



EVALUATION BOARD MANUAL

HUMIDITY SENSOR WITH INTEGRATED TEMPERATURE SENSOR

Evaluation board order code	Sensor order code
2525020210091	2525020210001

VERSION 1.1

FEBRUARY 23, 2021

Revision history

Manual version	Product version	Notes	Date
1.0	1.0	<ul style="list-style-type: none">• Initial release of the manual	September 2020
1.1	1.0	<ul style="list-style-type: none">• Chapter 1.2: Pin header compatibility added• Chapter 2: I²C and SPI chapter updated• Chapter 3.2: Layout added	February 2021

Abbreviations

Abbreviation	Description
I ² C	Inter integrated circuit
LSB	Least significant bit
MEMS	Micro electro mechanical system
SPI	Serial peripheral interface
SMD	Surface mount device

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1 General description

1.1 Introduction

The evaluation board of the humidity sensor provides the opportunity to verify the sensor performance and develop a prototype using an external processor e.g. Amber Pi design kit (Part No: 2609017281001) 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 I²C and SPI interface pins. The evaluation board can also be mounted on a bread board using through hole pin header connections. The humidity sensor (Part No: 2525020210001) is a 16-bit digital ultra-low-power with an integrated temperature sensor.

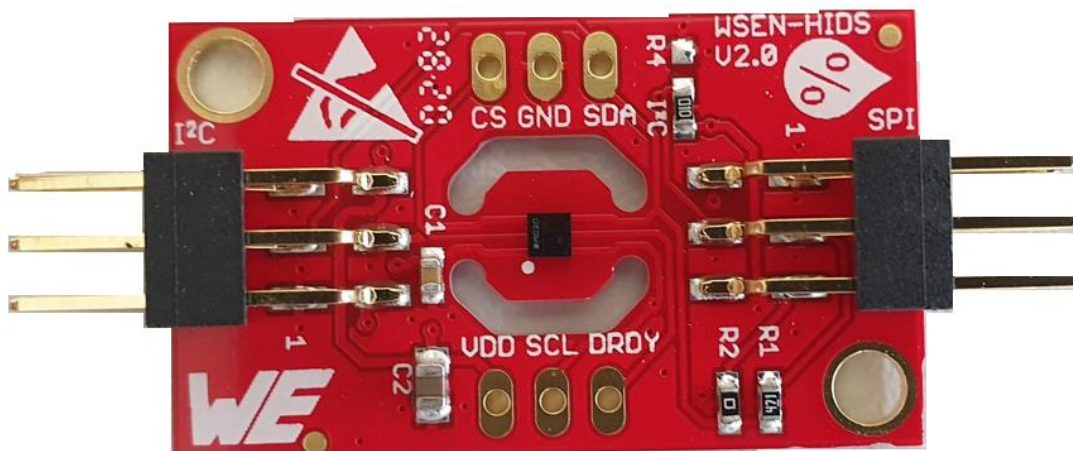


Figure 1: Evaluation board of the humidity sensor

1.2 Pin header compatibility

6-pin right angle headers mounted on this evaluation board can be directly plugged into the sensor shield for Arduino or Amber-Pi Design Kit. This serves a Plug-and-play solution to quickly take the evaluation board into operation.



Sensor shield for Arduino is a stackable extension board for Arduino UNO and DUE to connect the sensor evaluation boards. More information can be found on our website here.

2 Functional description

The humidity sensor evaluation board supports both the standard I²C and SPI communication interfaces.

- A positive supply voltage is applied to the sensor through *VDD* pin and negative supply voltage through *GND* pin.
- The I²C communication interface is enabled by connecting *CS* pin to *VDD*. The *CS* pin is connected to *VDD* using 100k Ω resistor R3.
- The SPI communication interface is enabled by removing the resistor R3 between *CS* pin to *VDD*.

