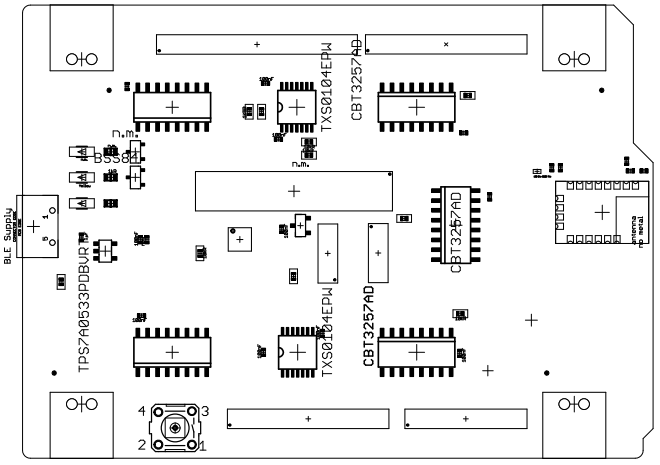


Figure 21: Assembly diagram

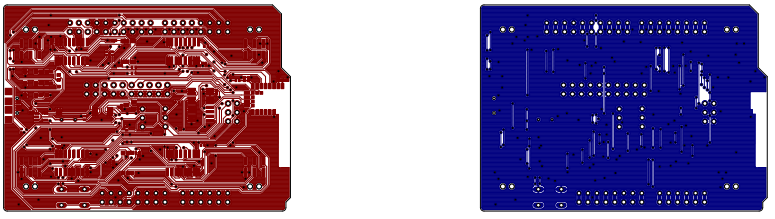


Figure 22: Layer

4 Software history

Arduino library software history

Version 1.0.0 "Release"

- First released version of the Arduino library.
- I^2C drivers and examples for: WSEN-PADS, WSEN-PDUS, WSEN-HIDS, WSEN-TIDS and WSEN-ITDS

5 Regulatory compliance information

Pursuant to Article 1 (2.) of the EU directive 2014/53/EU, Article 1 (2.) the directive does not apply to equipment listed in Annex I (4.): custom-built evaluation kits destined for professionals to be used solely at research and development facilities for such purposes.

5.1 Exemption clause

Relevant regulation requirements are subject to change. Würth Elektronik eiSos does not guarantee the accuracy of the before mentioned information. Directives, technical standards, procedural descriptions and the like may be interpreted differently by the national authorities. Equally, the national laws and restrictions may vary with the country. In case of doubt or uncertainty, we recommend that you consult with the authorities or official certification organizations of the relevant countries. Würth Elektronik eiSos is exempt from any responsibilities or liabilities related to regulatory compliance.

Notwithstanding the above, Würth Elektronik eiSos makes no representations and warranties of any kind related to their accuracy, correctness, completeness and/or usability for customer applications. No responsibility is assumed for inaccuracies or incompleteness.

6 Important notes

The following conditions apply to all goods within the sensors product range of Würth Elektronik eiSos GmbH & Co. KG:

6.1 General customer responsibility

Some goods within the product range of Würth Elektronik eiSos GmbH & Co. KG contain statements regarding general suitability for certain application areas. These statements about suitability are based on our knowledge and experience of typical requirements concerning the areas, serve as general guidance and cannot be estimated as binding statements about the suitability for a customer application. The responsibility for the applicability and use in a particular customer design is always solely within the authority of the customer. Due to this fact, it is up to the customer to evaluate, where appropriate to investigate and to decide whether the device with the specific product characteristics described in the product specification is valid and suitable for the respective customer application or not. Accordingly, the customer is cautioned to verify that the documentation is current before placing orders.

6.2 Customer responsibility related to specific, in particular safety-relevant applications

It has to be clearly pointed out that the possibility of a malfunction of electronic components or failure before the end of the usual lifetime cannot be completely eliminated in the current state of the art, even if the products are operated within the range of the specifications. The same statement is valid for all software and software parts contained in or used with or for products in the sensor product range of Würth Elektronik eiSos GmbH & Co. KG. In certain customer applications requiring a high level of safety and especially in customer applications in which the malfunction or failure of an electronic component could endanger human life or health, it must be ensured by most advanced technological aid of suitable design of the customer application that no injury or damage is caused to third parties in the event of malfunction or failure of an electronic component.

