



**Eval Kit Manual**

# **CCS811**

**Standard Board**

**CCS811-LG\_EK\_ST**

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## 1 Introduction

The document provides an overview of the CCS811 evaluation kit and covers the following topics: evaluation kit general description, software installation, board interface, test points, schematics, PCB layout and bill of materials (BOM).

## 2 General Description

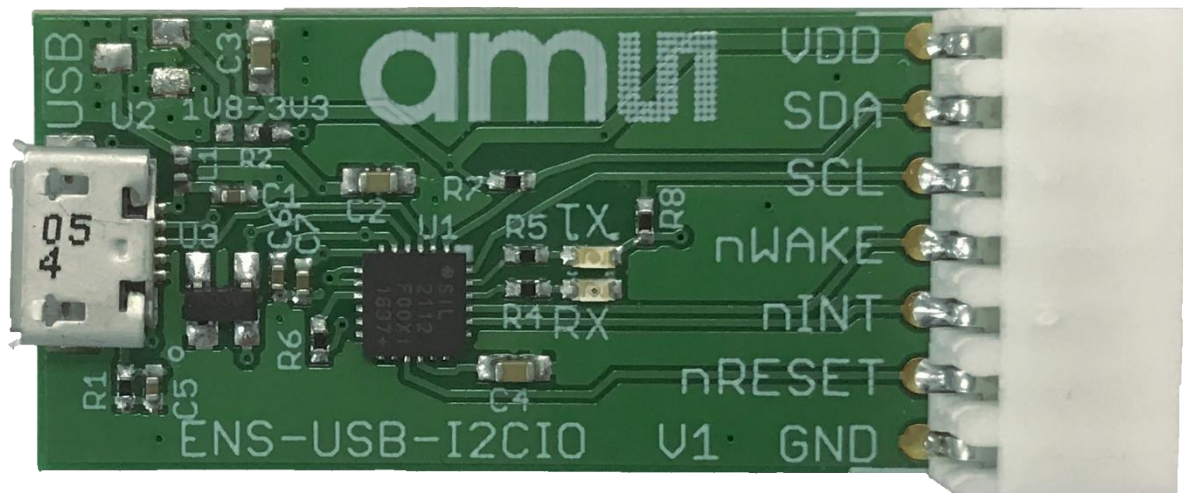
The CCS811 evaluation kit comes with the following components:

- ENS-USB-I2CIO : USB to I<sup>2</sup>C board
- ENS-CCS811-SB : CCS811 sensor board
- Thanks Card containing URL to download related software and documentation
- USB 2.0 A Male to Micro B cable

### 2.1 USB to I<sup>2</sup>C Board (ENS-USB-I2CIO)

The USB to I<sup>2</sup>C board refer to as ENS-USB-I2CIO, as shown in Figure 1, allows control and measurement of the CCS811 sensor board using the ENS Dashboard. By default the USB to I<sup>2</sup>C board provides a 3.3 V supply to the CCS811 sensor board.

**Figure 1 USB to I<sup>2</sup>C Board**



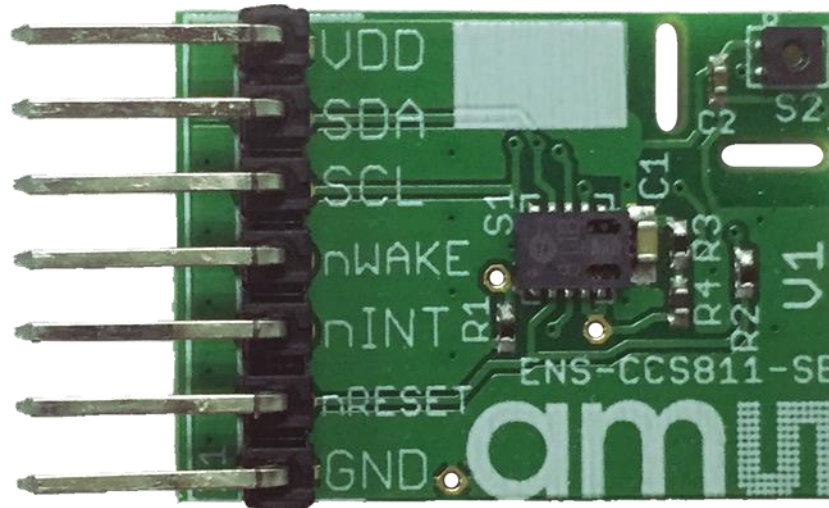
The USB to I<sup>2</sup>C board has the following key features:

- Silicon Labs CP2112 device which provides a simple solution for controlling I<sup>2</sup>C slave, the nWAKE and nRESET signals and monitors the nINT signal
- Board dimensions 42mm length x 18mm width
- Standard micro USB connector and board interface with power (VDD, GND) and I<sup>2</sup>C Signal (SCL, SDA).
- Supports Standard I<sup>2</sup>C mode (100 kHz) and Fast I<sup>2</sup>C mode (400 kHz)

