

## USER MANUAL

EVALUATION BOARD FOR ABSOLUTE  
PRESSURE SENSOR PADS

2511223013391

VERSION 2.2

OCTOBER 25, 2024

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## Revision history

Manual version	Product version	Notes	Date
1.0	1.0	<ul style="list-style-type: none"> <li>Initial release of the manual</li> </ul>	June 2019
2.0	2.0	<ul style="list-style-type: none"> <li>Release of the SPI interface</li> <li>Added PCB layout and assembly diagram in section 3.2</li> </ul>	October 2020
2.1	2.0	<ul style="list-style-type: none"> <li>Added Section 1.2</li> <li>Added Figure 2: Block Diagram</li> <li>Restructured Section 2.1</li> </ul>	February 2021
2.2	2.0	<ul style="list-style-type: none"> <li>Updated user manual to new corporate design</li> <li>Added resistor settings for I<sup>2</sup>C and SPI communication in Resistor functionality</li> <li>Updated section Important notes and Legal notice</li> </ul>	October 2024

## Abbreviations

Abbreviation	Description
I <sup>2</sup> C	Inter integrated circuit
MEMS	Micro electro mechanical system
LSB	Least significant bit
SPI	Serial Peripheral interface

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# 1 General description

## 1.1 Introduction

The EV-Board of the absolute pressure sensor provides an opportunity to verify the sensor performance and develop a prototype using an external processor or an extension board e.g. Sensor Shield for Arduino (Part No. 2501000101291). It can be directly plugged to Amber Pi design kit using the mounted I<sup>2</sup>C and SPI interface pins. It can also be placed on a bread board using through hole pin header connections. The absolute pressure sensor (Part No: 2511020213301) is a 24-bit compact piezo-resistive digital pressure sensor with an I<sup>2</sup>C and SPI digital interface.

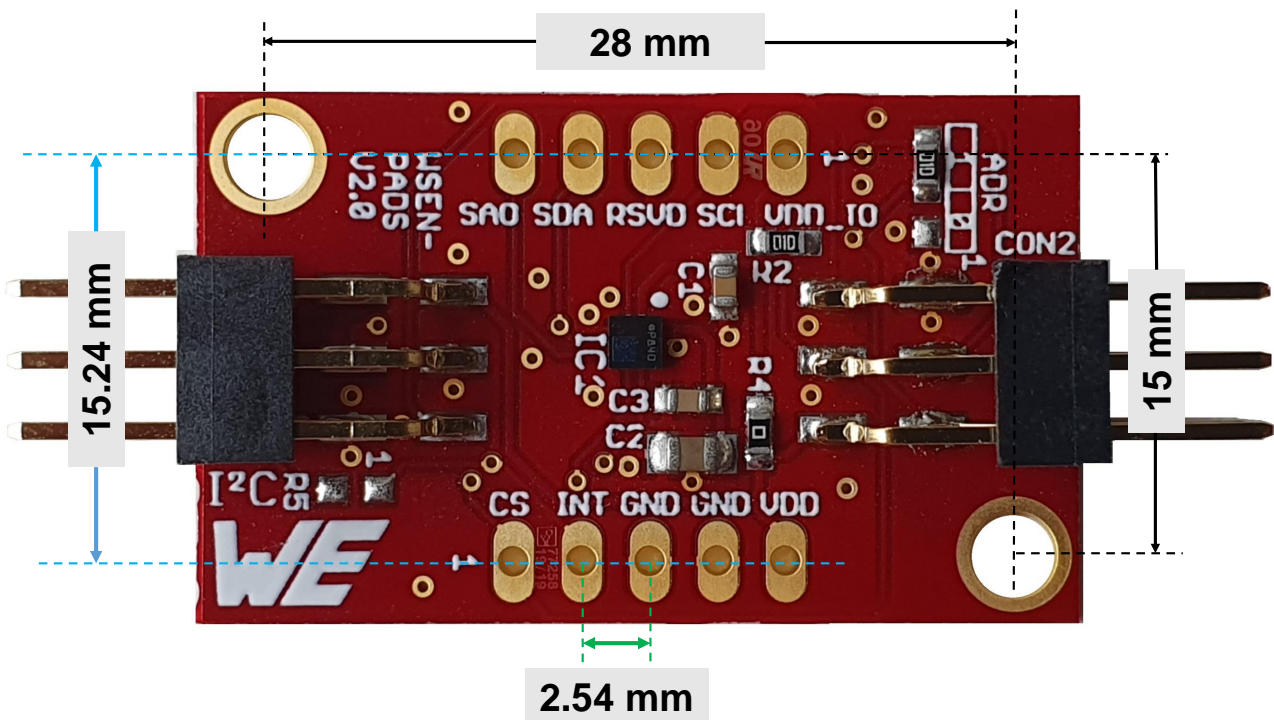


Figure 1: EV-Board for the absolute pressure sensor

## 1.2 Pin header compatibility

The 6-pin right angle headers mounted on this EV-Board can be directly plugged in to the Sensor Shield for Arduino or Amber-Pi Design Kit. This serves a plug-and-play solution to quickly take the EV-Board into operation.



