PSOC™ Control C1 Evaluation Kit (KIT-PSC1M3-EVK) user guide

About this document

Scope and purpose

This document provides the schematic and hardware description of the PSOC™ Control C1 Evaluation Kit KIT-PSC1M3-EVK, so that user is able to make use of this board for their application code development on PSC1M3FBLGQ0AT device.

Intended audience

For people who are interested to explore the functionality of PSC1M3 device.

Table of contents

About this document . . . 1

Table of contents . . . 2

1 Overview . . . 3

1.1 Key features . . . 3

1.2 Block diagram . . . 4

2 Hardware description . . . 5

2.1 Power supply . . . 5

2.2 Reset . . . 6

2.3 Clock generation . . . 6

2.3.1 External crystal and external Real time clock (RTC) crystal . . . 6

2.4 Boot option . . . 8

2.5 CAN bus connector . . . 9

2.6 Debug interface and virtual COM port . . . 10

2.7 LED . . . 11

2.8 Potentiometer . . . 12

2.9 Application card connector . . . 12

3 Production data . . . 14

3.1 Schematics . . . 14

3.2 Layout and geometry . . . 17

3.3 Component placement . . . 18

3.4 Bill of material . . . 19

Revision history . . . 21

Disclaimer . . . 22

1 Overview

This document describes the features and hardware details of the PSOC™ Control C1 Evaluation Kit KIT-PSC1M3-EVK. This board is assembled with ARM® Cortex®-M0 based PSC1M3 microcontroller from Infineon Technologies. This board is part of Infineon's PSOC™ Control Application Kits.

The PSOC™ Control C1 Evaluation Kit KIT-PSC1M3-EVK houses the PSC1M3FBLGQ0AT microcontroller and a 2x30 pin edge for application expansion. The board along with application cards demonstrates the capabilities of PSC1M3. The main use case for this board is to demonstrate the generic features of PSC1M3 device, including tool chain. The focus is safe operation under evaluation conditions. The board is neither cost nor size optimized and does not serve as a reference design.

1.1 Key features

The PSOC™ Control C1 Evaluation Kit KIT-PSC1M3-EVK is equipped with the following features:

- PSC1M3FBLGQ0AT (ARM® Cortex®-M0 based) microcontroller, PG-VQFN-48
- Connection to application cards via card edge connector
- Detachable J-Link debugger and UART virtual COM port, with USB-C connector
- Four user LEDs
- Potentiometer, connected to analog input P2.5
- Power supply via USB-C connector
- Option to use a 20-MHz external crystal for CAN communication
- Option to use a 32.768-kHz external crystal as standby clock

1.2 Block diagram

The Block diagram of the PSOC™ Control C1 Evaluation Kit shows the functional block diagram of the KIT-PSC1M3-EVK.

Features include:

- On board debugger for downloading and debugging of application code
- Virtual COM port for UART communication with terminal program
- 2x30 card edge connector for extension to application cards
- 4 User LEDs connected to GPIO P4.4, P4.5, P4.6, P4.7
- Variable resistor R122 connected to analog input P2.5
- All the pins of PSC1M3 are accessible via the connector JP101, JP103, JP104 and JP105
- CAN interface with CAN transceiver mounted
- External crystal 20-MHz and 32.768-kHz mounted

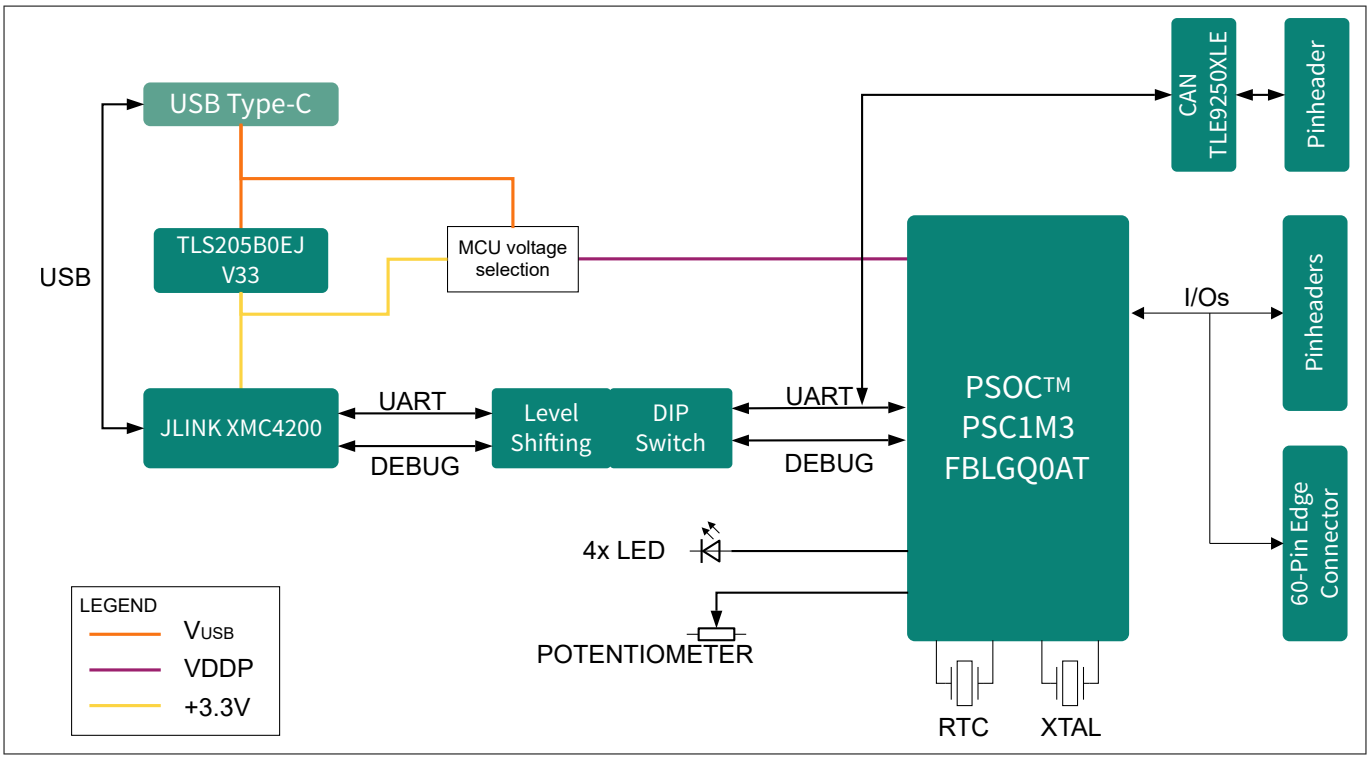


Figure 1 Block diagram of KIT-PSC1M3-EVK

2 Hardware description

The following sections gives a detailed description of the hardware and how it can be used.

