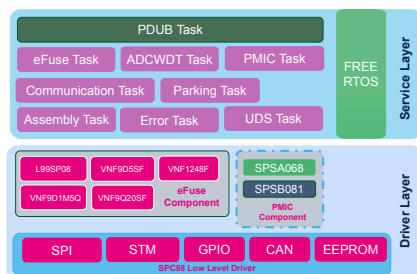


Firmware for STEVAL-PDUBV1 control and configuration



Features

- Allows configuring, controlling, and monitoring all output channels, protections, current/voltage thresholds, and diagnostic functions of the [STEVAL-PDUBV1](#) evaluation board
- The UDS protocol (according to the ISO 14229 standard) simplified implementation allows viewing electrical parameters (current, voltage, temperature), protection status, faults, or anomalies and the board status in real time
- Allows enabling or disabling each output channel of the [STEVAL-PDUBV1](#), ensuring dynamic and safe management of connected loads
- Manages the [STEVAL-PDUBV1](#) onboard e-fuses in the three operating states: normal mode, parking mode, and assembly mode

Description

The [STSW-PDUB-UDS](#) firmware enables comprehensive management of the [STEVAL-PDUBV1](#) power distribution unit (PDU) board, facilitating control and monitoring of its primary functionalities.

The firmware architecture is designed to provide maximum flexibility, reliability, and scalability, adjusting to various hardware configurations and application scenarios.

The driver layer implements the drivers for all the onboard devices: VNF family eFuse devices (for example, [VNF1248F](#), [VNF9D1M5Q](#), [VNF9D5SF](#), [VNF9Q20SF](#)), PMICs ([SPSA068](#) and [SPSB081](#)), [L99SP08](#) eFuse companion device, SPC58 hardware abstraction layer (HAL).

The service layer consists of several tasks running on the FreeRTOS™ operating system and handles: configuration, control, and monitoring of all eFuse channels and watchdogs, PMIC ICs, CAN communication, overvoltage, or undervoltage on rails A and B, eFuse configuration in assembly mode, system transition into parking mode, error detection, and report with specific diagnostic trouble codes (for example, channel overcurrent or channel overtemperature).

These tasks use the driver layer APIs to interact with the hardware. Therefore, they never access specific IC registers or hardware peripherals directly. Task activation is governed by a hardware timer, ensuring that periodic operations always occur at the same instant, with no jitter accumulation.

Multiple tasks can be activated at the same instant, allowing for the synchronization of critical operations. The scheduling logic is concentrated on a single point, allowing easier verification, validation, and temporal certification of the system.

This approach is widely adopted in the automotive field, where safety and predictability are essential requirements. The firmware enables rapid and straightforward evaluation of the [STEVAL-PDUBV1](#) board. It primarily facilitates the evaluation of high-side switch controllers with STi2Fuse protection in three operating states: normal mode, parking mode, and assembly mode. In this firmware, the Unified Diagnostic Services (UDS) module implements a simplified version of the ISO 14229 standard, providing diagnostic and service access to the [STEVAL-PDUBV1](#) ECU via CAN. It enables external tools and testers to interact with the ECU for configuration, fault reading, and system status.

Product summary	
Firmware for STEVAL-PDUBV1 control and configuration	STSW-PDUB-UDS
26-channel power distribution ECU based on SPC58NG84E7 Chorus 6M MCU and STi2Fuse devices	STEVAL-PDUBV1
Smart Octa P-channel for ultra-low current consumption automotive systems	L99SP08TR
High-side switch controller with STi2Fuse protection for 12 V, 24 V and 48 V automotive applications	VNF1248FTR
Automotive Power Management IC with LIN and CAN-FD	SPSB0815-TR
32-bit Power Architecture MCU for Automotive General Purpose Applications - Chorus family	SPC58NG84E7QEH0X

Product summary	
2-channel high-side driver with STi ² Fuse protection for automotive power distribution applications	VNF9D1M5QTR
2-channel high-side driver with STi ² Fuse protection for automotive power distribution applications	VNF9D5SFTR
PMIC with buck and precise voltage reference for MCU applications	SPSA068-TR
4-channel high-side driver with STi ² Fuse protection for automotive power distribution applications	VNF9Q20SFTR
Applications	Smart power distribution

The implemented UDS module supports different diagnostic sessions (for example, default, extended) to control access to various services and data. It decodes and processes UDS service requests, providing access to specific data items such as channel status, current, voltage, temperature, error information, and returning standardized positive or negative responses to each UDS request. Additionally, it interacts with the other firmware modules to retrieve diagnostic data and execute service requests.

The [STSW-PDUB-UDS](#) firmware is preloaded on the [STEVAL-PDUBV1](#) board. To download the flash memory image onto the board, unzip the file downloaded from the [STSW-PDUB-UDS](#) webpage.

The unzipped file includes: the “Build” folder, which contains the *out.elf* file to program the board, the “UDE” folder, which contains the *debug.wsx* file to be used to program the board through UDE PLS IDE, and the “PDU_database,” which contains the *PDU_database.dbc* file. The *dbc* file contains CAN messages for diagnostic access and available services (for example, logs, faults). This file is used for all message definitions to ensure interoperability and minimize errors.

Commercial CAN tools can be utilized for diagnostics, commissioning, and automated testing by leveraging this *.dbc* file.

You can refer to UM3594, section 6.3.9.1 for details on how to send messages to the board and get responses, implemented through the UDS protocol.

Revision history

Table 1. Document revision history

Date	Revision	Changes
24-Mar-2026	1	Initial release.

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