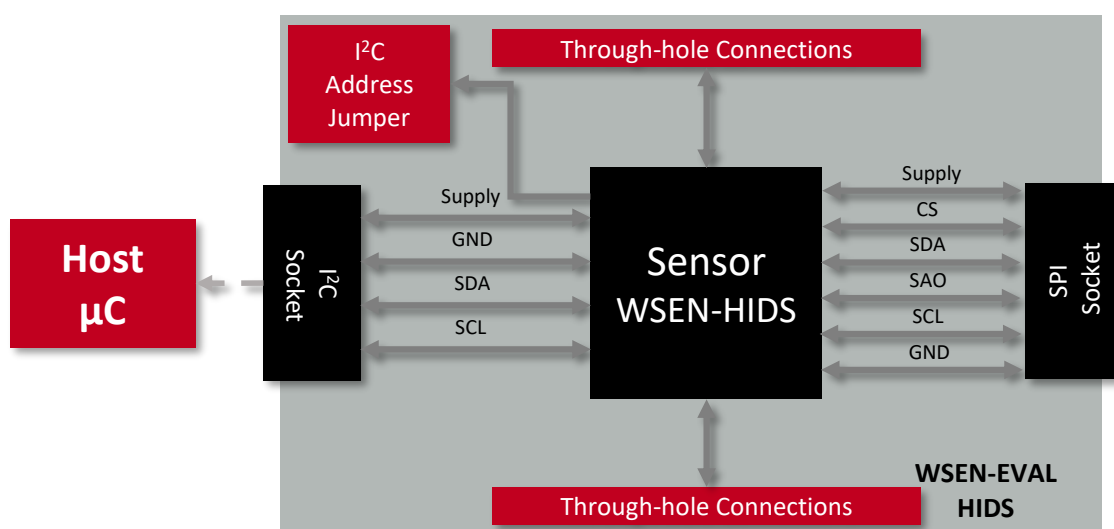


Figure 2: Block diagram



By default I²C communication interface is enabled in the evaluation board. The 7-bit slave address of the humidity sensor is 1011111b (0x5F)



Please refer to the data sheet and the user manual of the humidity sensor (Part No: 252502021001) for information about the electrical properties.

2.1 Evaluation board in operation

2.1.1 I²C connection (CON1)

The pinning of connector CON1 provides I²C communication interface fits directly to the sensor shield for Arduino and Amber-Pi as mentioned in section 1.2.

I²C Interface to external boards
e.g. Amber Pi design kit or
Sensor shield for Arduino

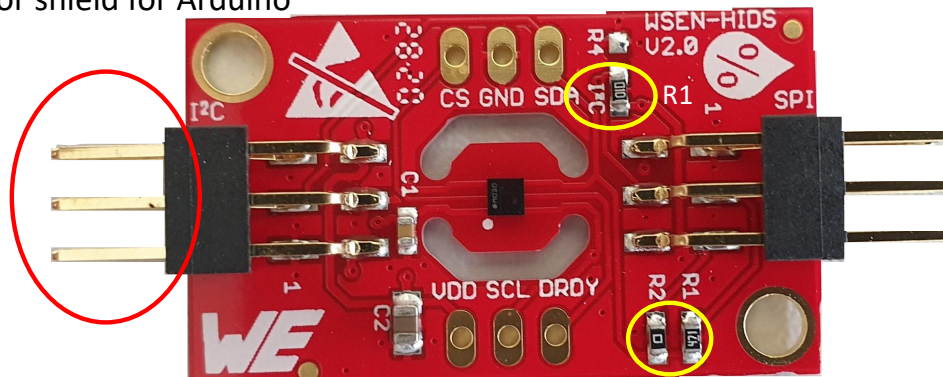
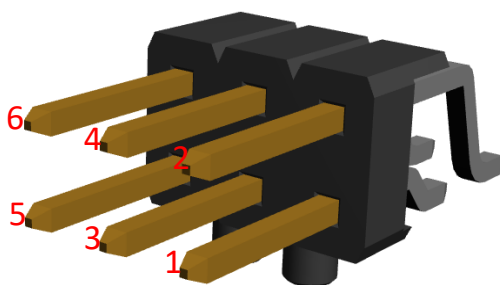