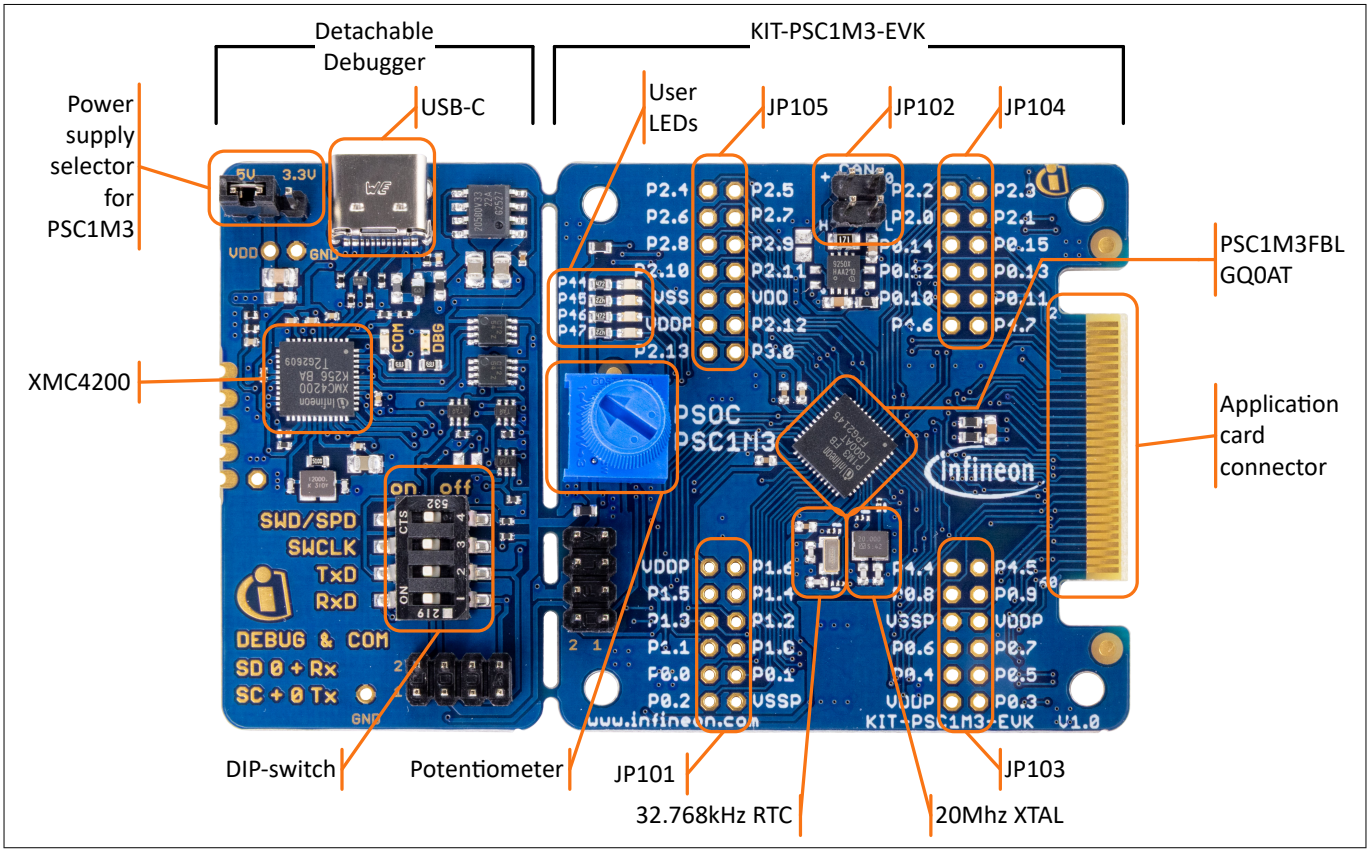


Figure 2 PSOC™ Control C1 Kit Evaluation KIT-PSC1M3-EVK

2.1 Power supply

The PSOC™ Control C1 Evaluation Kit KIT-PSC1M3-EVK is powered from the USB-C connector (+5V); however, there is a current limit that can be drawn from the host PC through USB. If the KIT-PSC1M3-EVK board is used to drive other application boards (e.g. Color LED Card, White LED Card) and the total current required exceeds 500 mA, then the board needs to be powered by external power supply connected to VDD and GND connection on board.

The PSC1M3FBLGQ0AT device can operate by power supply of 1.8 V to 5.5 V. On this board 5 V is used to power the PSC1M3FBLGQ0AT device. However, if the user wants to power the PSC1M3FBLGQ0AT device with 3.3 V, then set jumper to 3.3 V side.

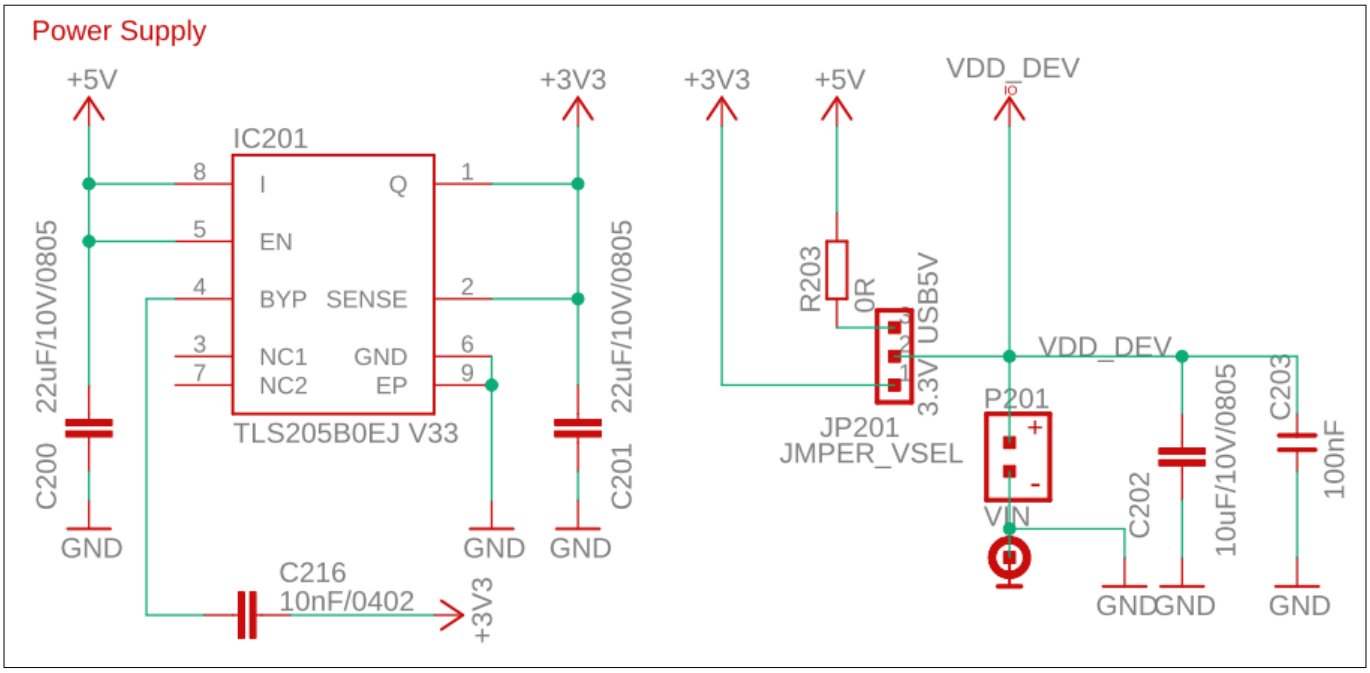


Figure 3 Power supply circuit

2.2 Reset

Since PSC1M3 does not have a reset pin, the user can unplug and replug the USB cable to achieve a power-on master reset.

2.3 Clock generation

PSC1M3FBLGQ0AT has two internal oscillators: DCO1 and DCO2. DCO1 has a clock output of 96 MHz. DCO2 is used to generate the standby clock running at 32.768 kHz which is also used for the Real time clock (RTC). The main clock, MCLK and fast peripheral clock, PCLK, are generated from the output of DCO1.

2.3.1 External crystal and external Real time clock (RTC) crystal

The PSC1M3 device allows its main clock MCLK to be generated from external crystal to achieve higher accuracy. It also allows its real time clock to be run from external RTC crystal. On the PSOC™ Control C1 Evaluation Kit, a 20-MHz external crystal circuit and a 32.768-kHz RTC external crystal circuit are implemented on board to allow the user to run their application using external crystals. The 20-MHz crystal Q102 is connected to the PSC1M3 device via R111 and R114. By default, R111 and R114 are not populated. If a user does want to use the external oscillator, resistors R113 and R115 need to be removed, while resistors R111 and R114 need to be populated. Removing R113 and R115 will reroute P0.10 and P0.11 from the PSC1M3 device to the external oscillator and disconnecting it from the 60-pin application card connector.

The 32.768-kHz crystal Q101 is by default not connected to the PSC1M3 device as well. If the user wants to use the external 32.768-kHz crystal, the two 0 Ω resistors R109 and R112 need to be populated while R108 and R110 need to be removed.

Please refer to the assembly diagram for locations of these 0 Ω resistors.

