

# EVAL\_XDPP1100\_Q040\_DB user manual

## XDPP1100-Q040 daughterboard

### About this document

#### Scope and purpose

This document explains the hardware features and serves as a user manual for the EVAL\_XDPP1100\_Q040\_DB daughterboard, designed by Infineon Technologies. XDPP1100-Q040 belongs to Infineon's XDP™ digital power controller family, optimized to provide a high level of performance and design flexibility to DC-DC converters. This controller is designed to achieve high efficiency, system control, and cost savings for applications such as telecom, servers, data centers, and computing isolated DC-DC solutions. The daughterboard is used as a test and firmware (FW) development tool.

#### Intended audience

Power supply design engineers, system engineers, and embedded power designers.

#### Evaluation Board

This board is to be used during the design-in process for evaluating, configuring, and programming the device.

*Note: PCB and auxiliary circuits are NOT optimized for final customer design.*

### Important notice

### Important notice

“Evaluation Boards and Reference Boards” shall mean products embedded on a printed circuit board (PCB) for demonstration and/or evaluation purposes, which include, without limitation, demonstration, reference and evaluation boards, kits and design (collectively referred to as “Reference Board”).

Environmental conditions have been considered in the design of the Evaluation Boards and Reference Boards provided by Infineon Technologies. The design of the Evaluation Boards and Reference Boards has been tested by Infineon Technologies only as described in this document. The design is not qualified in terms of safety requirements, manufacturing and operation over the entire operating temperature range or lifetime.

The Evaluation Boards and Reference Boards provided by Infineon Technologies are subject to functional testing only under typical load conditions. Evaluation Boards and Reference Boards are not subject to the same procedures as regular products regarding returned material analysis (RMA), process change notification (PCN) and product discontinuation (PD).

Evaluation Boards and Reference Boards are not commercialized products, and are solely intended for evaluation and testing purposes. In particular, they shall not be used for reliability testing or production. The Evaluation Boards and Reference Boards may therefore not comply with CE or similar standards (including but not limited to the EMC Directive 2004/EC/108 and the EMC Act) and may not fulfill other requirements of the country in which they are operated by the customer. The customer shall ensure that all Evaluation Boards and Reference Boards will be handled in a way which is compliant with the relevant requirements and standards of the country in which they are operated.

The Evaluation Boards and Reference Boards as well as the information provided in this document are addressed only to qualified and skilled technical staff, for laboratory usage, and shall be used and managed according to the terms and conditions set forth in this document and in other related documentation supplied with the respective Evaluation Board or Reference Board.

It is the responsibility of the customer’s technical departments to evaluate the suitability of the Evaluation Boards and Reference Boards for the intended application, and to evaluate the completeness and correctness of the information provided in this document with respect to such application.

The customer is obliged to ensure that the use of the Evaluation Boards and Reference Boards does not cause any harm to persons or third party property.

The Evaluation Boards and Reference Boards and any information in this document is provided "as is" and Infineon Technologies disclaims any warranties, express or implied, including but not limited to warranties of non-infringement of third party rights and implied warranties of fitness for any purpose, or for merchantability.

Infineon Technologies shall not be responsible for any damages resulting from the use of the Evaluation Boards and Reference Boards and/or from any information provided in this document. The customer is obliged to defend, indemnify and hold Infineon Technologies harmless from and against any claims or damages arising out of or resulting from any use thereof.

Infineon Technologies reserves the right to modify this document and/or any information provided herein at any time without further notice.

Safety precautions

Safety precautions

Note: Please note the following warnings regarding the hazards associated with development systems.

Table 1 Safety precautions


	<p><b>Caution:</b> The evaluation or reference board contains parts and assemblies sensitive to electrostatic discharge (ESD). Electrostatic control precautions are required when installing, testing, servicing or repairing the assembly. Component damage may result if ESD control procedures are not followed. If you are not familiar with electrostatic control procedures, refer to the applicable ESD protection handbooks and guidelines.</p>
---	--

Table of contents

**Table of contents**

**About this document..... 1**

**Important notice ..... 2**

**Safety precautions..... 3**

**Table of contents..... 4**

**1 General description ..... 5**

1.1 Daughterboard overview .....5

1.2 Jumper settings.....6

1.3 Test points .....6

1.4 LED indications.....7

**2 Getting started ..... 9**

2.1 Required equipment .....9

2.2 XDPP1100 GUI tool .....9

2.3 XDPP1100 GUI installation .....9

**3 Power-up procedure.....10**

3.1 Force I<sup>2</sup>C connection .....13

3.2 Telemetry Update .....14

3.3 Floating meter .....15

**4 Schematic and bill of materials .....16**

4.1 Schematic.....16

4.2 Bill of materials.....16

**References.....18**

**Revision history.....19**

**Disclaimer.....20**

## General description

### 1 General description

The EVAL\_XDPP1100\_Q040\_DB daughterboard is used for testing and programming the 40-pin version of the XDPP1100 VQFN 6 mm x 6 mm controller. An onboard I<sup>2</sup>C connector allows you to interface with the XDPP1100 controller through Infineon's XDPP1100 graphical user interface (GUI) and a USB-to-I<sup>2</sup>C dongle. You can download the XDPP1100 GUI and the drivers for the UBS007A1 dongle from the [Infineon Development Center](#).

The daughterboard can be used as a standalone FW development tool, or used with a power board (e.g., EVAL\_600W\_FFBX\_XDPP) as a complete evaluation kit. This document describes the standalone version of the daughterboard.

The daughterboard uses board-to-board connectors (QTE-020-01-L-D-A) to interface the control signals from the daughterboard to a power board with compatible connectors (QSE-020-01-L-D-A) to establish a plug-in mechanism. This plug-in mechanism provides flexibility for evaluating XDPP1100 with any of its supported topologies.

The board also provides the capability to use an IC socket (40QHRB50Y01G) for easy replacement of the XDPP1100-Q040 device instead of soldering the device onto the PCB. The IC socket is not mounted on the board and needs to be purchased separately.

#### 1.1 Daughterboard overview

The daughterboard shown in [Figure 1](#) consists of the control circuitry such as analog filters for processing the feedback signals from the power board, PWM outputs, digital inputs and outputs, I<sup>2</sup>C connector, Arm® Cortex® JTAG/SWD debug port, LED indicators, and the XDPP1100-Q040 controller. It can be powered using external 3.3 V or 3.3 V supply from the power board. The board-to-board rectangular header connectors are located on the bottom side of the PCB, as shown in [Figure 2](#).