Figure 3: Pin header connection to the external boards



Pin No	I ² C Pins (CON1)
1	<i>GND</i>
2	<i>SCL</i>
3	<i>SDA</i>
4	<i>GND</i>
5	<i>NC</i>
6	<i>VDD</i>

Table 1: Pin header to external boards

2.1.2 SPI connection (CON2)

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

SPI Interface to external boards
e.g. Amber Pi design kit
Sensor shield for Arduino

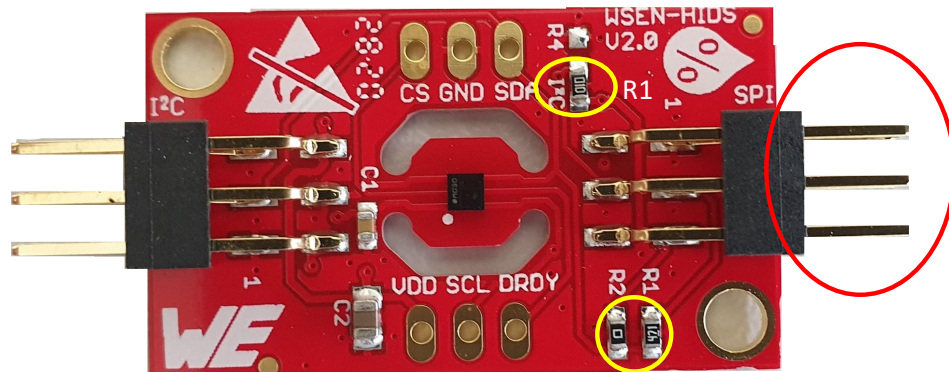
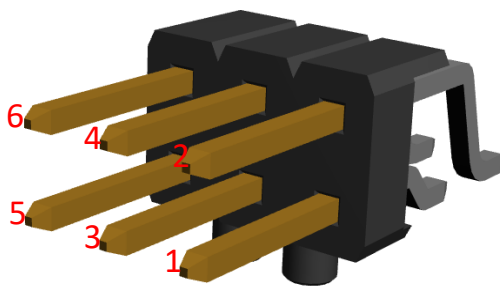


Figure 4: SPI Pin header connection to the external boards



Pin No	SPI Pins (CON2)
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 external boards



SPI communication is enabled by removing the resistor R3

2.1.3 Resistor functionality

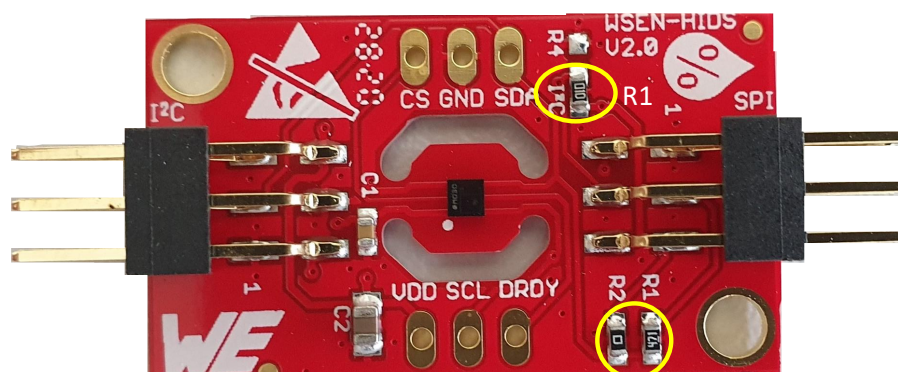


Figure 5: Resistor functionality

Resistor	Description
R1	SDA to MOSI connection; Series resistor
R2	SDA to MISO connection; Series resistor
R3	I ² C enabled by default. CS is connected to VDD

Table 3: Functionality of resistors on the evaluation board

2.1.4 Through hole connection

Through hole pin header connection gives direct access to each sensor pin. To use I²C via these through hole connections, SDA and SCL pins must be connected to VDD via pull-up resistors. Please refer to Table 4 for the pin description of the evaluation board.