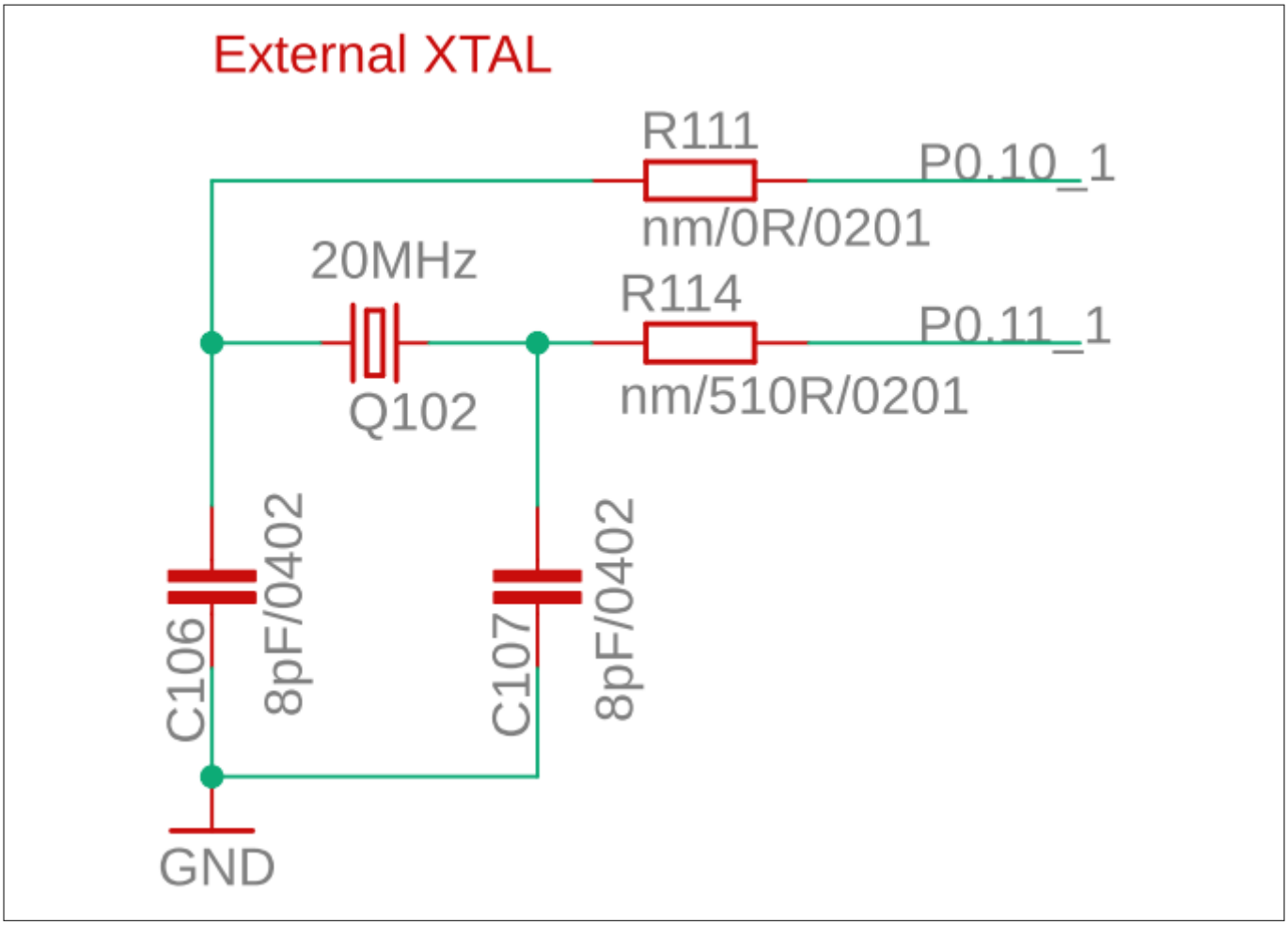


Figure 4 **The external 20-MHz crystal**

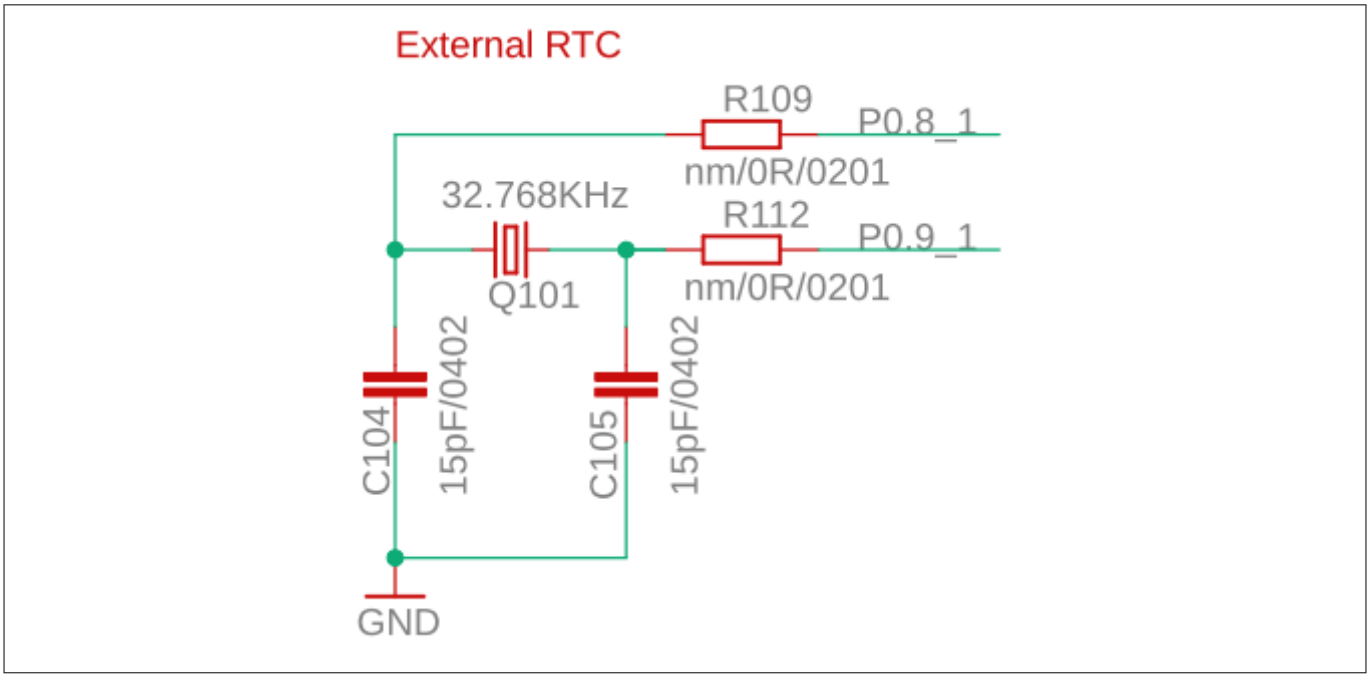


Figure 5 **The external 32.768-kHz RTC crystal**

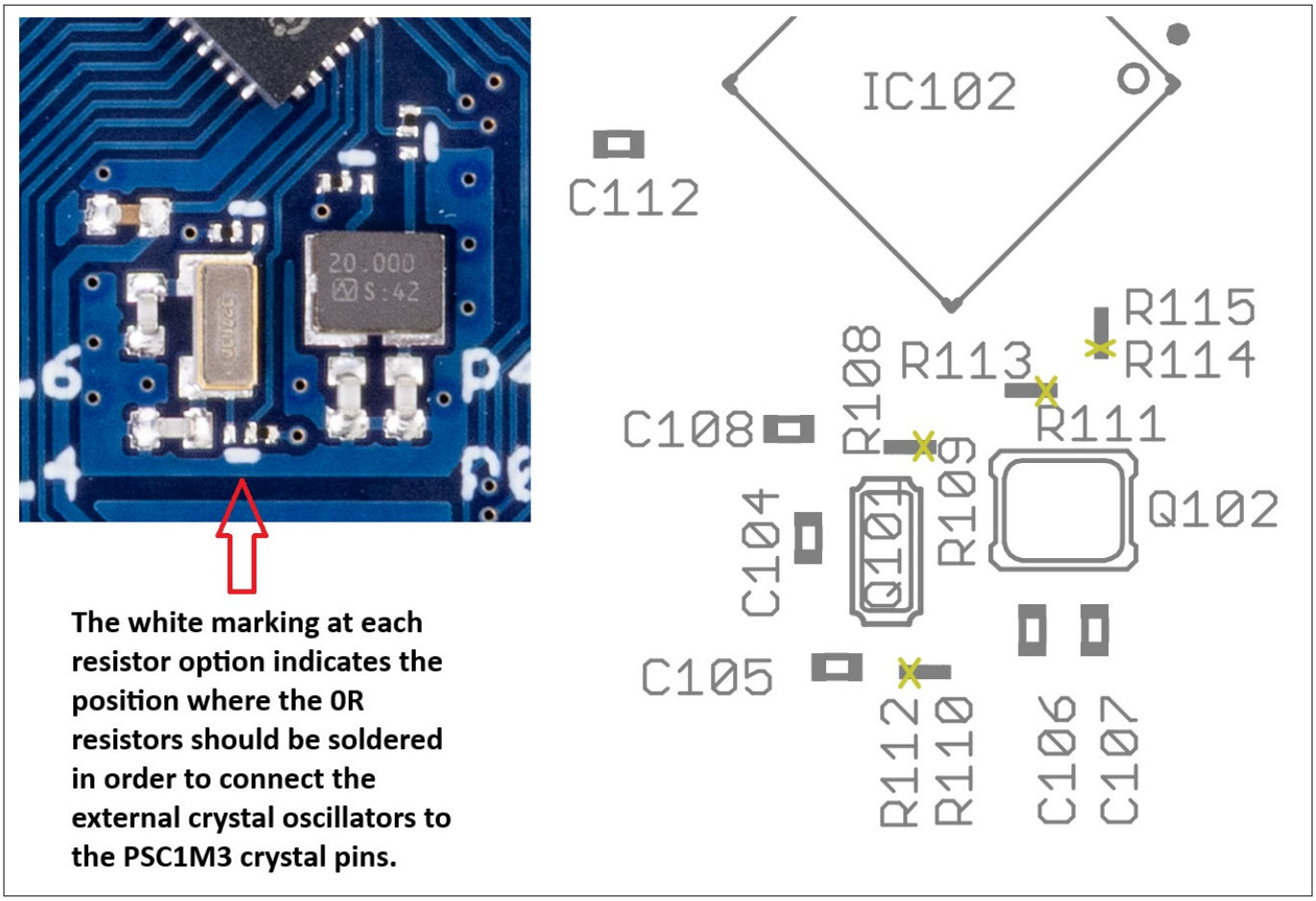


Figure 6 The positions of 0 Ω resistors for connection of external crystals to PSC1M3

2.4 Boot option

After power-on reset master reset, PSC1M3 device enters different boot modes depending on the BMI (Boot Mode Index) value stored in flash configuration sector 0 (CS0). The BMI value pre-programmed in the PSOC™ Control C1 Evaluation Kit is User mode with debug enabled, hence, the PSC1M3 device will start to run the application code in its embedded flash after power-on reset.

2.5 CAN bus connector

A CAN bus header connector is provided for CAN communication with the PSC1M3 device using CAN node 1 RXD pin P1.3 and TXD pin P1.2.

If the user wants to test the CAN BSL mode of PSC1M3 device using this CAN transceiver circuit, then R104 and R106 need to be populated, then RXD and TXD pins of TLE9250XLE need to be disconnected from the on-board debugger by setting 'TxD' and 'RxD' of DIP-switch S201 to position ‘off’.

TLE9250XLE requires 5 V power supply. If the input voltage to PSC1M3 is set to 3.3 V, then remove R101 and solder R102. Next, supply an external power supply of 5 V to pin4 (+) of JP102. By making these changes, the user can use this CAN transceiver for CAN BSL handshaking.