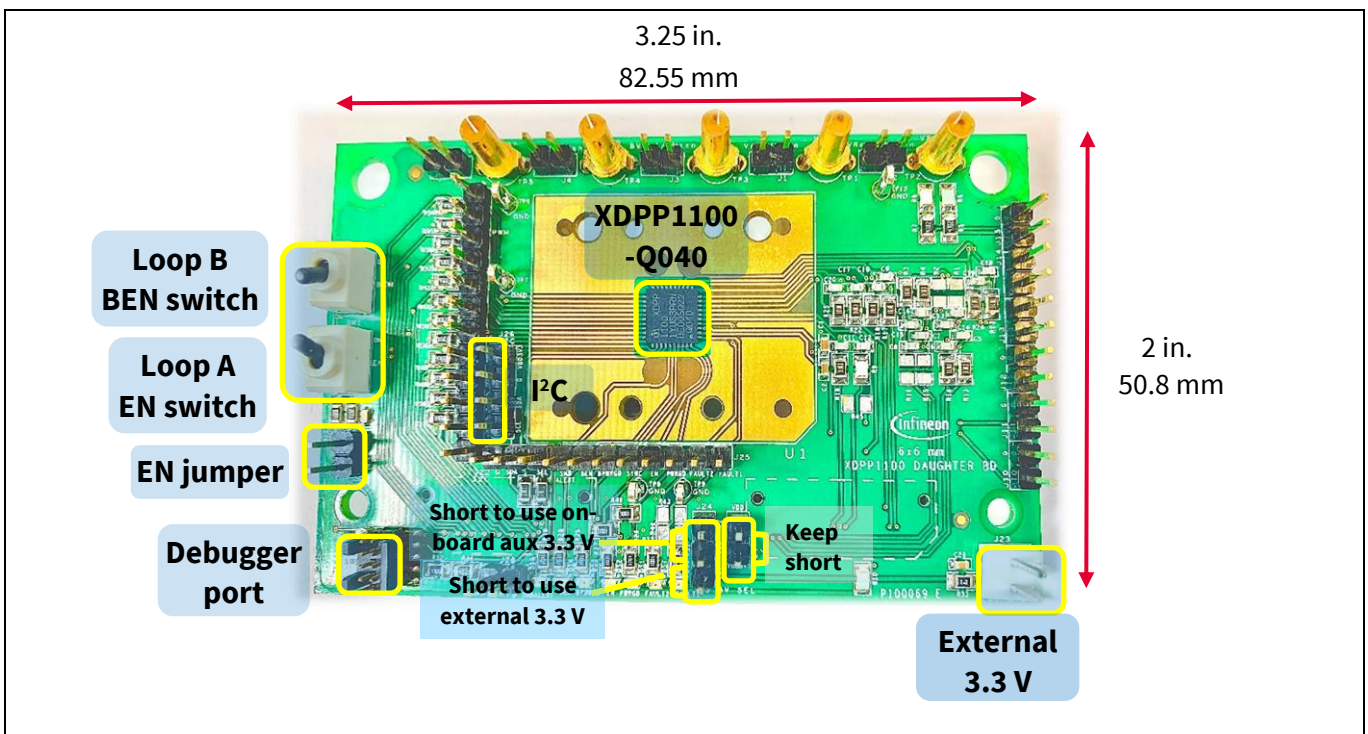


Figure 1 XDPP1100-Q040 daughterboard

General description

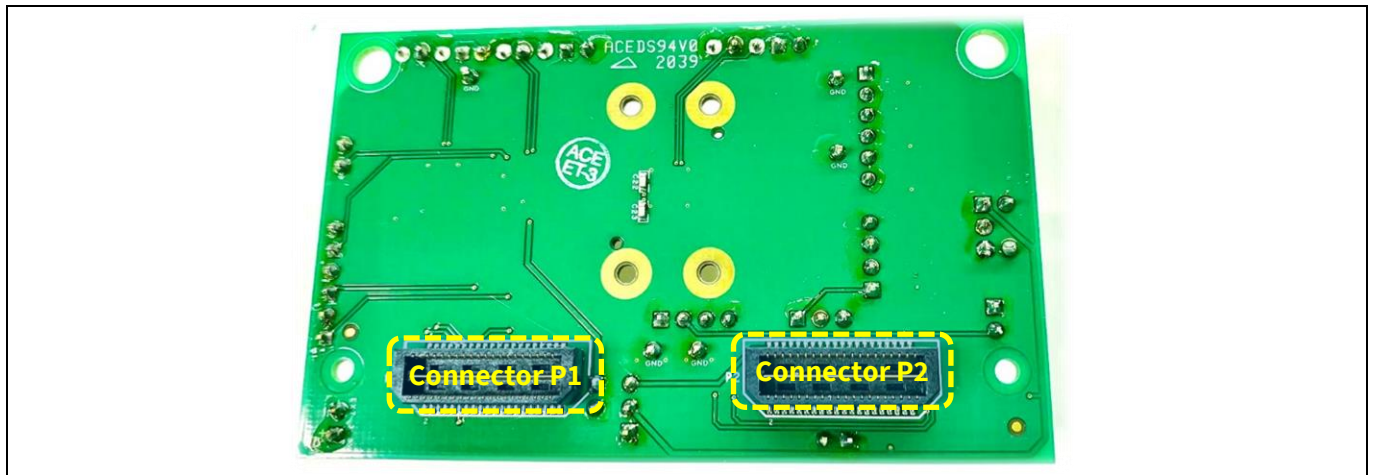


Figure 2 Bottom side of the daughterboard

1.2 Jumper settings

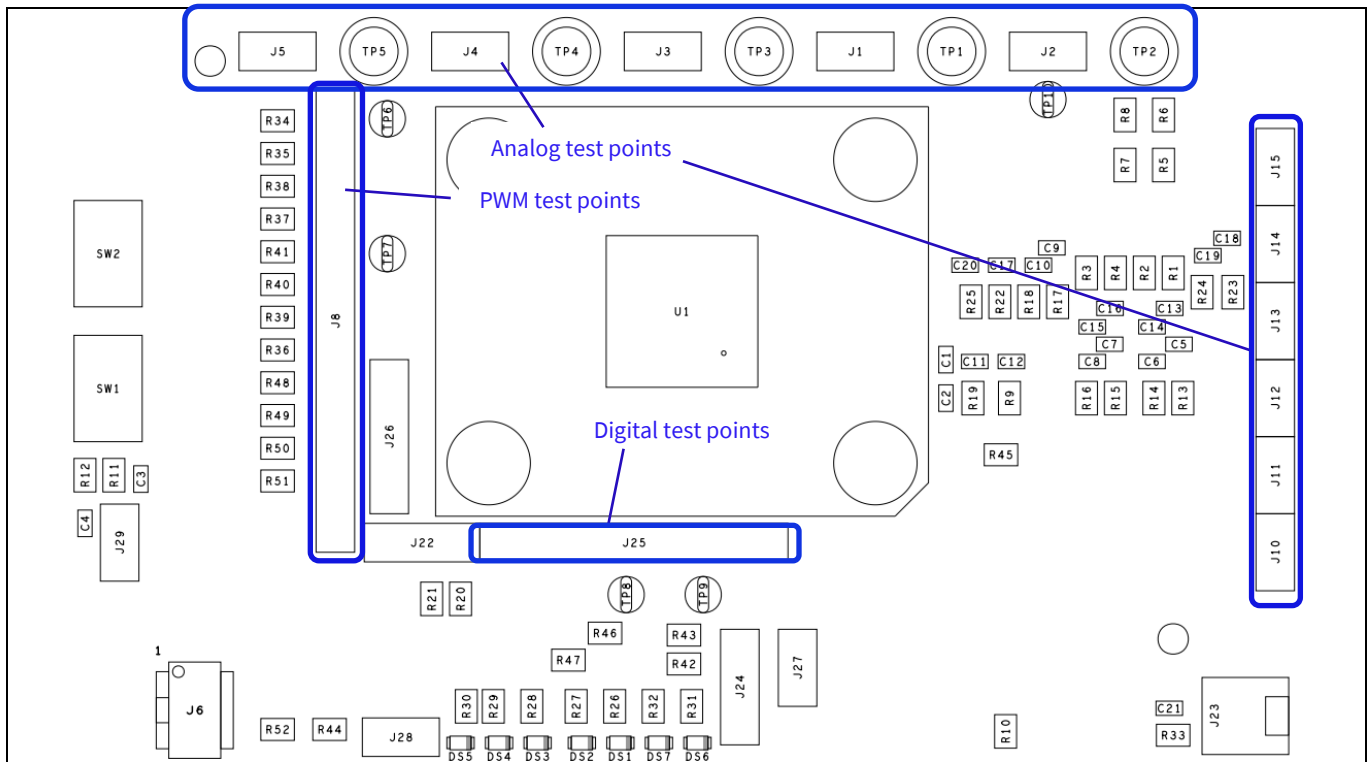
Table 2 Daughterboard jumper settings

Jumper	Description	Functionality
J23	External 3.3 V	This header is for the external 3.3 V supply to bias the daughterboard. If external 3.3 V is selected using J24, connect an external power supply capable of 3.3 V and 0.1 A at this jumper
J24	3.3 V selector	This jumper is used to select between external 3.3 V and 3.3 V supply from the auxiliary supply of the power board. By default, external 3.3 V supply is selected, i.e., pins 1 and 2 are shorted
J27	3.3 V jumper	This jumper is used to connect and disconnect the 3.3 V supply to VDD of the IC. By default, this is always populated
J28	SMBALERT jumper	This jumper connects the pull-up resistor to the SMBALERT pin
J29	EN jumper	This jumper allows the use of the enable switch (SW1) to control the EN pin of the XDPP1100 device

