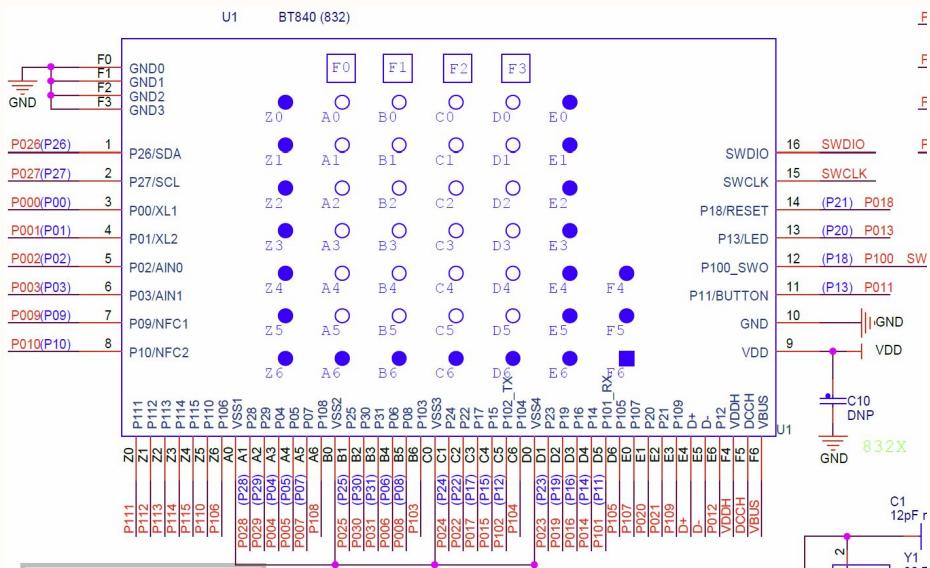
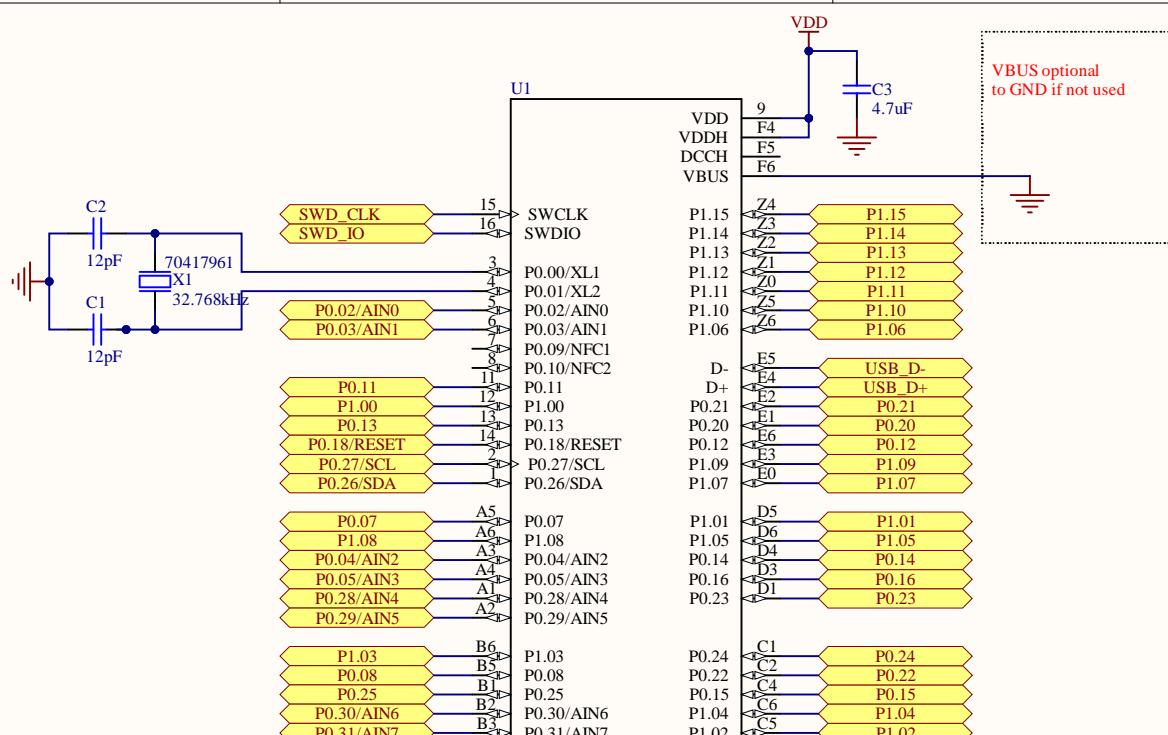


# Patchkeeper Version 2.0

- 1. LED position
- 2. Microphone replacement
- 3. New SPI port for SD card
- 4. USB-C connector
- 5. PPG device
- 6. Analog with potentiometer?

- Sheet 1: Cover Sheet
- Sheet 2: MCU BT840 Module (nRF52840)
- Sheet 3: Pin Map
- Sheet 4: Power Supply and Switch
- Sheet 5: ECG ADS1292
- Sheet 6: IMU and Microphone
- Sheet 7: Analog 1&2: Body Temperature and GSR Sensors
- Sheet 8: Analog 3&4: Strain and Pluse Sensors
- Sheet 9: Debugger, Pogo Interface and Test Pads

|   |   |
|---|---|
| Title: <b>Patchkeeper - V2.0</b>              | <i>Nokia Bell Labs<br/>Broers Building<br/>21 JJ Thomson Avenue<br/>Cambridge, CB3 0FA<br/>UK</i> |
| Size: A4                                      | Number: 1   |
| Date: 20/06/2021                              | Revision: 1   |
| Time: 00:00:31                                | Sheet 1 of 9  |
| Filename: Sheet1_Coversheet_V2.0.SchDoc       | DrawnBy: Hongwei Li   |
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|  |                |              |   |  |
|--|----------------|--------------|---|--|
| <b>Title:</b> <i><b>Patchkeeper - V2.0</b></i> |                |              | <i>Nokia Bell Labs<br/>Broers Building<br/>21 JJ Thomson Avenue<br/>Cambridge, CB3 0FA<br/>UK</i> | Cannot open file<br>C:\Users\hongweil\OneDrive |
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| Filename: Sheet2_MCU_BT840_V2.0.SchDoc         |                |              | DrawnBy: Hongwei Li   |  |

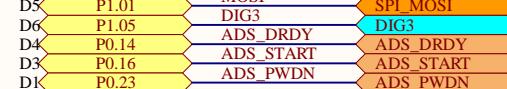
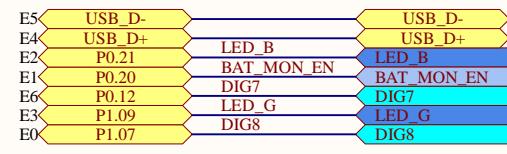
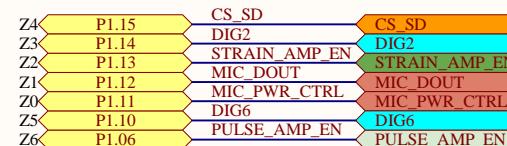
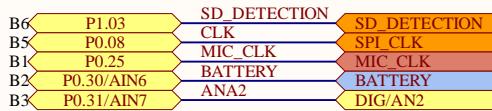
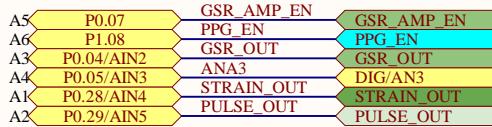
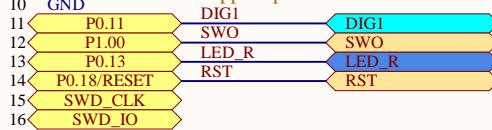
A

A



7 P0.09/NFC1 For NFC ciurcuits  
8 P0.10/NFC2

9 VDD Power supplier pair  
10 GND

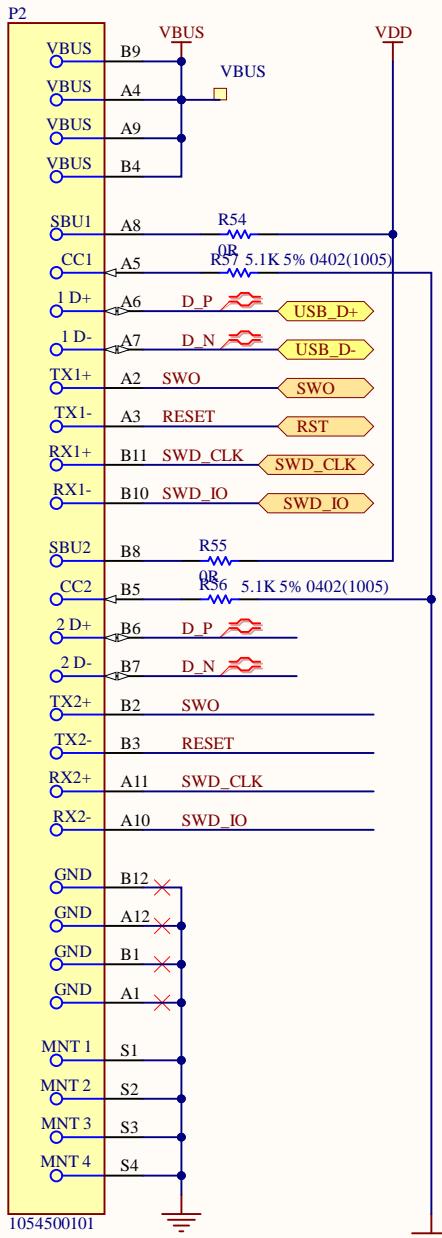
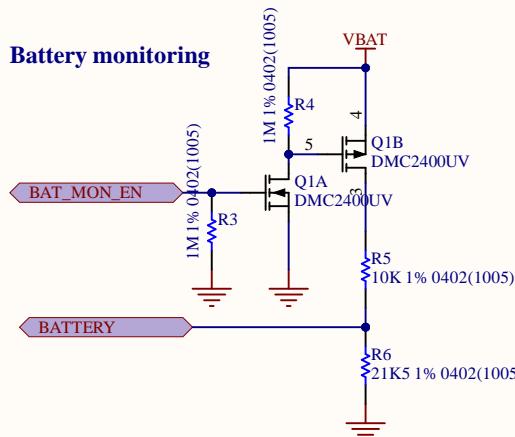


### Title: Patchkeeper - V2.0

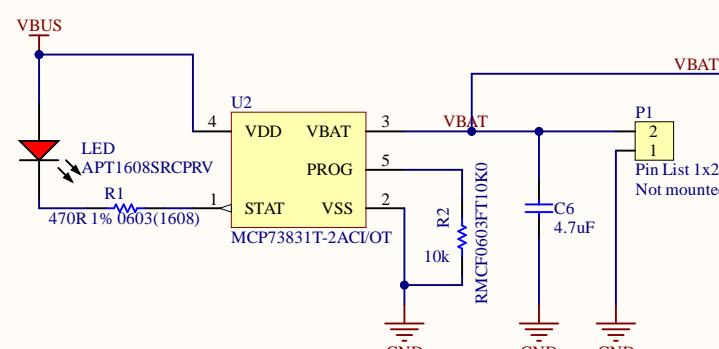
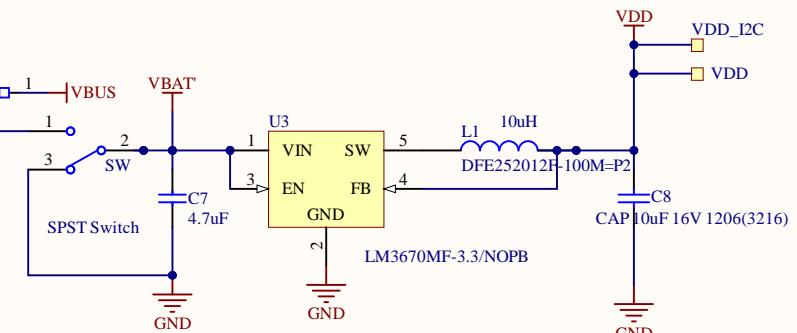
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| Filename: Sheet3_Pin_Map_V2.0.SchDoc |                | DrawnBy: Hongwei Li |