## 2.2 CCS811 Sensor Board (ENS-CCS811-SB)

The CCS811 sensor board refer to as ENS-CCS811-SB, as shown in Figure 2, is an evaluation platform for the CCS811 device. It contains a CCS811 digital VOC gas sensor with an ENS210 relative humidity and temperature sensor and has I<sup>2</sup>C interface which is compatible with the USB to I<sup>2</sup>C board for USB connection to PC / laptop

**Figure 2 CCS811 Sensor Board**

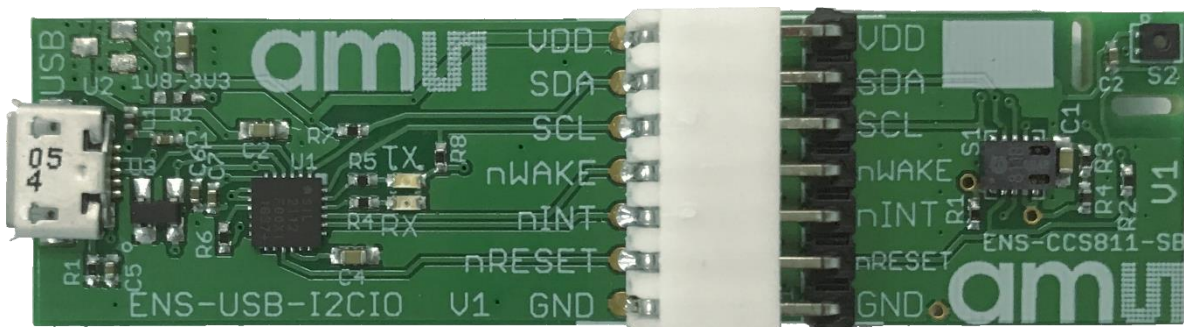


The sensor board has the following key features:

- CCS811 ultra-low power digital gas sensor for monitoring indoor air quality
- ENS210 relative humidity and temperature sensor with I<sup>2</sup>C Interface used to compensate for environmental changes
- Board dimensions 25mm length x 18mm width
- Board interface with power (VDD, GND) and I<sup>2</sup>C Signal (SCL, SDA).
- Sensor chips support standard I<sup>2</sup>C mode (100 kHz) and fast I<sup>2</sup>C mode (400 kHz)
- Sensor board supports 1.8 V to 3.6 V

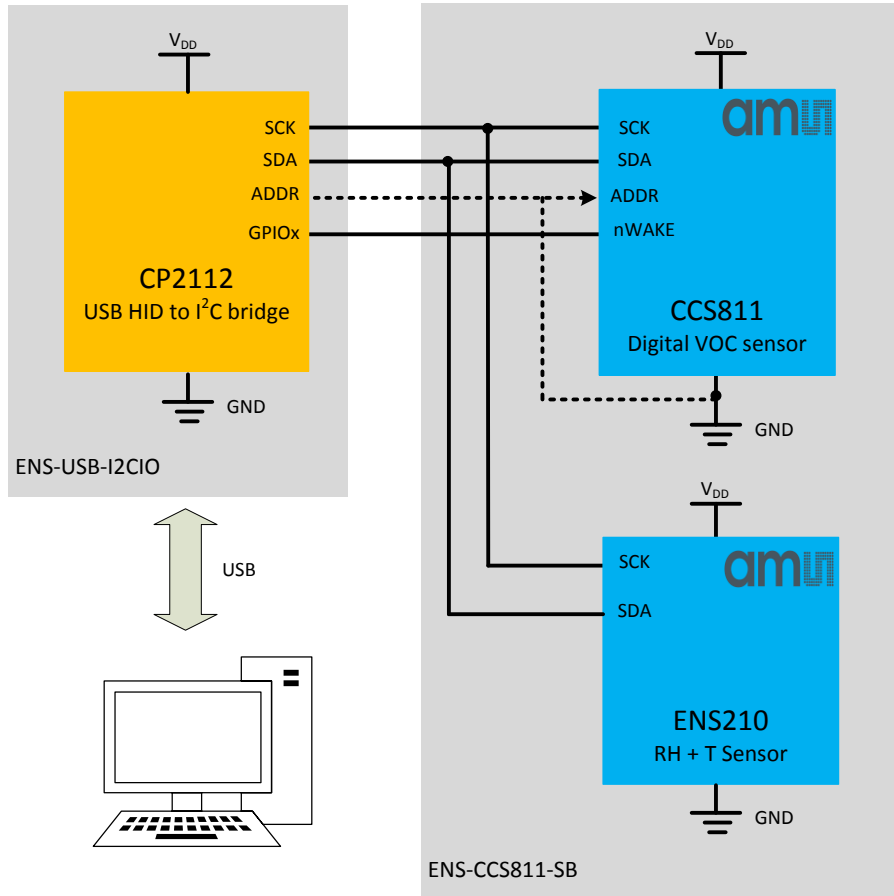
By plugging the CCS811 sensor board into the USB to I<sup>2</sup>C board as shown in Figure 3, direct connection to PC is enabled via USB.

