

Getting started with the GUI for the STEVAL-IOM001V1 and STEVAL-IOD003V1 IO-Link evaluation boards

Introduction

The **STSW-IOLINKGUI** is designed to facilitate the control of the **STEVAL-IOM001V1** and **STEVAL-IOD003V1** evaluation boards based, respectively, on the **L6360** and **L6362A** IO-Link transceivers.

The GUI works in combination with the **STSW-IOM001** firmware, running on the **NUCLEO-F446RE** board, and the **STSW-IOD003** firmware, running on the **NUCLEO-L073RZ** board.

The **STSW-IOLINKGUI** automatically detects the firmware version running on the **STM32 Nucleo** board connected to your laptop/PC via a USB cable.

For the featured evaluation boards, it allows you to monitor and program the internal registers, the UART interface, the digital signals and the interrupt status of the related IO-Link transceiver.

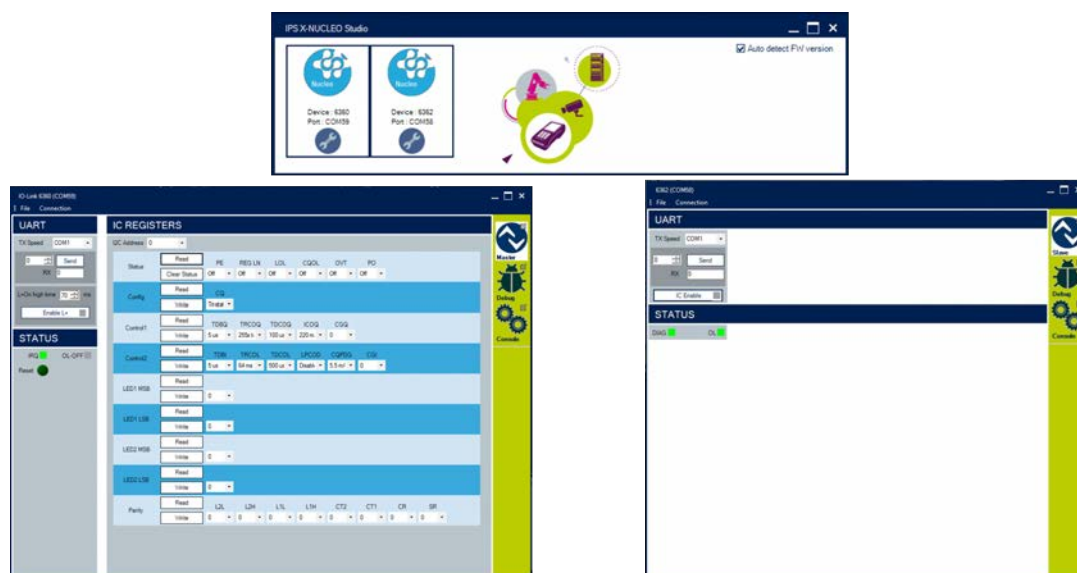
The GUI is available free of charge on www.st.com.

Figure 1. STSW-IOLINKGUI graphical user interface



1 STSW-IOLINKGUI overview

Figure 2. STSW-IOLINKGUI overview



The STSW-IOLINKGUI is a Windows®-based application able to control simultaneously the STSW-IOM001 and STSW-IOD003 firmware and able to automatically identify the firmware version.

The main features of the GUI can be split according to the firmware under control:

