

RH4Z2501-KIT

Evaluation Kit

Introduction

This document discusses how to use the RH4Z2501-KIT evaluation kit, describes its main features, and explains the necessary hardware setup to implement an IO-link network using different approaches.

Target devices:

- RH4Z2501 – IO-Link transceiver with integrated protection
- RH4Z2502 – IO-Link transceiver with integrated protection and embedded stack license

Note: The RH4Z2501-KIT can be used to evaluate the RH4Z2502; however, the board does not include an embedded stack license.

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1. Requirements

The RH4Z2501-KIT's hardware and software ecosystem provides a quick start and easy understanding of the IO-Link fieldbus functionalities and specificities. To obtain the described devices and development boards, contact Renesas [support](#).

1.1 Hardware Requirements

The following hardware is required to evaluate the RH4Z2501:

- RH4Z2501-EVB evaluation board
- [SSC Communication Board](#) (SSC-CB)
- An IO-Link Master Gateway; available from a third-party company:
 - This document uses the TMG-USB IO-Link Master V2 SE
 - The CCE4510 evaluation board – IO-Link Master

1.2 Software Requirements

- The Standard Edition (SE) of PC tool “TMG IO-Link Device Tool V5.1 – SE” can only be used with the “TMG-USB IO-Link Master V2 SE”
- The Professional Edition (PE) of PC tool “TMG IO-Link Device Tool V5.1 – PE” can be used in combination of any IO-Link Master:
 - Download the [IO-Link Device Tool](#)

2. Setup and Configuration

2.1 Hardware Setup

Complete the following steps to set up the evaluation board as shown in [Figure 1](#):

1. Connect the SSC-CB and the RH4Z2501-EVB.
2. Connect the SSC-CB to the user PC by the USB type B cable.
3. Connect the “TMG-USB IO-Link Master V2 SE” to your PC via a micro-USB cable.
4. Connect the “TMG-USB IO-Link Master V2 SE” to the RH4Z2501-EVB via an M12 cable.