1.3 Test points

The EVAL\_XDPP1100\_Q040\_DB daughterboard consists of test points for all of the XDPP1100 pins to allow measurement or monitoring of signals. These test points consist of analog signals, digital signals, and PWM signals. Figure 3 shows the physical location of the various test points on the daughterboard.

**General description**



**Figure 3 EVAL\_XDPP1100\_Q040\_DB test points**

**1.4 LED indications**

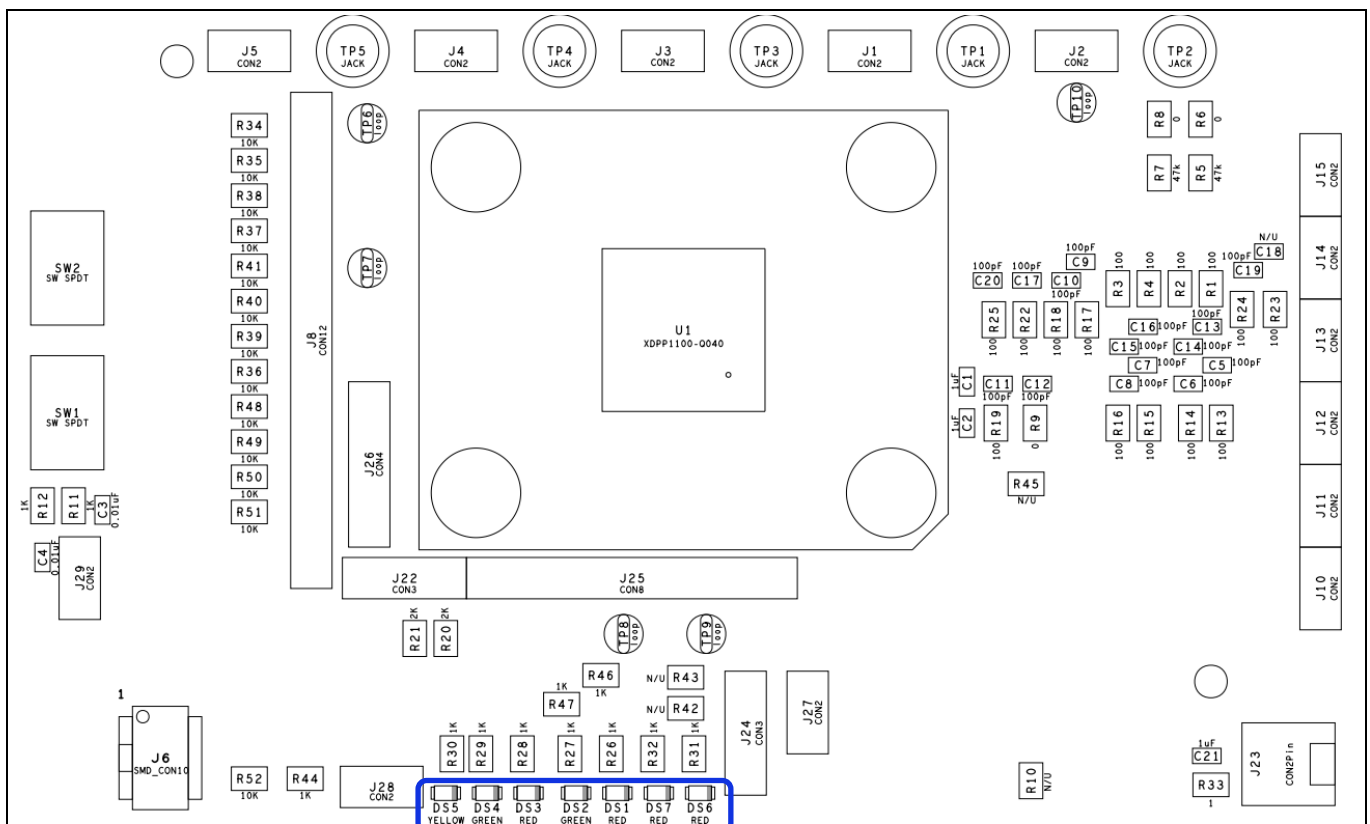
Table 3 shows the purpose and list of the available LEDs on the daughterboard, and Figure 4 shows the location of these LEDs.

**Table 3 LED indicators on the daughterboard**

LED	Color	Indications
PWRGD (DS1)	Red	<p>This LED indicates the health of the loop 0 output voltage based on the thresholds configured through PMBus commands. During first-time 3.3 V power up, this is on because it is pulled up to 3.3 V</p> <p>Once the converter is enabled, the status of this LED is determined by the level of the output voltage and the polarity of the POWER_GOOD pin. The default logic is active LOW, but can be modified to active HIGH by modifying the GPIO polarity (set to 2) in the PMBus command FW_CONFIG_PMBUS</p> <p>When the configuration is programmed to active HIGH:</p> <ul style="list-style-type: none"> <li>• If the output voltage is greater than POWER_GOOD_ON: LED is on</li> <li>• If the output voltage is less than POWER_GOOD_OFF: LED is off</li> </ul>
EN (DS2)	Green	<p>This LED indicates the logic level of the enable pin for loop 0. The LED is on when the EN pin is HIGH</p>

**General description**

LED	Color	Indications
BPWRGD (DS3)	Red	<p>This LED indicates the health of the loop 1 output voltage based on the thresholds configured through PMBus commands. During first-time 3.3 V power-up, this is on because it is pulled up to 3.3 V. Once the converter is enabled, the status of this LED is determined by the level of the output voltage and the polarity of the POWER_GOOD pin</p> <p>The default logic is active LOW, but can be modified to active HIGH by modifying the GPIO polarity (set to 2) in the PMBus command FW_CONFIG_PMBUS</p> <p>When the configuration is programmed to active HIGH:</p> <ul style="list-style-type: none"> <li>• If the output voltage is greater than POWER_GOOD_ON: LED is on</li> <li>• If the output voltage is less than POWER_GOOD_OFF: LED is off</li> </ul>
BEN (DS4)	Green	This LED indicates the logic level of the enable pin for loop 1. The LED is on when the EN pin is HIGH
SMBALERT (DS5)	Yellow	SMBALERT indicator. To enable the SMBALERT LED, short J28
Fault 1 (DS6)	Red	Not used
Fault 2 (DS7)	Red	Not used



**Figure 4 LED indicators**

## Getting started

## 2 Getting started

### 2.1 Required equipment

- DC power supply that can provide 3.3 V and 100 mA current
- PC with Microsoft Windows 10 (32-bit or 64-bit)
- Oscilloscope with 500 MHz or above bandwidth (optional)
- Infineon USB-to-I<sup>2</sup>C dongle USB007 Rev A1 or B

### 2.2 XDPP1100 GUI tool

Infineon provides a complimentary GUI tool that allows you to configure and evaluate the XDPP1100-Q040 controller. The tool has the following key features:

- Step-by-step design tools to configure the XDPP1100 device
- Fault status messages
- Telemetry reporting of  $V_{OUT}$ ,  $I_{OUT}$ ,  $V_{IN}$ ,  $P_{IN}$  and temperature
- Save and load design files
- Allows storing configuration of PMBus and I<sup>2</sup>C registers into both the RAM and one-time programmable (OTP) memory
- Allows storing of FW patch into both the RAM and OTP memory
- Linear11 format calculator tool

The following sections describe the requirements and procedure to operate and install Infineon's GUI.