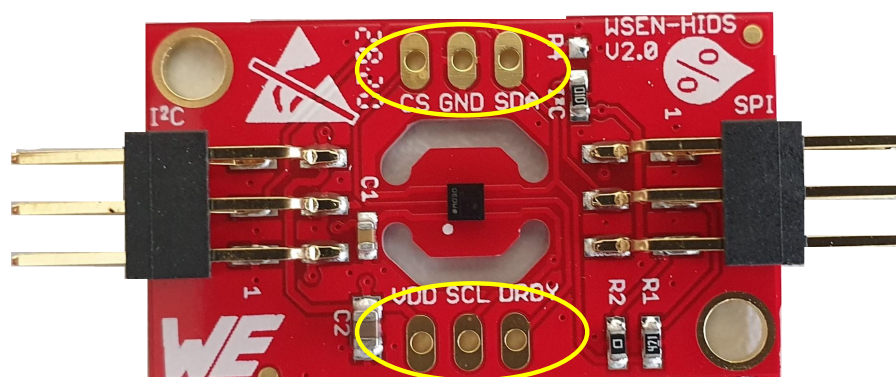


Figure 6: Through hole connection

Pin No.	Evaluation board pins	Description	Input/Output
1	<i>VDD</i>	Positive supply voltage	Supply
2	<i>SCL</i>	I ² C/SPI serial clock	Input
3	<i>INT</i>	Data ready output signal	Output
4	<i>SDA</i>	I ² C serial data; SPI serial data input/output (3-wire SPI)	Input/Output
5	<i>GND</i>	Negative supply voltage	Supply
6	<i>CS</i>	I ² C enable/disable; SPI chip select pin	Input

Table 4: Pin description



Check if necessary for your configuration, the resistors R1, R2 and R3 have to be removed before connecting the evaluation board to a processor.