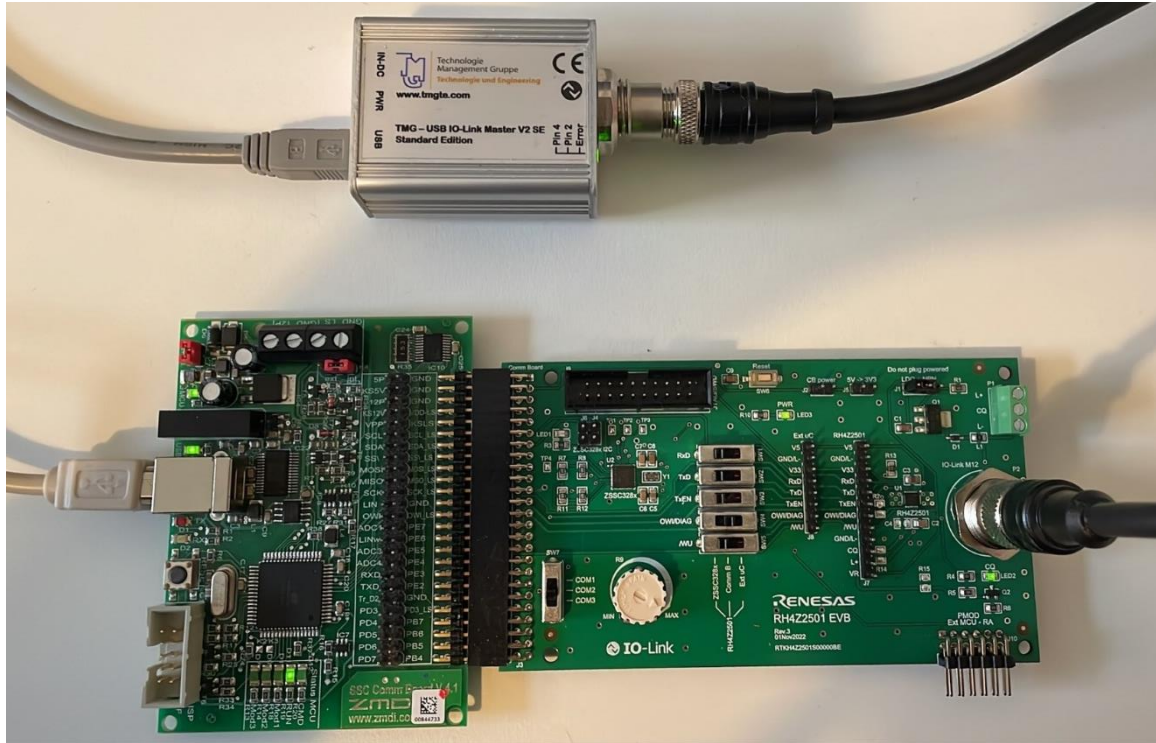


Figure 1. Hardware Setup

Note: Do not close J2 when using the SSC-CB at the same time as powering the board via the IO-Link line.

Table 1. Jumper Settings

Jumper/Switch	Position
J1	LDO (J1_2-3)
J5	Open
J2	Open
SW1	ZSSC328x position
SW2	ZSSC328x position
SW3	ZSSC328x position
SW4	Comm B position
SW5	ZSSC328x position
SW7	COM3 position

2.2 Firmware

At startup, the application running on the ZSSC328x configures its AFE to read the voltage variation induced by the potentiometer R9, and it also configures the RH4Z2501 via OWI. After the initial setup, write/read the processed data via the IO-link device stack provided by TMG.

Note: Renesas does not provide the binary file to be flashed to the target for confidentiality reasons. Therefore, firmware updates do not need to be performed to the target.

LED2 and LED3 should switch ON when the board is powered from the IO-Link line.

2.3 Data Visualization

Complete the following steps to have the read data initially available:

1. Run “IO-Link Device Tool V5.1.exe”.
2. Import the IODD file inside the tool as follows:
 - a. Open the “Import IODD” window by clicking on the Option/Import IODD menu.
 - b. Browse to the file location in the “Path” field.
 - c. Select all IODD files by clicking on “Select all” and “Import” (see [Figure 2](#)).