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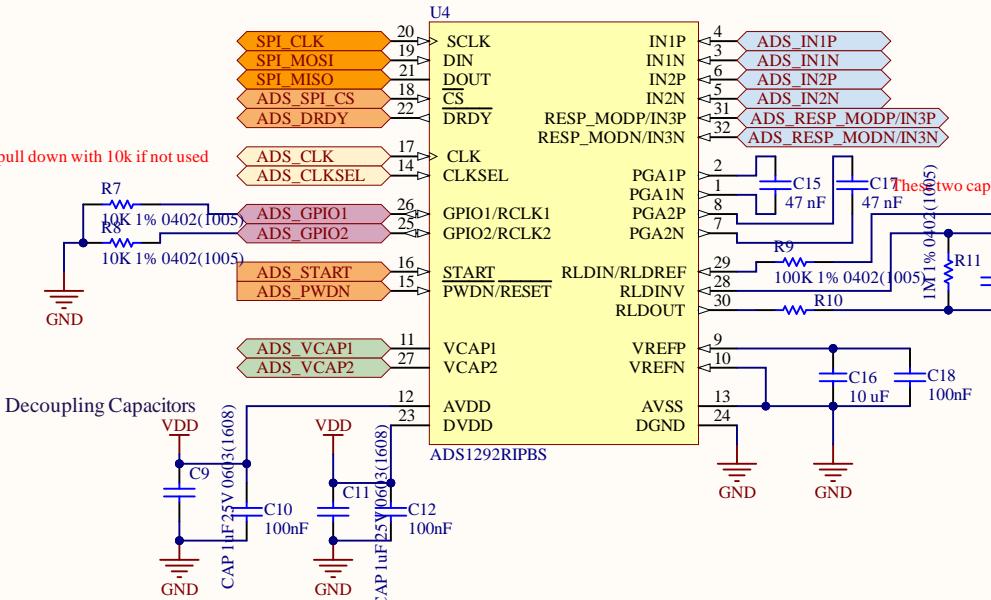
**USB port****Battery monitoring****Lithium Battery Charger MCP73831**

Lithium-Ion Batery 20mmx50mmx5mm, 3.7V, 500mAh

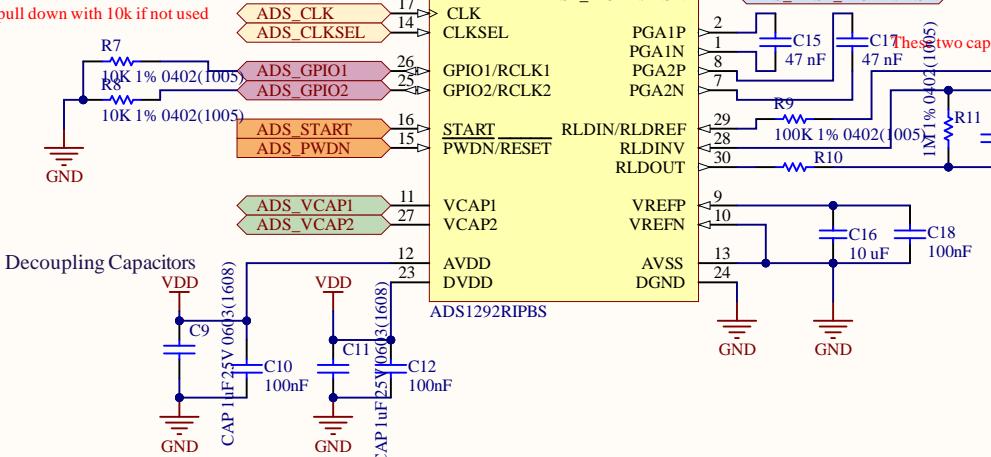
10kΩ charging resistor: 100mA  
2kΩ charging resistor: 500mA**Voltage Regulator LM3670MF-3.3 (VCC=3.3V)**Title: **Patchkeeper - V2.0**

|  |                       |                            |   |
|--|-----------------------|----------------------------|---|
| Size: <b>A4</b>                                  | Number: <b>1</b>      | Revision: <b>1</b>         | <i>Nokia Bell Labs</i><br><i>Broers Building</i><br><i>21 JJ Thomson Avenue</i><br><i>Cambridge, CB3 0FA</i><br><i>UK</i> |
| Date: <b>20/06/2021</b>                          | Time: <b>00:00:31</b> | Sheet <b>4</b> of <b>9</b> |   |
| Filename: <b>Sheet4_Power_supply_V2.0.SchDoc</b> |                       |                            | DrawnBy: <b>Hongwei Li</b>  |

A

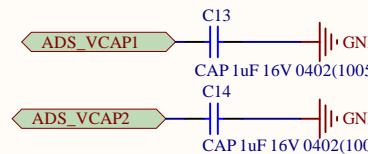


B

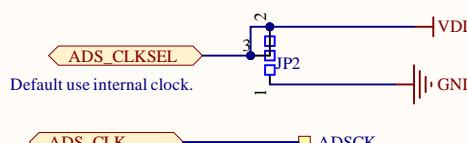


C

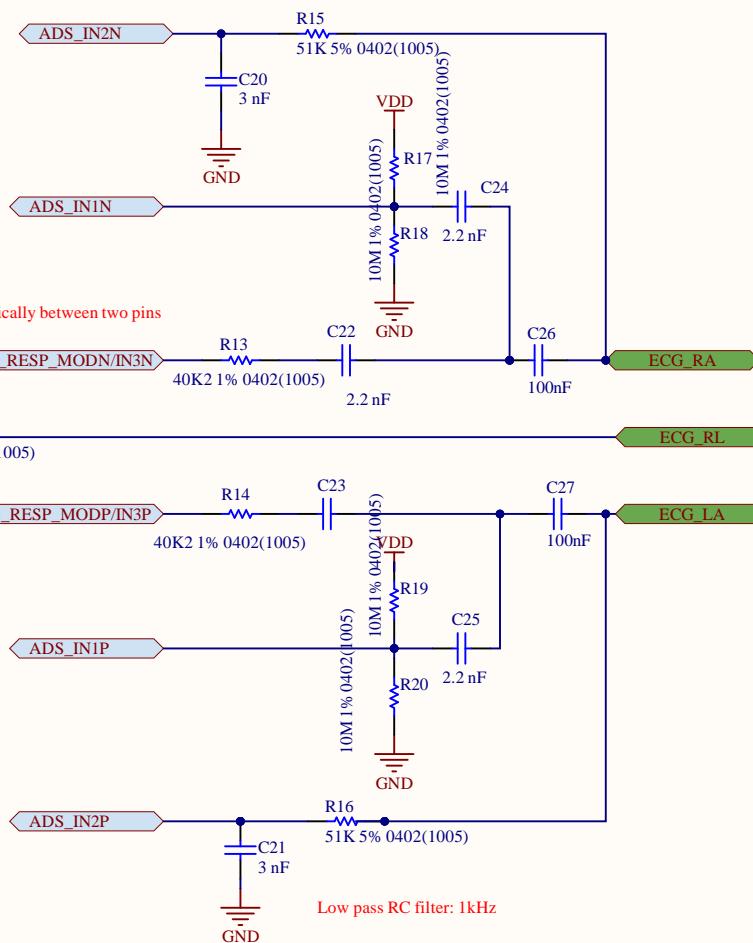
### Decoupling Capacitors



D



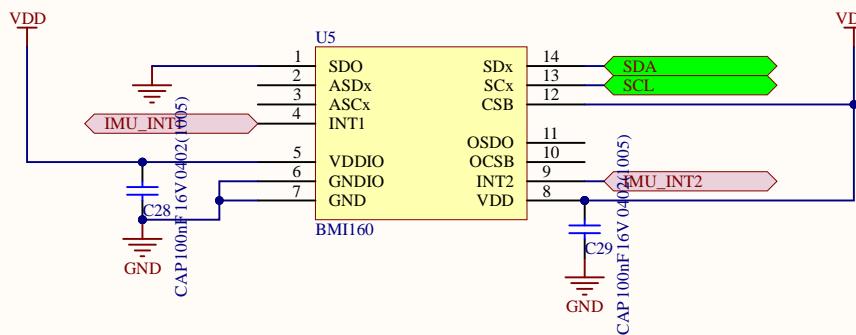
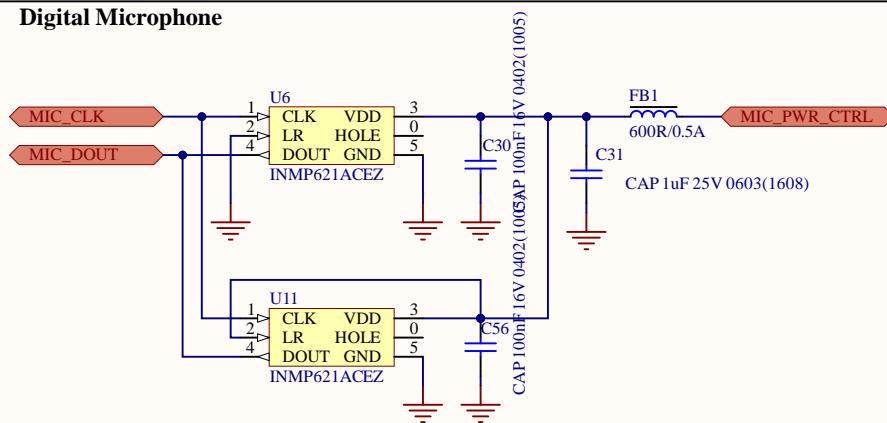
Low pass RC filter: 1kHz



Low pass RC filter: 1kHz

Title: **Patchkeeper - V2.0**

|  |                     |  |
|--|---------------------|--|
| Size: A4                                 | Number: 1           | Revision: 1                                    |
| Date: 20/06/2021                         | Time: 00:00:31      | Sheet 5 of 9<br>UK                             |
| Filename: Sheet5_ECG_ADS1292_V2.0.SchDoc | DrawnBy: Hongwei Li | Cannot open file<br>C:\Users\hongweil\OneDrive |

**Motion tracking device** I<sub>2</sub>C address: 0x68**Digital Microphone**

A

A

B

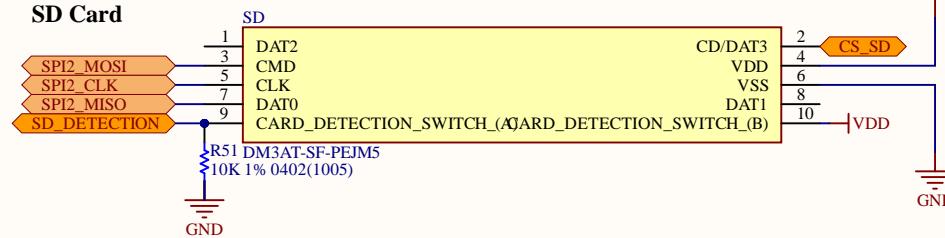
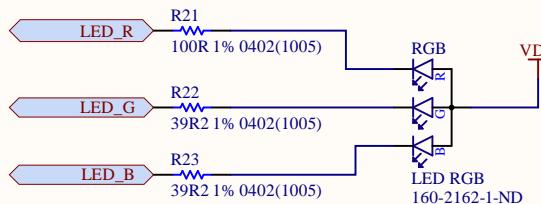
B