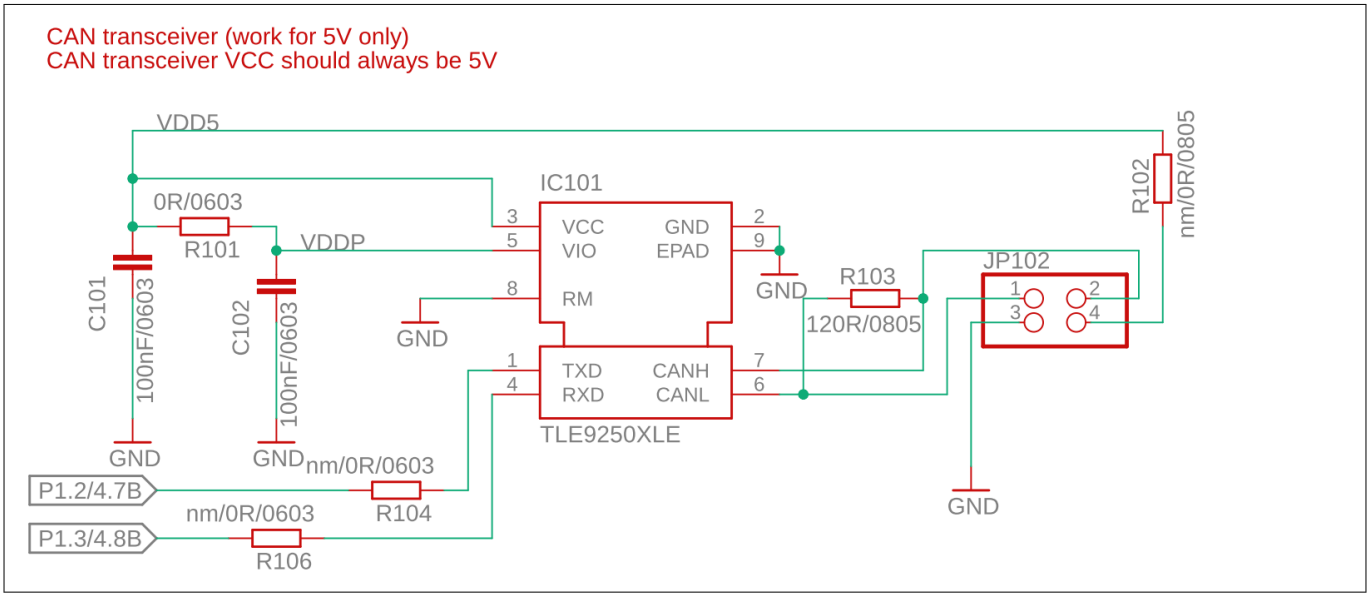


Figure 7 CAN transceiver circuitry

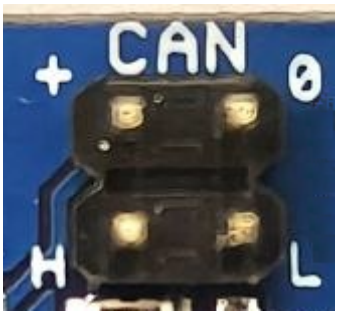


Figure 8 CAN header JP102, H refers to CANH, L refers to CANL, + refers to VCC, 0 refers to GND

2.6 Debug interface and virtual COM port

The PSOC™ Control C1 Evaluation Kit KIT-PSC1M3-EVK has an on-board debugger which supports Serial wire debug (SWD) and Single pin debug (SPD) as debug interface. SPD is a proprietary debugging protocol from Infineon Technologies and it requires only 1 pin for debug communication. The debugger also provides a virtual COM port which supports UART communication via P1.3 (rx-in) and P1.2 (tx-out) of PSC1M3. There is a 2x5 pin Header debug connector X201.

Table 1 Debug connector X201

Pin	Signal name	PSC1M3 signal	Description
1	SWCLK	P0.15	SWD clock signal
2	SWD (SPD)	P0.14	SWD/SPD signal
3	VDDP	VDDP	+3V3 or +5V
4	GND	VSSP	Ground
5	GND	VSSP	Ground
6	VDDP	VDDP	+3V3 or +5V
7	PC_TXD	P1.3	UART data received
8	PC_RXD	P1.2	UART data transmit

2.7 LED

The port pins P4.4, P4.5, P4.6 and P4.7 are connected to LED101, LED102, LED103 and LED104 respectively. The LEDs turn on by output ‘LOW’ at the respective port pins.