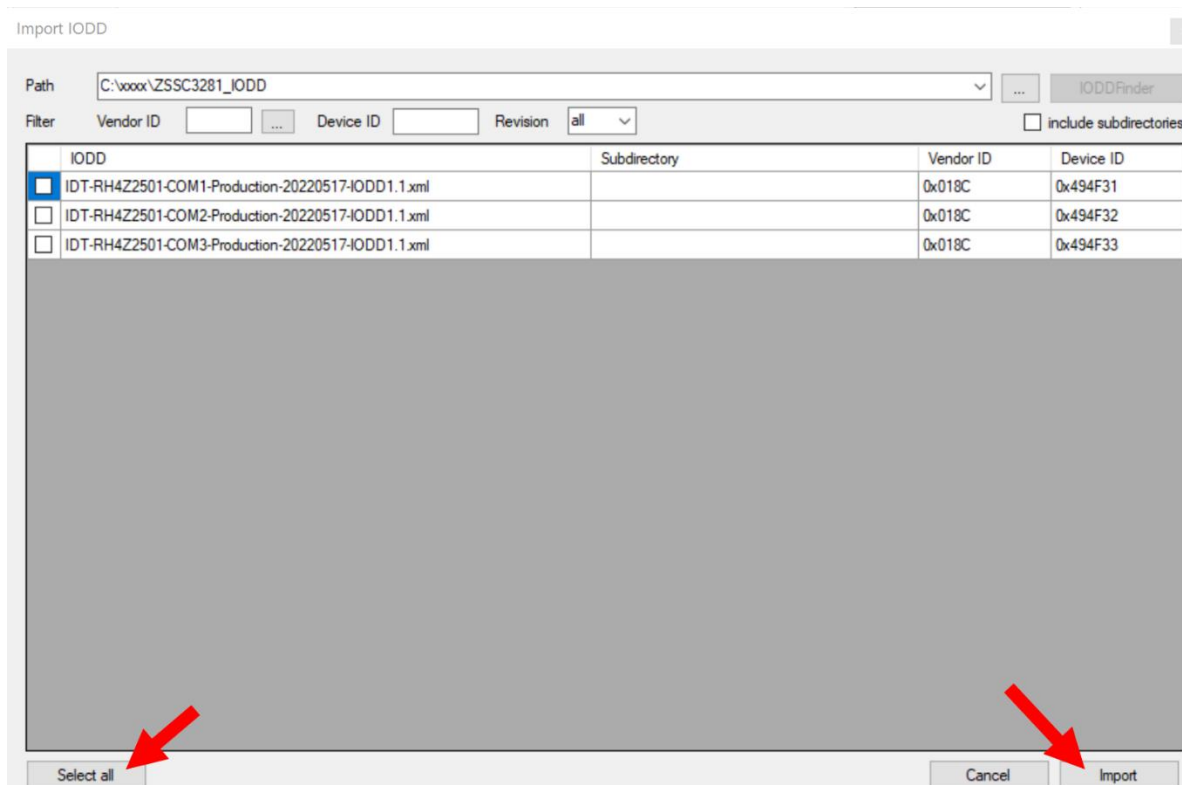


Figure 2. Importing IODD Files into TMG IO-Link Device Tool

- d. The IODD files are imported in the tool.
3. Detect the IO-link device by completing the following steps:
 - a. Click on “Search Master” in the main “IO-Link Device Tool VS5.1 – xE” window (see [Figure 3](#)).
 - i. The “Master Discovery” window pops-up.
 - ii. The IO-Link Masters in use are listed in the window.

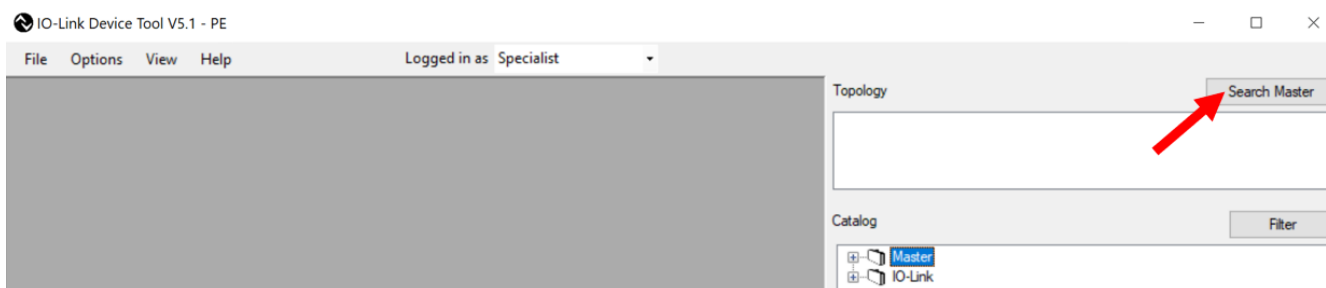


Figure 3. Search Master

- b. Select the correct IO-Link Master in the “Master Discovery” window using a double-click (see [Figure 4](#)).