6.3 Best care and attention

Any product-specific data sheets, manuals, application notes, PCN's, warnings and cautions must be strictly observed in the most recent versions and matching to the products revisions. This documents can be downloaded from the product specific sections on the wireless connectivity and sensors homepage.

6.4 Customer support for product specifications

Some products within the product range may contain substances, which are subject to restrictions in certain jurisdictions in order to serve specific technical requirements. Necessary information is available on request. In this case, the field sales engineer or the internal sales person in charge should be contacted who will be happy to support in this matter.

6.5 Product improvements

Due to constant product improvement, product specifications may change from time to time. As a standard reporting procedure of the Product Change Notification (PCN) according to the JEDEC-Standard, we inform about major changes. In case of further queries regarding the PCN, the field sales engineer, the internal sales person or the technical support team in charge should be contacted. The basic responsibility of the customer as per section 6.1 and 6.2 remains unaffected.
The sensor driver software ¨Sensor SDK¨ and it's source codes are not subject to the Product Change Notification information process.

6.6 Product life cycle

Due to technical progress and economical evaluation we also reserve the right to discontinue production and delivery of products. As a standard reporting procedure of the Product Termination Notification (PTN) according to the JEDEC-Standard we will inform at an early stage about inevitable product discontinuance. According to this, we cannot ensure that all products within our product range will always be available. Therefore, it needs to be verified with the field sales engineer or the internal sales person in charge about the current product availability expectancy before or when the product for application design-in disposal is considered. The approach named above does not apply in the case of individual agreements deviating from the foregoing for customer-specific products.

6.7 Property rights

All the rights for contractual products produced by Würth Elektronik eiSos GmbH & Co. KG on the basis of ideas, development contracts as well as models or templates that are subject to copyright, patent or commercial protection supplied to the customer will remain with Würth Elektronik eiSos GmbH & Co. KG. Würth Elektronik eiSos GmbH & Co. KG does not warrant or represent that any license, either expressed or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right relating to any combination, application, or process in which Würth Elektronik eiSos GmbH & Co. KG components or services are used.

6.8 General terms and conditions

Unless otherwise agreed in individual contracts, all orders are subject to the current version of the "General Terms and Conditions of Würth Elektronik eiSos Group", last version available at *www.we-online.com*.

7 Legal notice

7.1 Exclusion of liability

Würth Elektronik eiSos GmbH & Co. KG considers the information in this document to be correct at the time of publication. However, Würth Elektronik eiSos GmbH & Co. KG reserves the right to modify the information such as technical specifications or functions of its products or discontinue the production of these products or the support of one of these products without any written announcement or notification to customers. The customer must make sure that the information used corresponds to the latest published information. Würth Elektronik eiSos GmbH & Co. KG does not assume any liability for the use of its products. Würth Elektronik eiSos GmbH & Co. KG does not grant licenses for its patent rights or for any other of its intellectual property rights or third-party rights.

Notwithstanding anything above, Würth Elektronik eiSos GmbH & Co. KG makes no representations and/or warranties of any kind for the provided information related to their accuracy, correctness, completeness, usage of the products and/or usability for customer applications. Information published by Würth Elektronik eiSos GmbH & Co. KG regarding third-party products or services does not constitute a license to use such products or services or a warranty or endorsement thereof.

7.2 Suitability in customer applications

The customer bears the responsibility for compliance of systems or units, in which Würth Elektronik eiSos GmbH & Co. KG products are integrated, with applicable legal regulations. Customer acknowledges and agrees that it is solely responsible for compliance with all legal, regulatory and safety-related requirements concerning its products, and any use of Würth Elektronik eiSos GmbH & Co. KG components in its applications, notwithstanding any applications-related in-formation or support that may be provided by Würth Elektronik eiSos GmbH & Co. KG. Customer represents and agrees that it has all the necessary expertise to create and implement safeguards which anticipate dangerous consequences of failures, monitor failures and their consequences lessen the likelihood of failures that might cause harm and take appropriate remedial actions. The customer will fully indemnify Würth Elektronik eiSos GmbH & Co. KG and its representatives against any damages arising out of the use of any Würth Elektronik eiSos GmbH & Co. KG components in safety-critical applications.