C

C

D

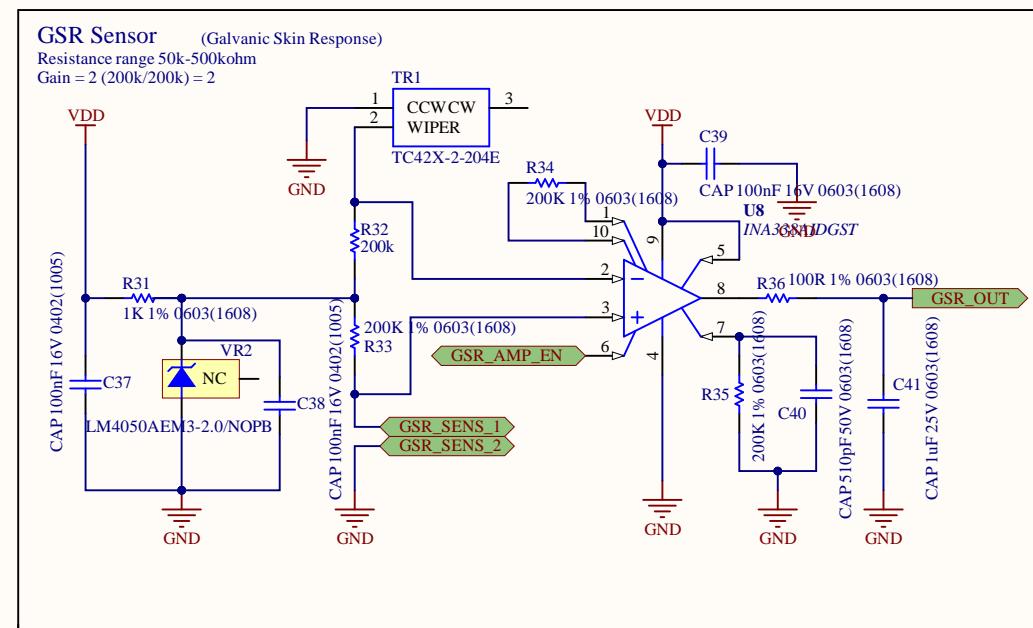
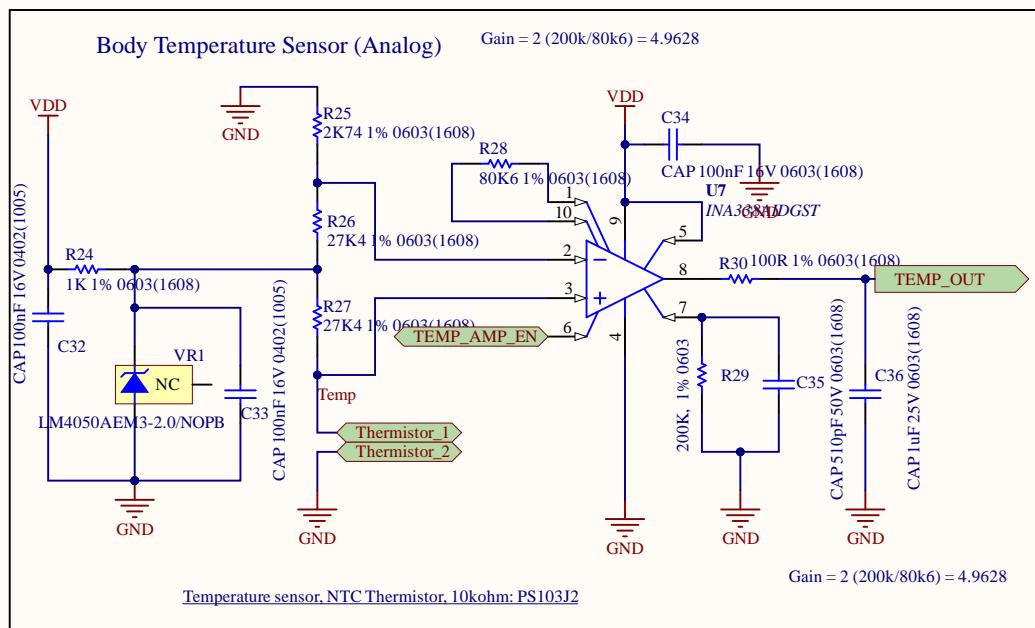
D

**SD Card****LEDs**Title: **Patchkeeper - V2.0**

|   |                |                     |
|---|----------------|---------------------|
| Size: A4  | Number: 1      | Revision: 1         |
| Date: 20/06/2021                                | Time: 00:00:31 | Sheet 6 of 9        |
| Filename: Sheet6_IMU_Microphone_PPG_V2.0.SchDoc |                | DrawnBy: Hongwei Li |

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C

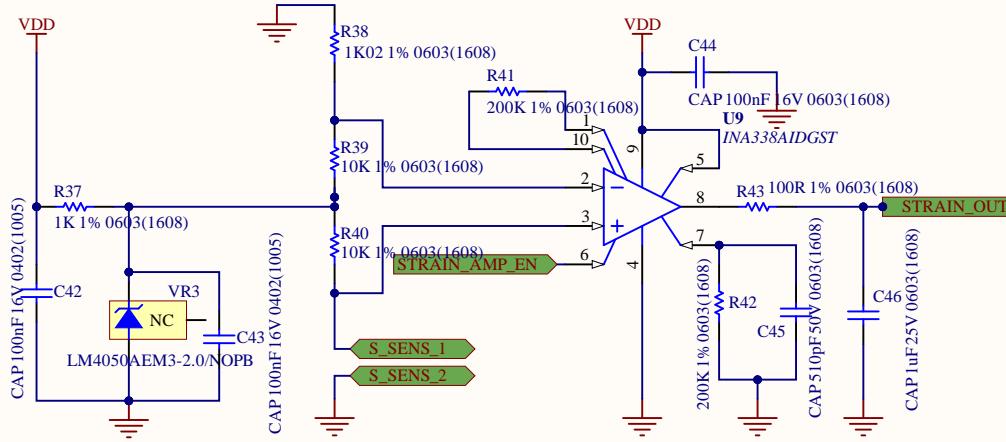
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| Title: <b>Patchkeeper - V2.0</b>                |                |              | <i>Nokia Bell Labs<br/>Broers Building<br/>21 JJ Thomson Avenue<br/>Cambridge, CB3 0FA<br/>UK</i> |
|---|----------------|--------------|---|
| Size: A4  | Number: 1      | Revision: 1  |   |
| Date: 20/06/2021                                | Time: 00:00:31 | Sheet 7 of 9 |   |
| Filename: Sheet7_Analog1-2_Temp_GSR_V2.0.SchDoc |                |              | DrawnBy: Hongwei Li   |

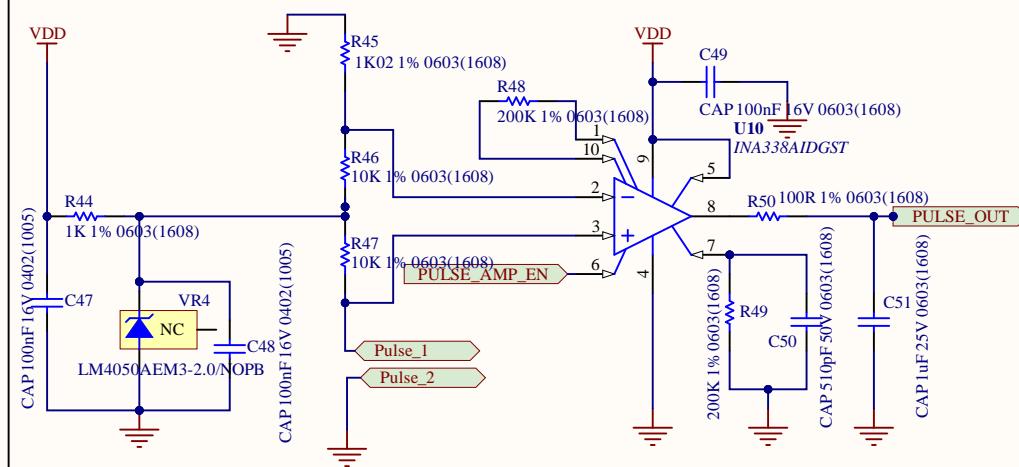
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**Strain Sensor**      Strange sensor resistance: 2kohm

Gain = 2 (200k/200k) = 2


**Analgo Pulse Sensor (Analog)**

Gain = 2 (200k/200k) = 2



A

A

B

B

C

C

D

D

Title: **Patchkeeper - V2.0**

Size: A4 Number: 1 Revision: 1

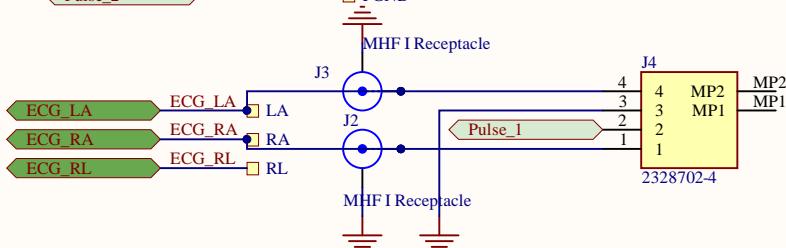
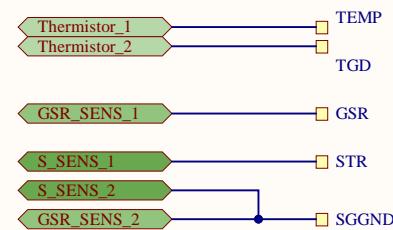
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Filename: Sheet8\_Analog3-4\_Strain\_pulse\_V2.0.SchDoc

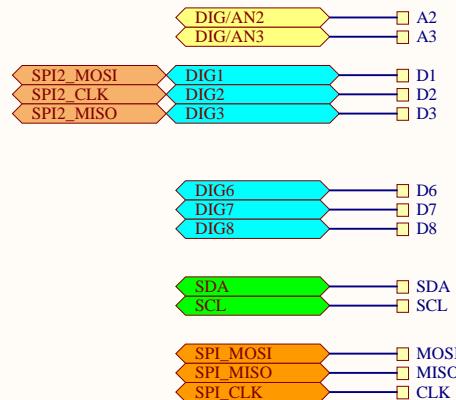
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Cambridge, CB3 0FA  
UKCannot open file  
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DrawnBy: Hongwei Li