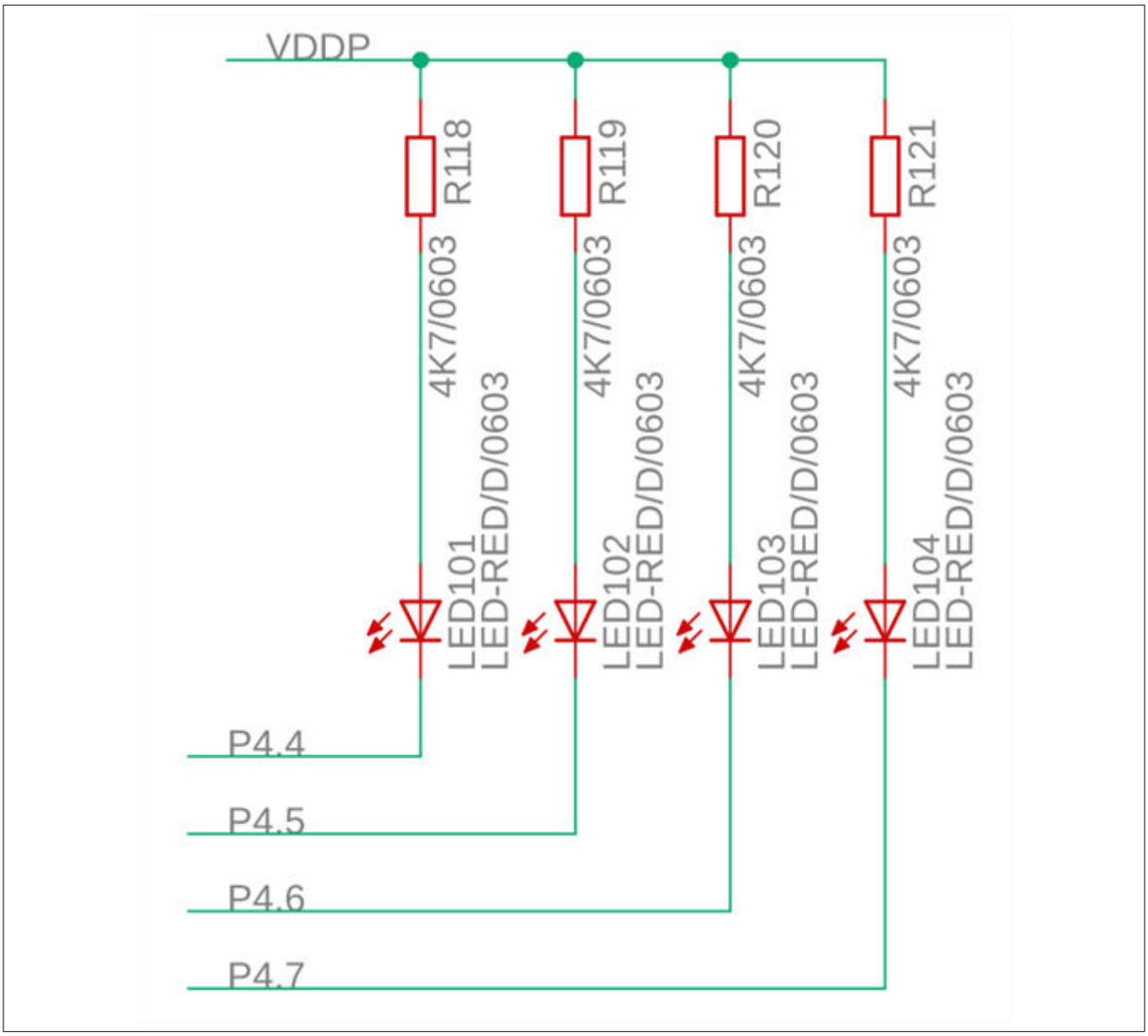


Figure 9 LEDs circuit

Table 2 LEDs pinout

LED	PSC1M3 port pin	Description
LED101	P4.4	Output ‘LOW’ to turn on LED
LED102	P4.5	Output ‘LOW’ to turn on LED
LED103	P4.6	Output ‘LOW’ to turn on LED
LED104	P4.7	Output ‘LOW’ to turn on LED

2.8 Potentiometer

The PSOC™ Control C1 Evaluation Kit KIT-PSC1M3-EVK provides a potentiometer R122 for ease of use and testing of the on-chip analog to digital converter. The potentiometer is connected to the analog input P2.5. The analog output range of the potentiometer is the same as the VDDP voltage supplied to the PSC1M3 device.

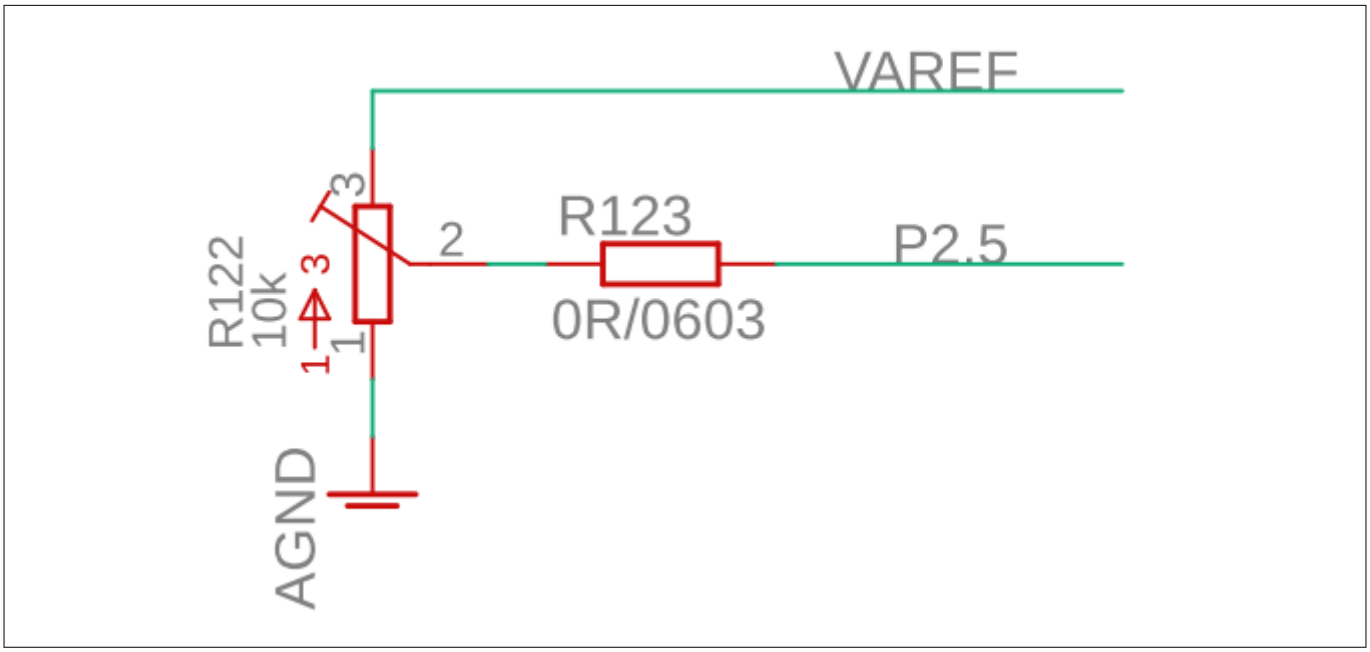


Figure 10 Potentiometer circuit

2.9 Application card connector

The PSOC™ Control C1 Evaluation Kit KIT-PSC1M3-EVK has a 2x30 pin card edge connector. The mating connector is SAMTEC HSEC8-130-01-L-RA-XX.