7.3 Usage restriction

Würth Elektronik eiSos GmbH & Co. KG products have been designed and developed for usage in general electronic equipment only. This product is not authorized for use in equipment where a higher safety standard and reliability standard is especially required or where a failure of the product is reasonably expected to cause severe personal injury or death, unless the parties have executed an agreement specifically governing such use. Moreover, Würth Elektronik eiSos GmbH & Co. KG products are neither designed nor intended for use in areas such as military, aerospace, aviation, nuclear control, submarine, transportation (automotive control, train control, ship control), transportation signal, disaster prevention, medical, public information network etc. Würth Elektronik eiSos GmbH & Co. KG must be

informed about the intent of such usage before the design-in stage. In addition, sufficient reliability evaluation checks for safety must be performed on every electronic component, which is used in electrical circuits that require high safety and reliability function or performance. By using Würth Elektronik eiSos GmbH & Co. KG products, the customer agrees to these terms and conditions.

8 License terms for Würth Elektronik eiSos GmbH & Co. KG sensor product software and source code

This License terms will take effect upon the purchase and usage of the Würth Elektronik eiSos GmbH & Co. KG sensor products. You hereby agree that this license terms are applicable to the product and the incorporated software, firmware and source codes (collectively, "Software") made available by Würth Elektronik eiSos in any form, including but not limited to binary, executable or source code form.
The software included in any Würth Elektronik eiSos sensor product is purchased to you on the condition that you accept the terms and conditions of this license terms. You agree to comply with all provisions under this license terms.

8.1 Limited license

Würth Elektronik eiSos hereby grants you a limited, non-exclusive, non-transferable and royalty-free license to use the software and under the conditions that will be set forth in this license terms. You are free to use the provided software only in connection with one of the products from Würth Elektronik eiSos to the extent described in this license terms.
You are entitled to change or alter the source code for the sole purpose of creating an application embedding the Würth Elektronik eiSos sensor product. The transfer of the source code to third parties is allowed to the sole extent that the source code is used by such third parties in connection with our product or another hardware provided by Würth Elektronik eiSos under strict adherence of this license terms. Würth Elektronik eiSos will not assume any liability for the usage of the incorporated software and the source code.
You are not entitled to transfer the source code in any form to third parties without prior written consent of Würth Elektronik eiSos.
You are not allowed to reproduce, translate, reverse engineer, decompile, disassemble or create derivative works of the incorporated software and the source code in whole or in part.
No more extensive rights to use and exploit the products are granted to you.

8.2 Usage and obligations

The responsibility for the applicability and use of the Würth Elektronik eiSos sensor product with the incorporated software in a particular customer design is always solely within the authority of the customer. Due to this fact, it is up to you to evaluate and investigate, where appropriate, and to decide whether the device with the specific product characteristics described in the product specification is valid and suitable for your respective application or not.
You are responsible for using the Würth Elektronik eiSos sensor product with the incorporated software in compliance with all applicable product liability and product safety laws. You acknowledge to minimize the risk of loss and harm to individuals and bear the risk for failure leading to personal injury or death due to your usage of the product.
Würth Elektronik eiSos' products are not authorized for use in safety-critical applications, or where a failure of the product is reasonably expected to cause severe personal injury or death. Moreover, Würth Elektronik eiSos' products are neither designed nor intended for