Sensor Shield for Arduino is a stackable extension board for Arduino UNO and DUE to connect the sensor EV-Boards. More information can be found on our *website*.



## 2.1 EV-Board in operation

### 2.1.1 I<sup>2</sup>C connection (CON1)

The pinning of connector CON1 provides I<sup>2</sup>C communication interface fits directly to the sensor shield for Arduino as well as Amber-Pi as mentioned in section 1.2.

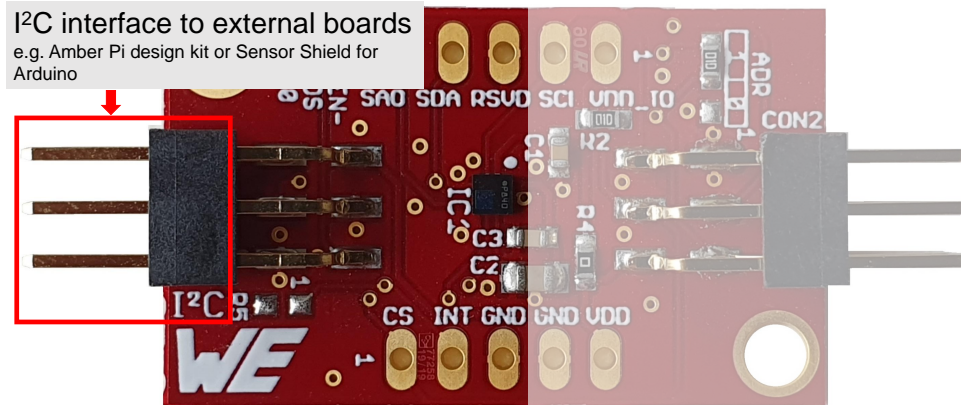
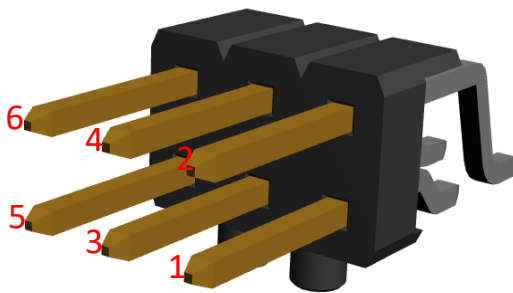


Figure 3: I<sup>2</sup>C Pin header connection to the external boards



Pin	I <sup>2</sup> C pins
1	<i>GND</i>
2	<i>SCL</i>
3	<i>SDA</i>
4	<i>GND</i>
5	<i>INT</i>
6	<i>VDD</i>

Table 1: Pin header to the external boards



When the EV-Board is connected to Amber Pi design kit using I<sup>2</sup>C interface pins, INT interrupt pin function will not be available.

**2.1.2 SPI connection (CON2)**

The pinning of connector CON2 provides SPI communication interface fits directly to the sensor shield for Arduino as well as Amber-Pi as mentioned in section 1.2.

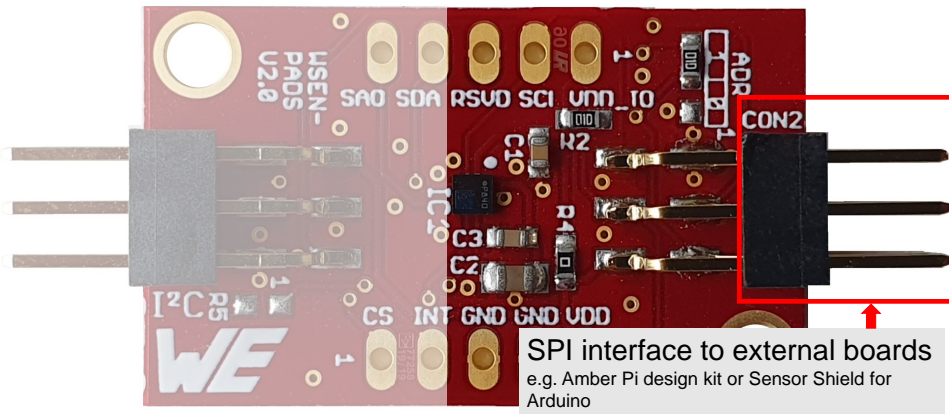
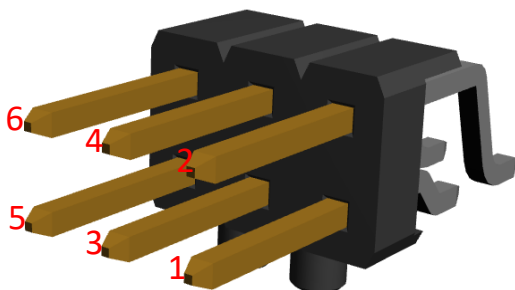


Figure 4: SPI Pin header connection to the external boards



Pin	SPI pins
1	<i>GND</i>
2	<i>SCL</i>
3	<i>SDA (MOSI)</i>
4	<i>CS</i>
5	<i>SAO (MISO)</i>
6	<i>VDD</i>

Table 2: Pin header to the external boards



CS pin is controlled by the host controller (master) when the SPI interface is used.



**2.1.3 Resistor functionality**

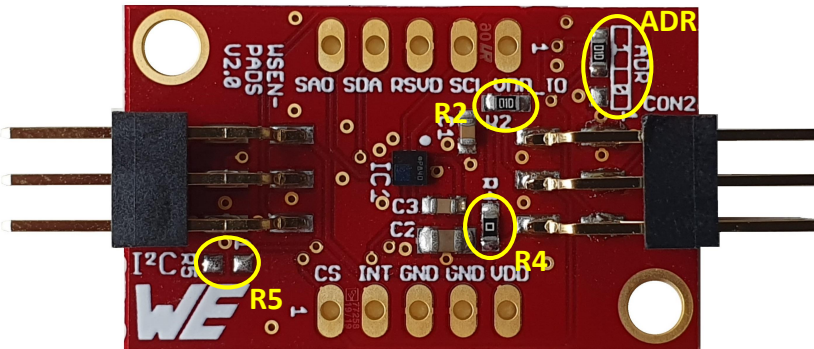


Figure 5: Resistor functionality

**Resistor settings for I<sup>2</sup>C communication**

Resistor	Value	Description
R2	0 Ω	mounted; I <sup>2</sup> C enabled. CS is connected to VDD_IO
R4	0 Ω	mounted; VDD and VDD_IO pins are connected together
ADR	100 kΩ	Position-1; I <sup>2</sup> C address of the sensor is 1011101b. SAO is pulled-up to the VDD_IO
R5	-	not mounted. optionally can be mounted with 0 Ω to use interrupt functionality on the INT pin

Table 3: Resistor settings for I<sup>2</sup>C operation EV-Board

**Resistor settings for SPI communication**

Resistor	Value	Description
R2	-	not mounted; CS pin controlled via microcontroller
R4	0 Ω	mounted; VDD and VDD_IO pins are connected together
ADR	-	not mounted; SAO pin of sensor works as serial data output
R5	-	not mounted. optionally can be mounted with 0 Ω to use interrupt functionality on the INT pin

Table 4: Resistor settings for SPI operation EV-Board

### 2.1.4 Through hole connection

Through hole pin header connection gives direct access to each sensor pin. To use I<sup>2</sup>C via these through hole connection, SDA, SCL and INT pins must be connected to VDD\_IO via pull-up resistors. SAO pin connection to either VDD or GND is also necessary in order to define an I<sup>2</sup>C slave address.

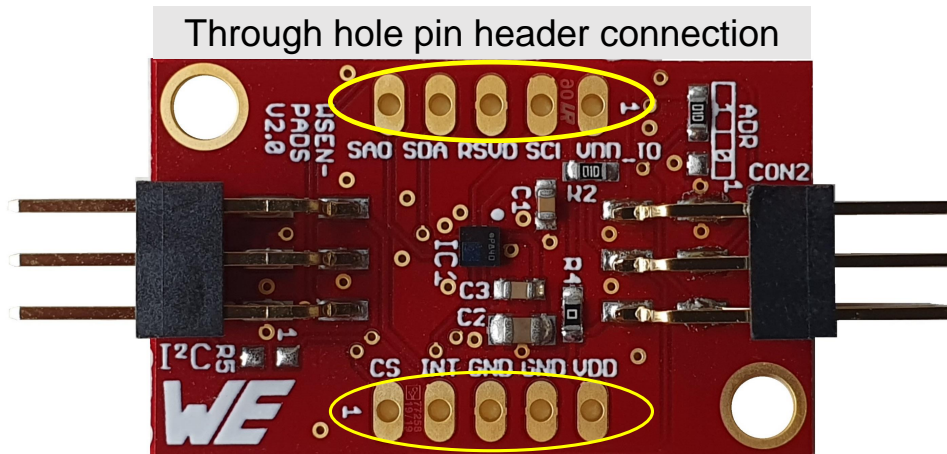


Figure 6: Through hole connection

Pin No.	Name	Function	I/O	Comments
1	<i>VDD_IO</i>	Positive supply voltage for I/O pins	Supply	
2	<i>SCL</i>	I <sup>2</sup> C/SPI serial clock	Input	Internal pull-up disconnected by default
3	<i>RSVD</i>	Reserved	Input	Connect to ground
4	<i>SDA</i>	I <sup>2</sup> C serial data; SPI serial data input	Input/Output	Internal pull-up disconnected by default
5	<i>SAO</i>	I <sup>2</sup> C device address selection; SPI serial data output	Input/Output	High: device address LSB is 1 Low: device address LSB is 0
6	<i>CS</i>	I <sup>2</sup> C enable/disable; SPI chip select pin	Input	High: I <sup>2</sup> C enable
7	<i>INT</i>	Interrupt	Input/Output	Do not connect if not used
8	<i>GND</i>	Negative supply voltage	Supply	
9	<i>GND</i>	Negative supply voltage	Supply	
10	<i>VDD</i>	Positive supply voltage	Supply	

Table 5: Pin description



Check if necessary for your configuration that R2, R4 and ADR resistors have to be removed before connecting the EV-Board to a processor.

### 3 EV-Board

#### 3.1 Schematic diagram

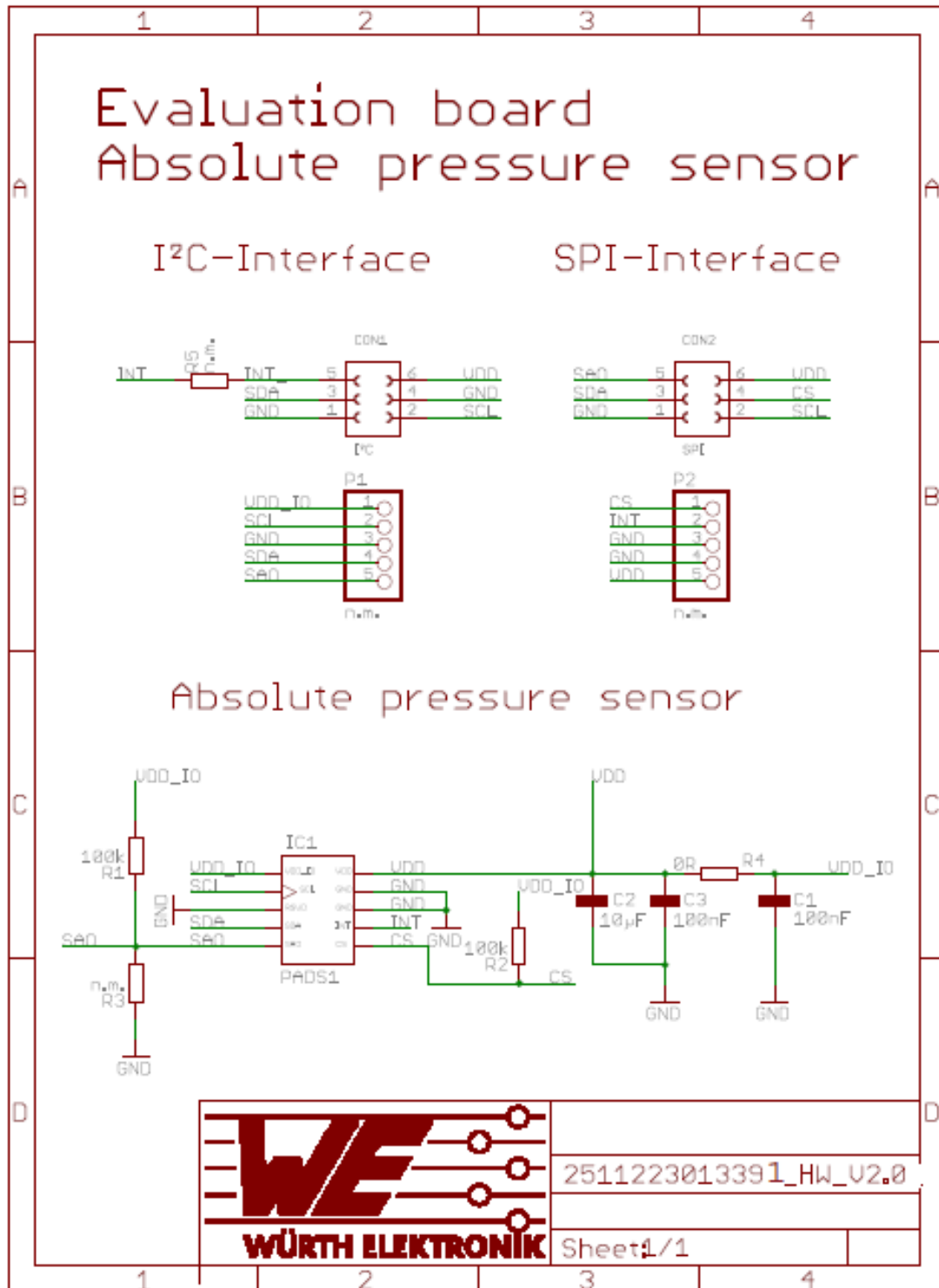


Figure 7: Schematic diagram

### 3.2 Layout

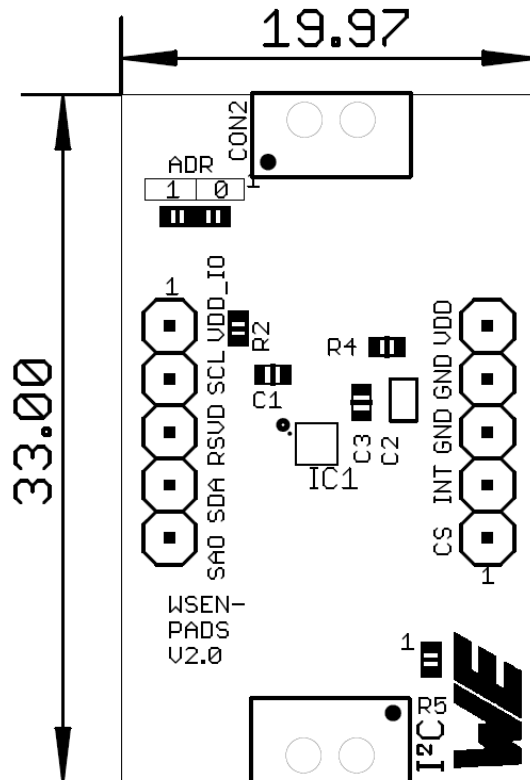


Figure 8: Assembly diagram

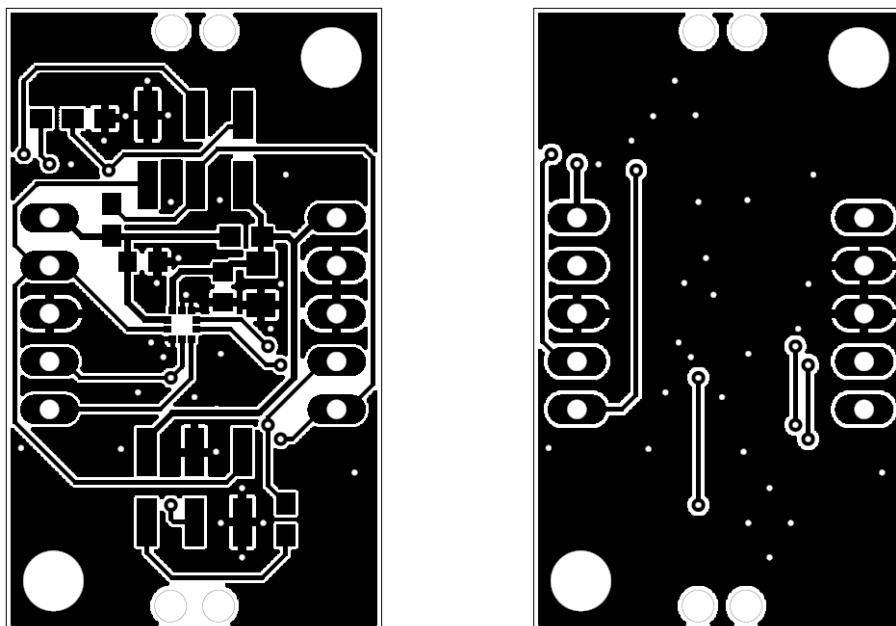


Figure 9: Top (left) and bottom (right) layers

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