### 2.3 XDPP1100 GUI installation

Installing the XDPP1100 GUI is the first step toward evaluating the XDPP1100. **Do not connect** the USB-to-I<sup>2</sup>C dongle before the installation process is complete.

1. Download the XDPP1100 GUI tool from the [Infineon Development Center](#)

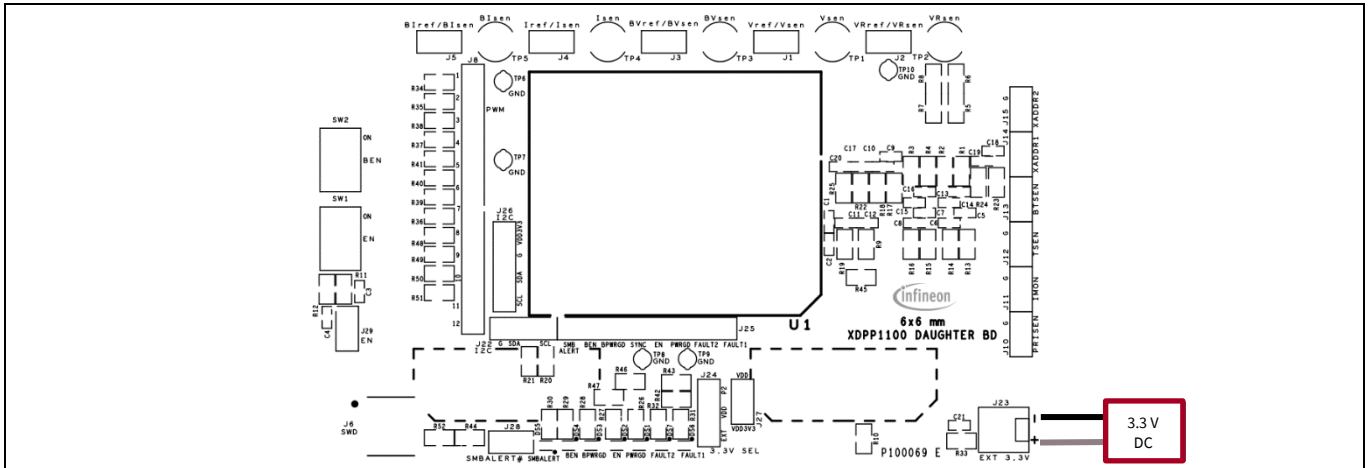
Refer to the [XDPP1100 GUI installation guide](#) for any additional information about GUI installation or troubleshooting issues related to dongle connection

Power-up procedure

### 3 Power-up procedure

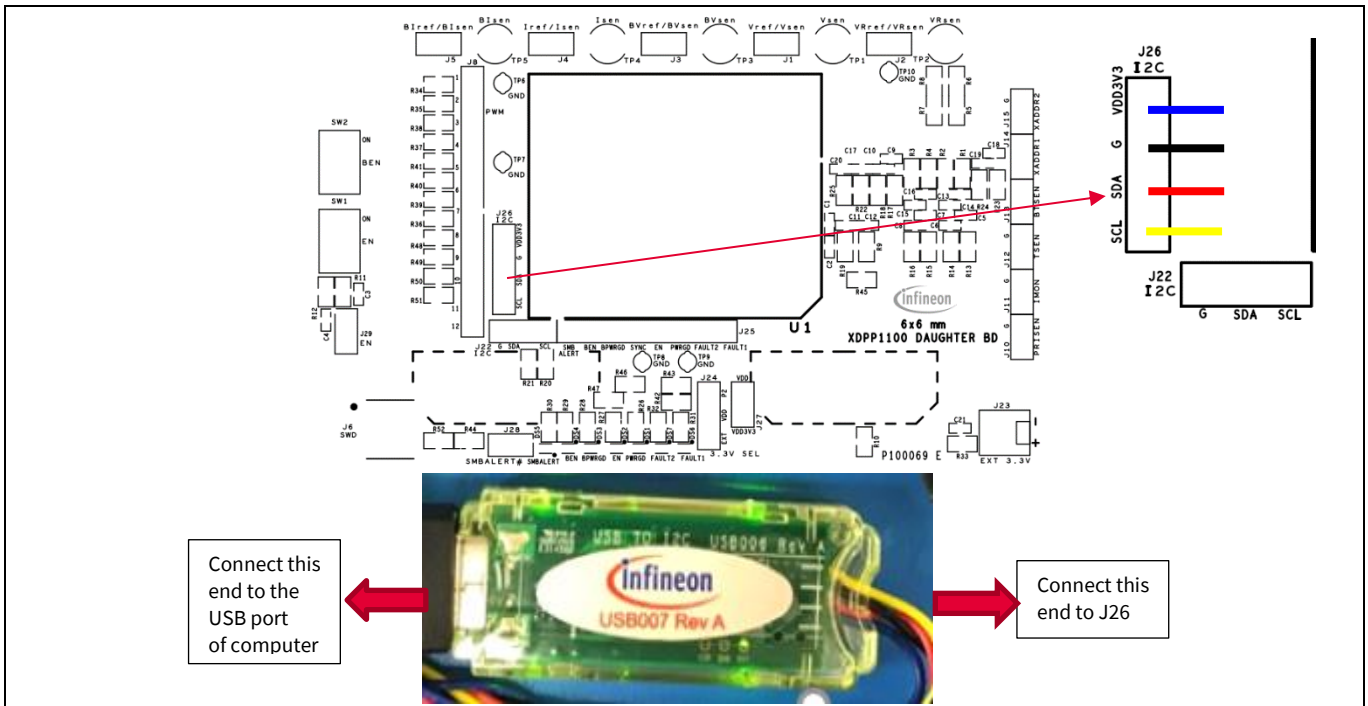
This section describes the power-up sequence for evaluating the XDPP1100-Q040 controller after installing the XDPP1100 GUI.