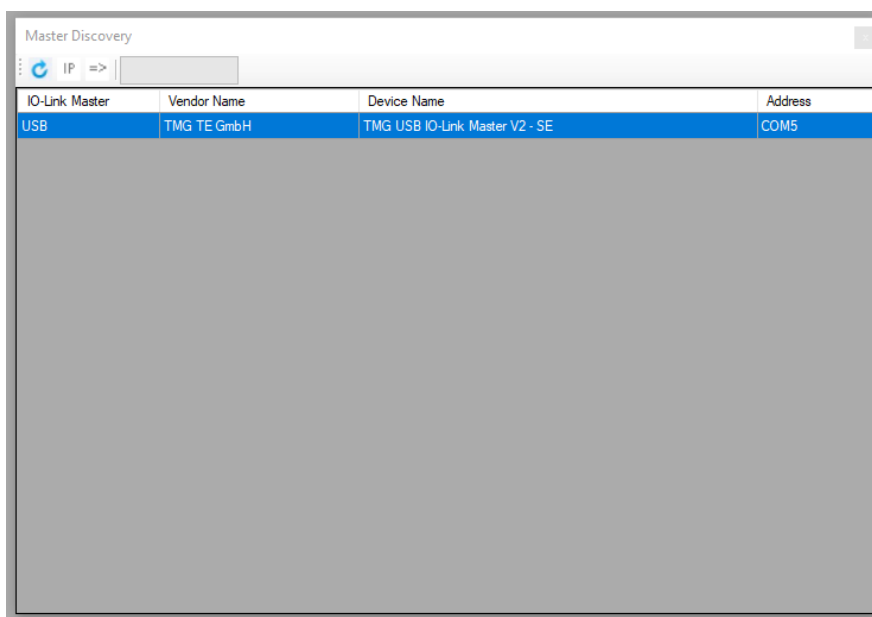


Figure 4. Master Discovery Window

- c. Click on the green lecture button and on the loop to run a device detection (see [Figure 5](#)).
- i. The “Check Devices” window pops-up.

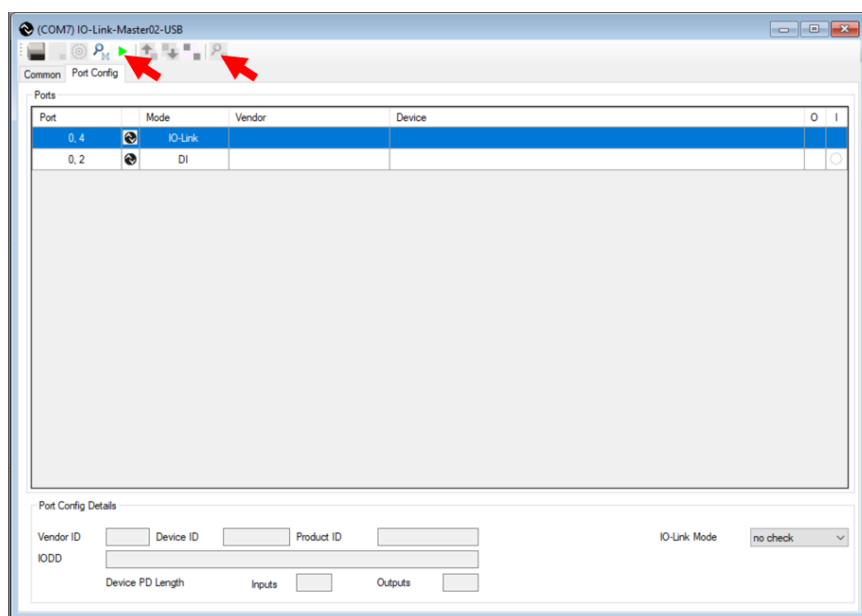


Figure 5. Device Detection

- d. Click on “Takeover devices into engineering” (see Figure 6). The window shown in Figure 7 then appears.

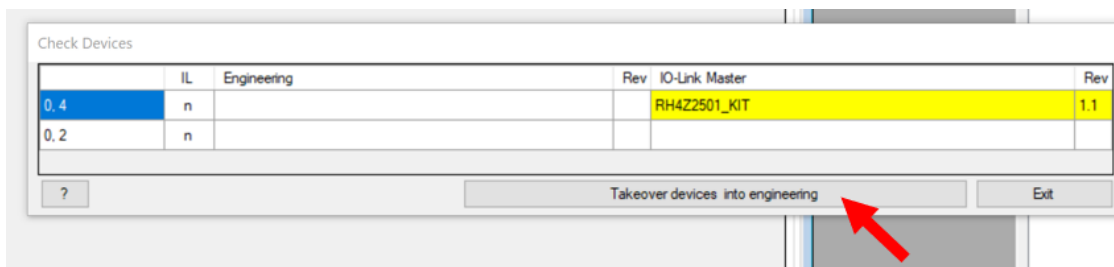


Figure 6. Takeover Devices

4. Process data readings by completing the following steps:
 - a. Open the “Process Data” tab in the “RH4Z2501_KIT” window (see Figure 7).

