

## USER MANUAL

SENSORBLE FEATHERWING KIT

2611187024001

VERSION 1.0

OCTOBER 6, 2022

WÜRTH ELEKTRONIK MORE THAN YOU EXPECT

\*\*\*\*\*

## **MUST READ**

### **Check for firmware updates**

Before using the product make sure you use the most recent firmware version, data sheet and user manual. This is especially important for Wireless Connectivity products that were not purchased directly from Würth Elektronik eiSos. A firmware update on these respective products may be required.

We strongly recommend to include in the customer system design, the possibility for a firmware update of the product.

## Revision history

Manual version	Notes	Date
1.0	Initial version	October 2022

## Contents

<b>1 General description</b>	<b>3</b>
1.1 Introduction . . . . .	3
1.2 Block diagram . . . . .	4
1.3 Contents . . . . .	5
<b>2 Functional description</b>	<b>6</b>
2.1 Adafruit Feather . . . . .	6
<b>3 Software description</b>	<b>7</b>
3.1 Software architecture . . . . .	7
3.2 Pre-compiled Apps . . . . .	9
<b>4 Regulatory compliance information</b>	<b>10</b>
4.1 Exemption clause . . . . .	10
<b>5 Important notes</b>	<b>11</b>
5.1 General customer responsibility . . . . .	11
5.2 Customer responsibility related to specific, in particular safety-relevant applications . . . . .	11
5.3 Best care and attention . . . . .	11
5.4 Customer support for product specifications . . . . .	11
5.5 Product improvements . . . . .	12
5.6 Product life cycle . . . . .	12
5.7 Property rights . . . . .	12
5.8 General terms and conditions . . . . .	12
<b>6 Legal notice</b>	<b>13</b>
6.1 Exclusion of liability . . . . .	13
6.2 Suitability in customer applications . . . . .	13
6.3 Trademarks . . . . .	13
6.4 Usage restriction . . . . .	13
<b>7 License terms</b>	<b>15</b>
7.1 Limited license . . . . .	15
7.2 Usage and obligations . . . . .	15
7.3 Ownership . . . . .	16
7.4 Firmware update(s) . . . . .	16
7.5 Disclaimer of warranty . . . . .	16
7.6 Limitation of liability . . . . .	17
7.7 Applicable law and jurisdiction . . . . .	17
7.8 Severability clause . . . . .	17
7.9 Miscellaneous . . . . .	17

# 1 General description

## 1.1 Introduction

The Würth Elektronik eiSos SensorBLE Gadget is an evaluation board set with pre-installed firmware and matching smart device app. These three boards are fully compatible to the popular Adafruit Feather line of development boards.

The Sensor Wing (2501000201291), consists of the following four sensors:

- WSEN-PADS - Absolute pressure sensor (2511020213301)
- WSEN-ITDS - 3-axis acceleration sensor (2533020201601)
- WSEN-TIDS - Temperature sensor (2521020222501)
- WSEN-HIDS - Humidity sensor (2523020210001)

All four sensors are connected over the shared I<sup>2</sup>C bus and hence can be connected to any of the Feather microcontroller boards, which is represented in this set by a Feather M0 Basic board.

The third board is providing the radio interface to Bluetooth® Low Energy by implementing the Proteus-III module on a Wing.

Please note that the Proteus-III in future releases of this Kit will be replaced by Setebos-I. The switch to Setebos-I does not require changes to the firmware of the M0 host and it does not change the functionality of the Kit.