1. Connect an external 3.3 V DC power supply at J23 as shown below



**Figure 5 External 3.3 V connection for the daughterboard**

2. Connect one end of the USB007 dongle at J26 as shown below by matching the color of the dongle wires to the signal names. Connect the other end to the USB port of the PC.
  - The blue wire of the USB007A1 dongle can be used for EN control. Connect it to J29 pin2 for controlling the EN pin through GUI. If left floating, controlling the EN pin through GUI is not possible
  - Connect the blue wire of the USB007B dongle to 3.3 V to bias the isolated dongle. When using the USB007B dongle, controlling the EN pin can be done by the onboard switch SW1 with jumper J29 shorted



**Figure 6 USB-to-I<sup>2</sup>C dongle connection**

### Power-up procedure

3. Turn on the 3.3 V power supply. If the USB dongle is connected and the dongle driver is installed properly, the USB icon at the bottom left corner will turn green. The USB hardware (HW) model and dongle FW version are displayed in the information bar at the bottom. If required, update the dongle firmware using the icon as shown below

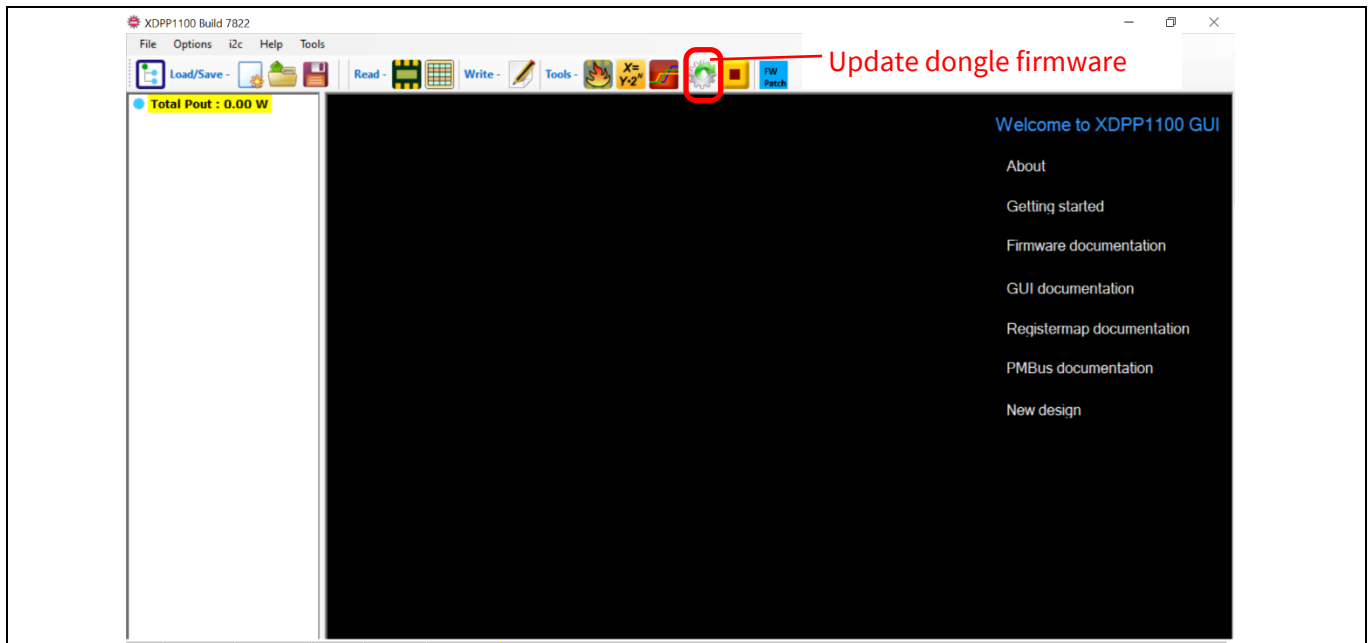


Figure 7 XDPP1100 GUI

4. Use the **Auto Populate** shortcut button to scan the device that is connected on the I<sup>2</sup>C bus.  
If the XDPP1100 device is properly biased, the GUI tool identifies the device part number and its address offset, which allows you to add the device to the design. The GUI will read the stored program from the IC to the GUI tool. If the XDPP1100 device is not pre-programmed (blank IC when it leaves the factory), the registers and PMBus command have the default values (most of them are zeroes)

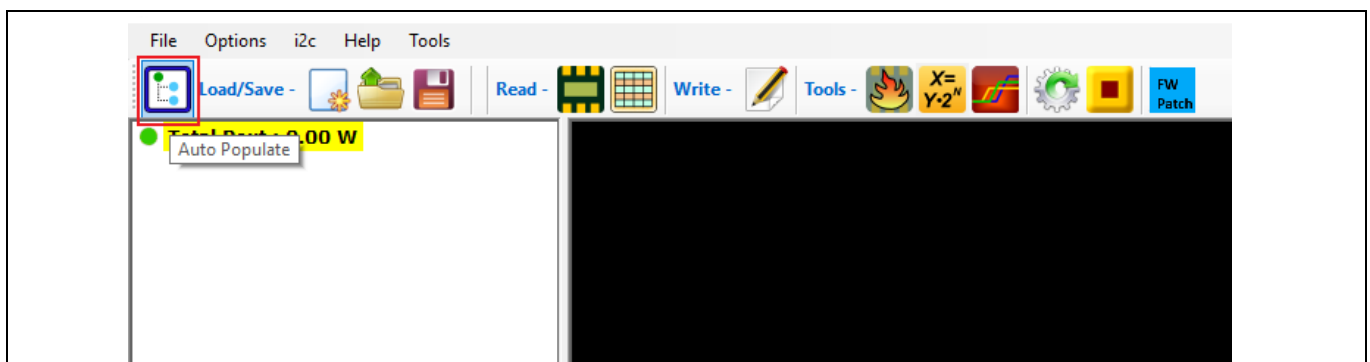
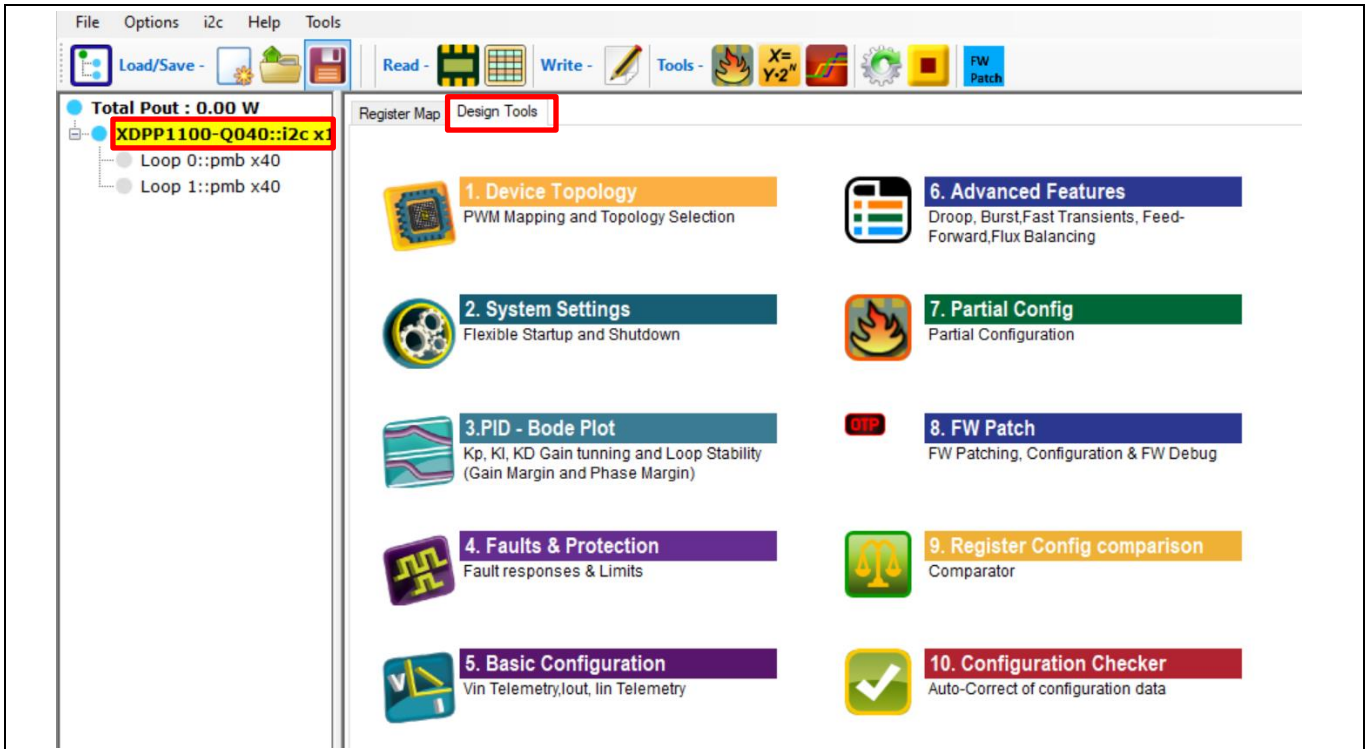