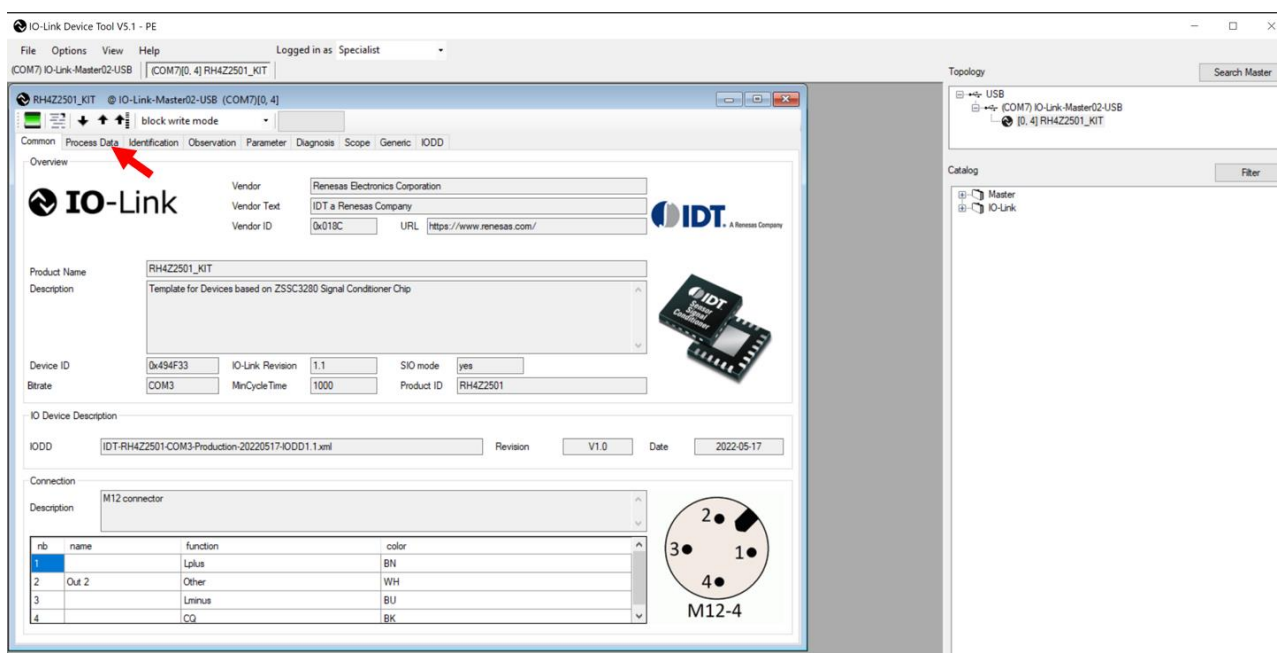


Figure 7. Opening the Process Data Tab

- b. Select the necessary values (see [Figure 8](#)).