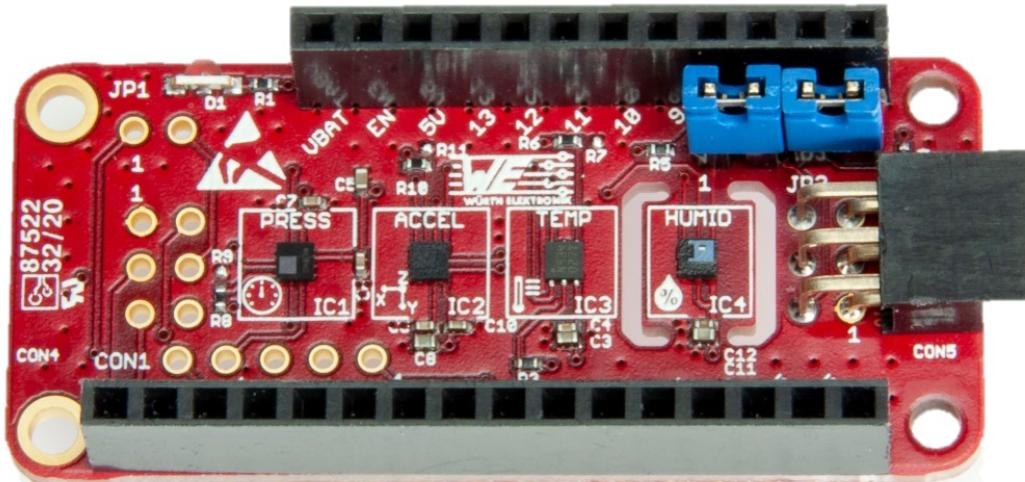


Figure 1: The WE Sensor FeatherWing (2501000201291)

The Setebos-I and Proteus-III FeatherWing are hardware identical, as is the Thyone-I FeaetherWing. It's just the radio module's firmware that is different. That board connects via the header to the M0 host and extends the host via UART with a Bluetooth LE radio.

