

## STM32Cube function pack for IO-Link applications controlling industrial IPS

Application	FP-IND-IODOUT1
Middleware	IO-Link Stack
Hardware Abstraction	STM32Cube Hardware Abstraction Layer
Hardware	STM32 Nucleo expansion boards X-NUCLEO-IOD02A1 or STEVAL-IOD003V1 X-NUCLEO-OUT03A1 or X-NUCLEO-OUT04A1 or X-NUCLEO-OUT07A1 STM32 Nucleo development board



### Features

- Complete firmware to build IO-Link device applications for [STM32L073RZ](#), [STM32G071RB](#) or [STM32L452RE](#) based boards
- Middleware libraries featuring IO-Link device mini-stack for [L6364Q](#) and [L6362A](#) transceiver ICs
- Drivers for [L6364Q/L6362A](#) transceivers and [IPS2050H/IPS2050H-32/IPS4260LM](#) Intelligent Power Switches
- Ready-to-use binary for IO-Link device data transmission and [IPS2050H/IPS2050H-32/IPS4260LM](#) control
- Easy portability across different MCU families, thanks to [STM32Cube](#)
- Free, user-friendly license terms

### Description

FP-IND-IODOUT1 is an [STM32Cube](#) function pack which lets you enable IO-Link communication between [P-NUCLEO-IOD3A1](#) or [P-NUCLEO-IOD04A1](#) or [P-NUCLEO-IOD7A1](#) kits and an IO-Link master through the [L6362A](#) transceiver mounted on the [STEVAL-IOD003V1](#) or the [L6364Q](#) transceiver mounted on the [X-NUCLEO-IOD02A1](#).

The function pack integrates an IO-Link demo-stack and the management of [IPS2050H](#) and [IPS2050H-32](#), dual channel high side switches mounted on the [X-NUCLEO-OUT03A1](#) and [X-NUCLEO-OUT04A1](#) respectively, integrates also an IO-Link demo-stack and the management of [IPS4260LM](#) quad channel low side driver mounted on the [X-NUCLEO-OUT07A1](#).

FP-IND-IODOUT1 also includes the IODD file to be uploaded to your IO-Link master.

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

Product summary	
STM32Cube function pack for IO-Link applications controlling industrial IPS	FP-IND-IODOUT1
STM32 Nucleo pack for IO-Link device applications based on <a href="#">L6362A</a> transceiver, <a href="#">IPS2050H</a> power switch and <a href="#">STM32L073RZ</a> or <a href="#">STM32L452RE</a> MCU	P-NUCLEO-IOD3A1
STM32 Nucleo pack for IO-Link device applications based on <a href="#">L6364Q</a> transceiver, <a href="#">IPS2050H-32</a> high side switch and <a href="#">STM32L073RZ</a> or <a href="#">STM32G071RB</a> MCU	P-NUCLEO-IOD04A1
STM32 Nucleo pack for IO-Link device applications based on <a href="#">L6364Q</a> transceiver, <a href="#">IPS4260LM</a> low side switch and <a href="#">STM32G071RB</a> , or <a href="#">STM32L073RZ</a> MCU	P-NUCLEO-IOD7A1
Industrial IO-Link device software expansion for <a href="#">STM32Cube</a>	X-CUBE-IOD02
Software expansion for <a href="#">STM32Cube</a> driving industrial	X-CUBE-IPS

Product summary	
digital output based on IPS	
Applications	Industrial sensors and actuators Industrial Drives Condition Monitoring

## 1 Detailed description

### 1.1 What can you do with STM32Cube function packs?

STM32Cube function packs leverage the modularity and interoperability of STM32 Nucleo and X-NUCLEO boards together with STM32Cube and X-CUBE software to create function examples for some of the most common use cases of different application technologies.

These software function packs are designed to exploit the underlying STM32 ODE hardware and software components as much as possible to best satisfy the requirements of final user applications.

Moreover, function packs may include additional libraries and frameworks that are not present in the original X-CUBE packages, thus enabling new functionalities allowing real and usable system for developers.

### 1.2 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.

### 1.3 How does this function pack complement STM32Cube?

This software is based on the STM32CubeHAL.

It extends STM32Cube by providing a board support package (BSP) for IO-Link communication through the ST IO-Link Device boards ([STEVAL-IOD003V1](#) and [X-NUCLEO-IOD02A1](#)) and the control of the industrial dual channel high side switches [IPS2050H](#) and [IPS2050H-32](#) mounted on the [X-NUCLEO-OUT03A1](#) and [X-NUCLEO-OUT04A1](#), respectively. It provides also the control of industrial quad low side switch [IPS4260LM](#) mounted on the [X-NUCLEO-OUT07A1](#).

The drivers abstract low-level details of the hardware and allow the middleware components and applications to access data in a hardware-independent manner.

The package includes a middleware library to enable an IO-Link demo stack. Developers can prototype an IO-Link device (sensor and/or actuator node) running on an STM32 microcontroller to acquire sensor data and provide commands from an IO-Link master where the IODD in the function pack has been uploaded.

## Revision history

**Table 1. Document revision history**

Date	Revision	Changes
02-Oct-2023	1	Initial release.
25-Mar-2024	2	Modified cover image and title in cover page, <i>Section Features</i> , <i>Section Description</i> , <i>Section Product summary table</i> and <i>Section 1.3: How does this function pack complement STM32Cube?</i> .
26-Sep-2024	3	Modified cover image and title in cover page, <a href="#">Section Features</a> , <a href="#">Section Description</a> , <a href="#">Section Product summary table</a> and <a href="#">Section 1.3: How does this function pack complement STM32Cube?</a> .

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