



## 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, STEVAL-IOD003V1, X-NUCLEO-OUT03A1, X-NUCLEO-OUT04A1, X-NUCLEO-OUT07A1, X-NUCLEO-DO40A1 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/IPS4140HQ Intelligent Power Switches
- Ready-to-use binary for IO-Link device data transmission and IPS2050H/IPS2050H-32/IPS4260LM/IPS4140HQ 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-IOD5A1 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 and of IPS4140HQ quad channel high side driver mounted on the X-NUCLEO-DO40A1.

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 L6362A transceiver, IPS2050H power switch and STM32L073RZ or STM32L452RE MCU	P-NUCLEO-IOD3A1
STM32 Nucleo pack for IO-Link device applications based on L6364Q transceiver, IPS2050H-32 high side switch and STM32L073RZ or STM32G071RB MCU	P-NUCLEO-IOD04A1
STM32 Nucleo pack for IO-Link device applications based on L6364Q transceiver, IPS4140HQ high side switch and STM32G071RB, or STM32L073RZ MCU	P-NUCLEO-IOD5A1
STM32 Nucleo pack for IO-Link device applications based on L6364Q transceiver, IPS4260LM low side switch and STM32G071RB, or STM32L073RZ MCU	P-NUCLEO-IOD7A1

Product summary	
Industrial IO-Link device software expansion for STM32Cube	X-CUBE-IOD02
Software expansion for STM32Cube driving industrial digital output based on IPS	X-CUBE-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](#) and of industrial quad high side switch [IPS4140HQ](#) mounted on the [X-NUCLEO-DO40A1](#).

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, <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> .
03-Feb-2025	4	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> .

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