Figure 8 Auto-populating device parameters

5. Use the GUI design tool to program the device per application requirements (Figure 9).  
All configurations are in the RAM, which is a volatile memory that can be used during the evaluation phase to try different configuration settings without limitation. The XDPP1100 device has 32 KB RAM of which 10 KB is reserved for the user. It is recommended to use the 10 KB RAM to verify patch and configuration. You

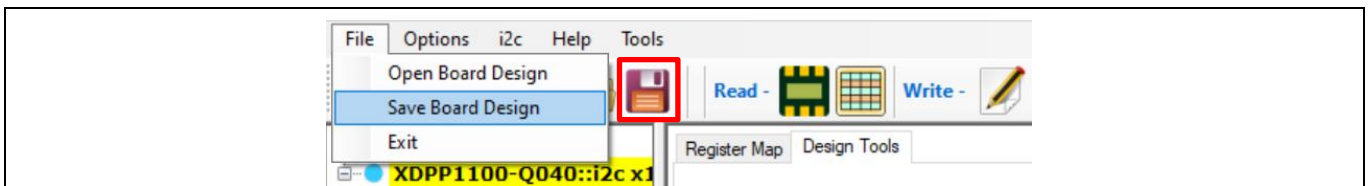
**Power-up procedure**

should save only the final configuration to the device’s non-volatile memory, which is one-time programmable (OTP). The XDPP1100 device has 64 KB available OTP space for FW patch and configuration



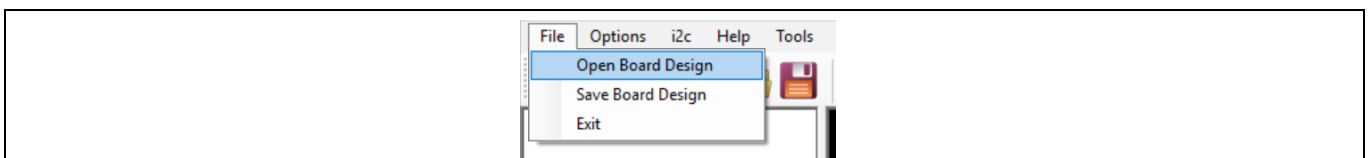
**Figure 9 GUI design tool**

6. Select **File > Save Board Design** (or, click the Save icon) to save the configuration to a design file (.pcd) that has the register and PMBus configuration



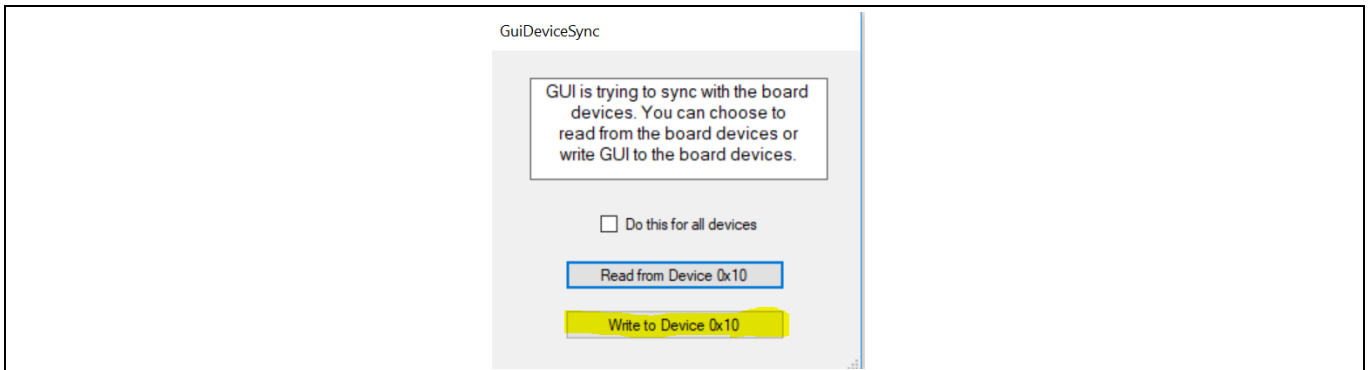
**Figure 10 Save configuration to design file**

7. Select **File > Open Board Design** to reload the design file to the device shown in Figure 11 to open the .pcd file. The GUI tool will show a pop-up window (Figure 12). Click **Write to Device 0x10** to write the program into the RAM of the device



**Figure 11 Open design file**

**Power-up procedure**

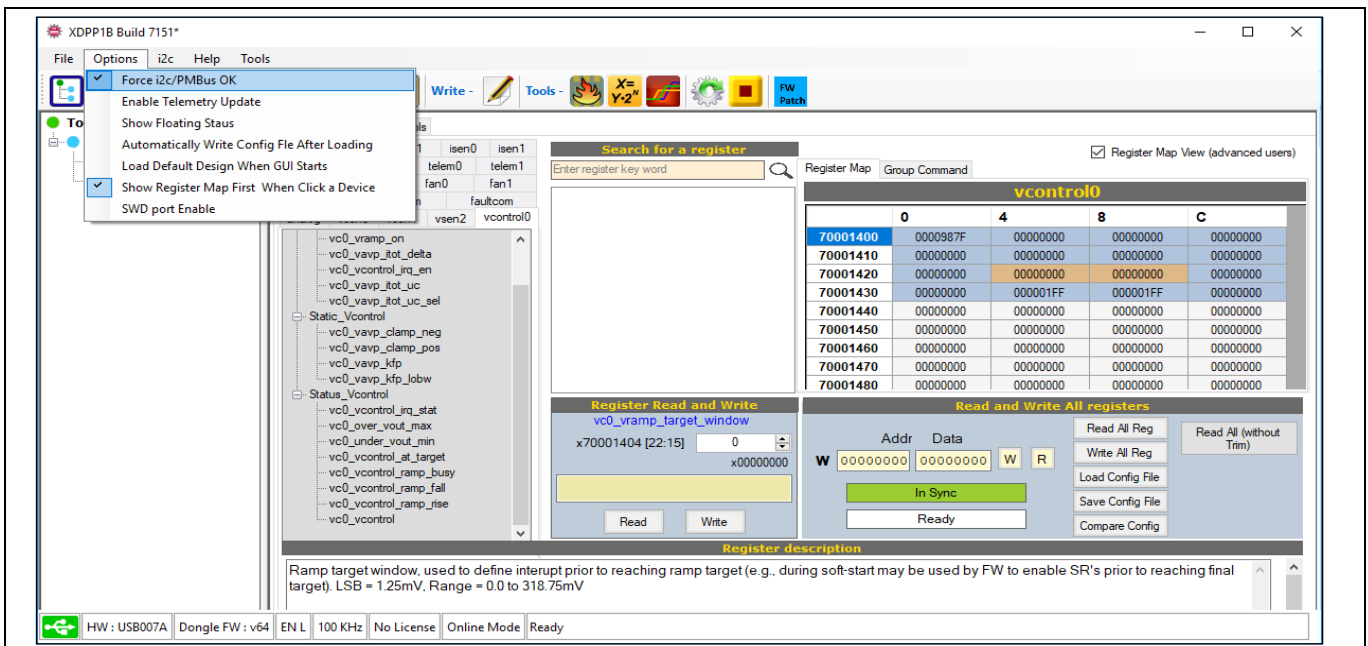


**Figure 12 Write to device operation**

For more information about the GUI tool, refer to **Help** in the top-left corner for additional documentation or refer to the *XDPP1100\_GUI\_User\_Guide.pdf* file in the path *C:\XDPP1100\XDPP1100\_GUI*.