2 Hardware description

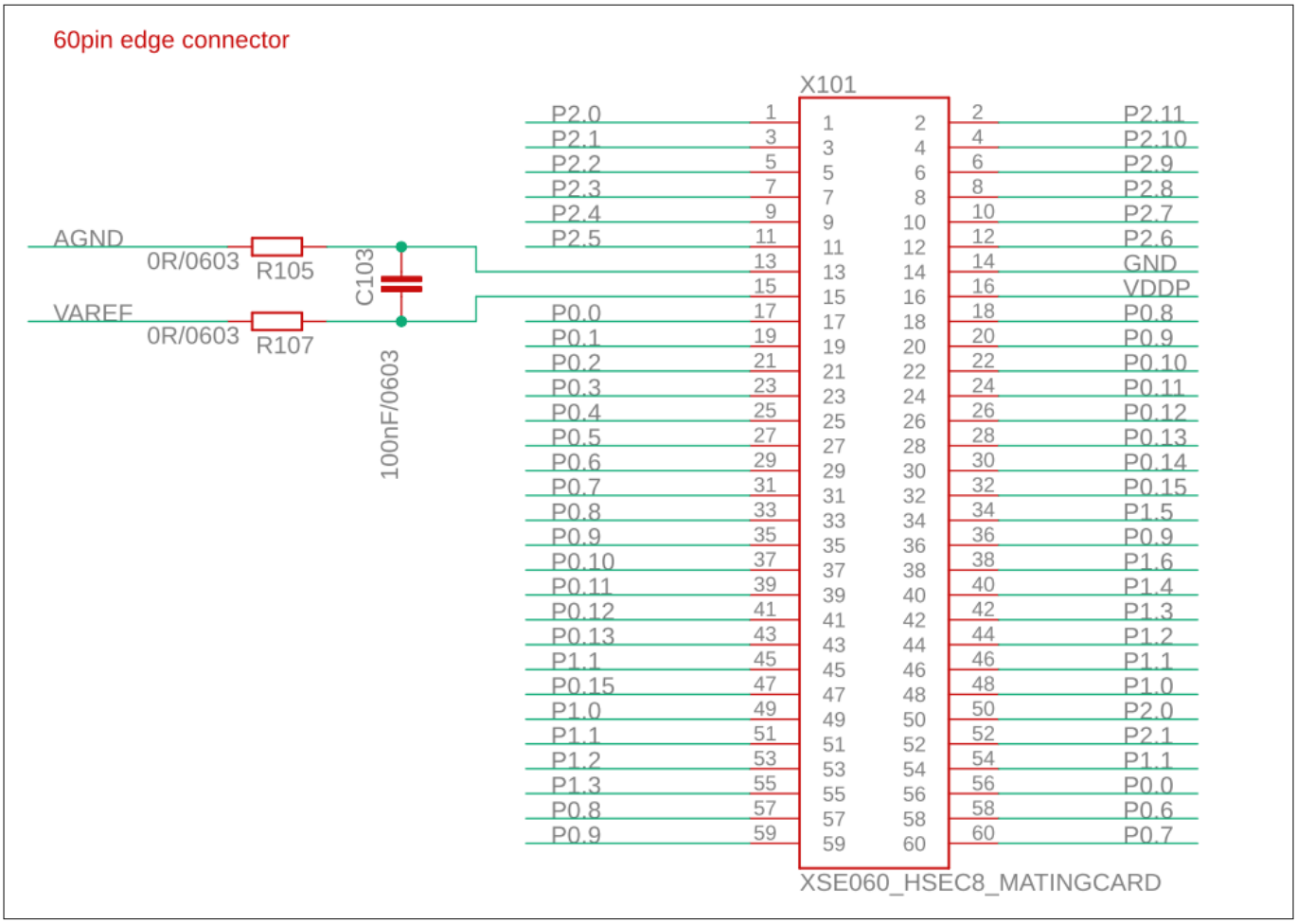


Figure 11 Pinout of the 2x30 pin edge connector

3 Production data

3.1 Schematics

This chapter contains the schematics for the PSOC™ Control C1 Evaluation Kit:

- Figure 12: CPU, pin headers, external crystals, CAN transceiver circuitry, potentiometer, LEDs and 60-pin edge connector
- Figure 13: On-board debugger, power supply