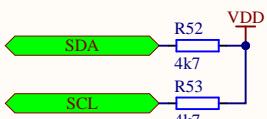
## Connection for Pogo Pins



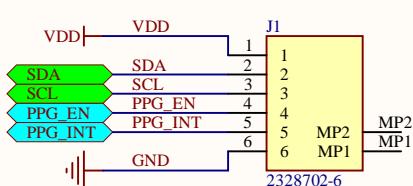
## testing pads



## I2C Pull resistors



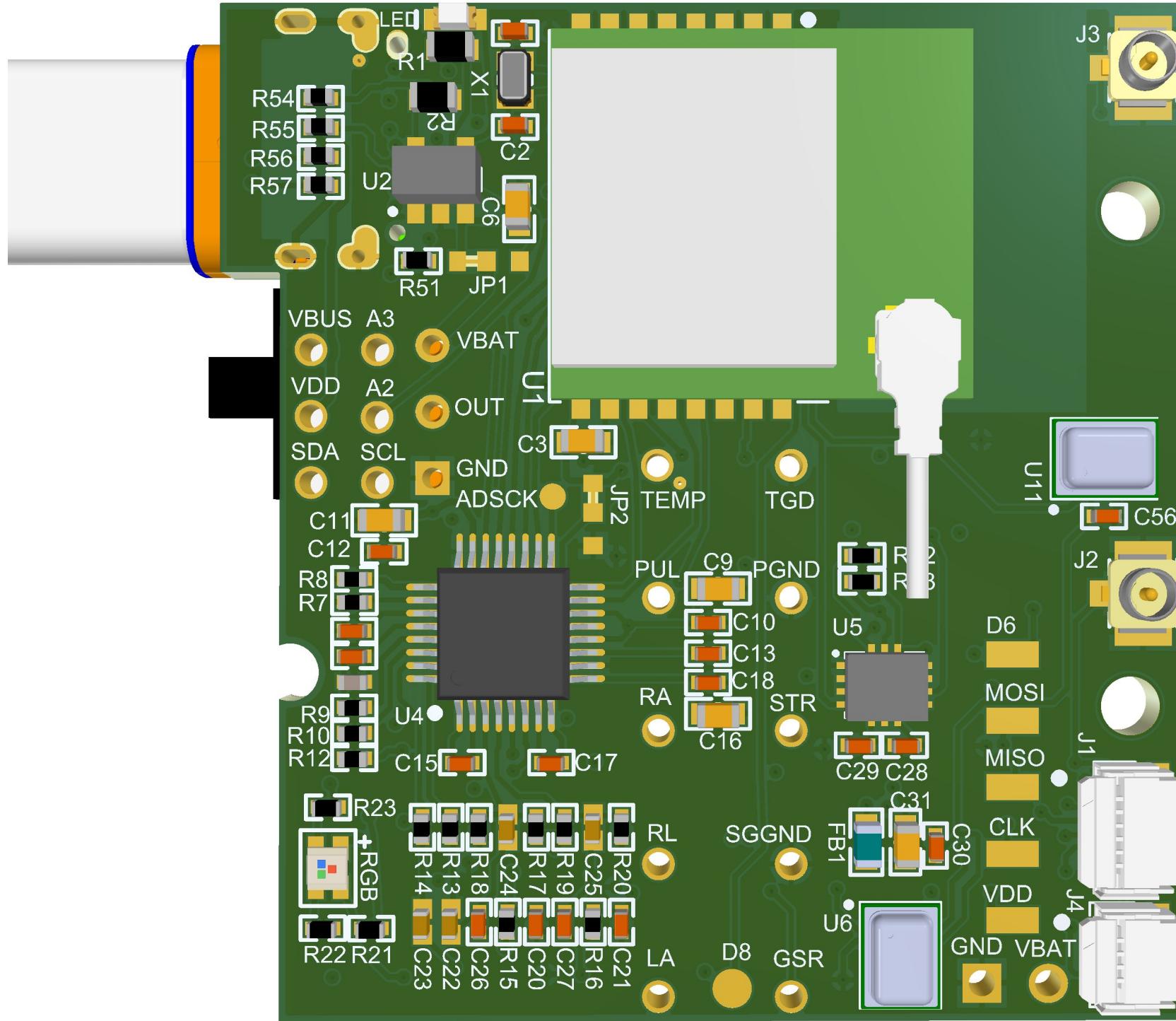
## PPG Connector

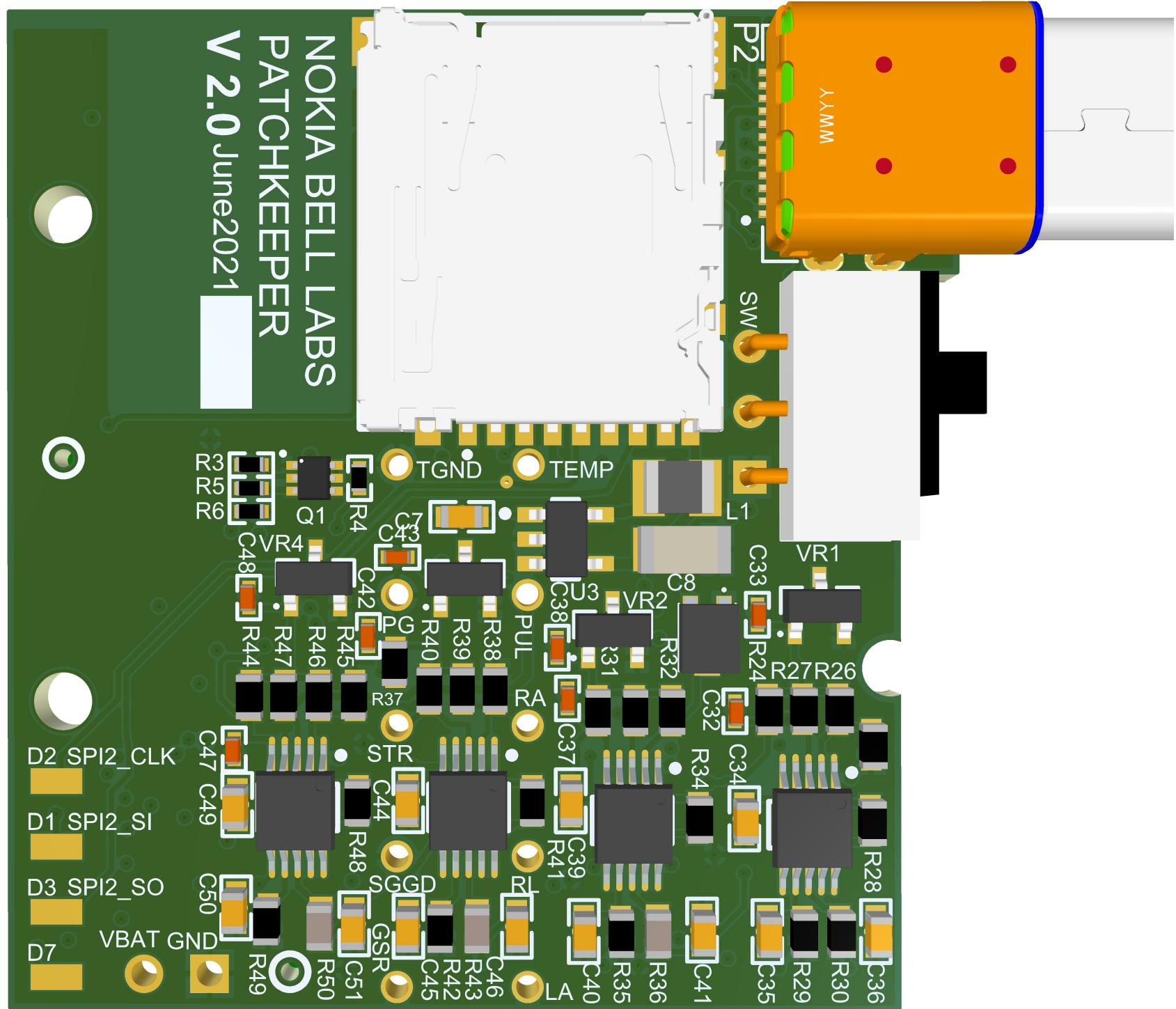
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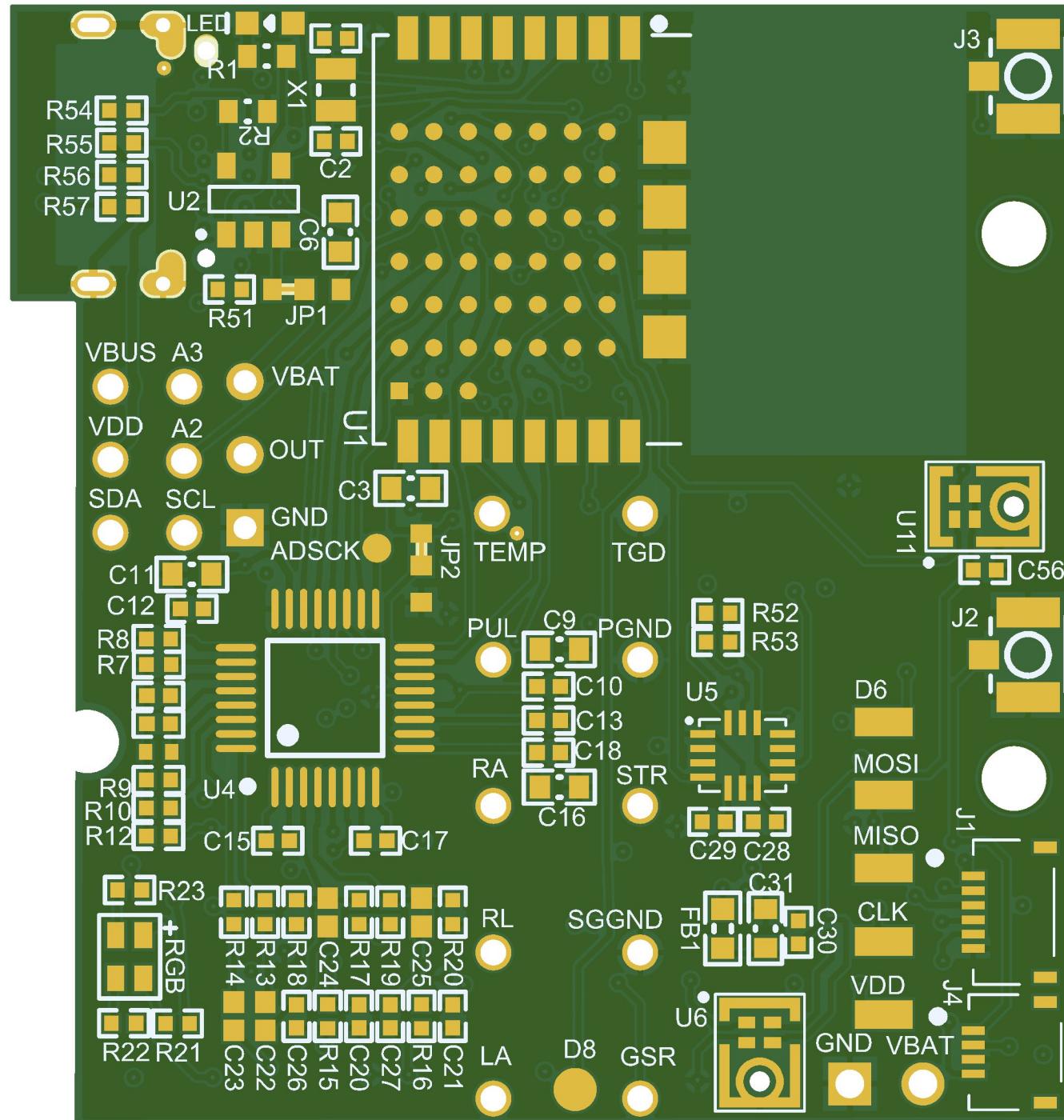
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| Date: 20/06/2021                                     | Time: 00:00:31 | Sheet 9 of 9        |
| Filename: Sheet9_Debugger_Pogo_Interface_V2.0.SchDoc |                | DrawnBy: Hongwei Li |

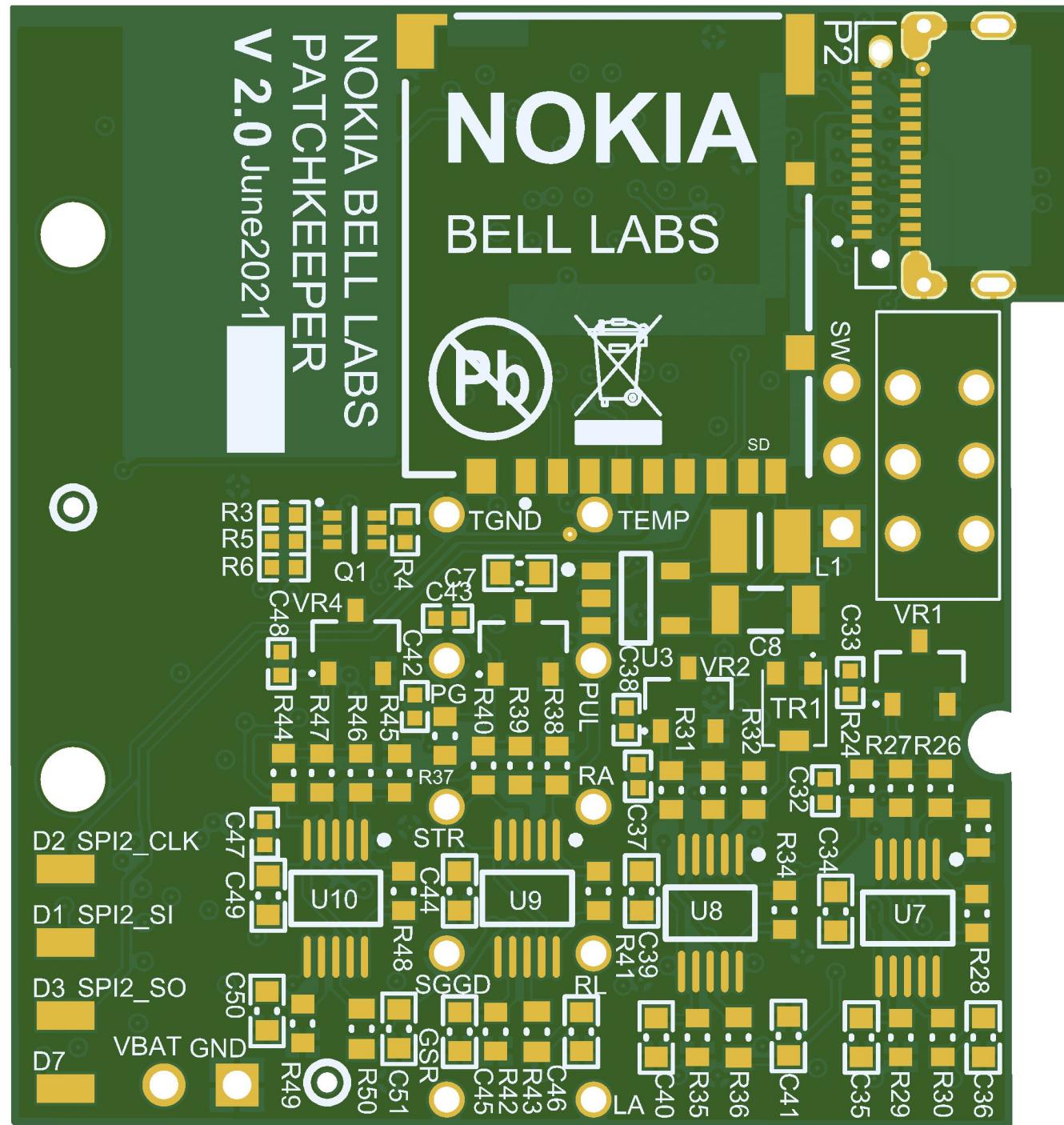
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UK