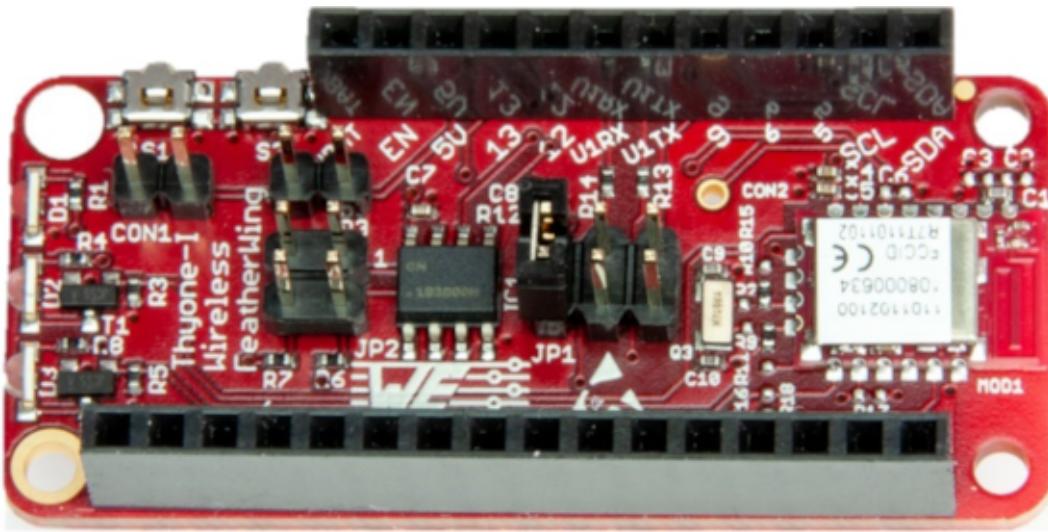


Figure 2: The WE Setebos-I / Proteus-III FeatherWing

## 1.2 Block diagram

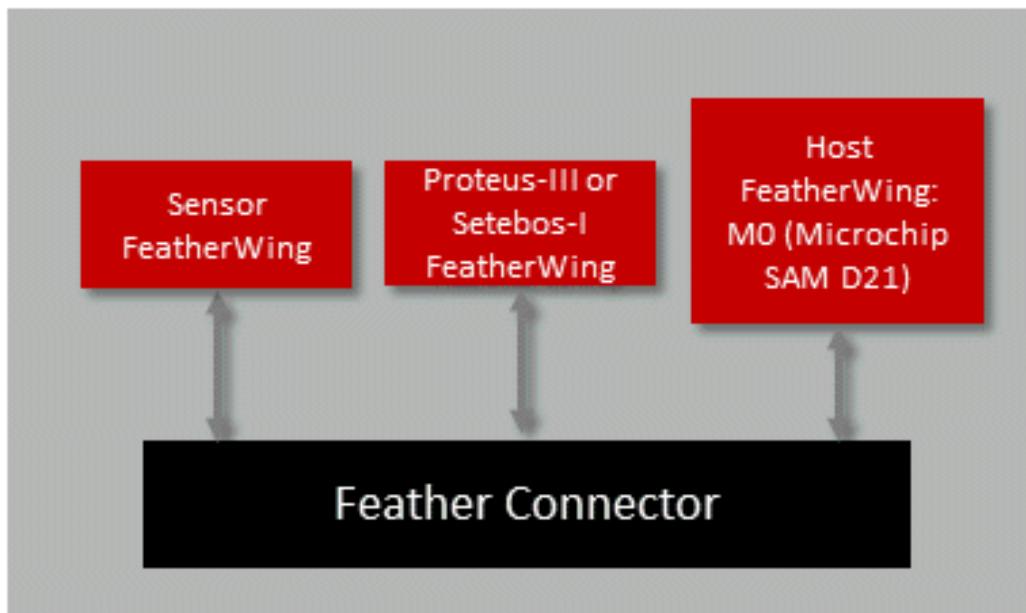


Figure 3: Block diagram - Sensor FeatherWing

## 1.3 Contents

Description	Quantity
WE Sensor FeatherWing	1
WE Proteus-III or Setebos-I FeatherWing	1
Adafruit Feather M0	1
Packaging: ESD safe bag	1

Table 1: Contents 2611187024001

## 2 Functional description

The SensorBLE Gadget was designed with rapid prototyping in mind. Being fully compatible with the Adafruit ecosystem, this FeatherWing provides the user with the flexibility to choose the preferred host microcontroller. The inherent modularity of the ecosystem allows the FeatherWing to be easily integrated into any project.

The next sections provide a brief introduction to Adafruit's Feather ecosystem.

Feel free to check our youtube channel:

[www.youtube.com/user/WuerthElektronik/videos](http://www.youtube.com/user/WuerthElektronik/videos) for video tutorials, hands-ons and webinars relating to our products.

### 2.1 Adafruit Feather

The Adafruit Feather ecosystem consists of two types of boards apart from a host of accessories:

- **Feather:** Adafruit Feathers are a complete line of development boards from Adafruit that are standalone and stackable. They can be powered either over the on-board micro-USB plugs or using a Li-Po battery. Feathers are portable, flexible and light as their namesake.
- **FeatherWings:** FeatherWings are stackable boards that when used along with a Feather add a certain functionality to the system.

The Feather system with more than 50+ Wings, several different types of accessories and arduino/circuit python based code support provides a perfect ecosystem for rapid prototyping. Please refer to [adafruit.com/feather](http://adafruit.com/feather) for more details on the Adafruit Feather ecosystem.

### 3 Software description

Würth Elektronik eiSos provides a Software Development Kit (SDK) with examples to support all the FeatherWings created by Würth Elektronik eiSos. Here are the salient features of the WE FeatherWing SDK.

Specifically for this Evaluation Kit, the GitHub repository contains the following software parts:

- Firmware for Feather M0 implementing the Sensor2BLE functionality
- Smartphone App matching to the protocol of the demo firmware of the Kit

The SDK can be accessed on Github at [github.com/WE-eiSmart/FeatherWings](https://github.com/WE-eiSmart/FeatherWings), the Kit uses the "Sensor2BLE" and "ProteusFeatherWing" folders of this repository to create the firmware required for this set. See the included readme files for dependencies and instructions, i.e. the readme of the basic project as well as the readme files of the two dependencies.