**Figure 3 CCS811 Sensor Board with USB to I<sup>2</sup>C board**



A block diagram of the CCS811-LG\_EK\_ST which illustrates the end-to-end connection between the PC via USB to I<sup>2</sup>C board (ENS-USB-I2CIO) and CCS811 sensor board (ENS-CCS811-SB) is shown in Figure 4 below.

**Figure 4 Block Diagram of CCS811-LG\_EK\_ST**



Relative humidity and temperature data from ENS210 can be read on the I<sup>2</sup>C bus and this information can be written to CCS811 to compensate for temperature and humidity changes for indoor air quality monitoring.

### 3 Software Installation

Quick steps:

- Connect CCS811 sensor board (ENS-CCS811-SB) into USB to I<sup>2</sup>C board (ENS-USB-I2CIO)
- Connect USB to I<sup>2</sup>C board (ENS-USB-I2CIO) via USB cable to Windows PC
- Install Windows PC ENS dashboard application available at <http://ens.ams.com/>

The ENS Dashboard application setup wizard will be launched and guide you through the installation, please refer to the ENS Dashboard user manual.

## 4 Board Interface and Test Points

### 4.1 Board Interface

The signal labels and pin designators for the interface are shown in Figure 5.

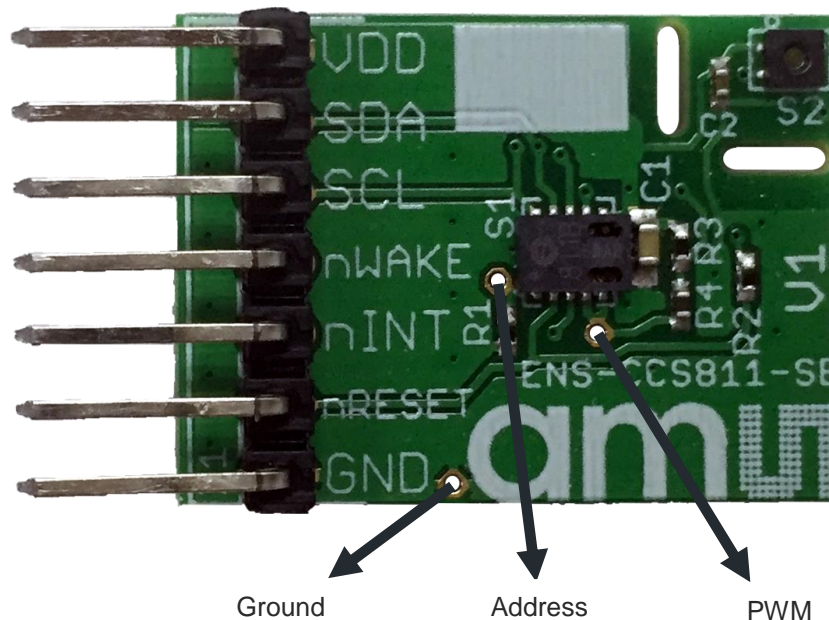
**Figure 5 Board Interface**

in (s)	Label	Description
1	VDD	Supply voltage
2	SDA	I <sup>2</sup> C data
3	SCL	I <sup>2</sup> C clock
4	nWAKE	Wake up pin. Active low
5	nINT	Optional interrupt pin. Active low
6	nRESET	Optional reset pin. Active low
7	GND	Ground

### 4.2 Test Points

There are 3 test points for I<sup>2</sup>C address, GND and PWM as shown below on the CCS811 sensor board (ENS-CCS811-SB).

**Figure 6 CCS811 Sensor Board Test Points**



## 5 Schematic, PCB Layout and Bill of Materials

The schematic design, PCB layout and bill of materials (BOM) for CCS811-LG\_EK\_ST is documented in the following sections.

### 5.1 Schematic Design

The schematic design for USB to I<sup>2</sup>C board (ENS-USB-I2CIO) and the CCS811 sensor board (ENS-CCS811-SB) is documented at the end of the document.

### 5.2 Bill of Materials (BOM)

The bill of materials (BOM) for the USB to I<sup>2</sup>C board (ENS-USB-I2CIO) and CCS811 sensor board (ENS-CCS811-SB) are shown in the following sections.

