.dp - digital power 2.0

.dp Interface Gen2

User Manual

About this document

Scope and purpose

This document provides insights of the .dp Interface Gen2 (.dpIfGen2) and information on the electrical functionality and the functionality provided by the firmware running on .dpIfGen2.

Intended audience

This document is intended solely for experienced engineers.

Table of Contents

1   Important Safety Instructions and Legal Notes

Please read and understand the user manual and the following safety warnings. The design operates with unprotected high voltages. The direct connection of the open and unprotected board to a power supply poses a severe risk of electric shock. Extra caution must be exercised when handling the exposed conductor, terminals of components or charged capacitors (even after disconnection) as high voltages may present there or at other points across the board.

Therefore, the board may only be handled in a laboratory environment by persons with sufficient electrical engineering training and experience wearing suitable personal protective equipment such as eye protection. The customer assumes all responsibility and liability for its correct handling and/or use of the board and undertakes to indemnify and hold Infineon Technologies harmless from any third party claim in connection with or arising out of the use and/or handling of the board by the customer. The board is a sample to be used by the customer solely for the purpose of evaluation and testing. Due to the purpose of the system, it is not subjected to the same procedures regarding Returned Material Analysis (RMA), Process Change Notification (PCN) and Product Withdraw (PWD) as regular products. European legislation in relation to inter alia the restriction of hazardous substances (RoHS), waste from electrical and electronic equipment (WEEE), electromagnetic compatibility, as well as duties to comply with FCC or UL standards may not apply to the board and the board may not fulfil such requirements. Every prepared setup needs to be evaluated and the results need to be documented by the user before using this setup.

The final setup needs to be tested according to all relevant normative requirements. This means that the following actions are mandatory:

1. Every combination of parameter sets/configurations needs to be fully evaluated by a technical expert. Make sure that the combination of parameters used matches your application's needs. It is the customer's responsibility to make sure that the chosen parameters meet all requirements, including safety-related requirements.
2. Before using a parameter set, make sure that the system – including any programming/ OTP burning hardware – is fully tested and working as expected.
3. Every parameter set is only valid for the dedicated evaluated hardware configuration, including PCB, Layout, used topology and all used electronic components (e.g. MOSFET, Transformer, …)

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Note: Please ensure that the certification for isolation requirements is only valid for the .dp Interface Gen2 (without application cable and application connector).

Note: The user has to cover the whole application board including the cable and connector with a housing fulfilling isolation Class II requirements.

Note: Calibration: If a tool provided by Infineon informs you about a non-calibrated .dp Interface Board Gen2, please contact your Infineon representative to obtain support on this topic.

2   Introduction

This board is designed to control DP2x devices from a PC. To achieve a stable and simple PC connection, an HID device was chosen. The standard tool on the PC side is called *.dpVision* and will be provided by Infineon Technologies AG. *.dpVision* (software GUI) is recommended for use of the .dp Interface Gen2 (hardware) and is provided together with the .dp Interface Gen2 board (abbreviated .dpIfGen2).