use in areas such as military, aerospace, aviation, nuclear control, submarine, transportation (automotive control, train control, ship control), transportation signal, disaster prevention, medical, public information network etc. You shall inform Würth Elektronik eiSos about the intent of such usage before design-in stage. In certain customer applications requiring a very high level of safety and in which the malfunction or failure of an electronic component could endanger human life or health, you must ensure to have all necessary expertise in the safety and regulatory ramifications of your applications. You acknowledge and agree that you are solely responsible for all legal, regulatory and safety-related requirements concerning your products and any use of Würth Elektronik eiSos' products in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by Würth Elektronik eiSos. YOU SHALL INDEMNIFY WÜRTH ELEKTRONIK EISOS AGAINST ANY DAMAGES ARISING OUT OF THE USE OF WÜRTH ELEKTRONIK EISOS' PRODUCTS IN SUCH SAFETY-CRITICAL APPLICATIONS.

8.3 Ownership

The incorporated Software created by Würth Elektronik eiSos is and will remain the exclusive property of Würth Elektronik eiSos.

8.4 Disclaimer of warranty

THE SOFTWARE AND IT'S SOURCE CODE IS PROVIDED "AS IS". YOU ACKNOWLEDGE THAT WÜRTH ELEKTRONIK EISOS MAKES NO REPRESENTATIONS AND WARRANTIES OF ANY KIND RELATED TO, BUT NOT LIMITED TO THE NON-INFRINGEMENT OF THIRD PARTIES' INTELLECTUAL PROPERTY RIGHTS OR THE MERCHANTABILITY OR FITNESS FOR YOUR INTENDED PURPOSE OR USAGE. WÜRTH ELEKTRONIK EISOS DOES NOT WARRANT OR REPRESENT THAT ANY LICENSE, EITHER EXPRESS OR IMPLIED, IS GRANTED UNDER ANY PATENT RIGHT, COPYRIGHT, MASK WORK RIGHT, OR OTHER INTELLECTUAL PROPERTY RIGHT RELATING TO ANY COMBINATION, MACHINE, OR PROCESS IN WHICH THE WÜRTH ELEKTRONIK EISOS' PRODUCT WITH THE INCORPORATED SOFTWARE IS USED. INFORMATION PUBLISHED BY WÜRTH ELEKTRONIK EISOS REGARDING THIRD-PARTY PRODUCTS OR SERVICES DOES NOT CONSTITUTE A LICENSE FROM WÜRTH ELEKTRONIK EISOS TO USE SUCH PRODUCTS OR SERVICES OR A WARRANTY OR ENDORSEMENT THEREOF.

8.5 Limitation of liability

Any liability not expressly provided by Würth Elektronik eiSos shall be disclaimed.
You agree to hold us harmless from any third-party claims related to your usage of the Würth Elektronik eiSos' products with the incorporated software and source code. Würth Elektronik eiSos disclaims any liability for any alteration, development created by you or your customers as well as for any combination with other products.

8.6 Applicable law and jurisdiction

Applicable law to this license terms shall be the laws of the Federal Republic of Germany. Any dispute, claim or controversy arising out of or relating to this license terms shall be

resolved and finally settled by the court competent for the location of Würth Elektronik eiSos registered office.

8.7 Severability clause

If a provision of this license terms are or becomes invalid, unenforceable or null and void, this shall not affect the remaining provisions of the terms. The parties shall replace any such provisions with new valid provisions that most closely approximate the purpose of the terms.

8.8 Miscellaneous

Würth Elektronik eiSos reserves the right at any time to change this terms at its own discretion. It is your responsibility to check at Würth Elektronik eiSos homepage for any updates. Your continued usage of the products will be deemed as the acceptance of the change.
We recommend you to be updated about the status of new software, which is available on our website or in our data sheet, and to implement new software in your device where appropriate.
By ordering a sensor product, you accept this license terms in all terms.

List of Figures

List of Tables

WÜRTH ELEKTRONIK

more than you expect

Internet of Things

Monitoring & Control

Automated Meter Reading

Contact:
Würth Elektronik eiSos GmbH & Co. KG
Division Wireless Connectivity & Sensors

Max-Eyth-Straße 1
74638 Waldenburg
Germany

Tel.: +49 651 99355-0
Fax.: +49 651 99355-69
www.we-online.com/wireless-connectivity