**3.1 Force I<sup>2</sup>C connection**

The auto-populate option can add a device by detecting the product ID. The I<sup>2</sup>C communication is automatically set up after auto-populating. In some cases, you may need to configure a device with an unmatched product ID. In this case, select **Options > Force i2c/PMBus OK** to force-enable the I<sup>2</sup>C communication (Figure 13).



**Figure 13 Force I<sup>2</sup>C/PMBus connection**

Power-up procedure

### 3.2 Telemetry Update

The **Status** tab in the GUI tool shows all the status commands such as STATUS\_WORD and STATUS\_VOUT.

Do one of the following:

- Click the **Read status** button to see the updated status
- Select **Options > Enable Telemetry Update** to have the status and telemetry information automatically updated every second

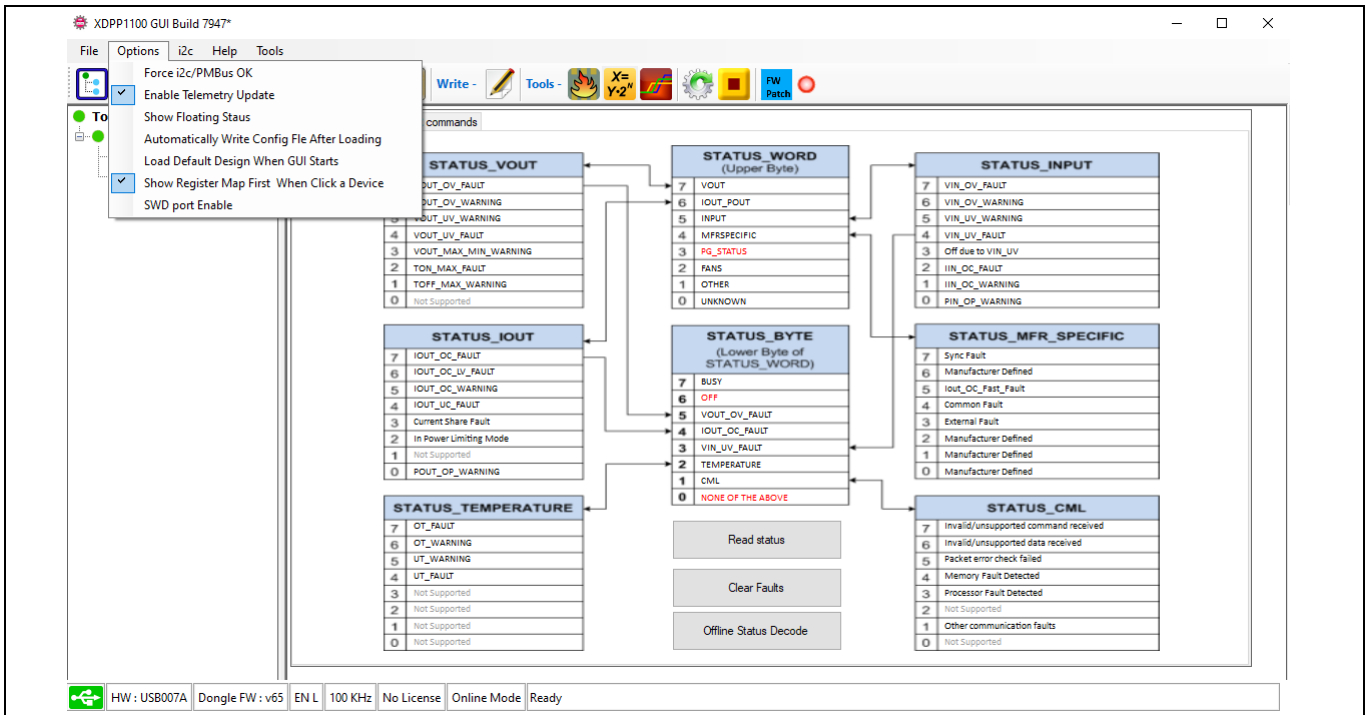


Figure 14 Enable Telemetry Update

Power-up procedure

### 3.3 Floating meter

The GUI tool offers a floating meter to monitor the key status of the converter such as input voltage, output voltage, input current, output current, input power, and temperature.

Select **Options > Show Floating Status** to turn on the floating meter. Once turned on, the information will be shown in a pop-up window, which stays on the screen even when the GUI main window is minimized.

