

## Industrial IO-Link device software expansion for STM32Cube

Application	IO-Link device communication example
Hardware Abstraction	IO-Link device mini-stack
	STM32Cube Hardware Abstraction Layer (HAL)
Hardware	STM32 Nucleo expansion board X-NUCLEO-IOD02A1 (including L6364 transceiver)
	STM32 Nucleo development board NUCLEO-L0/G0



### Features

- Complete software to build applications for the L6364 IO-Link transceiver
- GPIOs, SPI, UART and IRQs configuration
- Smart software architecture based on a mini-stack library combined with source code (communicating through API) and IODD configuration file
- Sample implementation available for X-NUCLEO-IOD02A1 expansion board connected to a NUCLEO-L073RZ or NUCLEO-G071RB development board
- Easy portability across different MCU families, thanks to STM32Cube
- Free, user-friendly license terms

### Description

The X-CUBE-IOD02 package is a software expansion for STM32Cube with driver for the L6364 transceiver, a mini-stack library and an IODD configuration file.

The package allows you to develop IO-Link sensor applications based on the L6364 mounted on the X-NUCLEO-IOD02A1 expansion board when connected to a NUCLEO-L073RZ or NUCLEO-G071RB development board.

The software architecture is based on a mini-stack library combined with source code communicating via APIs, and is designed to accommodate custom application development.

The expansion is built on STM32Cube software technology to ease portability across different STM32 microcontrollers.

Product summary	
Industrial digital output software expansion for STM32Cube	X-CUBE-IOD02
Dual channel IO-Link device expansion board based on L6364 for STM32 Nucleo	X-NUCLEO-IOD02A1
Dual channel SIO and IO-Link PHY device	L6364
Applications	Factory Automation IO-Link modules

## 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 dual channel SIO and IO-Link applications.

The package is based on the STM32CubeHAL hardware abstraction layer for STM32 microcontrollers and extends **STM32Cube** with a Board Support Package (BSP) for the **STM32 Nucleo** expansion board based on the **L6364**.

The drivers abstract low-level details of the hardware to access the **L6364** 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 **L6364** output stage (CQ and DIO) is controlled via the SPI peripheral (Single-Byte and Multi-Byte transmission modes) or UART peripheral (Transparent transmission mode) and application debugging is supported on the **X-NUCLEO-IOD02A1** through LEDs, GPIO and interrupt signals for activity and diagnostics.

The configuration of the internal registers is managed through the SPI peripheral, regardless of the selected transmission mode.

## Revision history

**Table 1. Document revision history**

Date	Version	Changes
01-Sep-2020	1	Initial release.
05-Oct-2020	2	Updated title, cover page image and description.

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