The Smartphone Apps sourcecode can be accessed on Github at [github.com/WE-eiSmart/WE-SensorBLE](https://github.com/WE-eiSmart/WE-SensorBLE).

Follow the included readme file for dependencies and instructions, especially how to install and run the capacitor framework and it's dependencies.

#### 3.1 Software architecture

The Würth Elektronik eiSos FeatherWing SDK is built up in a modular way using a set of open-source tools to enable complete flexibility for the user.

The figure 4 shows the architecture of the Würth Elektronik eiSos FeatherWing SDK.

- **PlatformIO:** is a cross-platform, cross-architecture, multiple framework professional tool for embedded software development. It provides the tool chain necessary for the software development including building, debugging, code-upload and many more. PlatformIO works well on all the modern operating systems and supports a host of development boards including the Feathers from Adafruit. Further details about PlatformIO can be found under [platformio.org](https://platformio.org)
- **Platform interface:** this layer provides abstraction to the peripheral drivers for the platform being used. Currently, this SDK implements an abstraction to the Arduino peripheral drivers for the Feather M0 express platform.
- **Würth Elektronik eiSos SDK:** this is a layer of platform-independent pure C drivers for sensors and wireless connectivity modules from Würth Elektronik eiSos. These drivers implement all the necessary functions to utilize full feature set of the sensors and wireless connectivity modules.  
More details on the SDK and downloads under [github.com/WurthElektronik](https://github.com/WurthElektronik). One SDK addresses Sensors, a second one the Wireless Connectivity modules.
- **Board files:** this layer provides abstraction at a board level and provides functions to configure and control individual FeatherWings from Würth Elektronik eiSos.