Highlights

- Safe and galvanic isolation from DP2x board to low voltage side (USB)
- Startup sequence and VCC supply voltage for DP2x is generated on the .dpIfGen2
- Short circuit detection on VCC
- Status LEDs for power, sync and PC connection
- CE certified
- Easily adaptable to specific application boards via standard 8-pin (2x4 pins) connector at the .dpIfGen2
- Firmware of the .dpIfGen2 can be updated via USB
- Electrical isolation (VDE60950 reinforced)
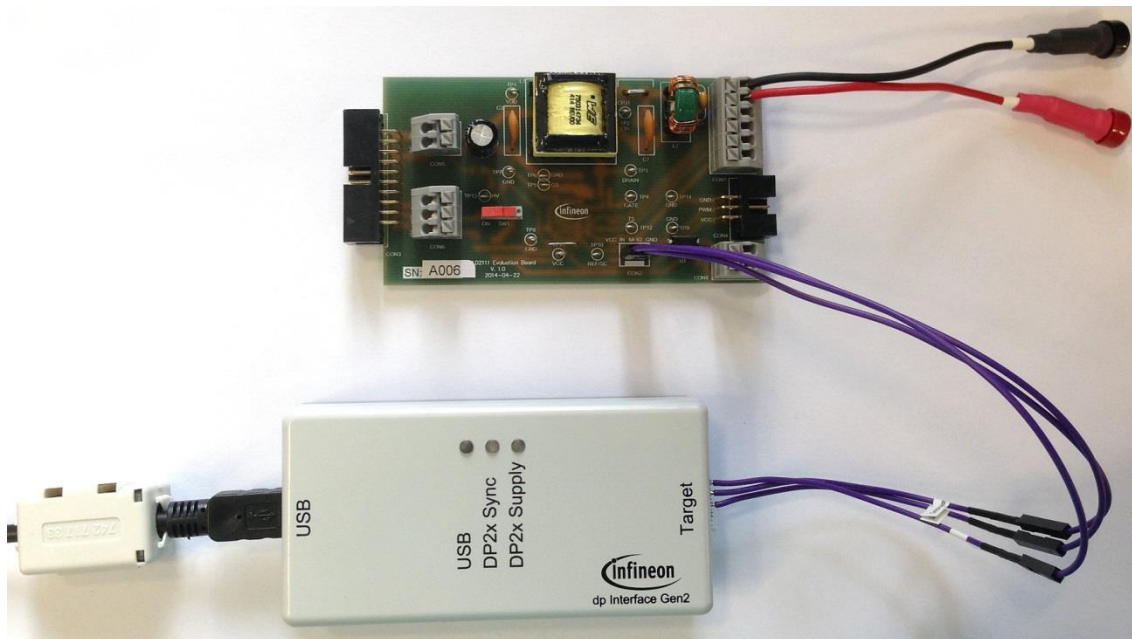 USB power and communication lines are isolated from the DP2x domain.

Figure 1   Complete System Setup with .dp Interface Gen2 Board (.dpIfGen2)

Note: The detection of the .dpIfGen2 sometimes fails on USB3.0 ports. Therefore the use of a USB2.0 port is recommended (which can be provided by an external USB2.0 hub, if the machine offers USB3.0 ports only).

To generate the startup voltage needed to activate DP2x (up to 24V) a step-up (boost) converter is available on the board (Figure 2 shows a block diagram of the system).
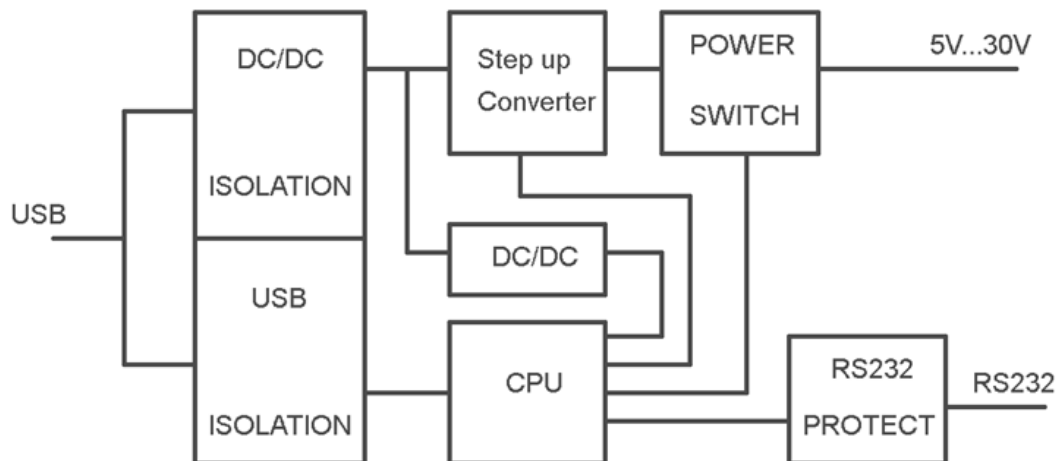

Figure 2   System Block Diagram

The USB supply (5V) is constantly checked by the microcontroller on the board. If the voltage drops below 4V, the output switch will be opened to disconnect the device from the voltage converter. Before applying power to DP2x, the impedance of the attached board at VCC is checked. This is done by applying a sequence of 8 short 5V pulses. Using this test, different possible scenarios can be detected:

- Everything is OK (load down to min. 220R @ 8.5 V)
- Short circuit (should disconnect at or below 47R)
- External capacitance (the external capacitance should be equal to or less than 47 µF, otherwise successful charging is not guaranteed)

Note: The interface is protected against overvoltage (up to 30 V), short-circuit to GND and short-circuit to VCC for the communication line.

3   Setup

Three LEDs are available for displaying the adapter status:

Figure 3   .dp Interface Gen2 Housing

- USB: Connection to PC established
- DP2x Sync: .dpIfGen2 and DP2x communication working (in sync)
- DP2x Supply: DP2x is supplied power via .dpIfGen2

The pinout of the interface connector can be found in Figure 4.

Note: The UART communication line (Comm) should be connected directly, without any filtering, to the communication pin on the application board.

Note: The VCC line should also be connected directly to the application board. There's no need for a diode in the VCC path.
<u>Please be aware</u>: If a diode was added, the VCC voltage supplied by default might not be sufficient for reliable OTP programming, due to the voltage drop of the diode.

● VCC   ● Comm   ● GND   ● Reserved
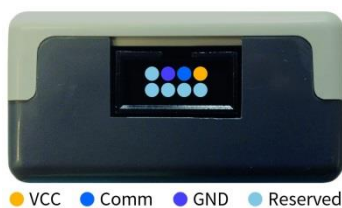
Figure 4   Pinout - Connection to Board

To connect the user board, an application specific cable is necessary. This cable will be provided together with the application board by Infineon Technologies AG or can be built easily with standard components. The connection to the .dpIfGen2 needs to be done with an 8-pin (2x4) connector which comes together with the board. The connector on the application side may be different.

If there are any problems in detecting the .dpIfGen2, please first try to update the firmware with the *.dpVision* application. If the .dpIfGen2 is not detected by this application, try to force a firmware update as described below.

3.1   Forcing Firmware Update

Connect pins 2 and 4 of the .dpIfGen2 before connecting the USB cable to the PC (these are the pins marked by a red rectangle in Figure 5 below). If the DP2x Sync LED starts flashing, the firmware can be updated using *.dpVision*. Otherwise, please exchange your .dpIfGen2.

● VCC ● Comm ● GND ● Reserved

Figure 5   Pinout - Forcing Firmware Update

4 Technical Data

4.1 Ratings

Table 1   Technical Data of the .dp Interface Gen2

Name	Value
Maximum power consumption (safe side) - USB	800mW
Power supply (safe side) - USB	5V ± 5%
Maximum output power (unsafe side) - Target	350mW
Maximum voltage swing output (unsafe side) - Target	5 – 30V
Operating voltage (unsafe side) - Target	7.5V (typ.), adjustable between 5V and 29.5V
Tolerance for Vout @7.5V	± 50mV
Maximum ambient temperature	40° C

Isolation characteristics	
Reinforced insulation according to:	IEC 60950-1, 230Vrms (325Vpeak) VDE V 0884-10: 2006-12, (846Vpeak)
Single protection according to:	UL1577, 5000Vrms isolation voltage

5 Output Configuration of .dp Interface Gen2

The .dp Interface Gen2 board (.dpIfGen2) is able to be active while DP2x is generating the supply voltage (which is usual in a switching application). No diode needs to be added in the supply line. However, there is a small amount of current flowing into the .dpIfGen2 depending on the supply applied to the terminal VCC-DP2 (near top left in the schematic below).
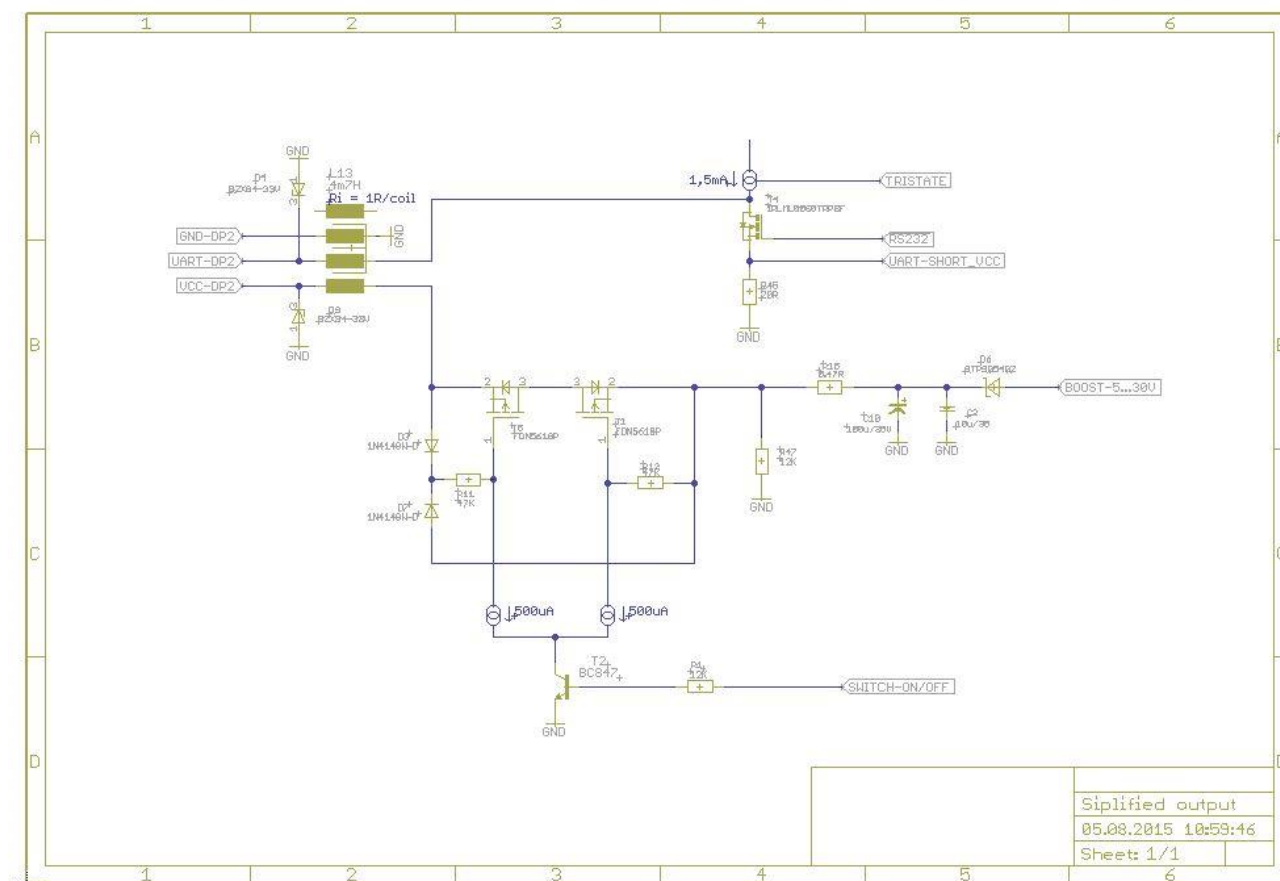
Figure 6   Simplified Output Stages of .dp Interface Gen2

6   EC Declaration of Conformity

EC Declaration of Conformity

We hereby declare that the following products are in conformity with the requirements of the following EC Directives:

Product

Name:	dp Interface Board Gen2
Product Scope:	Isolation adapter for .dp Evaluation and Demoboards to program and debug DP2x devices
Order Code:	IF-BOARD.DP-GEN2 – SP001260696
Title of Directives:	EMC Directive
	Low voltage Directive

These products are designed and manufactured in accordance with the following standards.

<u>EMC Directive:</u>

- DIN EN 55022; VDE 0878-22:2011-12 - Einrichtungen der Informationstechnik - Funkstöreigenschaften - Grenzwerte und Messverfahren (CISPR 22:2008, modifiziert); Deutsche Fassung EN 55022:2010
- DIN EN 55024; VDE 0878-24:2011-09 Einrichtungen der Informationstechnik - Störfestigkeitseigenschaften - Grenzwerte und Prüfverfahren (CISPR 24:2010); Deutsche Fassung EN 55024:2010

<u>Low voltage Directive:</u>

- IEC 60950-1:2005 (Second Edition) + Am 1:2009 + Am 2:2013 Information technology equipment - Safety

Measurement & Test:

<u>EMC Directive</u>

Notified Body:	SGS Germany GmbH
Address:	Hofmannstr. 50, D – 81379 München
Certification number:	Test Report No.: H1KB0001

<u>Low voltage Directive</u>

Notified Body:	SGS Germany GmbH
Address:	Hofmannstr. 50, D – 81379 München
Certification number:	Test Report No.: H1KB0002

Manufacturer:	Infineon Technologies AG
Responsible Name:	Kurt Marquardt
Address:	Am Campeon 1-12, 85579 Neubiberg, Germany

Kurt Marquardt
Senior Director
Applications&Systems Lighting
Infineon Technologies AG

Date: _14. 7. 2014_   Signed: _____

Revision History

Major changes since the last revision (1.4)

Page or Reference	Description of change
all	Template change and Updated "Important Safety Instructions and Legal Notes"

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Legal Disclaimer

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Information

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Warnings

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