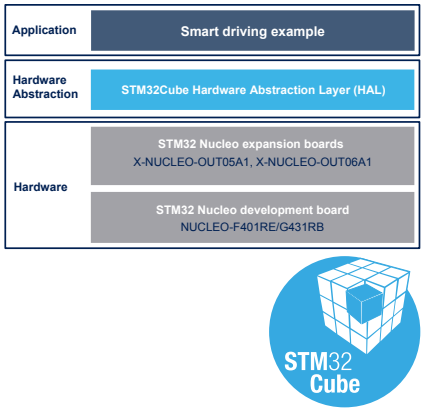
X-CUBE-OUT5

Data brief

Industrial digital output STM32Cube software expansion for X-NUCLEO-OUT05A1 and X-NUCLEO-OUT06A1



Features

- Software package to build applications for IPS1025H and IPS1025H-32
- High-side switch with extended diagnostics and smart driving for capacitive loads
- Ready-to-use firmware to easily evaluate the driving and diagnostic capabilities of IPS1025H and IPS1025H-32 with industrial loads
- Implementation on X-NUCLEO-OUT05A1 or X-NUCLEO-OUT06A1 expansion boards
- NUCLEO-F401RE or NUCLEO-G431RB development boards supported
- Driver library to control IPS1025H and IPS1025H-32
- GPIOs, PWMs and IRQs
- Fault/Diagnostics interrupt handling
- Easy portability across different MCU families, thanks to STM32Cube
- Free, user-friendly license terms

Product summary	
STM32Cube software expansion for X-NUCLEO-OUT05A1 and X-NUCLEO-OUT06A1	X-CUBE-OUT5
Industrial digital output expansion boards	X-NUCLEO-OUT05A1 X-NUCLEO-OUT06A1
Single channel high side switches	IPS1025H IPS1025H-32
Microcontrollers	STM32F401RE STM32G431RB
Applications	Programmable Logic Controllers

Description

The X-CUBE-OUT5 software package expands the functionality provided by STM32Cube. It runs on the STM32 microcontroller and includes a driver controlling the IPS1025H or the IPS1025H-32 (single-channel high-side switches for industrial applications) mounted on X-NUCLEO-OUT05A1 or X-NUCLEO-OUT06A1 expansion boards.

This software allows controlling the output channels of the expansion boards when connected to a NUCLEO-F401RE or NUCLEO-G431RB development board.

It is possible to build a system with up to four stacked X-NUCLEO-OUT05A1 and/or X-NUCLEO-OUT06A1 boards to evaluate an up to four-channel digital output module.

Each board channel can be switched into steady state mode or in PWM mode.

In PWM mode the software allows you to program the expansion boards to be switched on and off using a specific frequency in the 0-100 Hz range (0.1 Hz resolution), and specific duty cycle in the 0-100% range (1% resolution).

The software included in the package can be used in three integrated development environments (IDE): IAR, KEIL and STM32CubeIDE.

1 Detailed description

1.1 What is STM32Cube?

STM32Cube is a combination of a full set of PC software tools and embedded software blocks running on STM32 microcontrollers and microprocessors:

- STM32CubeMX configuration tool for any STM32 device; it generates initialization C code for Cortex-M cores and the Linux device tree source for Cortex-A cores
- STM32CubeIDE integrated development environment based on open-source solutions like Eclipse or the GNU C/C++ toolchain, including compilation reporting features and advanced debug features
- STM32CubeProgrammer programming tool that provides an easy-to-use and efficient environment for reading, writing and verifying devices and external memories via a wide variety of available communication media (JTAG, SWD, UART, USB DFU, I2C, SPI, CAN, etc.)
- STM32CubeMonitor family of tools (STM32CubeMonRF, STM32CubeMonUCPD, STM32CubeMonPwr) to help developers customize their applications in real-time
- STM32Cube MCU and MPU packages specific to each STM32 series with drivers (HAL, low-layer, etc.), middleware, and lots of example code used in a wide variety of real-world use cases
- STM32Cube expansion packages for application-oriented solutions.

1.2 How does this software complement STM32Cube?

The software supports single channel digital output applications.

The package is based on the STM32CubeHAL, the hardware abstraction layer for the STM32 microcontroller. The package extends STM32Cube by providing a board support package (BSP) for the STM32 Nucleo expansion board based on the IPS1025H or IPS1025H-32.

The drivers abstract low-level details of the hardware to access the IPS1025H and IPS1025H-32 device data in a hardware independent manner.

The software package includes a set of examples that the developer can use to start experimenting with the code. The IPS1025H and IPS1025H-32 output channel is controlled via GPIO peripheral and application debugging is supported on the X-NUCLEO-OUT05A1 and X-NUCLEO-OUT06A1 through LEDs, GPIO and interrupt signals for activity and diagnostics.

Revision history

Table 1. **Document revision history**

Date	Revision	Changes
24-Mar-2022	1	Initial release.