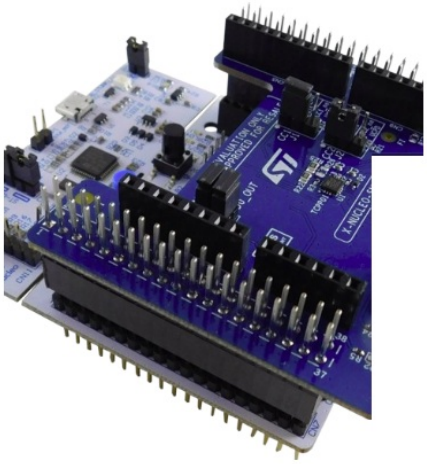
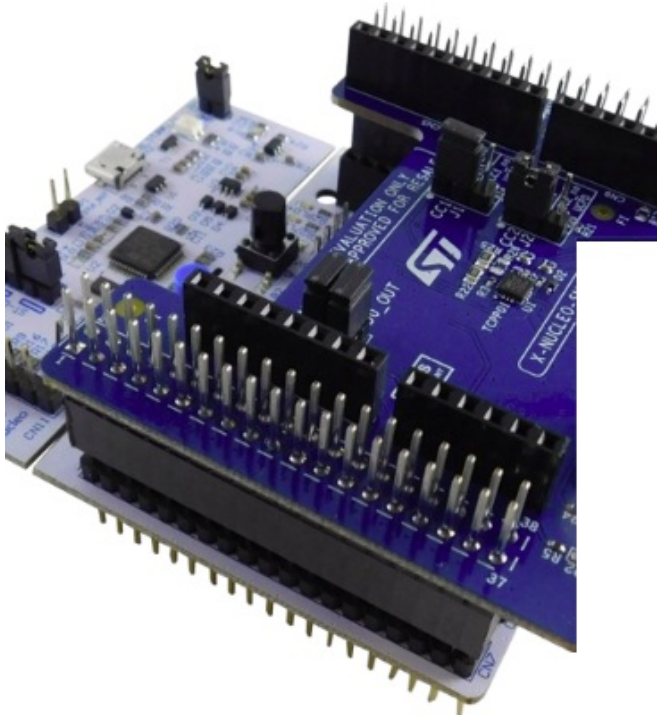