3 Production data

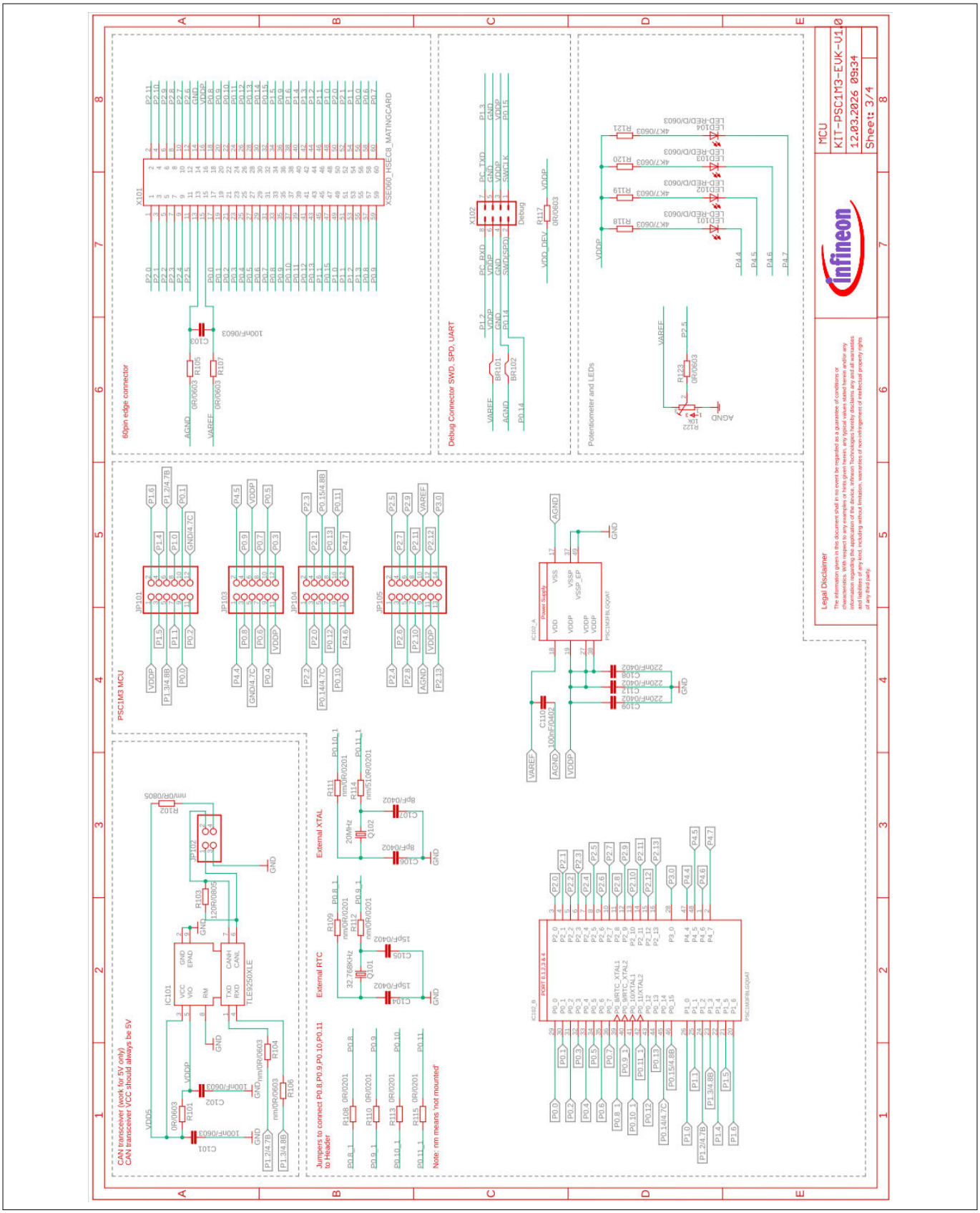


Figure 12 Schematic 1 of 2 KIT-PSC1M3-EVK

3 Production data

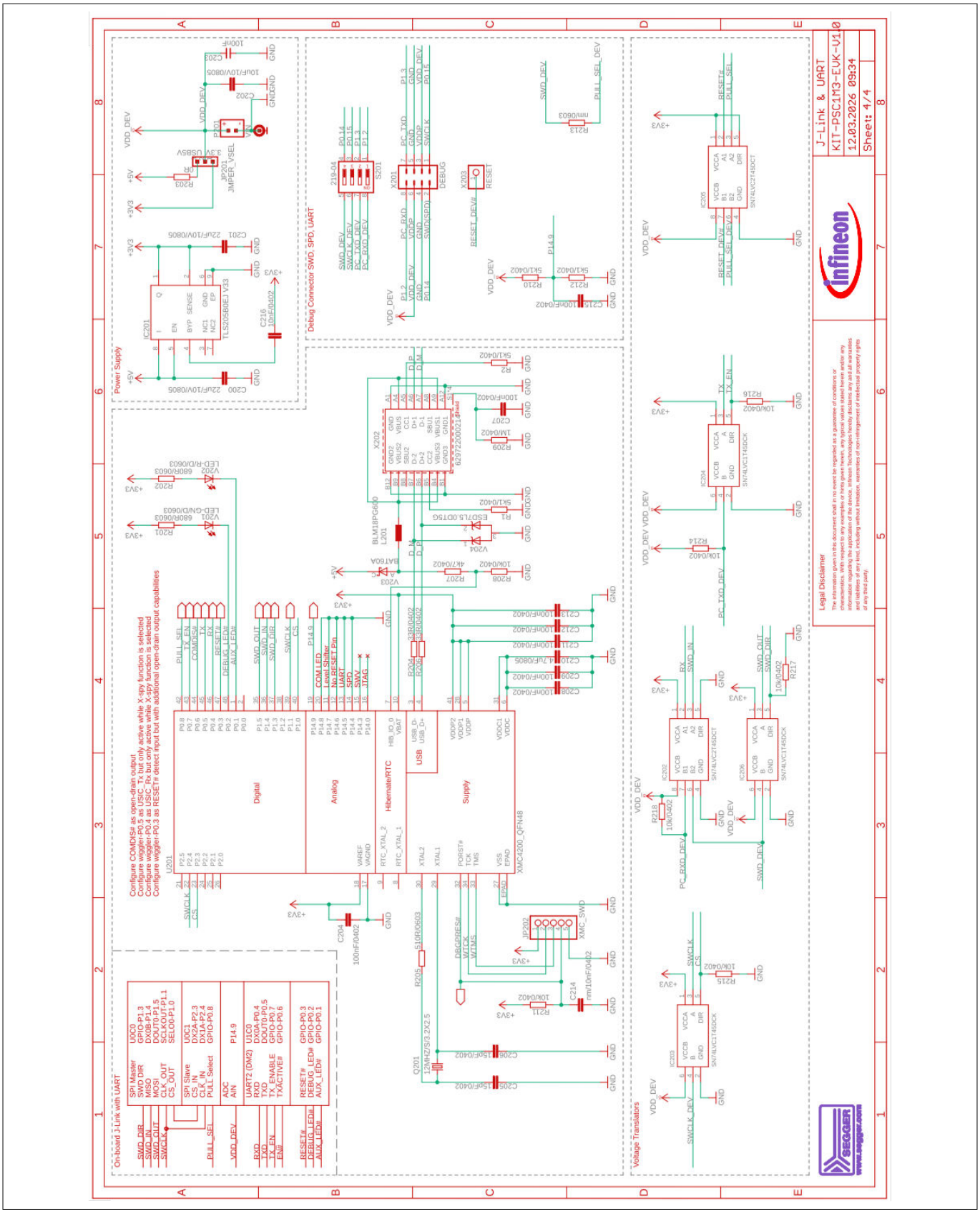


Figure 13 Schematic 2 of 2 KIT-PSC1M3-EVK

3.2 Layout and geometry

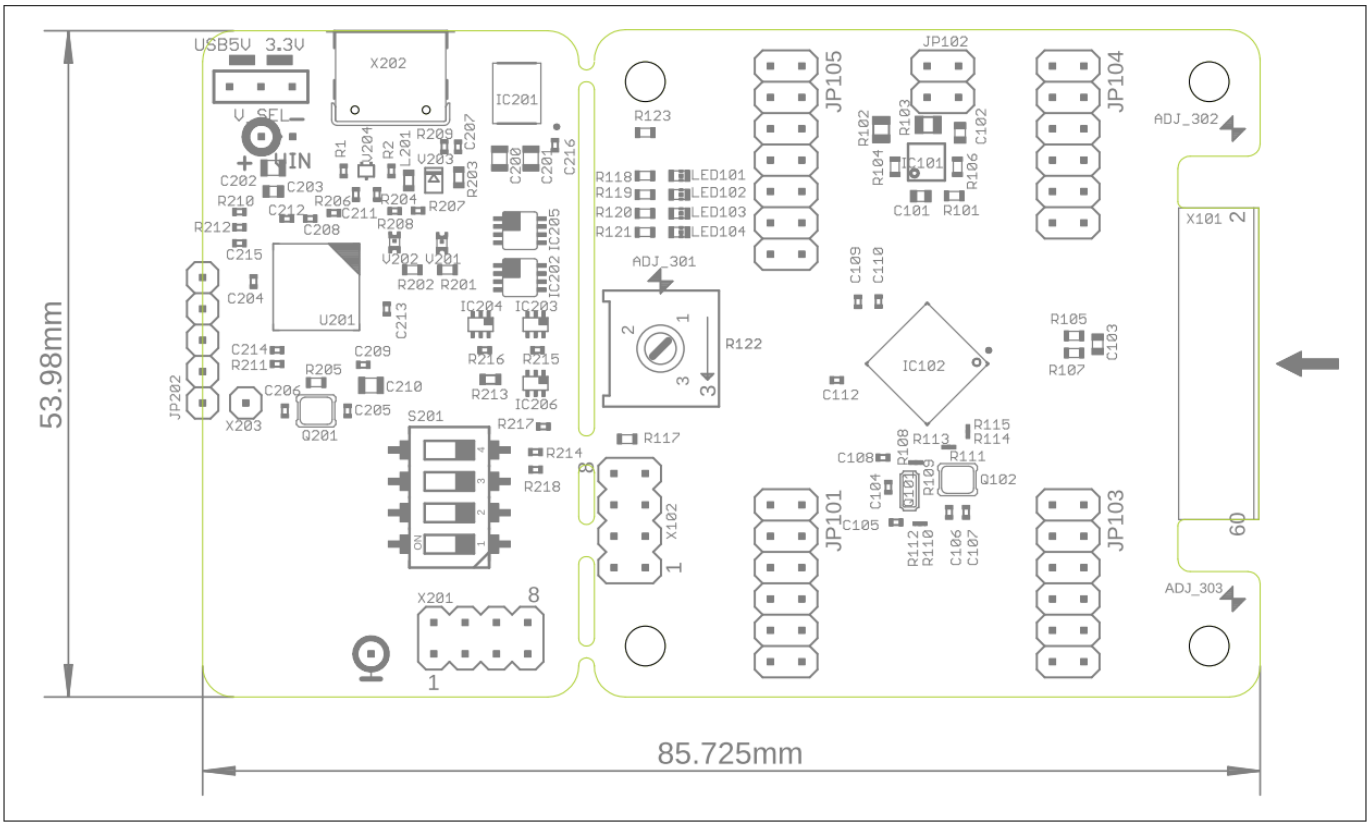


Figure 14 KIT-PSC1M3-EVK layout and geometry

3.3 Component placement

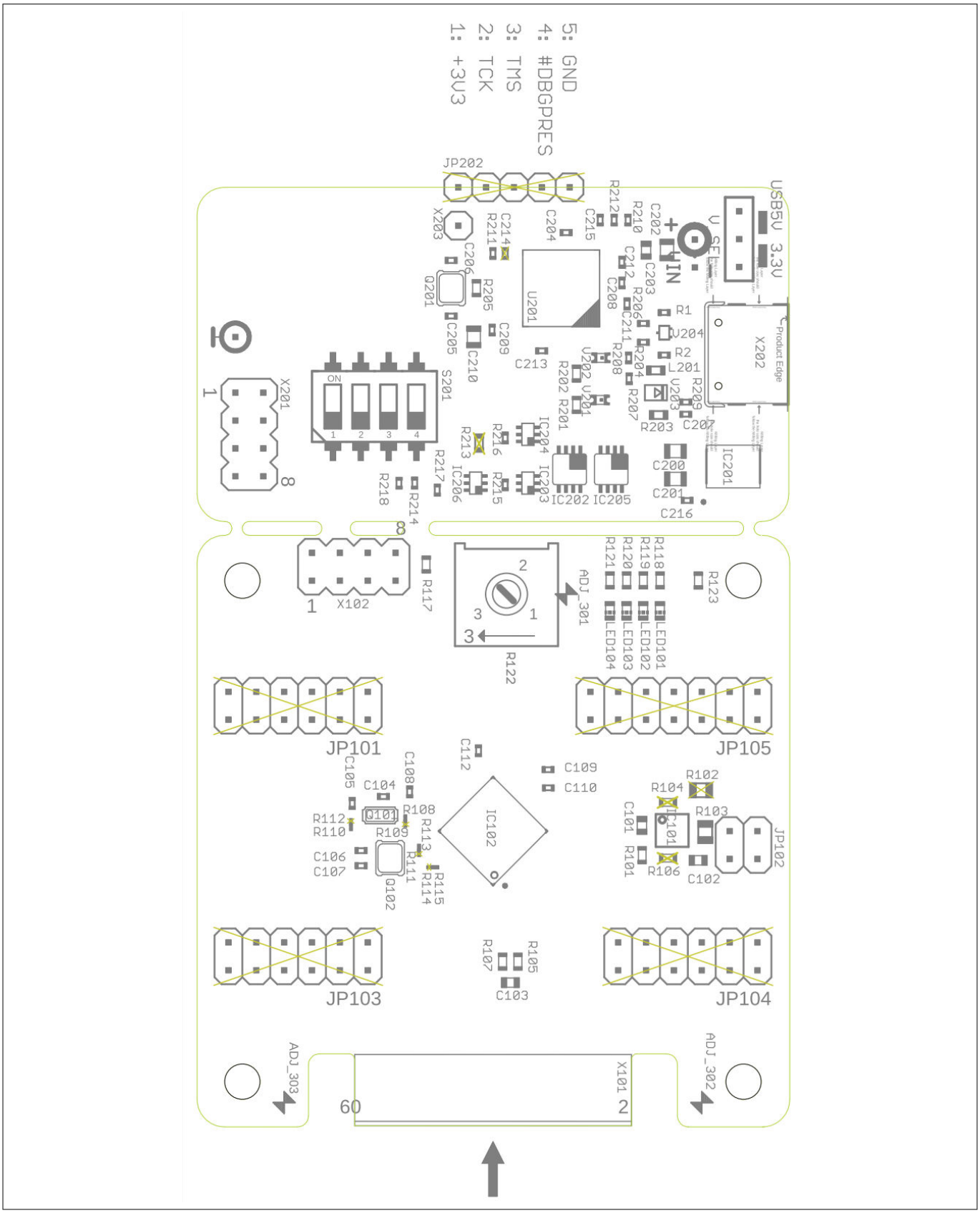


Figure 15 Component placement

3.4 Bill of material

Table 3 KIT-PSC1M3-EVK

No.	Value	Device	Qty	Reference designator
1	JMPER_VSEL	1x3 pin header	1	JP201
2	CAN pins	2x2 pin header	1	JP102
3	Debug	2x4 pin header	2	X102 X201
4	100 nF 10 V 10% 0402	Capacitor X7R	9	C110 C204 C207 C208 C209 C211 C212 C213 C215
5	100 nF 10 V 10% 0603	Capacitor X7R	4	C101 C102 C103 C203
6	10 µF 10 V 10% 0805	Capacitor X7R	1	C202
7	15 pF 10 V 1% 0402	Capacitor NPO	4	C104 C105 C205 C206
8	220 nF 10 V 10% 0402	Capacitor X7R	4	C108 C109 C112
9	22 µF 10 V 10% 0805	Capacitor X7R	2	C200 C201
10	4.7 µF 10 V 10% 0805	Capacitor X7R	1	C210
11	8 pF 10 V 2% 0402	Capacitor NPO	2	C106 C107
12	12MHz 3.2X2.5	Crystal 12-MHz SMD 8 pF CX3225GA12000D0PTVCC	1	Q201
13	20MHz 3.2X2.5	Crystal 20-MHz SMD 8 pF STDCRA2-20M	1	Q102
13a[1)]	20MHz 3.2X2.5	Crystal 20-MHz SMD 8 pF HONG KONG X'TALS LIMITED 3225M2000IB01	1	Q102
14	ESD7L5.0DT5G	TVS Diode	1	V204
15	SN74LVC2T45DCT	Dual-bit Dual supply bus transceiver	2	IC202 IC205
16	BLM18PG600	Ferrite Bead	1	L201
17	LED-GN D 0603	LED, green	1	V201
18	jumper (black)	Jumper	1	JP201A
19	629722000214	Connector USB-C Wurth Elektronik 629722000214	1	X202
20	LED-RED D 0603	LED, red	1	V202
21	LED-RED D 0603	LED, red	4	LED101 LED102 LED103 LED104
22	0R 1% 0201	Resistor	4	R108 R110 R113 R115
23	0R 1% 0603	Resistor	6	R101 R105 R107 R117 R123 R203