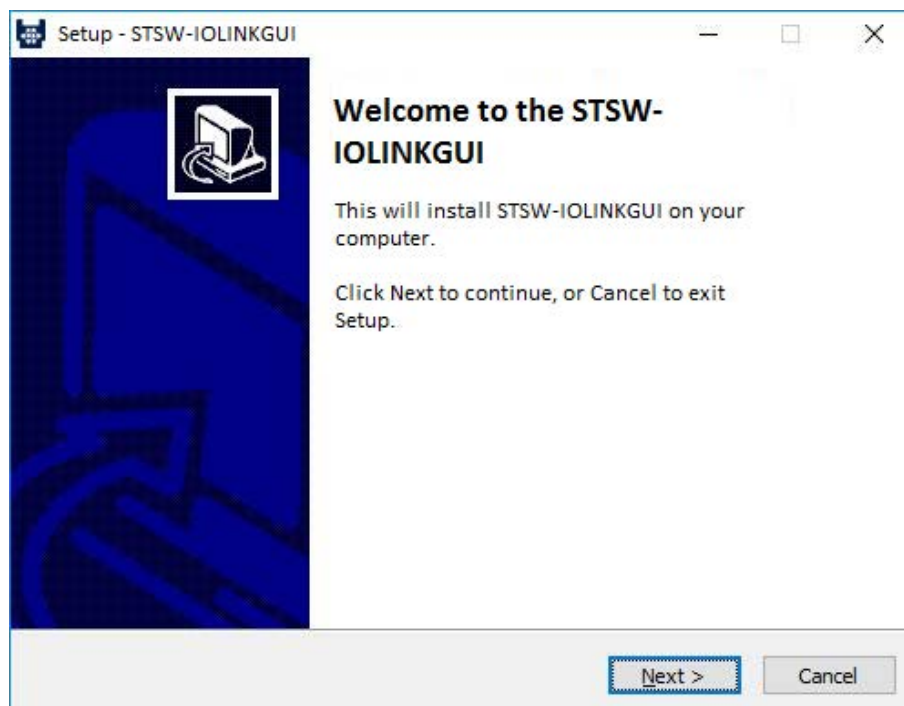
- For the STEVAL-IOM001V1:
 - Control of the evaluation board through the NUCLEO-F446RE board
 - L6360 address selection
 - I²C control for internal register configuration and monitoring
 - Dedicated control of L6360 RESET, ENL+,ENC/Q and SEL pins
 - Fault detection via IRQ pin monitoring
 - UART control (INC/Q, OUTC/Q) with speed selection (COM1, COM2, COM3)
 - LED1 and LED2 control
- For the STEVAL-IOD003V1:
 - Control of the evaluation board through the NUCLEO-L073RZ board
 - Dedicated control of L6362A EN/DIAG and SEL pins
 - UART control (IN2, OUTI/Q) with speed selection (COM1, COM2, COM3)
 - Fault detection via OL and EN/DIAG pin monitoring

2 Software installation

The **STSW-IOLINKGUI** software is designed to run on Microsoft® Windows.
To install the GUI:

- Step 1.** Run *Setup_STSW-IOLINKGUI.exe* included in the package
- Step 2.** Follow the installation instructions

Figure 3. STSW-IOLINKGUI installation guide



3 Running the graphical user interface

The STSW-IOLINKGUI is designed to simultaneously control both the STSW-IOM001 and the STSW-IOD003, allowing you to connect an STM32 Nucleo board (e.g. NUCLEO-F446RE) with the STEVAL-IOM001V1 and another STM32 Nucleo board (e.g. NUCLEO-L073RZ) with the STEVAL-IOD003V1 on two different USB ports.

- Step 1.** Launch the installed software from [Start]>[STMicroelectronics]>[STSW-IOLINKGUI]>[MDGUI.exe]
If an STM32 Nucleo board with the supported firmware is connected to your PC, when the application starts, it is automatically detected and an appropriate COM port is opened.

Note: The [Select Port] dropdown list is populated only with the connected STM32 Nucleo boards running the supported firmware.

Figure 4. STSW-IOLINKGUI selection window



- Step 2.** [Click] on the blue Nucleo logo to open the panel which controls the STSW-IOM001 and/or the STSW-IOD003. The Nucleo logo becomes green after the board/firmware recognition succeeded. The active panels can be closed by clicking again on the green Nucleo logo.

Figure 5. STSW-IOLINKGUI STSW-IOM001 control panel

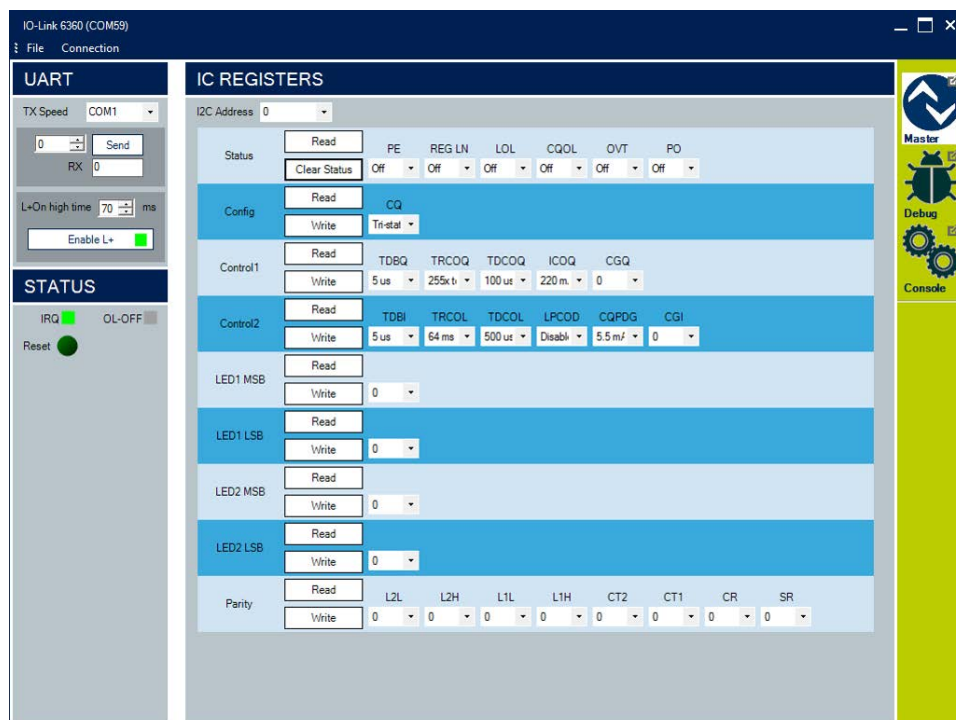
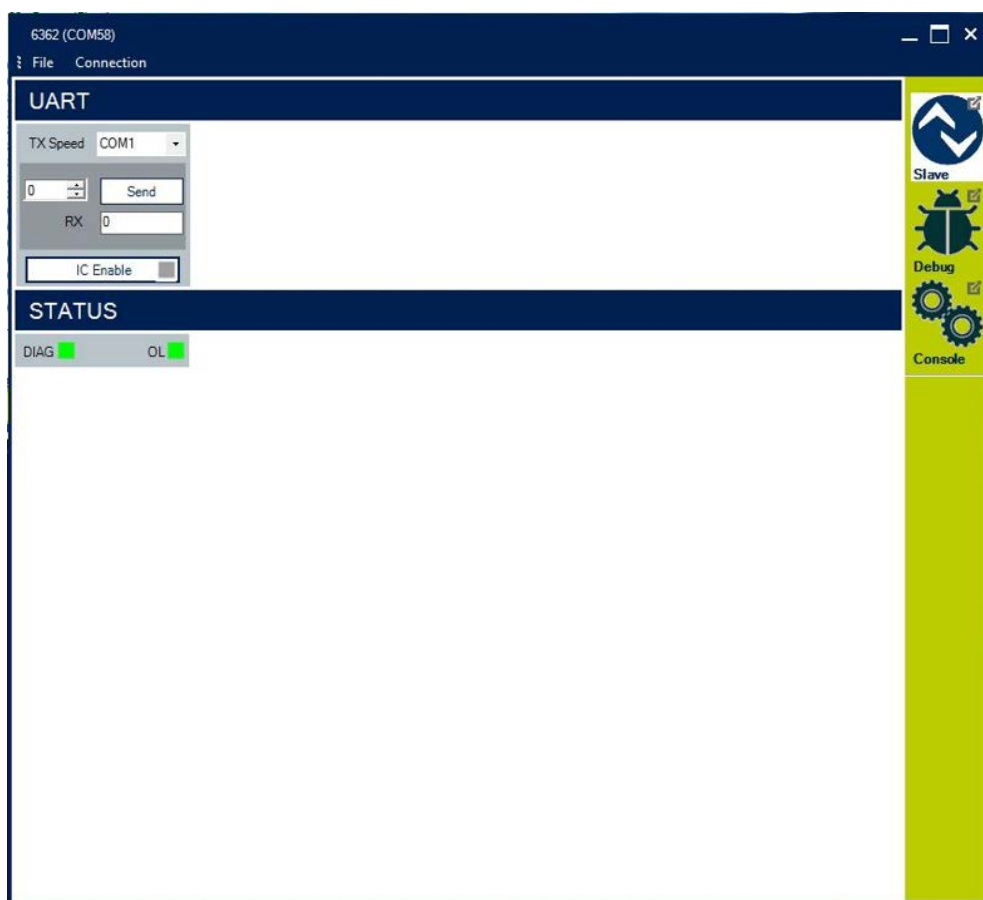


Figure 6. STSW-IOLINKGUI STSW-IOD003 control panel



4 STSW-IOM001 control panel

This control panel (see [Figure 5. STSW-IOLINKGUI STSW-IOM001 control panel](#)) shows four main function areas:

- STATUS
- L+ ENABLE
- IC Registers
- UART

4.1 STATUS

In this section, the control panel shows the status (high/low) of the [L6360](#) pins IRQ (green/red) and RST (red/grey).

The IRQ remains active (red) until the [STEVAL-IOM001V1](#) is supplied by 24 V on its CN1: when the evaluation board is supplied, the IRQ remains green until a fault event is triggered (see [L6360](#) datasheet on [www.st.com](#) for details).

Note: The STM32 running the STSW-IOM001 is supplied by the USB (not from the L6360 VDD pin). If the GUI is running and Vcc drops below UVLO(OFF) threshold, the IRQ button becomes red. If the GUI still runs when the Vcc goes back higher than UVLO(ON) threshold, then you must click on the GUI **Clear status** or **Reset** button to restore the alignment between the GUI and the application board.

At startup, the RST pin is maintained high (red on the GUI) forcing the L6360 to reset state.

Note: You must click on the RST button (grey on the GUI) before performing any other action with L6360.

An additional **Open Load Detection** feature is implemented (but not active) in the firmware. This feature can be activated by soldering the proper R34 pull-up resistor on the STEVAL-IOM001V1 (see [IPS161H](#) datasheet on [www.st.com](#) for details) and it is reflected on the GUI by the OL-OFF icon.

4.2

L+ ENABLE

Note: In this section, you can control the EnL+ pin of the [L6360](#) to enable the L+ rail on connector CN3.

Clicking on the GUI **Enable L+** button, EnL+ and L+On (driving U2 of the [STEVAL-IOM001V1](#)) signals are activated: EnL+ remains active until you click again on **Enable L+** button, while the L+On remains active for ~50ms together with EnL+ and then goes back to inactive.

This driving architecture allows managing very high capacitive loads on L+ requiring up to 400 mA for the first 50 ms after the activation of L+.

When the STSW-IOM001 starts, both EnL+ and L+On signals are not active.

The activation of EnL+ causes the setting of the PO bit in the status register and the triggering of an interrupt on IRQ pin (IRQ becomes red on the GUI). To reset the PO bit (and to restore IRQ to green), you must click on **Clear status** button.

4.3

IC Registers

In this section, you can monitor and control the internal registers of the [L6360](#) mounted on the [STEVAL-IOM001V1](#).

The I²C address selection window allows selecting among 8 possible I²C addresses of the chip: the address selected on the GUI has to correspond to the I²C address set by SW0/SW1/SW2 on the STEVAL-IOM001V1.

The configuration register allows setting the output stage (CQ) of the L6360: for example, you can set **Push-Pull** to test if the STEVAL-IOM001V1 is connected to the [STEVAL-IOD003V1](#) CN3.

In general, for read/write register, you can set the desired value and then click on the **Write** button: clicking on **Read** button you can verify if the register has been updated with the new value.

Registers controlling LED1 and LED2 have a direct effect on the yellow LEDs D12 and D13 which blinks according to the value set.

For read-only registers, you can verify their actual value by clicking on the GUI related **Read** button.

For further details on the L6360 register, refer to the L6360 datasheet on www.st.com.

4.4 UART

This section allows controlling the data transmission/reception and the related speed (COM1, COM2, COM3) on CQ line.

In transmission mode (TX), you can set the value to transmit (0x00 to 0xFF) and then activate transmission by clicking the GUI **Send** button. If the output stage has been enabled (e.g. Configuration register set to Push-Pull) and the receiver is properly set in reception mode (e.g. IC Enable low in the [STEVAL-IOD003V1](#)), then the same data are transferred to the CQ line.

*Note: When the **Send** button is clicked, the EnCQ signal of the [L6360](#) is automatically forced high until the selected data is transmitted over the CQ line: EnCQ is normally low when the L6360 is not transmitting data over the CQ line.*

In reception mode (RX), the data received on the CQ line are displayed in hex format: the reception mode can be tested connecting the STEVAL-IOD003V1 to the [STEVAL-IOM001V1](#) CN3 connector. It could be necessary to set the debounce time to 0 in the Configuration 1 register, according to the COM mode selected.

5 STW-IOD003 control panel

This control panel shows three main function areas:

- STATUS
- IC Enable
- UART

5.1 STATUS

In this section, the control panel shows the status (high/low) of the [L6362A](#) pins EN/DIAG (green/red) and OL (green/red).

Refer to the L6362A datasheet on www.st.com for further details on EN/DIAG and OL open drain pins.

5.2 IC Enable

In this section, the control panel allows controlling (active or hi-Z) the output stage of the [L6362A](#). Normally, the output stage of the L6362A remains set in high impedance except when it is transmitting data over CQ line.

5.3 UART

This section allows controlling the data transmission/reception and the related speed (COM1, COM2, COM3) on the CQ line.

In transmission mode (TX), you can set the value to transmit (0x00 to 0xFF) and then activate transmission by clicking the GUI **Send** button. If the output stage has been enabled (IC Enable high) and the receiver is properly set in reception mode (e.g. CQ set to Push-Pull in the [STEVAL-IOM001V1](#)), then the same data is transferred to the CQ line.

In reception mode (RX), the data received on the CQ line are displayed in hex format: the reception mode can be tested connecting the [STEVAL-IOD003V1](#) (set IC Enable low) to STEVAL-IOM001V1 CN3 connector.

Revision history

Table 1. Document revision history

Date	Version	Changes
28-Jun-2018	1	Initial release.

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