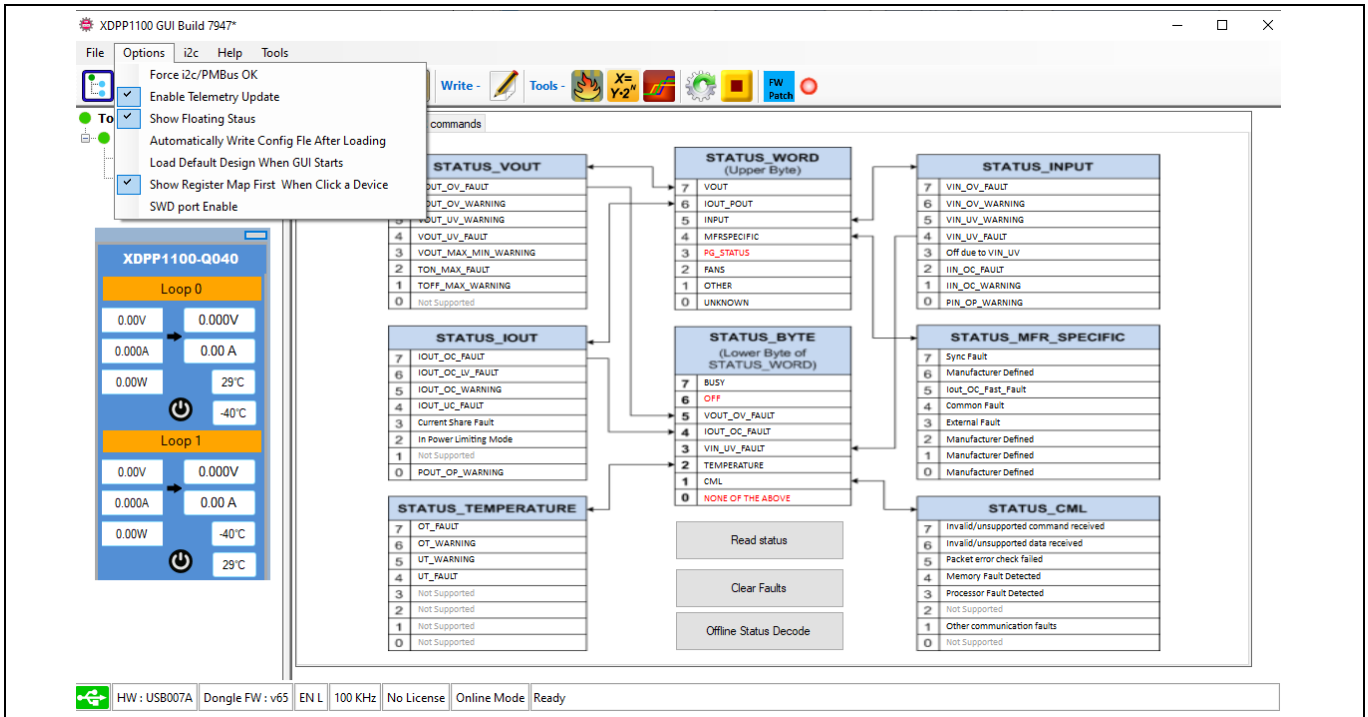


Figure 15 Show Floating Status

Schematic and bill of materials

## 4 Schematic and bill of materials

### 4.1 Schematic

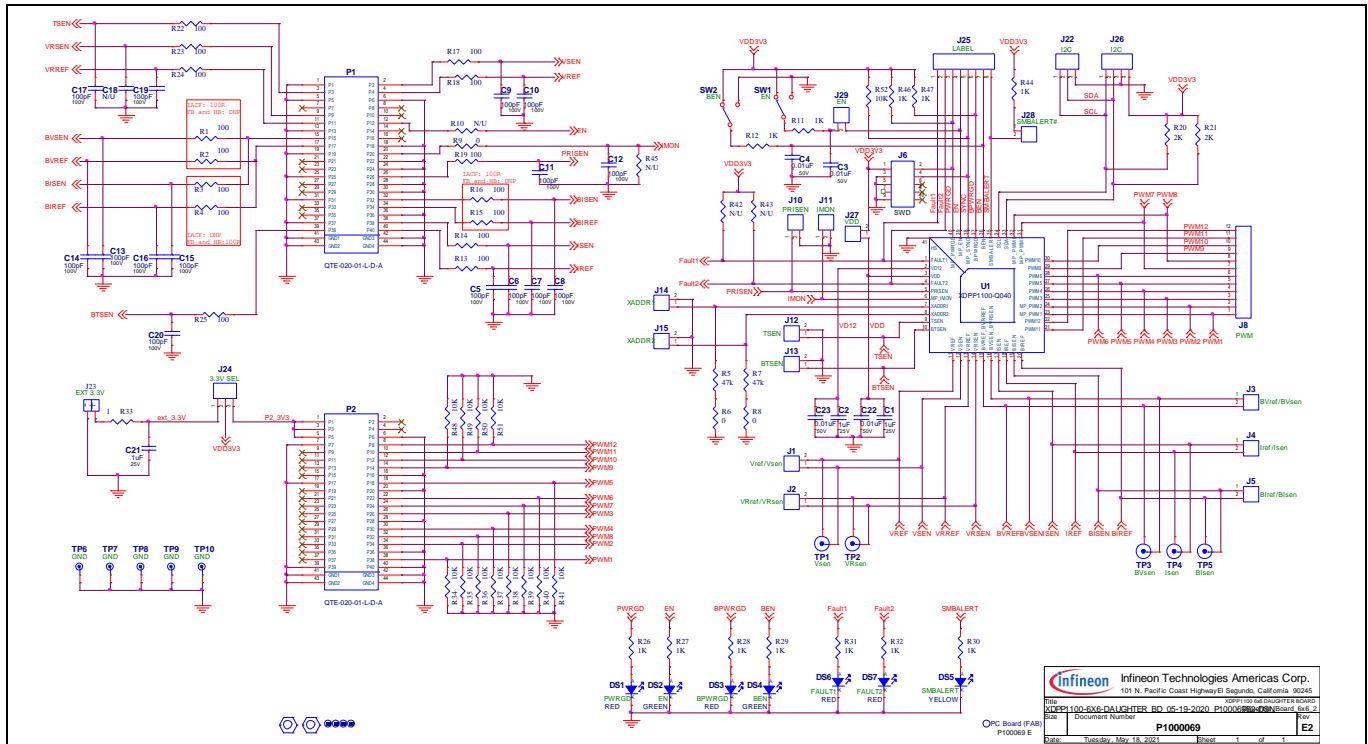


Figure 16 XDPP1100\_Q040 daughterboard schematic

### 4.2 Bill of materials

Table 4 BOM for daughterboard

Item	Qty.	Ref.	Manufacturer	Part number
1	1	BRD1		P100069 E
2	3	C1, C2, C21	TDK	C1608X7R1E105K
3	4	C3, C4, C22, C23	TDK	C1608X7R1H103K080
4	15	C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C19, C20	TDK	C1608C0G2A101K
5	4	DS1, DS3, DS6, DS7	Würth	150060RS75000
6	2	DS2, DS4	Würth	150060GS75000
7	1	DS5	Würth	150060YS75000
8	14	J1, J2, J3, J4, J5, J10, J11, J12, J13, J14, J15, J27, J28, J29	Würth	613 002 111 21
9	1	J6	Samtec	FTSH-105-01-L-DV-K
10	1	J8	Würth	613 012 111 21
11	2	J22, J24	Würth	613 003 111 21
12	1	J23	TE Connect	640456-2
13	1	J25	Würth	613 008 111 21

**Schematic and bill of materials**

<b>Item</b>	<b>Qty.</b>	<b>Ref.</b>	<b>Manufacturer</b>	<b>Part number</b>
14	1	J26	Würth	613 004 111 21
15	2	M1, M2	Keystone	8833
16	2	P1, P2	Samtec	QTE-020-01-L-D-A
17	15	R1, R2, R3, R4, R13, R14, R15, R16, R17, R18, R19, R22, R23, R24, R25	Panasonic	ERJ-6ENF1000V
18	2	R5, R7	Panasonic	ERJ-6ENF4702V
19	3	R6, R8, R9	Panasonic	ERJ-6GEY0R00V
20	12	R11, R12, R26, R27, R28, R29, R30, R31, R32, R44, R46, R47	Panasonic	ERJ-6ENF1001V
21	2	R20, R21	Panasonic	ERJ-6ENF2001V
22	1	R33	Panasonic	ERJ-6RQF1R0V
23	13	R34, R35, R36, R37, R38, R39, R40, R41, R48, R49, R50, R51, R52	Panasonic	ERJ-6ENF1002V
24	5	R42, R43, R45, R10, C18		Not used
25	2	SW1, SW2	C&K	GT11MCBE
26	5	TP1, TP2, TP3, TP4, TP5	CINCH CON	129-0701-202
27	5	TP6, TP7, TP8, TP9, TP10	Keystone	5020
28	1	U1	Infineon	XDPP1100-Q040

## References

### References

- [1] Infineon Technologies AG: *Application note - XDPP1100 GUI installation guide*; [Available online](#)
- [2] Infineon Technologies AG: *Application note - The XDPP1100 digital power supply controller*; [Available online](#)

**Revision history**

**Revision history**

<b>Document revision</b>	<b>Date</b>	<b>Description of changes</b>
V 1.0	2025-03-10	Initial release

**Trademarks**

All referenced product or service names and trademarks are the property of their respective owners.

**Edition 2025-03-10**

**Published by**

**Infineon Technologies AG**

**81726 Munich, Germany**

**© 2025 Infineon Technologies AG.**

**All Rights Reserved.**

**Do you have a question about this document?**

**Email:** [erratum@infineon.com](mailto:erratum@infineon.com)

**Document reference**

**UG194030**

**Warnings**

Due to technical requirements products may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies office.

Except as otherwise explicitly approved by Infineon Technologies in a written document signed by authorized representatives of Infineon Technologies, Infineon Technologies' products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury.