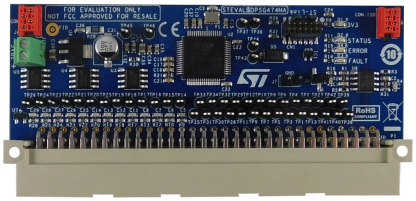
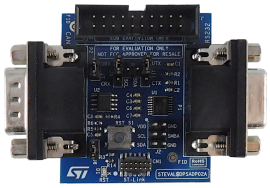
STEVAL-DPSG474

Data brief

Digital power supply control kit based on STM32G474RE





Features

- Control board for digital SMPS (PFC converters, HF isolating DC-DC converters, DC-AC inverters) based on the STM32G474RE microcontroller:
  - High-resolution timer (HRTIM) for D-SMPS applications
  - Filter math accelerator unit (FMAC) to perform arithmetic operations on vectors
  - Coprocessor (CORDIC) to provide hardware acceleration of trigonometric functions
- 64-pin DIN 41612 connector for D-SMPS modular approach
- STDC14 programming connector
- Opto-coupled serial communication for board-to-board communication
- RC filters for analog inputs
- Protection of the microcontroller analog lines with diode arrays
- ESD protection on SWD and COM lines
- Adapter board provided for programming and user communication (USART, CAN, SMBus)
- Supply voltage: 5 V
- Embedded 5 V/3.3 V voltage regulator
- Dedicated test points for debugging
- LED signaling for power-on, faults, errors, and general purpose
- RoHS compliant

Product summary	
Digital power supply control board based on STM32G474RE	STEVAL-DPSG474
Mainstream Arm Cortex-M4	STM32G474RET6
Applications	Power Supplies and Converters Digital Power Server & Telecom Power

Description

The STEVAL-DPSG474 is a digital power supply control kit. It consists of a main board, based on the STM32G474RE microcontroller from the STM32G4 family, and an adapter board, which provides different communication interfaces and allows programming the microcontroller through a standard 20-pin JTAG connector.

The STM32G474RE microcontroller includes the high-performance Arm® Cortex® M4 32-bit RISC core operating at up to 170 MHz frequency, a floating point unit (FPU), a full set of DSP (digital signal processing) instructions, and high-speed embedded memories (512 Kbytes of flash memory and 128 Kbytes of SRAM).

The device embeds peripherals that allow the mathematical/arithmetic function acceleration (CORDIC for trigonometric functions and FMAC unit for filter functions).

The MCU offers five fast 12-bit ADCs (5 Msps), seven ultra-fast comparators, six operational amplifiers, seven DAC channels (three external and four internal), a low-power RTC, 32-bit timers, three timers dedicated to motor control, seven general-purpose 16-bit timers, one 16-bit low-power timer, and the high-resolution timer (HRTIM) with 184 ps resolution, specifically designed to drive power conversion systems.

The main board embeds a standard 64-pin DIN 41612 connector for connection with a power board. It provides all the PWM control signals, sensing networks, and protection features needed for a wide range of digital power supply applications.

An external 5 V supply voltage can supply the board either through a dedicated connector or through the main connector. The adapter board features a configurable user communication (SMBus, CAN, or RS-232) with two DB9 connectors and the appropriate transceiver ICs, a standard STDC14 14-pin connector, which provides the SWD interface for debugging and USART communication for user interface (UI), and the standard JTAG connector for programming.

The board also includes a reset button and a termination resistance between the CAN lines.

You can easily connect the STEVAL-DPSG474 to another control board via opto-coupled serial communication and dedicated connectors.

1 Schematic diagrams

Figure 1. STEVAL-DPSG474 control board: MCU circuit schematic

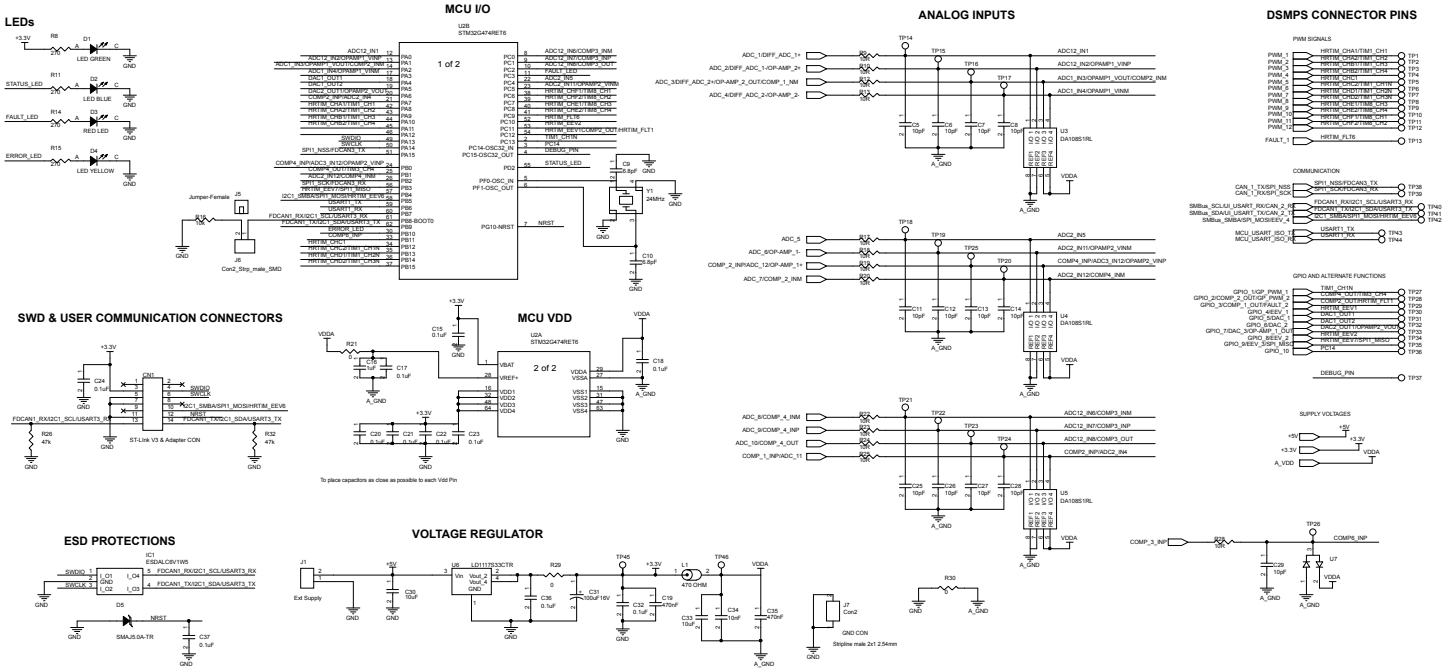


Figure 2. STEVAL-DPSG474 control board: D-SMPS connector circuit schematic

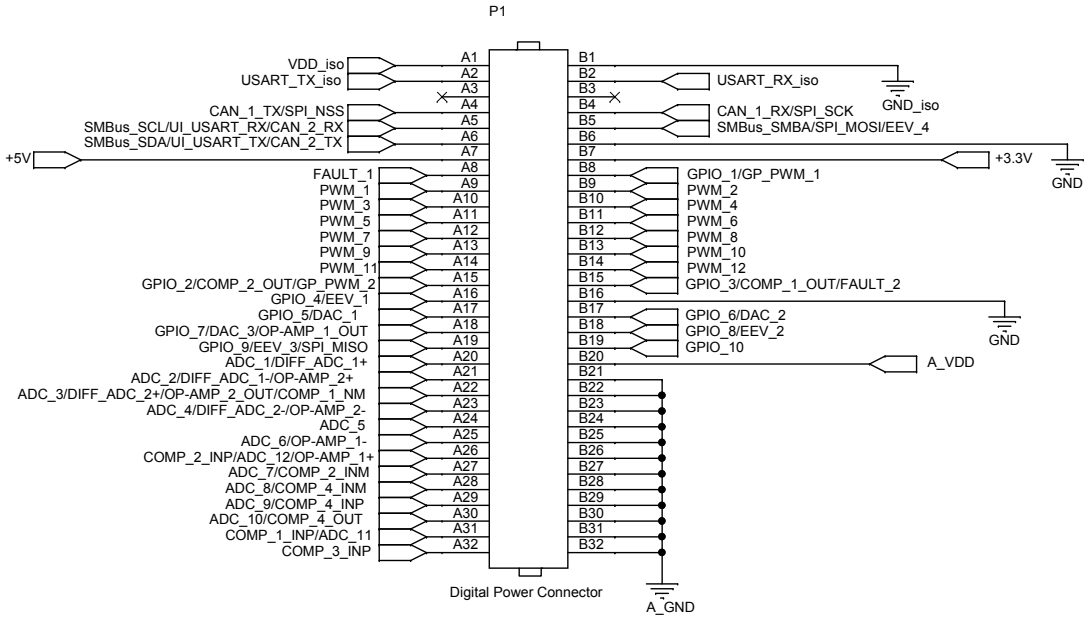


Figure 3. STEVAL-DPSG474 control board: isolated communication circuit schematic

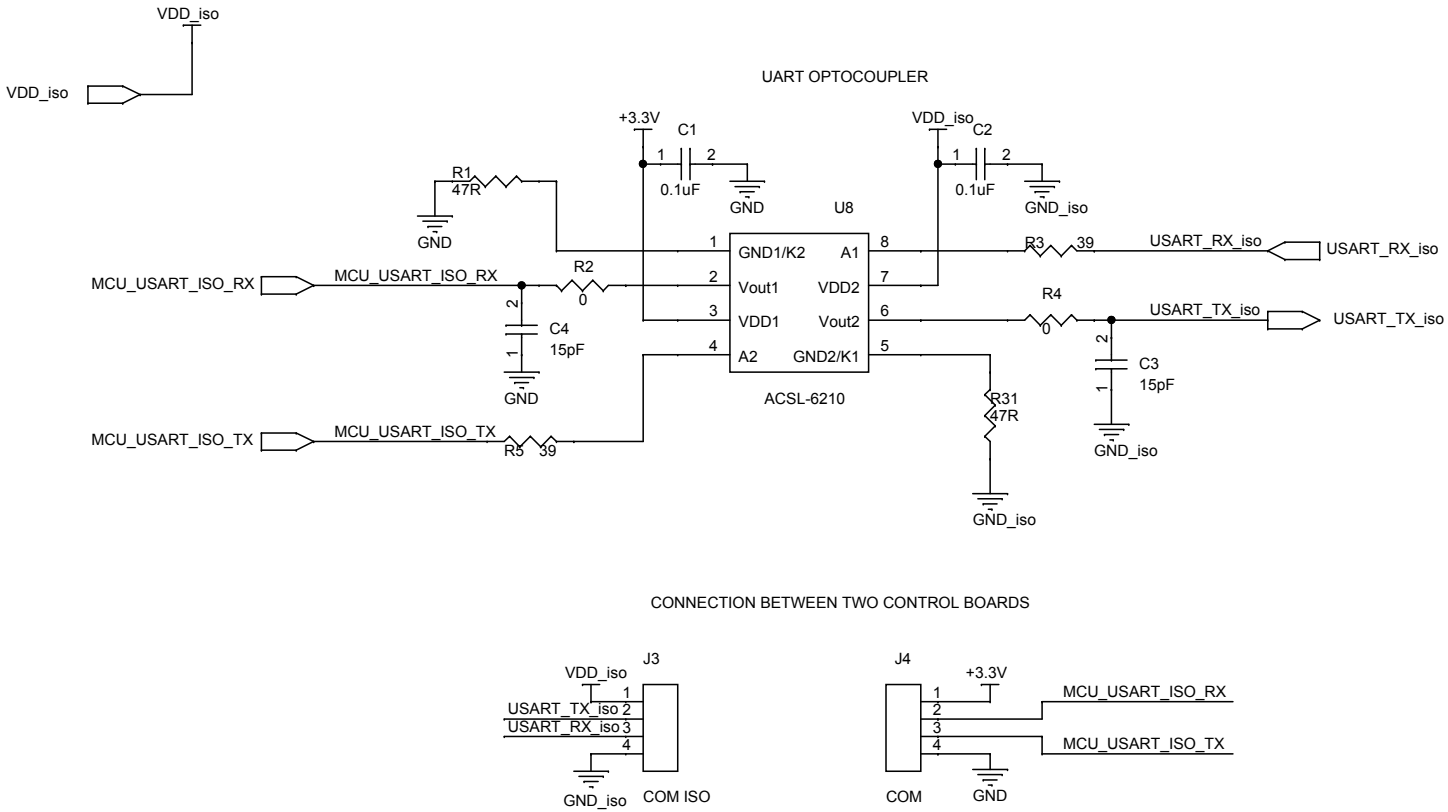
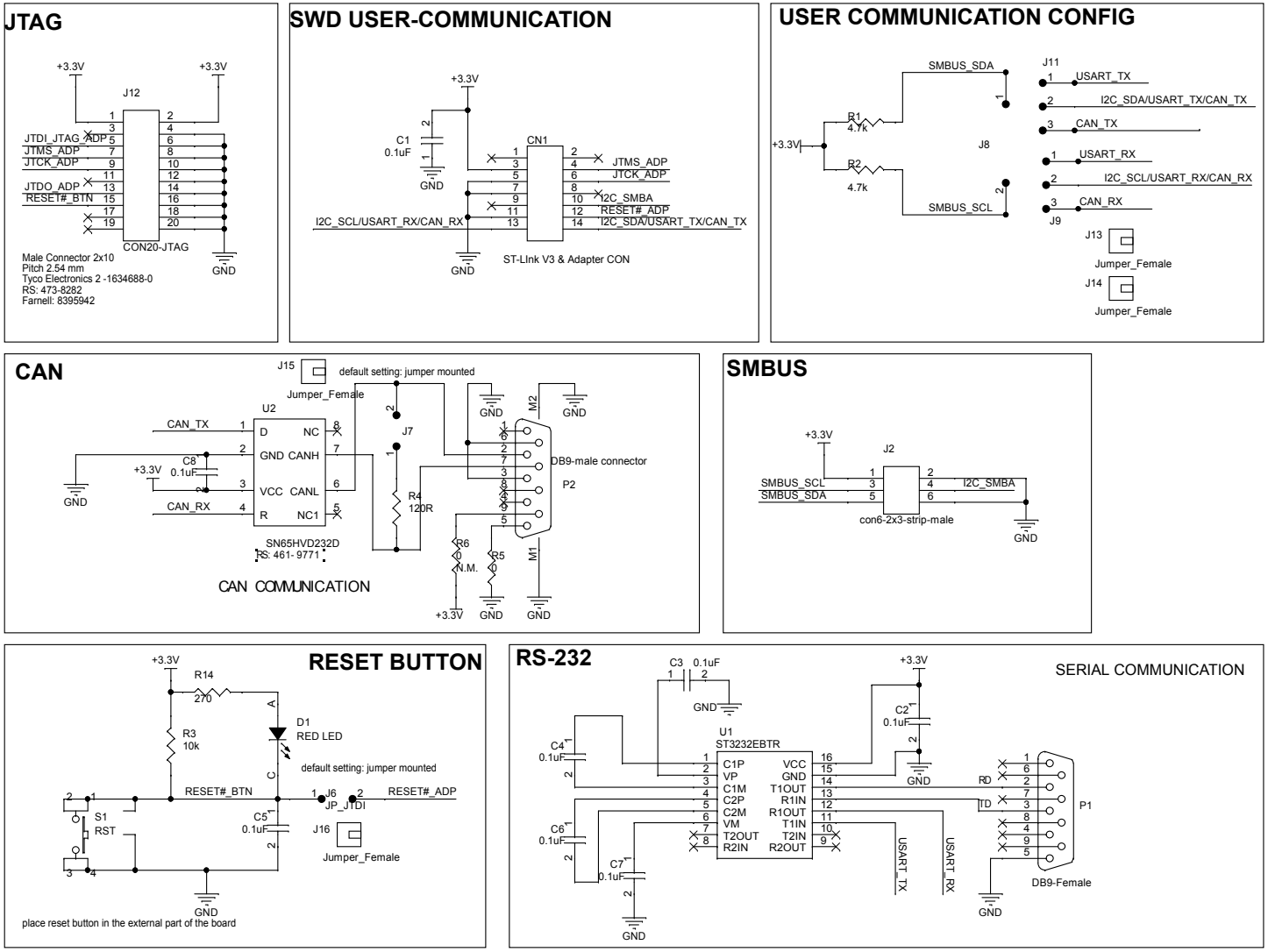


Figure 4. STEVAL-DPSG474 adapter board circuit schematic



2 Kit versions

Table 1. STEVAL-DPSG474 versions

PCB version	Schematic diagrams	Bill of materials
STEVAL$DPSG474A (1)	STEVAL$DPSG474A schematic diagrams	STEVAL$DPSG474A bill of materials

1. *This code identifies the STEVAL-DPSG474 evaluation kit first version. It is printed on the board PCB. The kit includes the STEVAL-DPSG474M control board, whose first version is identified by the STEVAL$DPSG474MA code, and the STEVAL-DPSADP02, whose first version is identified by the STEVAL$DPSADP02A code.*

Revision history

Table 2. **Document revision history**

Date	Revision	Changes
12-Apr-2022	1	Initial release.

IMPORTANT NOTICE – READ CAREFULLY

STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST’s terms and conditions of sale in place at the time of order acknowledgment.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of purchasers’ products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. For additional information about ST trademarks, refer to www.st.com/trademarks. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2022 STMicroelectronics – All rights reserved