3 Evaluation board

3.1 Schematic diagram

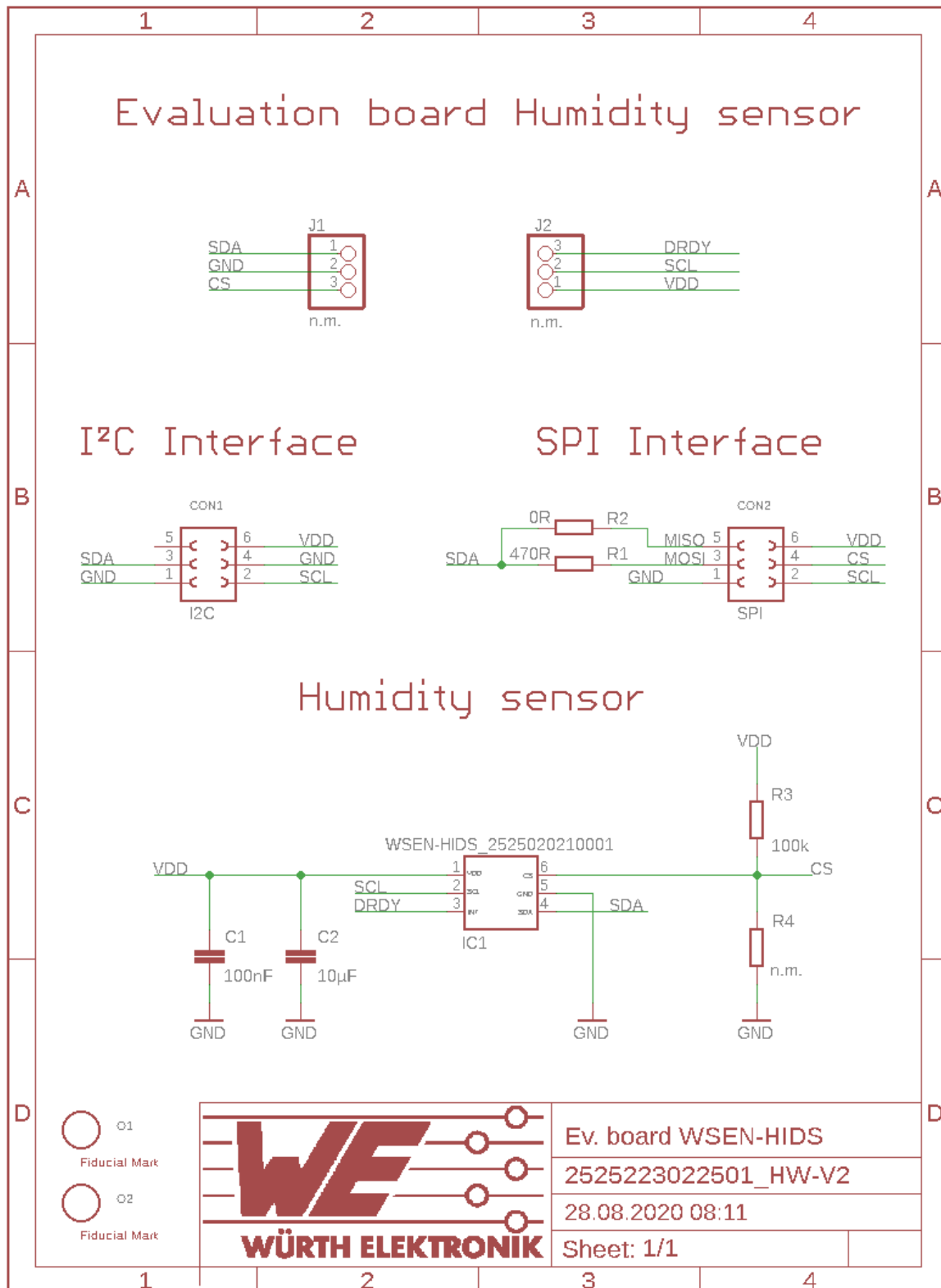


Figure 7: Schematic diagram

3.2 Layout

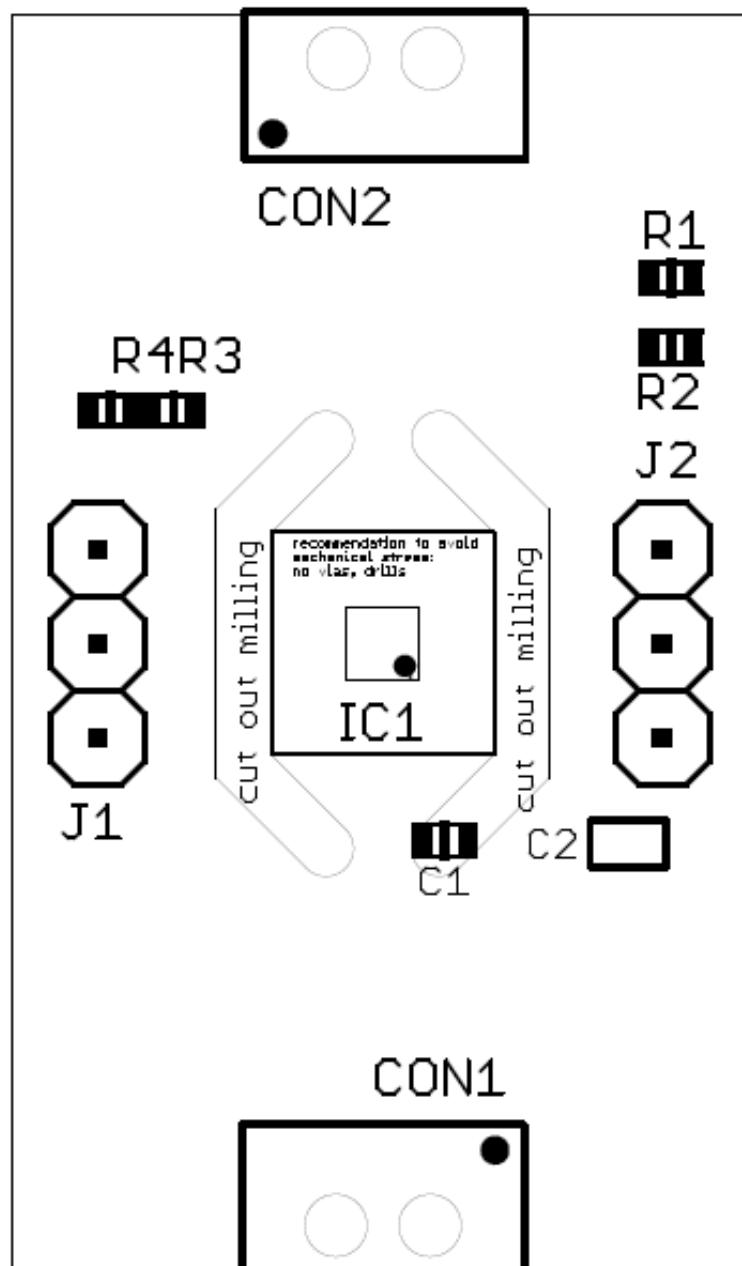