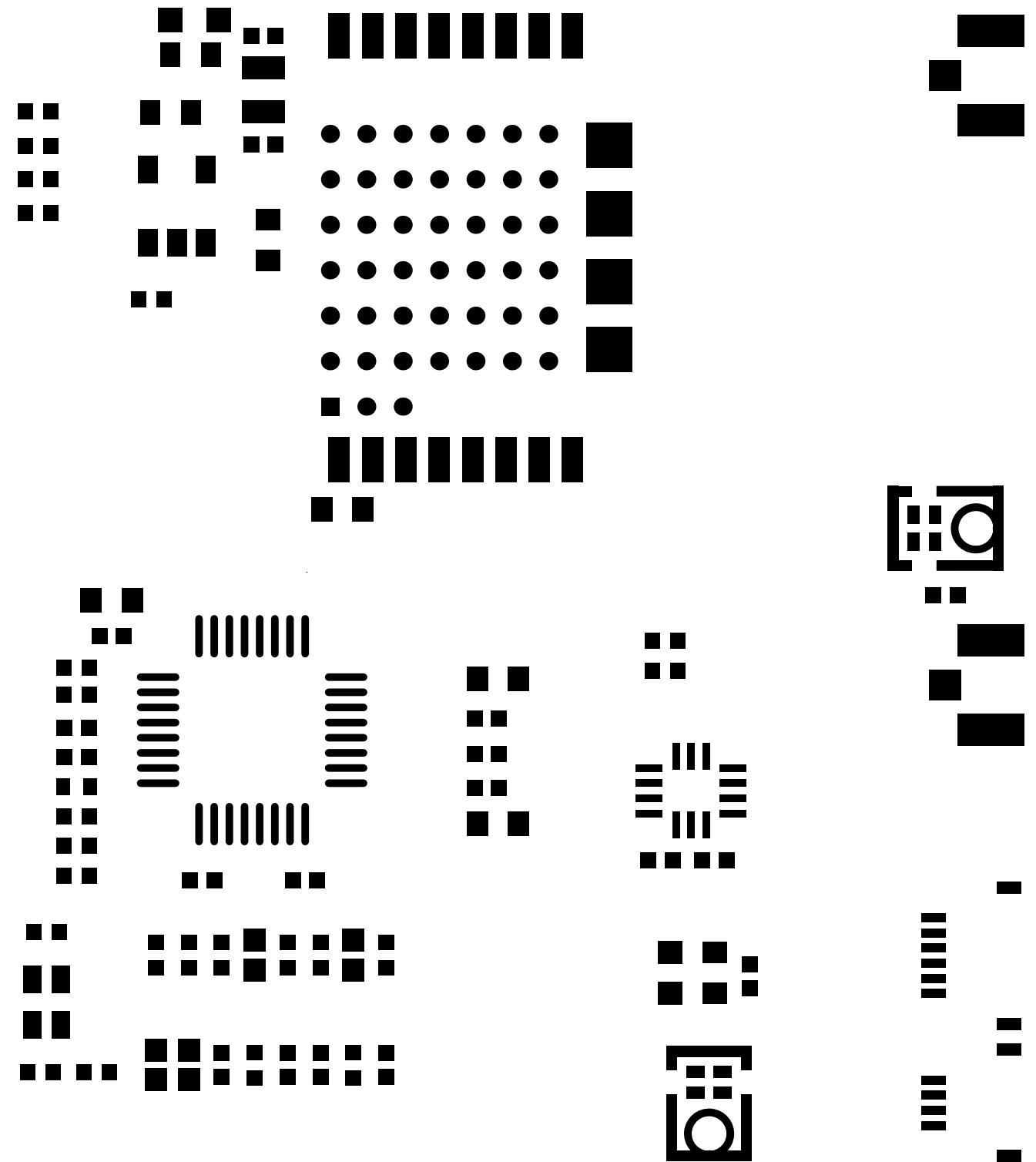
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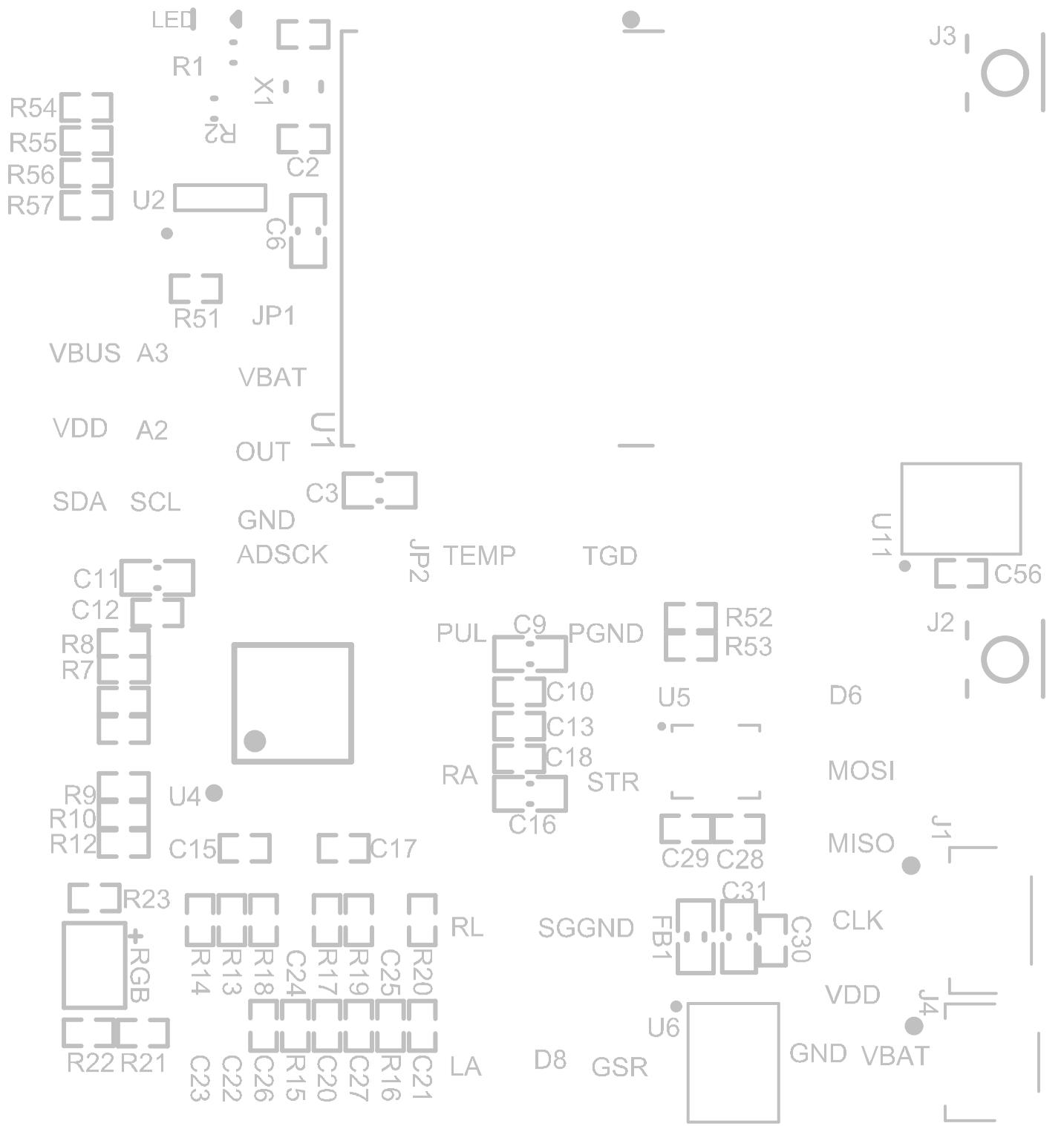


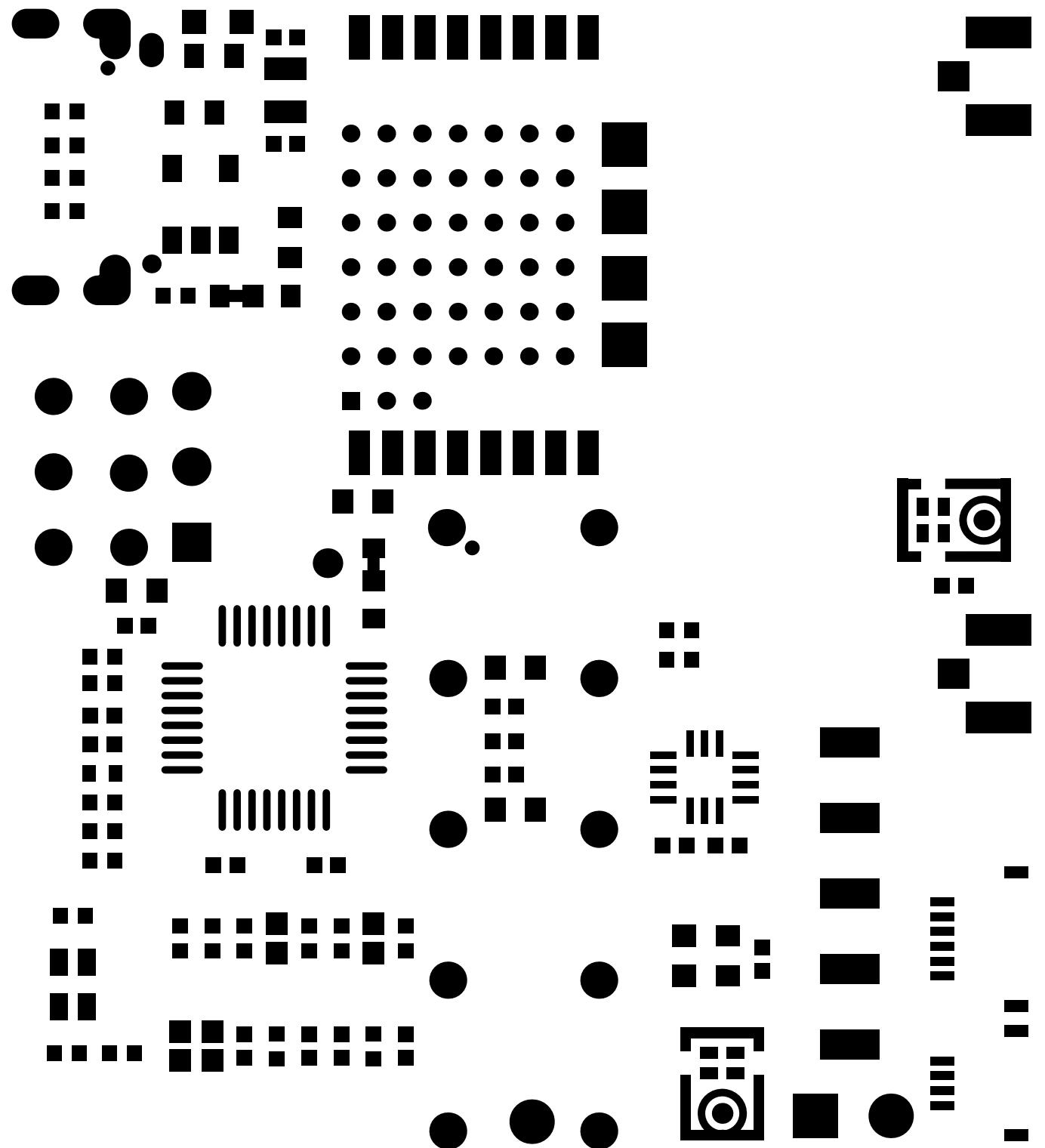


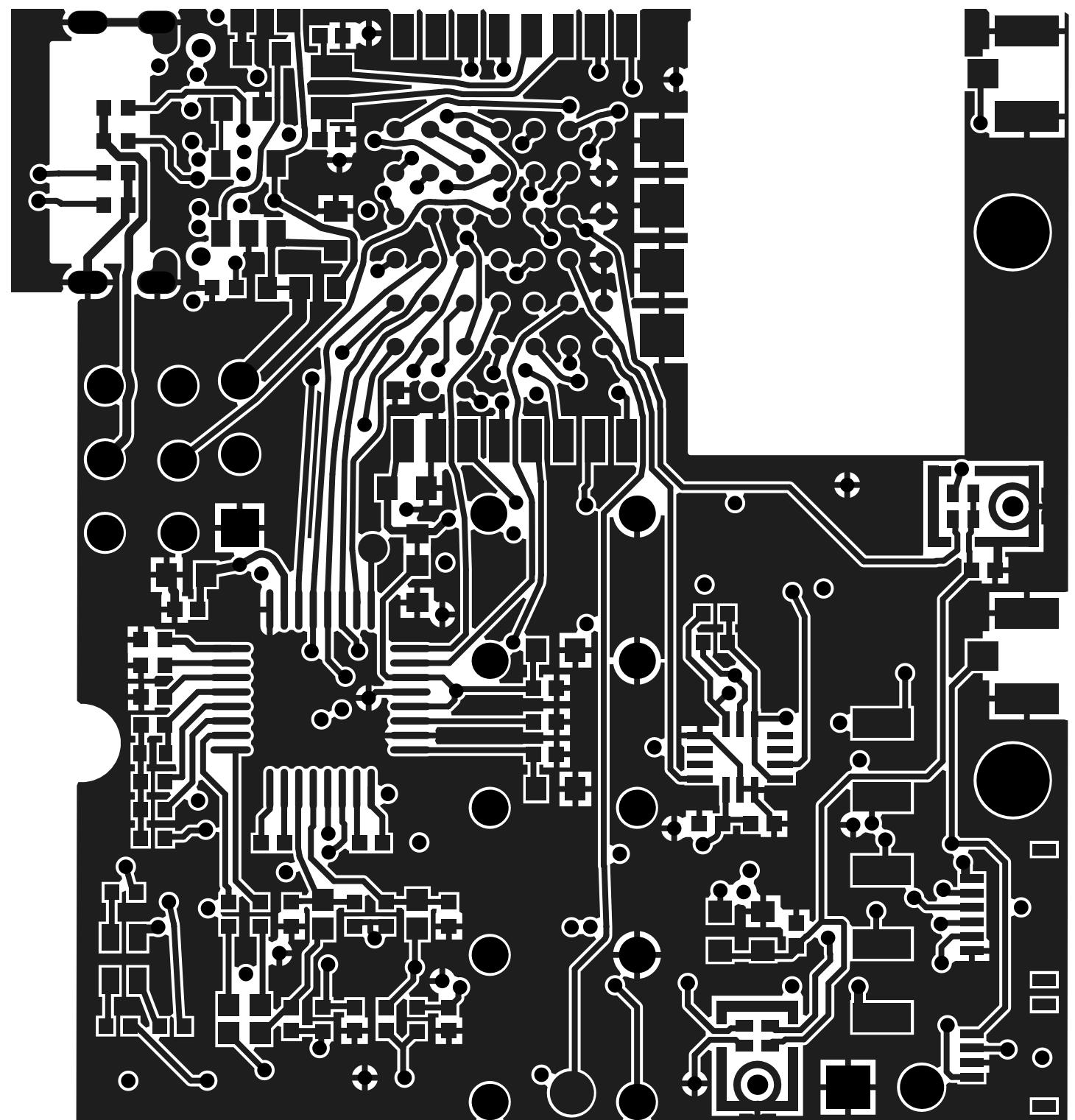


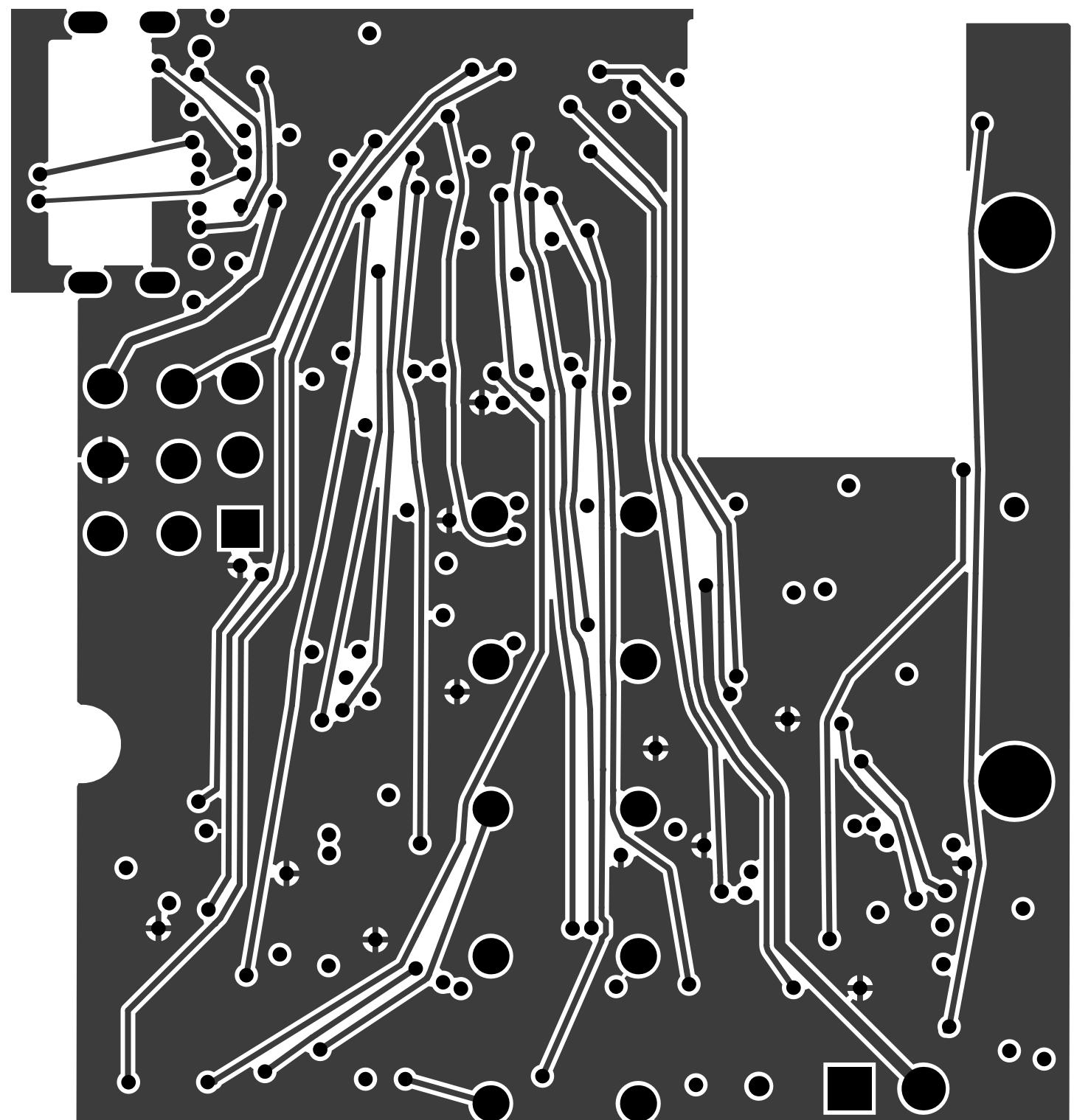


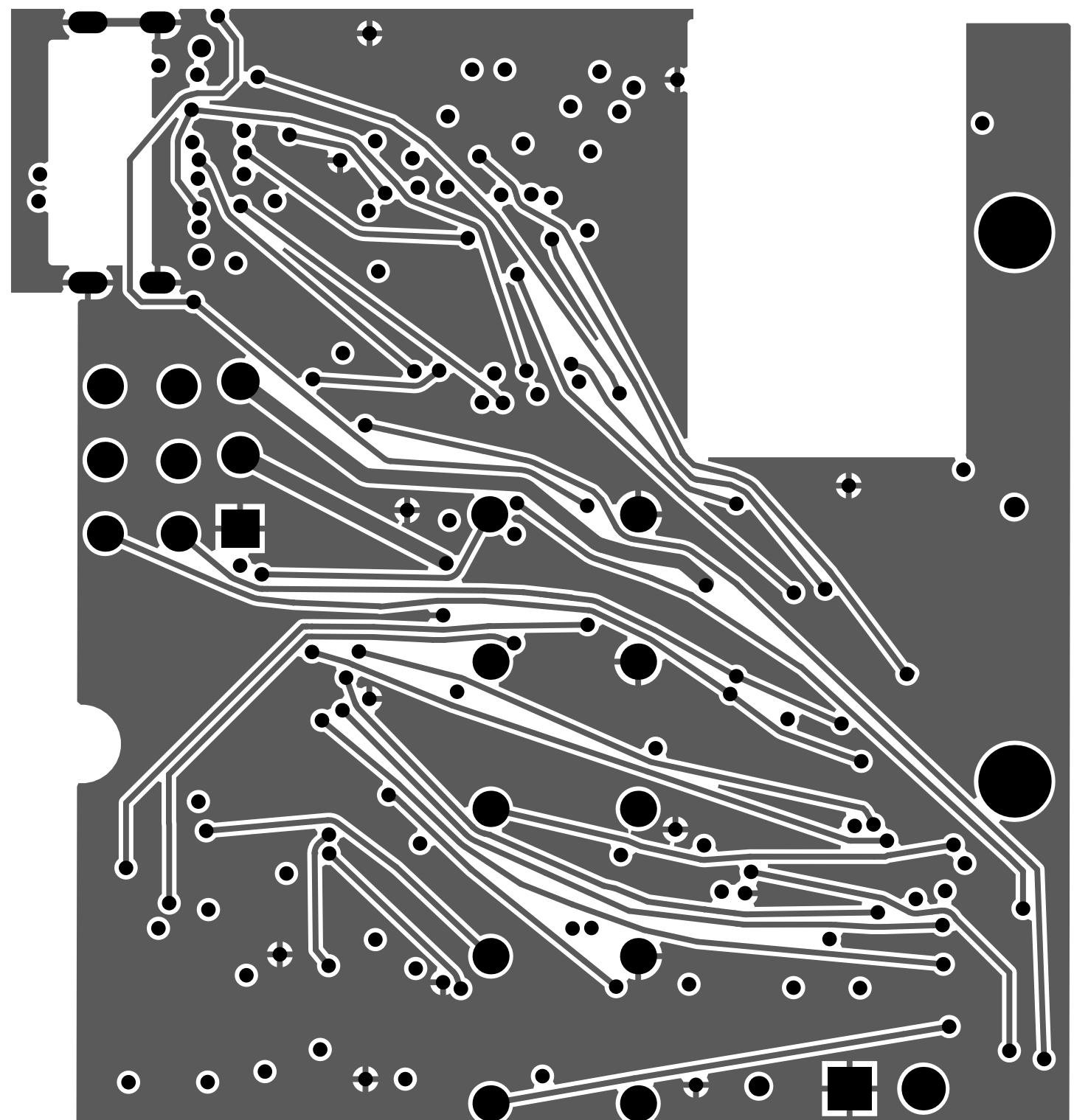


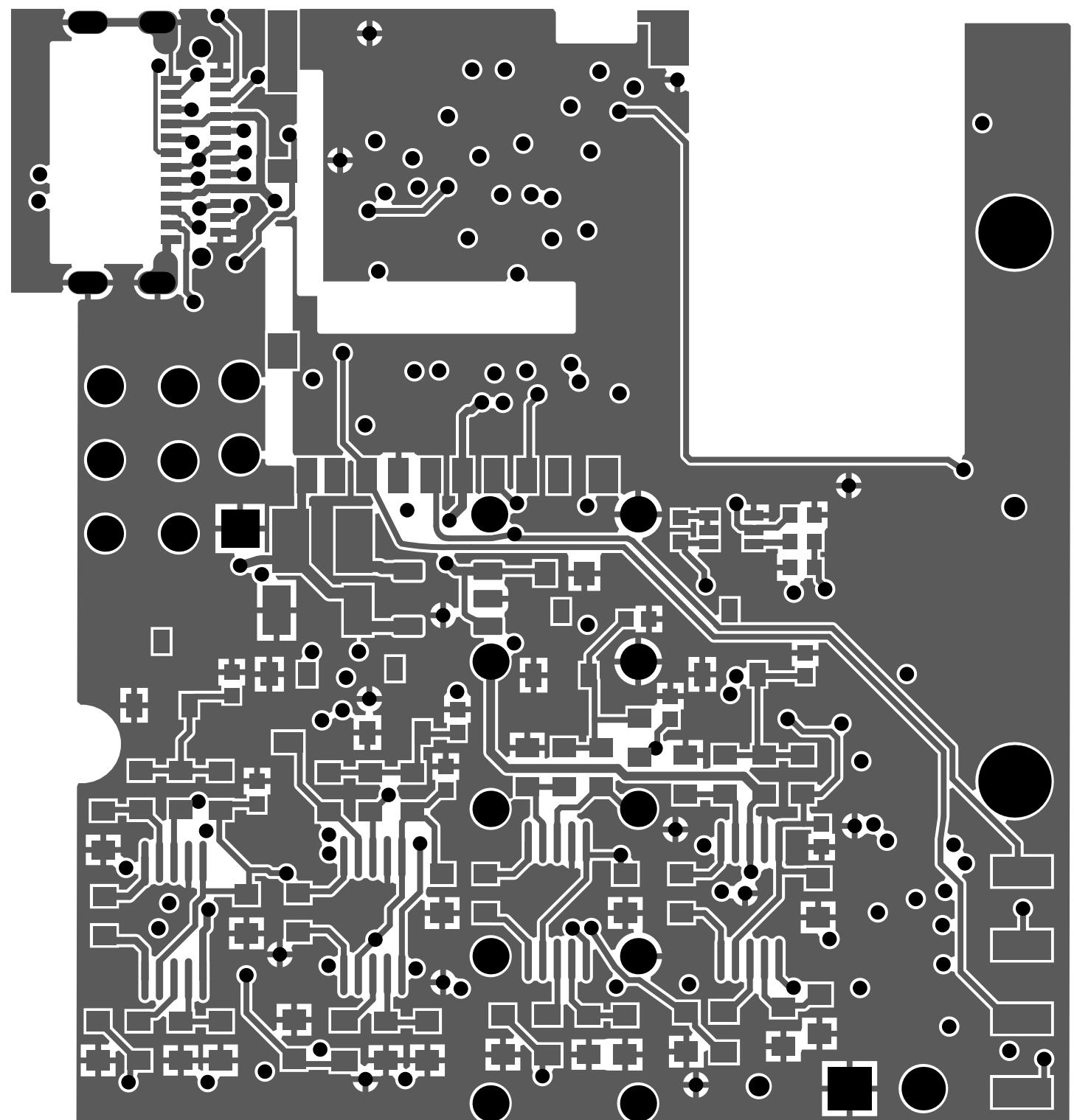


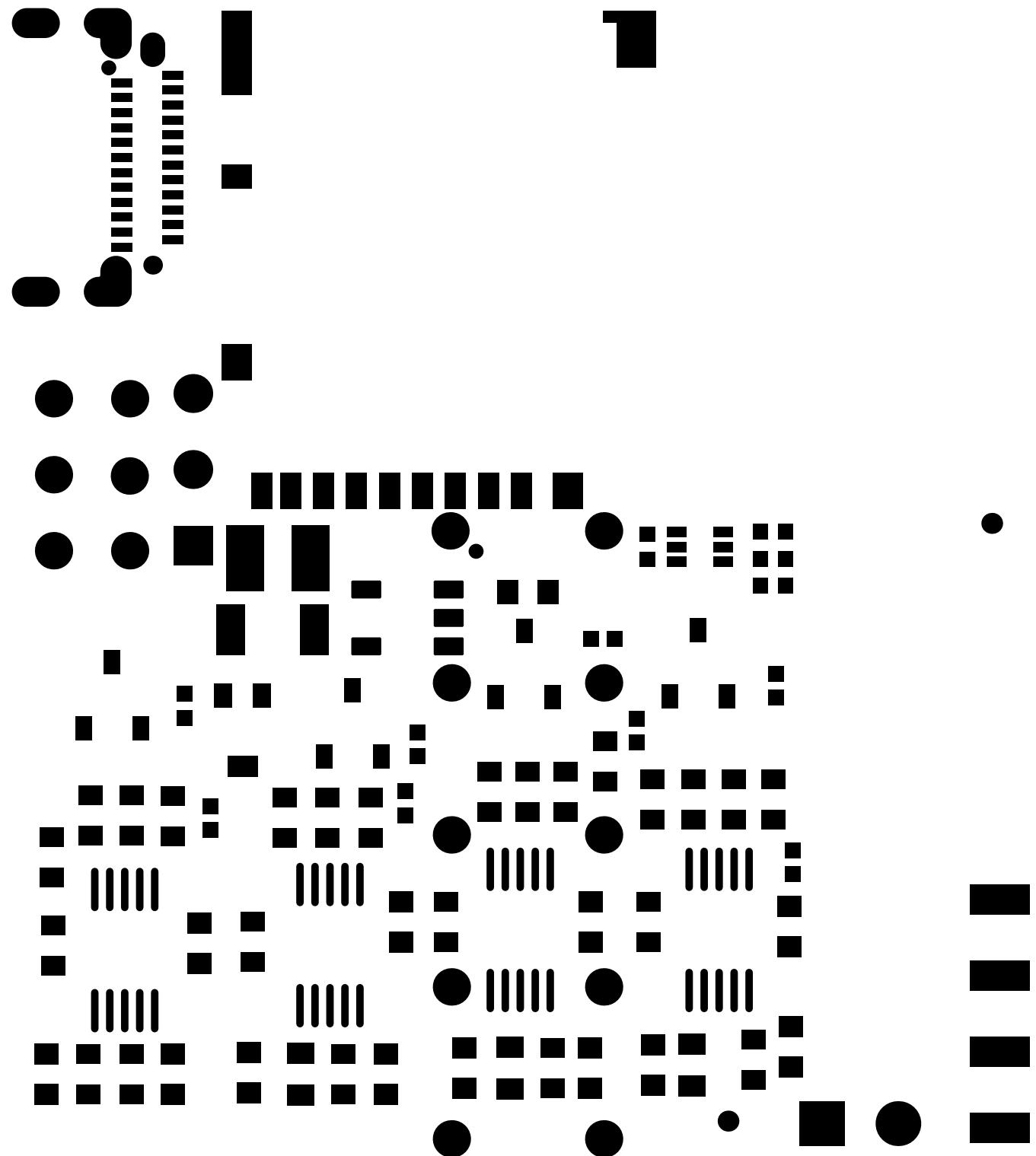


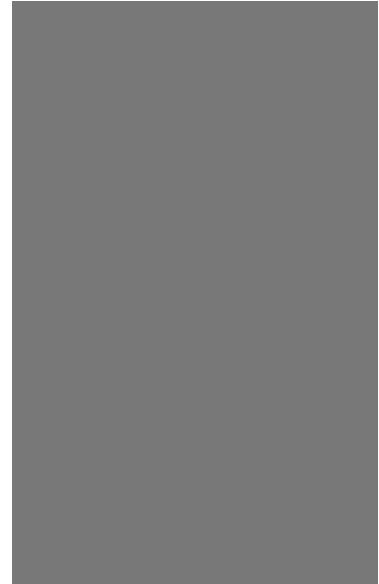


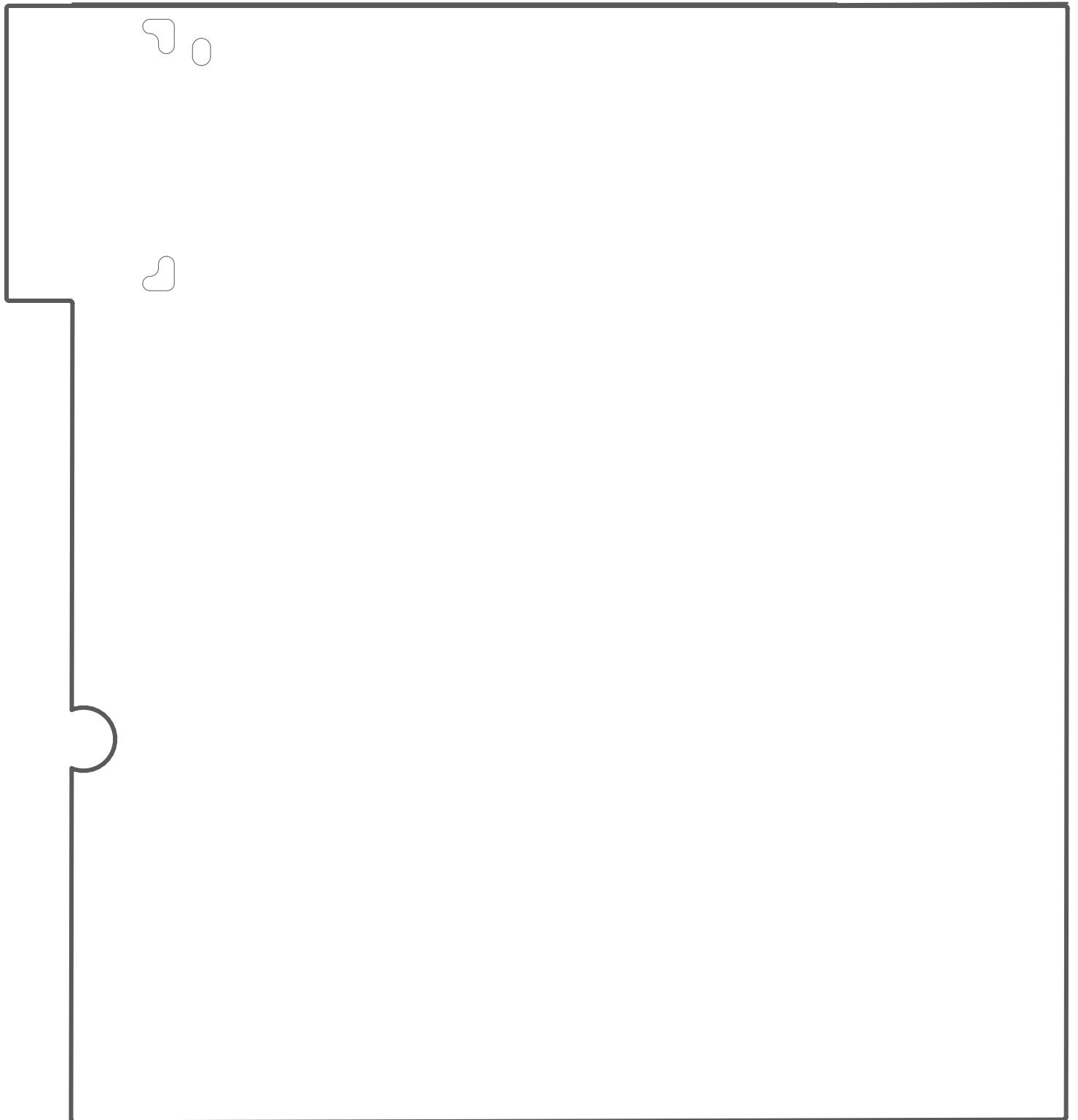


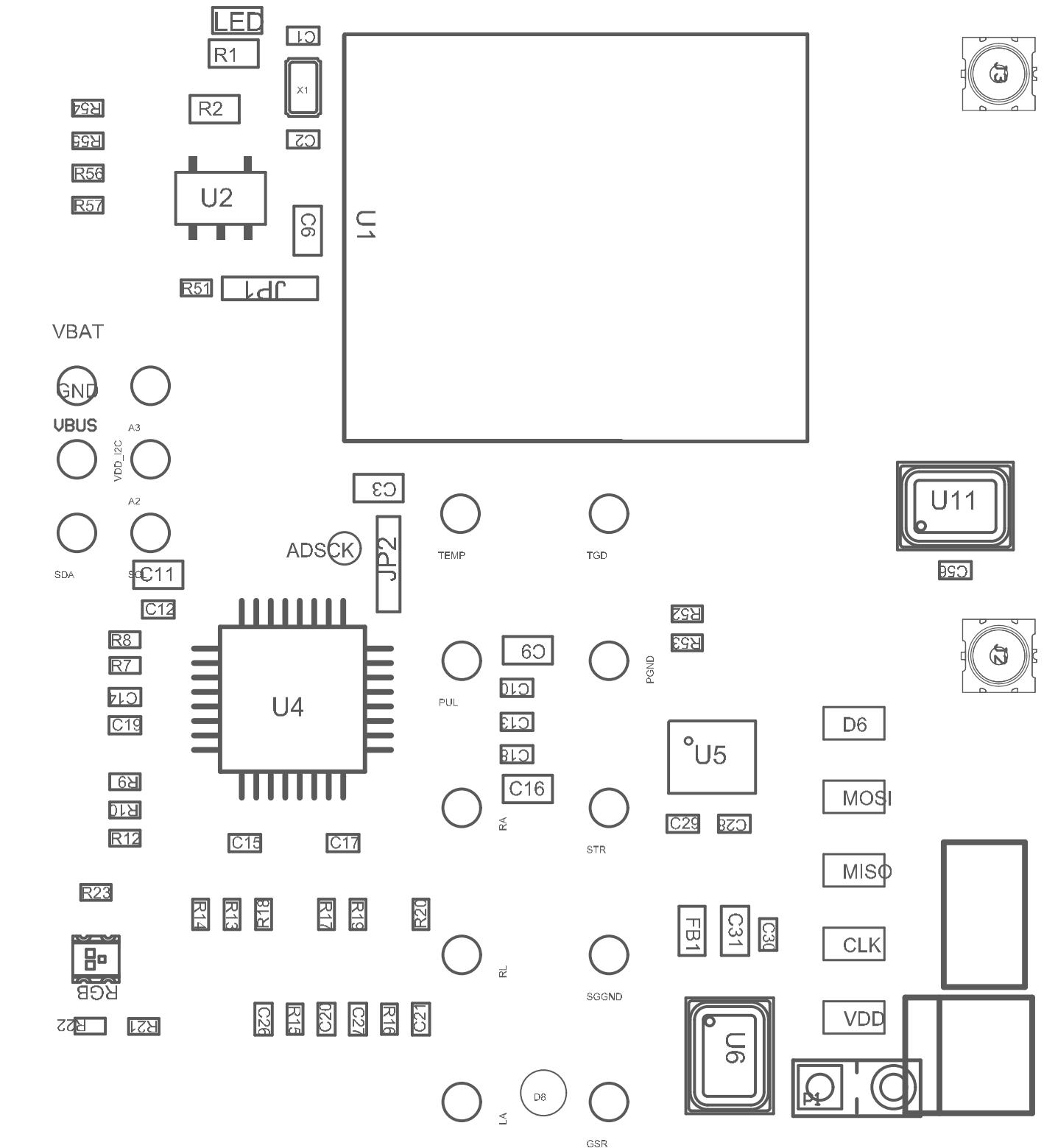


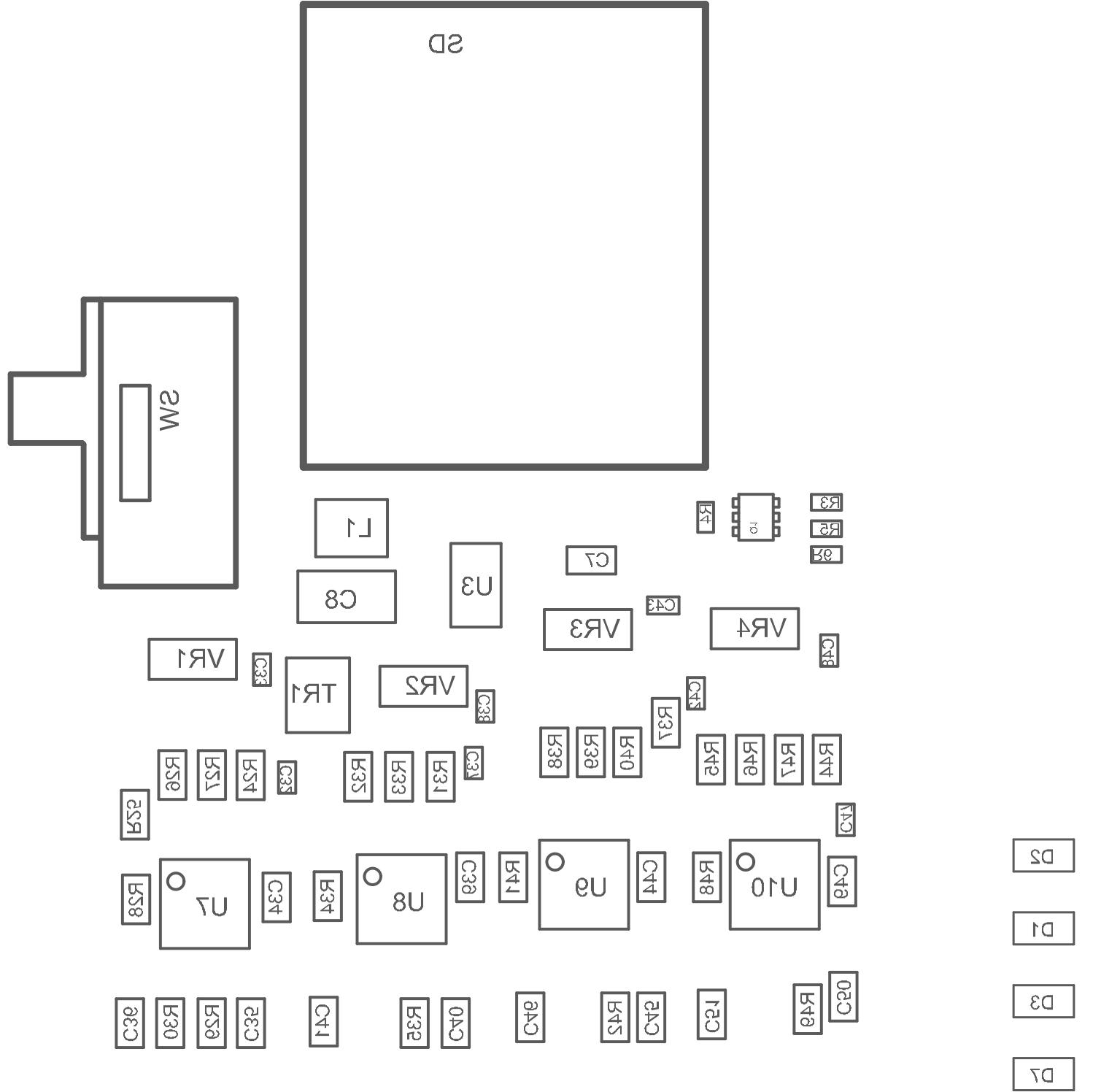










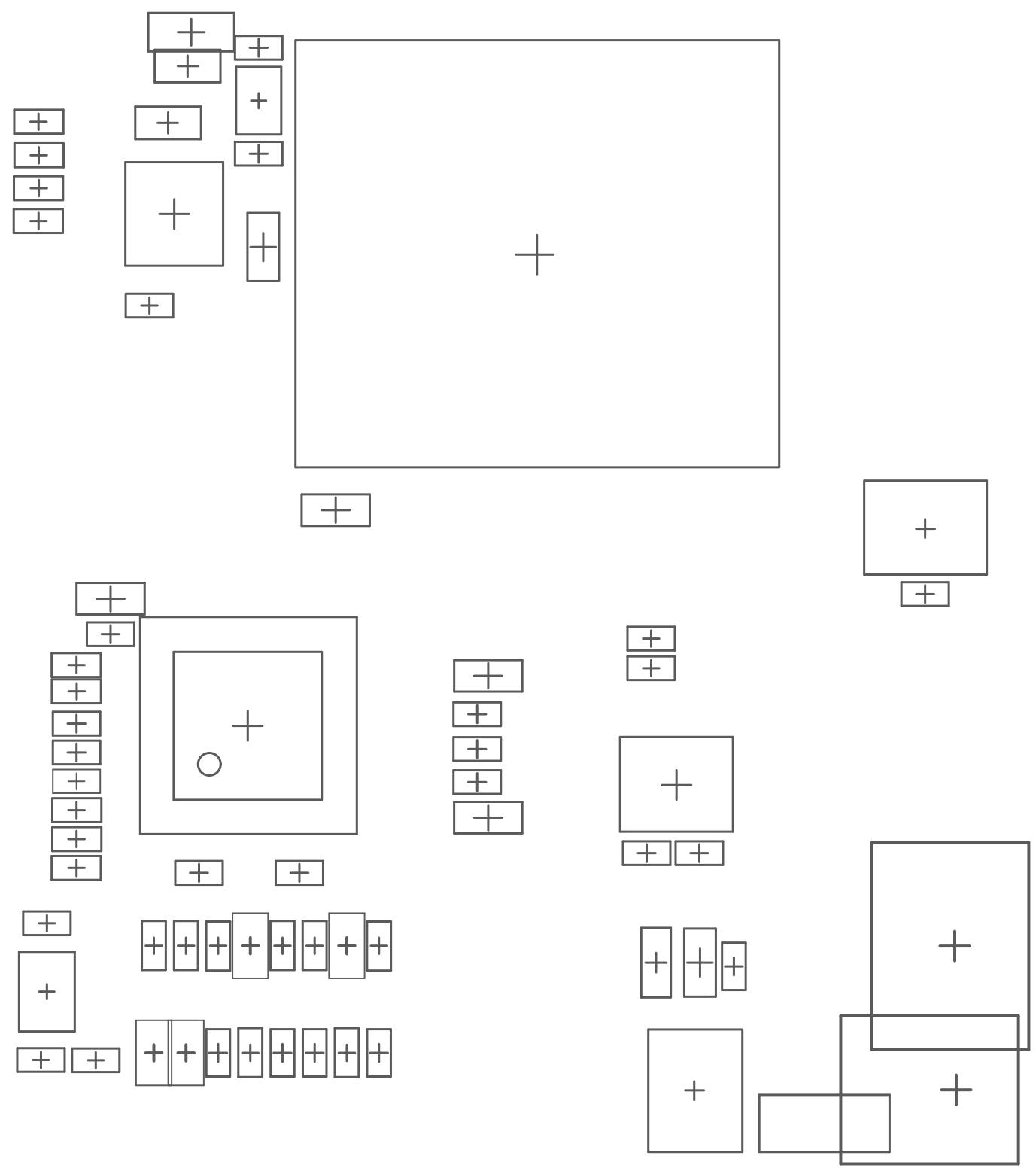


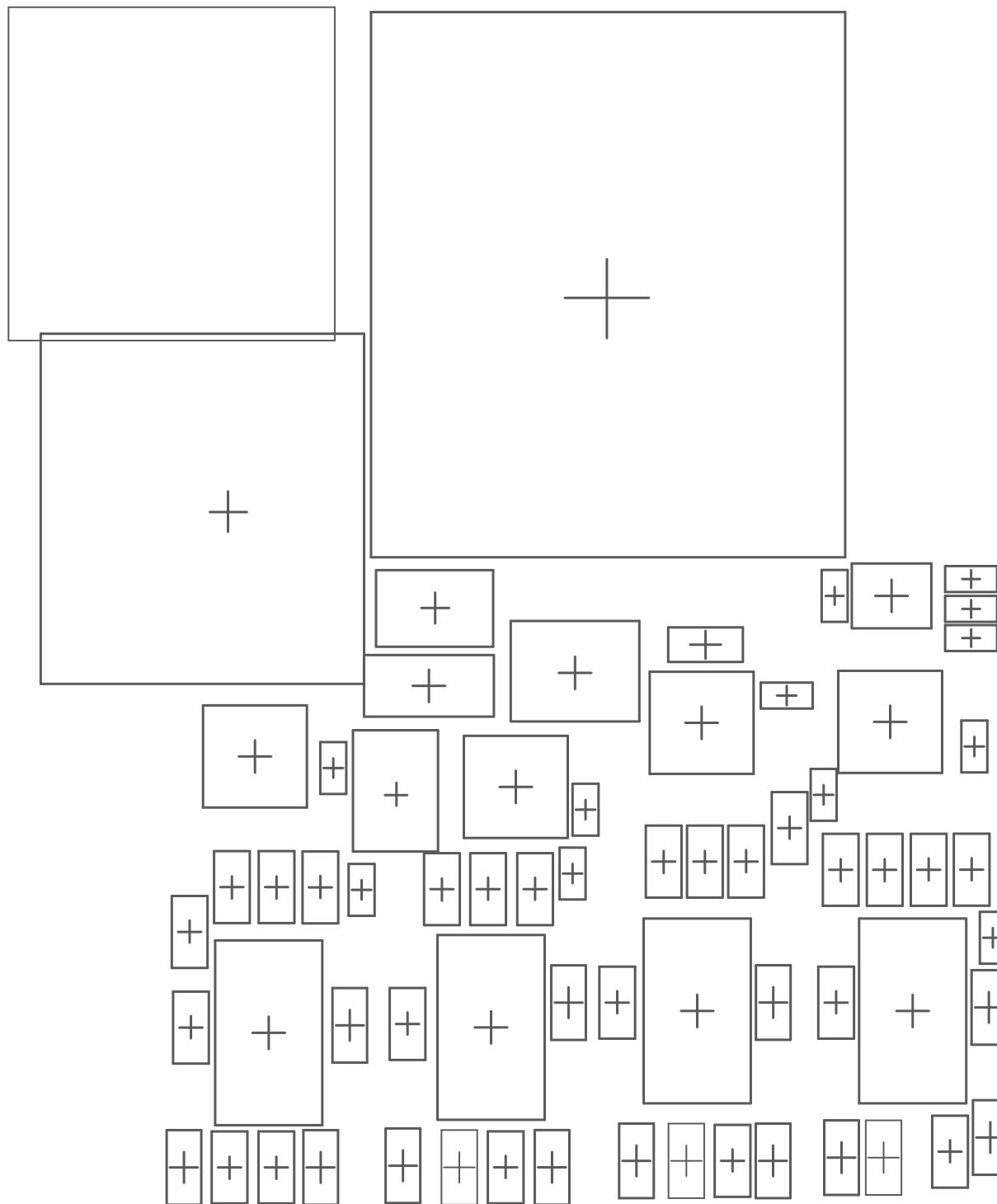
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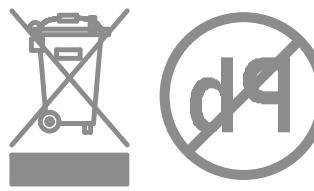




O

D2 ABAT GND  
D3 SPI\_S0  
D1 SPI\_SI  
D2 SPI\_CLK

0.5V  
NOKIA  
БАТАРЕЙКА  
ВЕРГ ГАВБ  
БЕЛЛАБС



NOKIA

WS

SD

TEMP

RA

R32

RA

U10

U9

STR

C47

C46

C45

C44

C43

C42

C41

C40

C39

C38

C37

C36

C35

C34

C33

C32

C31

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C4

C3

C2

C1