EVLIOL4LSV1 Industrial Tower Light Driver board Based User Guide

EVLIOL4LSV1 Industrial Tower Light Driver board Based User Guide



Contents

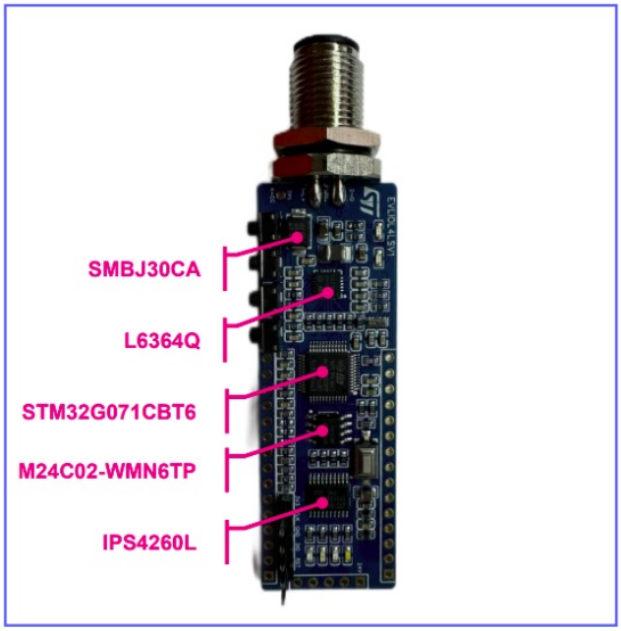
Hardware Overview

Hardware Description

- The EVLIOL4LSV1 is a driver board developed for industrial tower light applications. It simplifies all jumpers and jumper caps to streamline the circuitry, making the entire board closer to the final application product.
- For general users, since its M12 connector meets the universal IO-Link standard, this board can be directly connected to any IO-Link master port. As the EVLIOL4LSV1 has preloaded examples with the IO-Link protocol stack, it can establish communication with the master quickly and stably. The communication connection status can be intuitively judged through the red and green indicators on the board. By importing the IODD file of EVLIOL4LSV1 into the control interface of the master, users can intuitively control the LED indicators' on and off states through PDO and monitor the button's pressed/released state on PDI.
- For secondary developers, the board includes components such as L6364Q, STM32G071, IPS4260L, and SMBJ30CA. With the IO-Link ministack provided by ST (currently adapted to the G0, L0, and L4 series MCUs), developers can quickly verify the IO-Link communication function of the L6364Q and perform secondary development based on the reserved GPIO. The four-channel lowside driver chip IPS4260L on the board allows developers to drive simple 24V DC loads (indicators, solenoid valves, etc.), and its driving capability of up to 500mA per channel can meet most industrial light load application scenarios.

Main Features:

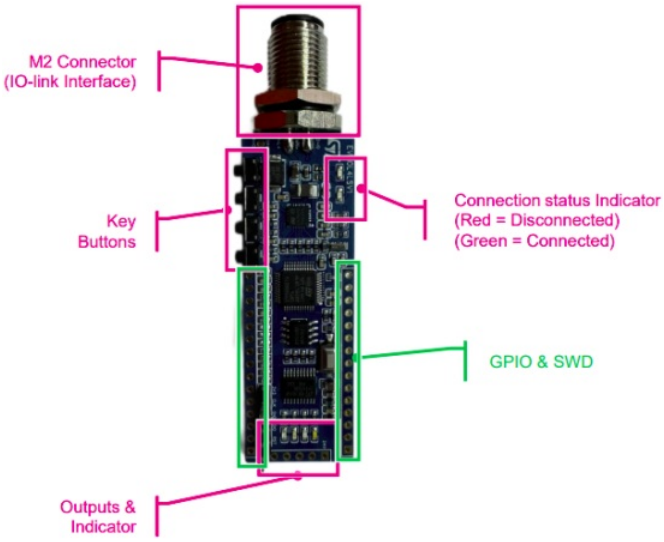
- IO-Link Communication (Supported by L6364Q and ST IO-Link Ministack)
- 4 Keys indicates the digital input
- 4 Low-side channel for external loads(tower light, valves)
- Reserved GPIOs for secondary development and evaluation of ST IO-Link Ministack
- Overload and over-temperature protections
- Open load detection
- ESD protection by SMBJ30CA
- UVLO



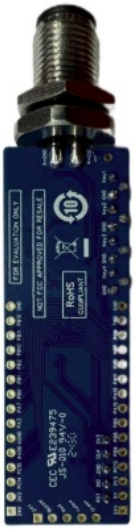
Key Products on the Nucleo expansion board:

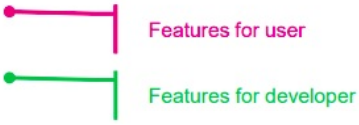
SMBJ30CA, L6364Q, STM32G071, M24C02, IPS4260L IO-Link Tower Light Driver board & ST IO-Link Ministack evaluation board

Top view



Bottom view





X-CUBE-IOD02 software package

SW architecture overview

Software Description:

The package allows you to develop IO-Link sensor applications based on the L6364 mounted on the XNUCLEO IOD02A1 expansion board when connected to a NUCLEO-L073RZ or NUCLEO-G071RB or NUCLEO-L452RE or NUCLEO-F303RE development board.

The package can also be used to develop IO-Link sensor applications based on the L6362A mounted on the STEVAL-IOD003V1 expansion board when connected to a NUCLEO-L073RZ or NUCLEO-L452RE development board.

The software architecture is based on mini-stack libraries 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.

Key Features:

- Complete software to build applications for the L6364 and L6362A IO-Link transceiver
- GPIOs, SPI, UART and IRQs configuration
- Smart software architecture based on mini-stack libraries 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 or NUCLEO-L452RE or NUCLEO-F303RE development board
- Sample implementation available for STEVAL-IOD003V1 expansion board connected to a NUCLEOL073RZ or NUCLEO-L452RE development board
- Easy portability across different MCU families, thanks to STM32Cube

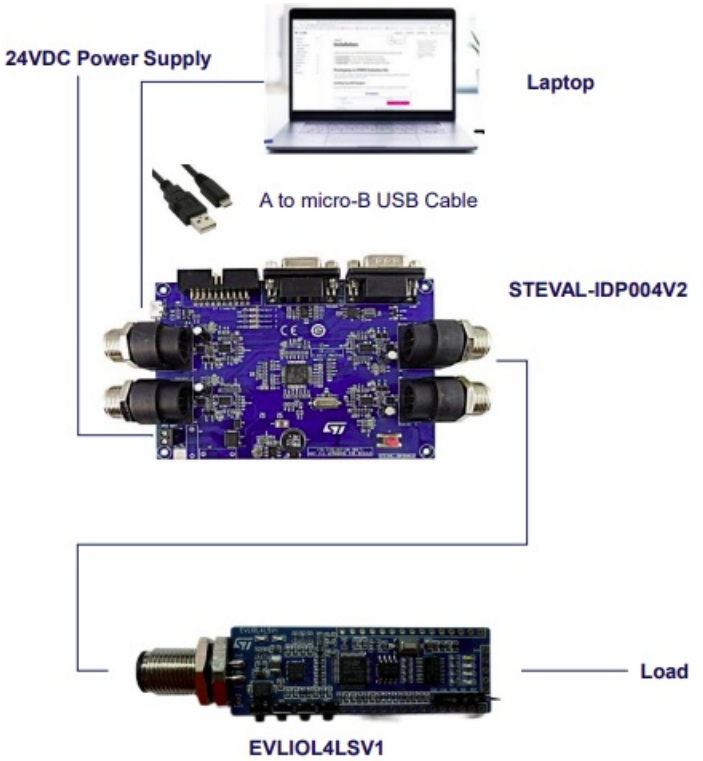
- Free, user-friendly license terms

Applications & demonstrations	IO-Link Tower Light Example		
Middleware	ST IO-Link Ministack		
Hardware Abstraction	STM32Cube Hardware Abstraction Layer (HAL)		
Hardware	STM32G071CBT6		
	L6364Q	Key Buttons	IPS4260L

Demo Example: Bill Of Material

HW pre-requisites

- 1x IO-Link Master (e.g. STEVAL-IDP004V2)
- 1x EVLIOL4LSV1
- 1x M12-A 4Pin Cable
- 1x 24V DC Power Supply
- 1x USB type A to micro-B cable
- 1x Laptop/PC with Windows 7, 8 or above
- (Optional)1x 24VDC load (e.g. Tower Light, Valve)



Both user and developer needs:

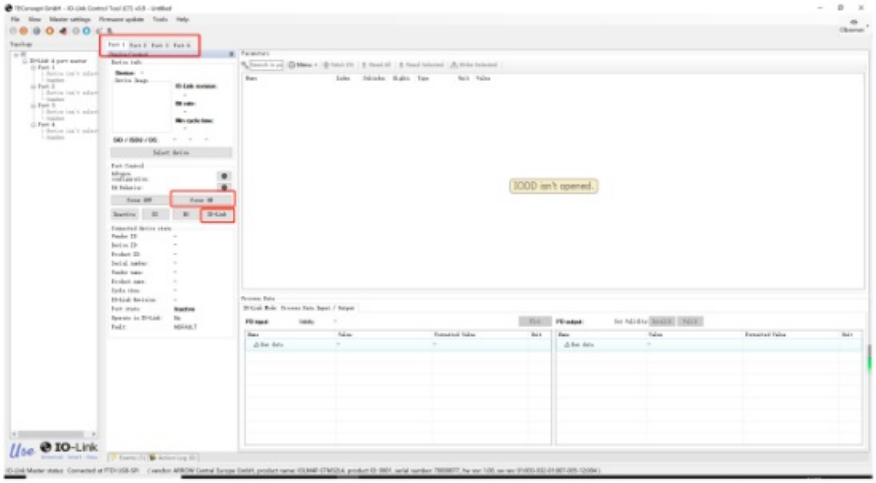
- TEConcept IO-Link Control Tool V3.9 (depends on master)
- USB Driver (CDM212364_Setup)

Developer also needs:

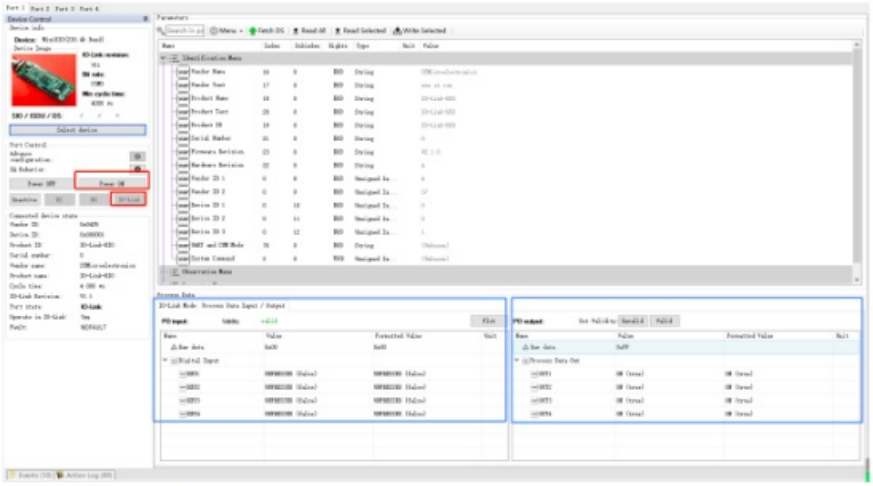
- X-CUBE-IOD02: software package with ST IO-Link ministack
- STCUBEPROGRAMMER: for downloading the firmware into the board.

Steps:

- Connect all the hardware as previous HW pre-requisites shown.
- Connect the Master to TEConcept IOLink Control Tool
- Click “Power on” button of the port which EVLIOL4LSV1 connected. The board turns on red led



- Click “IO-Link” button of the port which EVLIOL4LSV1 connected. The board turns off red led and turns on green led
- Click “Select device” and import the IODD of EVLIOL4LSV1. The app shows more parameters and the raw data shows a user-friendly format
- Click “Power on” and “IO-Link” of the port which EVLIOL4LSV1 connected
- Press the keys and the “PD Input” changes accordingly. Overwrite the “OUT”, the LED indicator turn on accordingly



Further Information (Optional for user)

TEConcept IO-Link Control Tool

In the IO-Link Control Tool, the columns that can be seen include “Device Control”, “Port Control”, “Connected device state”, “Parameter”, and “Process Data”.

In “Device Control” (red box), users can import the device description file “IODD”. The device description file can translate the raw process data transmitted by IO-Link into more intuitive and readable results/status/options, and record the index address, parameter name, and data value of the parameters. Each time the master connects to the slave, the IO Link Control Tool will automatically search and load the IODD that matches the Vendor ID and Device ID in the IODD library.
In “Port Control” (yellow box), users can power on/power off the port. Configure the CQ mode, including “Inactive”, “DI” (Digital Input), “DO” (Digital Output), and “IO-Link” communication.

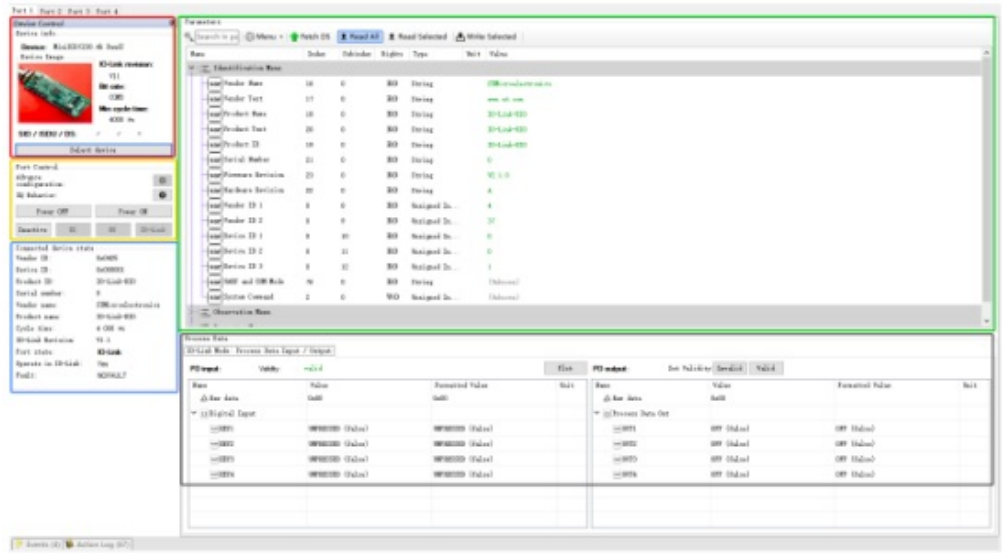
In “Connected device state” (blue box), the device information of the slave will be read, including vendor number, device number, product number, serial number, etc. The “Cycle time” is an important concept and parameter of IO-Link, defining a master-slave communication behavior where the master actively sends data and requests slave data. The cycle time is the time interval between two master-slave communication behaviors.

In “Parameter” (green box), user can see “Direct Parameter” and “Index Service Data Unit, ISDU”. Users can distinguish them as direct parameters being the basic parameters of the device, including cycle time, minimum cycle time, vendor number, device number, product number, etc. ISDU records the parameter configuration of the slave device application layer, such as the distance judgment threshold of the distance sensor, the channel working mode of the multi channel input/output module, and other parameters. The index address range of direct parameters is index = 0 or 1, and the subindex address range is subindex = 0~15. The index address range of ISDU is index > 1, subindex = 0.

The difference between parameters and process data is that parameters are not updated in real-time by polling but are read/written upon active request. On the host computer, you can click “Read All” to read all the parameters listed in the IODD at once. Click “Read Select” to read the parameter data of the selected index address. Click “Write Select” to write the parameter data to the selected index address.

In “Process Data” (black box), users can see the input process data “PD Input” uploaded by the slave and the output process data “PD Output” issued by the master. When the IODD is not imported, users see the raw process data in hexadecimal. After importing the IODD, users can see the parsed data, such as the state of the button being pressed/not pressed, the state of the indicator light being on/off.

The master can read the valid indication bit of the input process data from the slave and can also set the valid indication bit of the output process data. The valid indication bit ensures the validity of the data. When the slave is in a special situation, such as during online upgrade or in a high-temperature working environment, the slave can declare the input process data as invalid while uploading the input process data, leaving the decision-making power of data processing to the upper layer.
Similarly, the master can also set the valid indication bit of the output process data. Note: Data validity indication and data integrity verification are not the same concept. Verifying data integrity can filter out data that has been tampered with in a noisy environment during transmission. Data integrity verification can be achieved through CRC check, parity check, and checksum.



Documents & related resources

All documents are available in the DOCUMENTATION tab of the related products webpage

EVLIOL4LSV1 (IO-Link Device)

- **DB5300:** IO-Link actuator for industrial tower light based on L6364Q and IPS4260L – **Data Brief**
- **QSG:** this document – **Quick Start Guide**
- Schematics, Gerber files, BOM

STEVAL-IDP004V2 (IO-Link Master)

- **DB4029:** IO-Link master multi-port evaluation board based on L6360 – **Data Brief**
- **UM2232:** Getting started with the IO-Link evaluation solution firmware for STEVAL-IDP004V2 and STEVAL-IDP003V1 – **User manual**
- Schematics, Gerber files, BOM

X-CUBE-IOD02 (ST IO-Link Ministack)

- **DB3884:** Industrial IO-Link device software expansion for STM32Cube – **Data Brief**
- **UM2749:** Getting started with the X-CUBE-IOD02 industrial IO-Link device transceiver software expansion for STM32Cube – **User manual**

TEConcept IO-Link Control Tool

- **https://www.teconcept.de/en/downloads/** – **Link**

Visit www.st.com for the complete list

Documents / Resources

	**ST EVLIOL4LSV1 Industrial Tower Light Driver board Based** [pdf] User Guide L6364Q, IPS4260L, STM32G071CBT6, EVLIOL4LSV1 Industrial Tower Light Driver board Based, EVLIOL4LSV1, Industrial Tower Light Driver board Based, Tower Light Driver board Based, Light Driver board Based, Driver board Based, board Based, Based

References

- **User Manual**