Figure 8: Assembly diagram

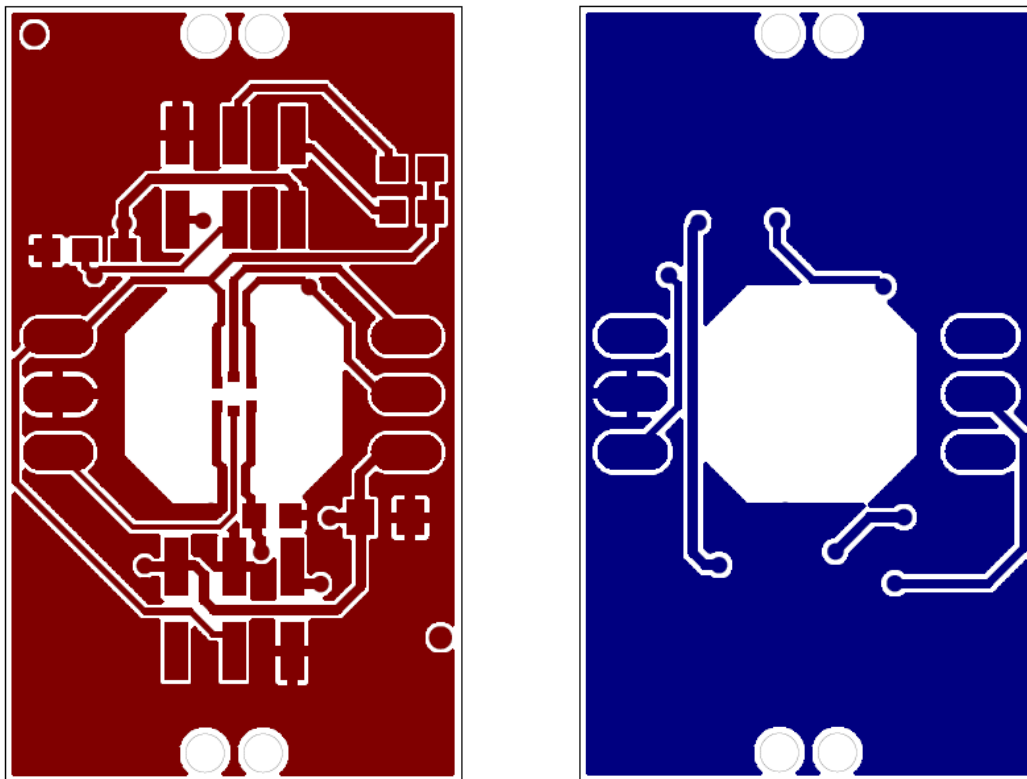


Figure 9: Top (left) and bottom (right) layers

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