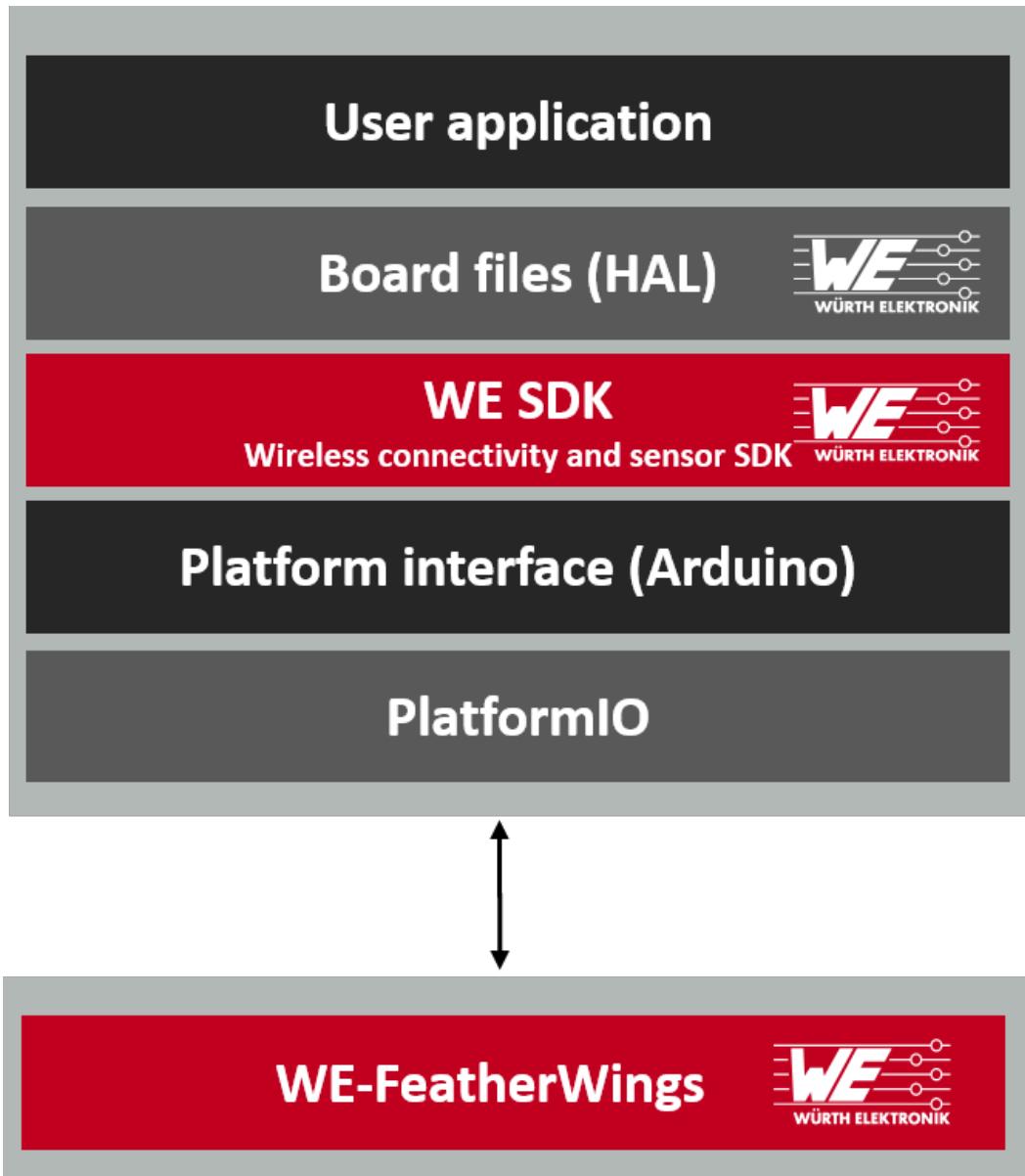


Figure 4: Software architecture

- **User application:** the SDK currently implements a quick start example for each of the FeatherWings. For this Evaluation Kit the Application part is located in the Sensor2BLE folder.

### 3.2 Pre-compiled Apps



Figure 5: WE-SensorBLE in Apple App Store



Figure 6: WE-SensorBLE in Google Play Store

## 4 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.

### 4.1 Exemption clause

Relevant regulation requirements are subject to change. Würth Elektronik eiSos GmbH & Co. KG 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 GmbH & Co. KG is exempt from any responsibilities or liabilities related to regulatory compliance.

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## 5 Important notes

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

### 5.1 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.

### 5.2 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 sourcecode and firmware parts contained in or used with or for products in the wireless connectivity and 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.

### 5.3 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 firmware revisions. This documents can be downloaded from the product specific sections on the wireless connectivity homepage.

### 5.4 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.

## 5.5 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 5.1 and 5.2 remains unaffected. All wireless connectivity module driver software "wireless connectivity SDK" and its source codes as well as all PC software tools are not subject to the Product Change Notification information process.

## 5.6 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.

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### **7.3 Ownership**

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If a provision of this license terms is 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.

## 7.9 Miscellaneous

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We recommend you to be updated about the status of new firmware and software, which is available on our website or in our data sheet and manual, and to implement new software in your device where appropriate.

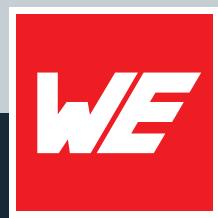
By ordering a wireless connectivity product, you accept this license terms in all terms.

## List of Figures

1	The WE Sensor FeatherWing (2501000201291)	3
2	The WE Setebos-I / Proteus-III FeatherWing	4
3	Block diagram - Sensor FeatherWing	4
4	Software architecture	8
5	WE-SensorBLE in Apple App Store	9
6	WE-SensorBLE in Google Play Store	9

## List of Tables

1	Contents 2611187024001	5
---	------------------------	---



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