#### 5.2.1 USB to I<sup>2</sup>C Board (ENS-USB-I2CIO)

Figure 7 Bill of Materials (BOM) for the USB to I<sup>2</sup>C Board

Label	Description	Part Number	Manufacturer
U1	IC - USB to I <sup>2</sup> C bridge QFN24	CP2112	Silicon labs
U3	ESD Protection Device SOT-14	SP0503BAHTG	LITTLEFUSE
R1	330K Resistor 0402	CRG0402J330K	TE CONNECTIVITY
R2	0R Jumper Resistor 0402	ERJ-2GE0R00X	PANASONIC ELECTRONIC
R4, R5	1K Resistor 0402	ASC0402-1K0FT10	WELWYN
R6, R7, R8	4K7 Resistor 0402	CRG0402F4K7	TE CONNECTIVITY
L1	Inductor 0402-N	742843122	WURTH ELEKTRONIK
C1,C6,C7	100nF Capacitor 0402	MC0402X104K100CT	MULTICOMP
C2, C3, C4	4.7uF Capacitor 0402	GRM188R61A475KE15D	Murata
C5	10nF Capacitor 0402-N	MCCA000077	MULTICOMP
LED1-TX	Chip LED 0603	150060GS75000	WURTH ELEKTRONIK
LED2-RX	Chip LED 0603	150060YS75000	WURTH ELEKTRONIK
USB	USB_MICROBOUT	47346-0001	Molex
X1	Board-To-Board Connector	38-00-1337	Molex

#### 5.2.2 CCS811 Sensor Board (ENS-CCS811-SB)

Figure 8 Bill of Materials (BOM) for the CCS811 sensor Board

Label	Description	Part Number	Manufacturer
S1	CCS811B Digital gas sensor for indoor air quality monitoring	CCS811B-JOPR	ams AG

Label	Description	Part Number	Manufacturer
S2	Relative Humidity and Temperature Sensor with I <sup>2</sup> C Interface	ENS210-LQFM	ams AG
X1	Connector 7pin 2.54mm	22-28-6070	Molex
C1	100nF Capacitor 0402	MC0402X104K100CT	MULTICOMP
C2	4.7uF Capacitor 0402	GRM188R61A475KE15D	Murata
R1	100KΩ Resistor 0402	MCWR04X1003FTL	MULTICOMP
R2(8-4)	100kΩ NTC Thermistor 0402-N	NCP15WF104F03RC	Murata

## 6 Summary

This document describes the CCS811 evaluation kit about what it is and how to use it from the user point of view.



## 7 Ordering & Contact Information

Ordering Code	Description
CCS811-LG_EK_ST	CCS811 Eval Kit Standard Board

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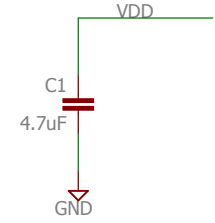
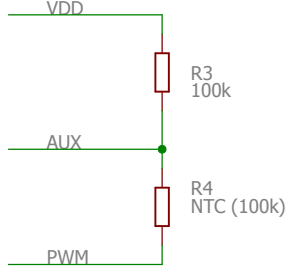
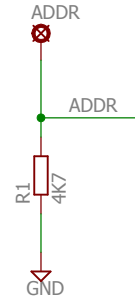
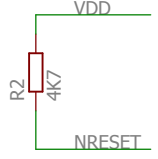
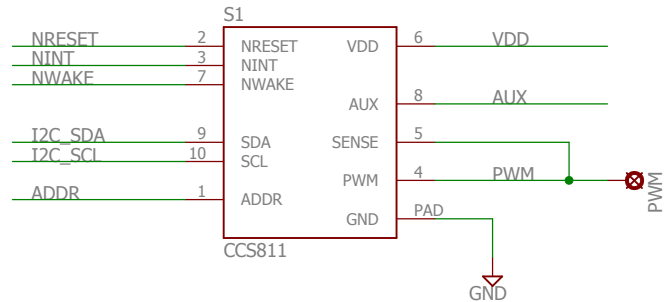
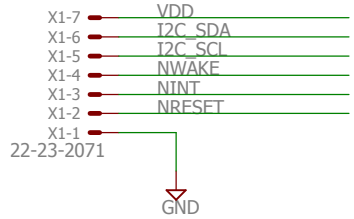
## 9 Revision Information

Changes from previous version to current revision 1-01 (2017-Jan-16)	Page
Minor updates only	

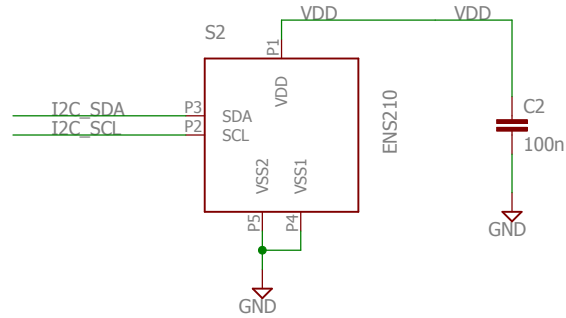
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**Note:** Page numbers for the previous version may differ from page numbers in the current revision.  
Correction of typographical errors is not explicitly mentioned.

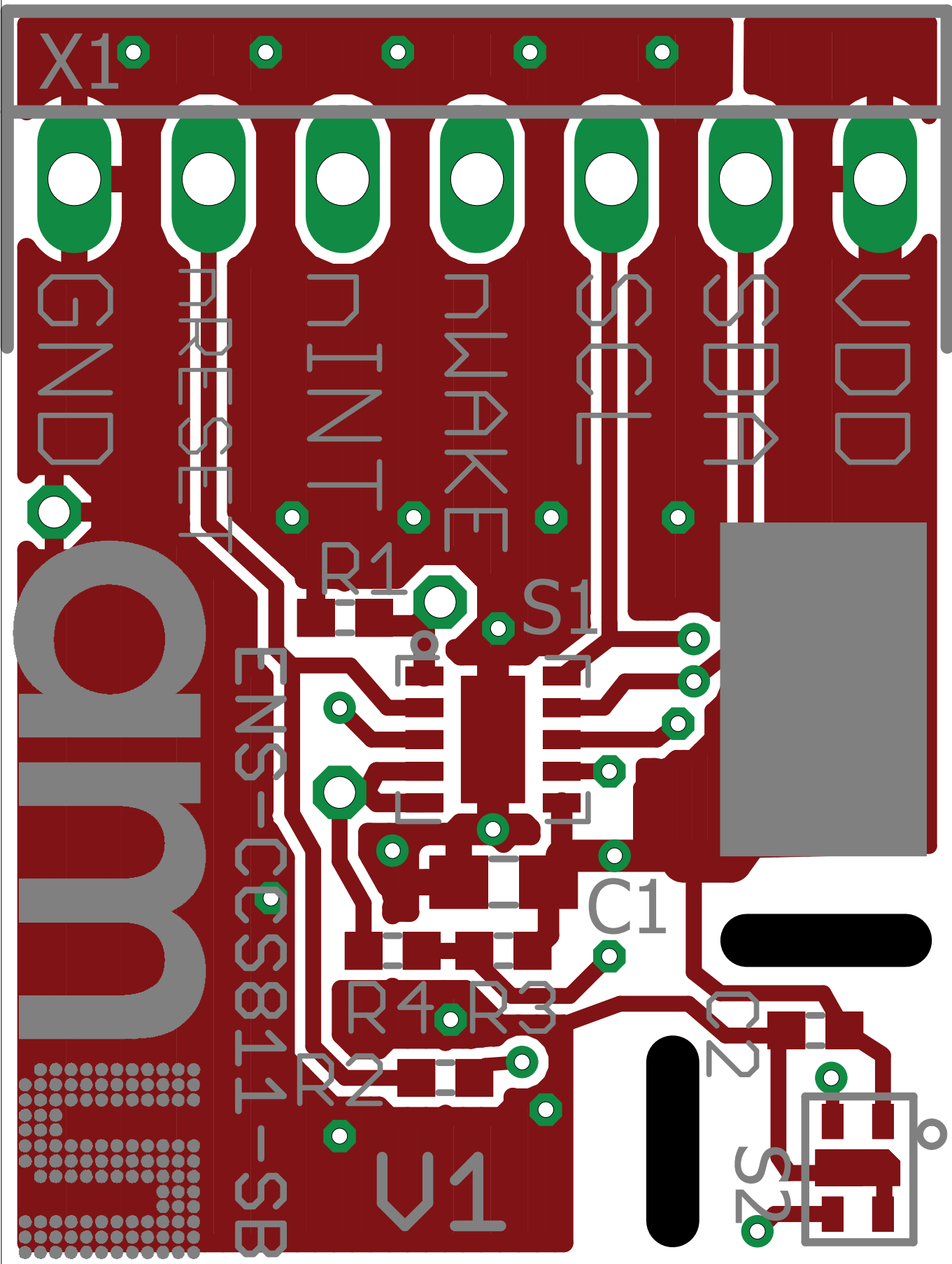
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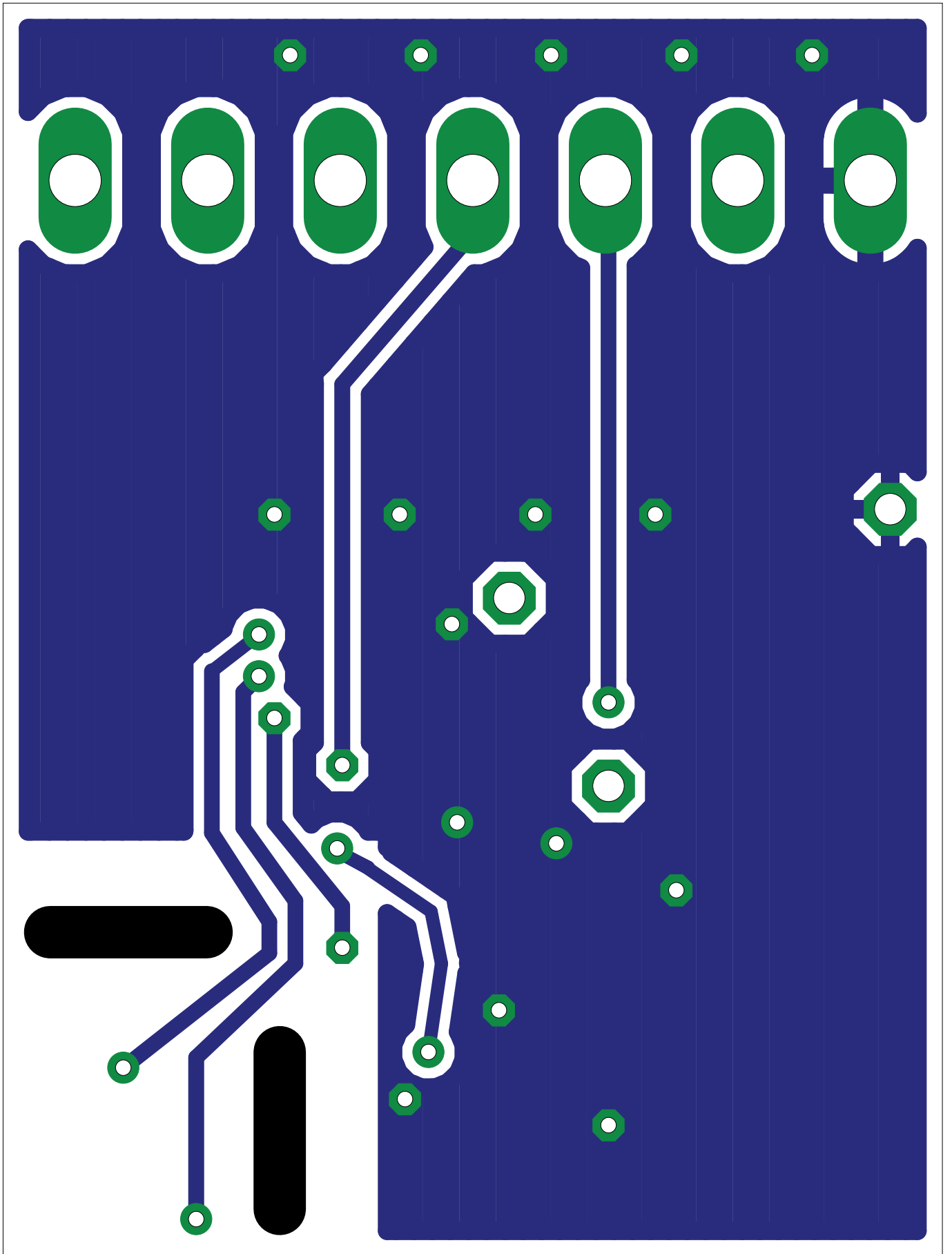


Relative Humidity + Temperature Sensor

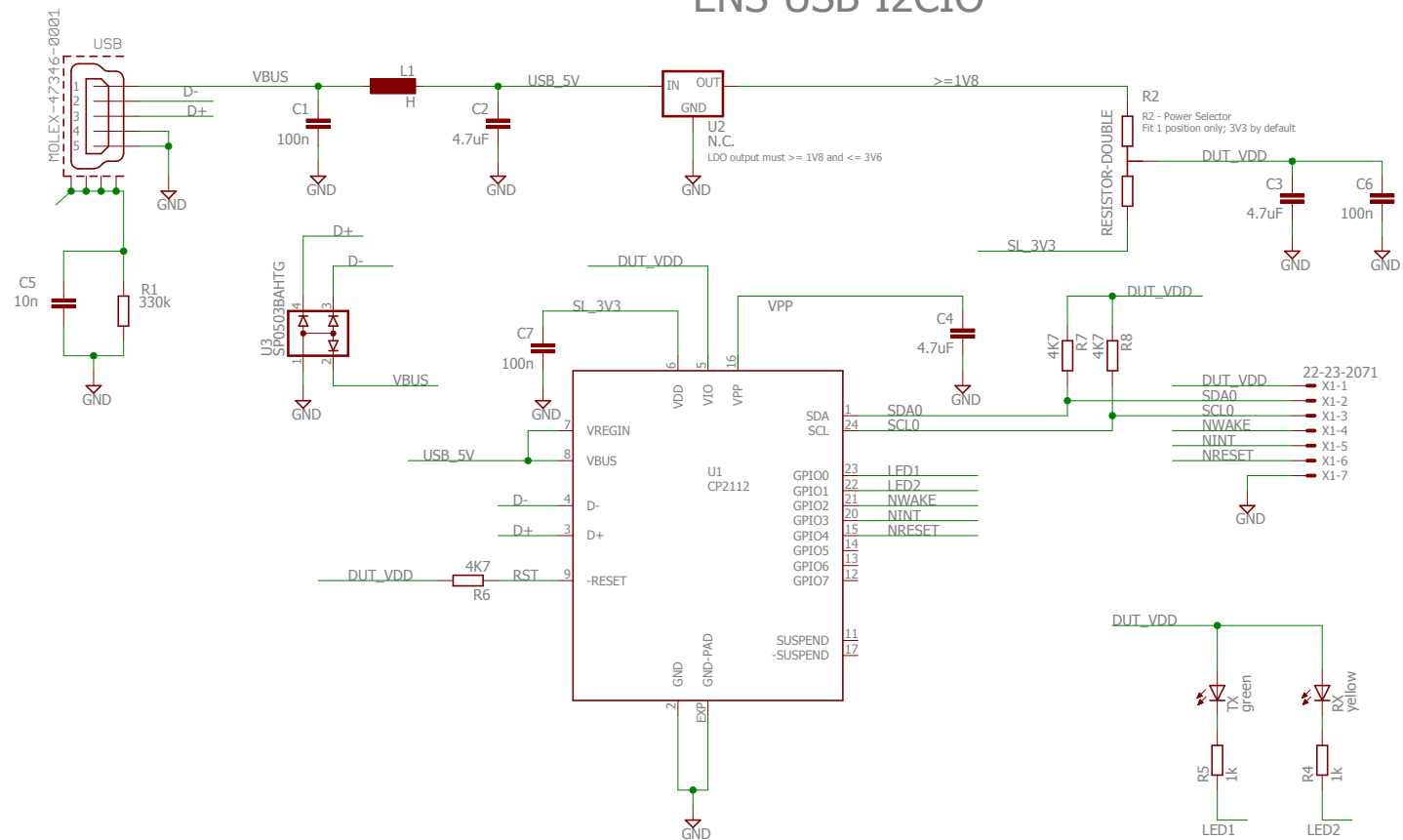


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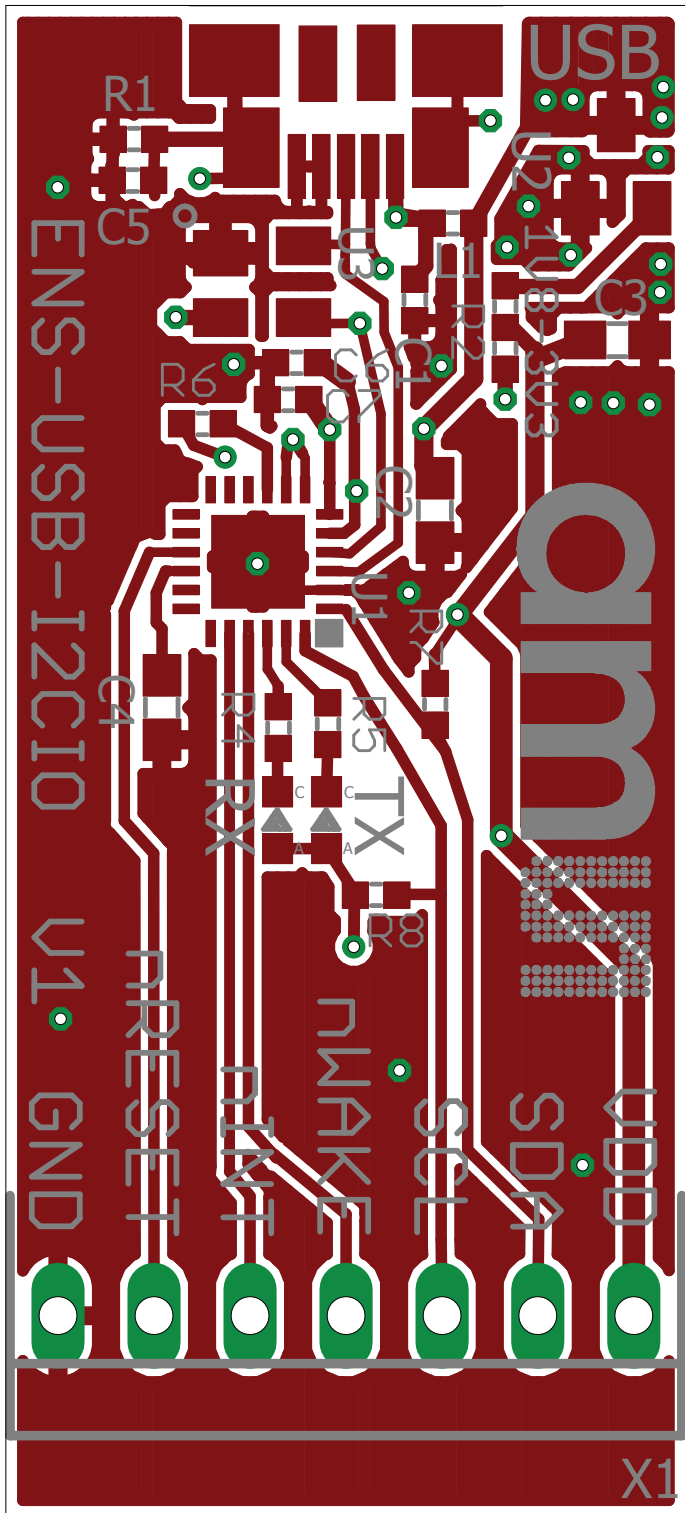




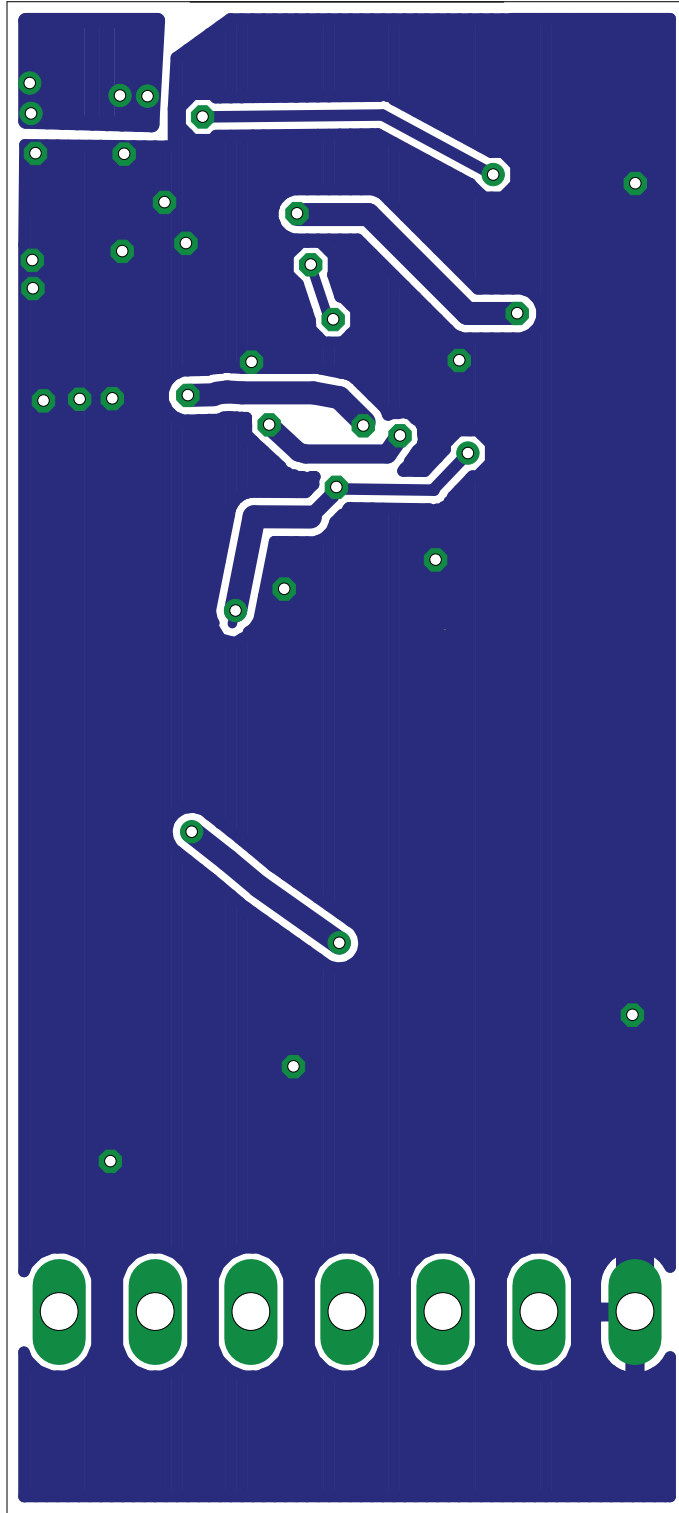
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