24	10k	Resistor, Potentiometer	1	R122

(table continues...)

3 Production data

Table 3 (continued) KIT-PSC1M3-EVK

No.	Value	Device	Qty	Reference designator
25	10k 1% 0402	Resistor	7	R208 R211 R214 R215 R216 R217 R218
26	120R 1% 0805	Resistor	1	R103
27	1M 1% 0402	Resistor	1	R209
28	33R 1% 0402	Resistor	2	R204 R206
29	4k7 1% 0402	Resistor	1	R207
30	4K7 1% 0603	Resistor	4	R118 R119 R120 R121
31	510R 1% 0603	Resistor	1	R205
32	5K10 1% 0402	Resistor	2	R1 R2 R210 R212
33	680R 1% 0603	Resistor	2	R201 R202
34	32.768kHz 3.2X1.5	Crystal 32.768-kHz SMD 12.5 pF ABS07-32.768KHZ-T	1	Q101
34a[1)]	32.768-kHz, FC-135	Crystal 32.768-kHz SMD HONG KONG X'TALS LIMITED 3215K3276IB01	1	Q101
35	SN74LVC1T45DCK	Single bit, Dual supply bus transceiver	3	IC203 IC204 IC206
36	TLE9250XLE	CAN transceiver, Infineon	1	IC101
37	PSC1M3FBLGQ0AT	Microcontroller, Infineon	1	IC102
38	TLS205B0EJV33	Voltage regulator, 3V3, Infineon	1	IC201
39	XMC4200-Q48K256	Microcontroller, Infineon	1	U201
40	BAT60A	Diode Infineon	1	V203
41	DIP switch, SPST, 4 pos.	219-4LPST	1	S201
42	10 nF 50 V 10% 0402	Capacitor X7R	1	C216
43	Not mounted 10 nF 10% 0402	Capacitor	1	C214
44	MCU pins (Not mounted)	2x6 pin header	3	JP101 JP103 JP104
44b	MCU pins (Not mounted)	2x7 pin header		JP105
45	XMC_SWD (Not mounted)	1x5 pin header	1	JP202
46	Not mounted 0R 1% 0805	Resistor	1	R102
47	Not mounted 0R 1% 0201	Resistor	1	R109 R111 R112
48	Not mounted 510R 1% 0201	Resistor	1	R114
49	Not mounted 0R 1% 0603	Resistor	1	R104 R106
50	Not mounted 0R 1% 0603	Resistor	1	R213

1) Alternative part.

Revision history

Document revision	Date	Description of changes
**	2026-07-01	Initial release.
*A	2026-07-16	Updated Figure 2

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