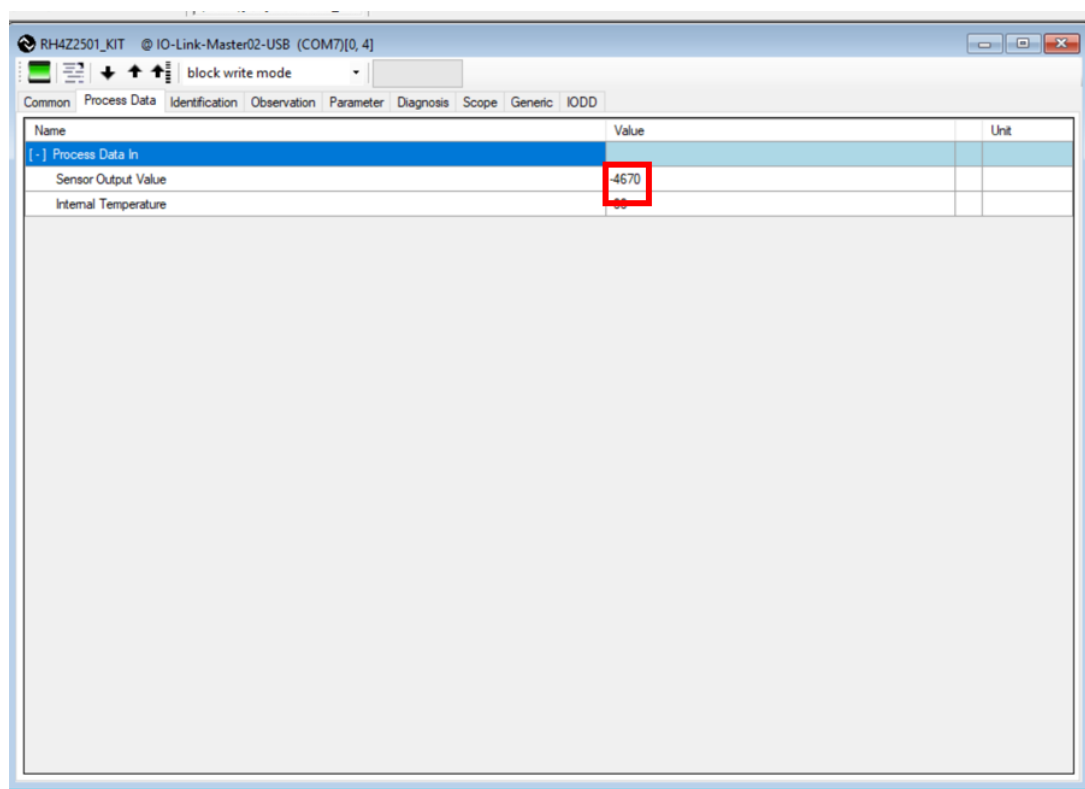


Figure 8. Reading Data Values

5. Select the COM mode as follows:
 - a. Set the Switch 7 (SW7) to the selected COM mode (see [Figure 9](#)).

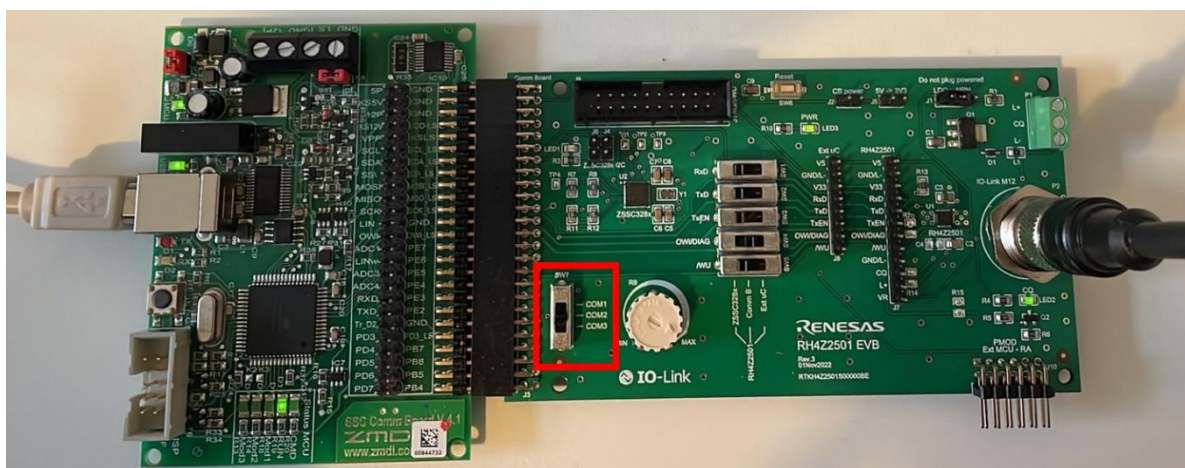


Figure 9. Selecting COM Mode by SW7

- b. Press Switch 6 to reset the ZSSC328x firmware (see [Figure 10](#)).

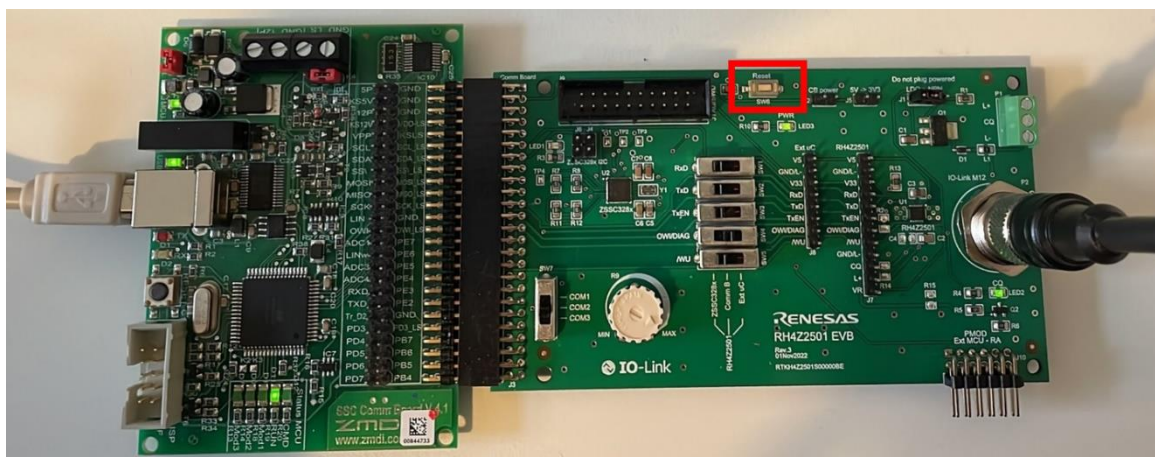


Figure 10. Reset by SW6

- c. Delete old IODD by “right click->delete” and clicking “Yes” in the pop-up confirmation window (see [Figure 11](#)).

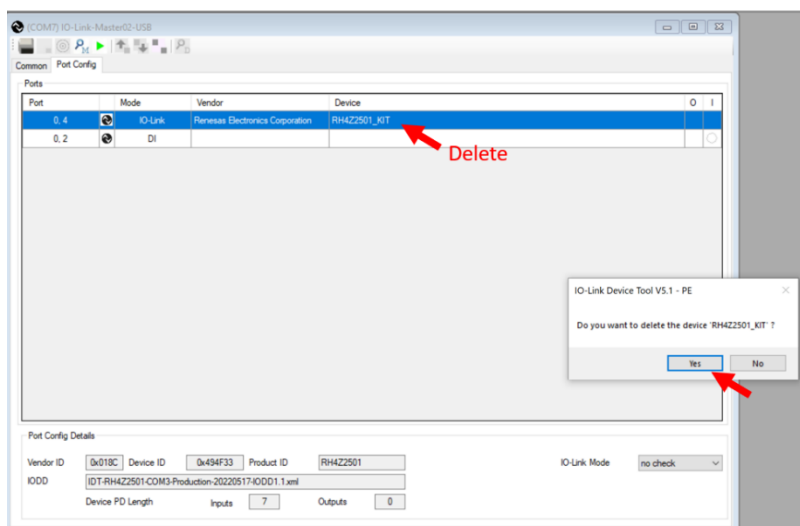


Figure 11. Deleting IODD Files

- d. Re-run a device detection by clicking on the loop and then on “Takeover devices into engineering” (see Figure 12).

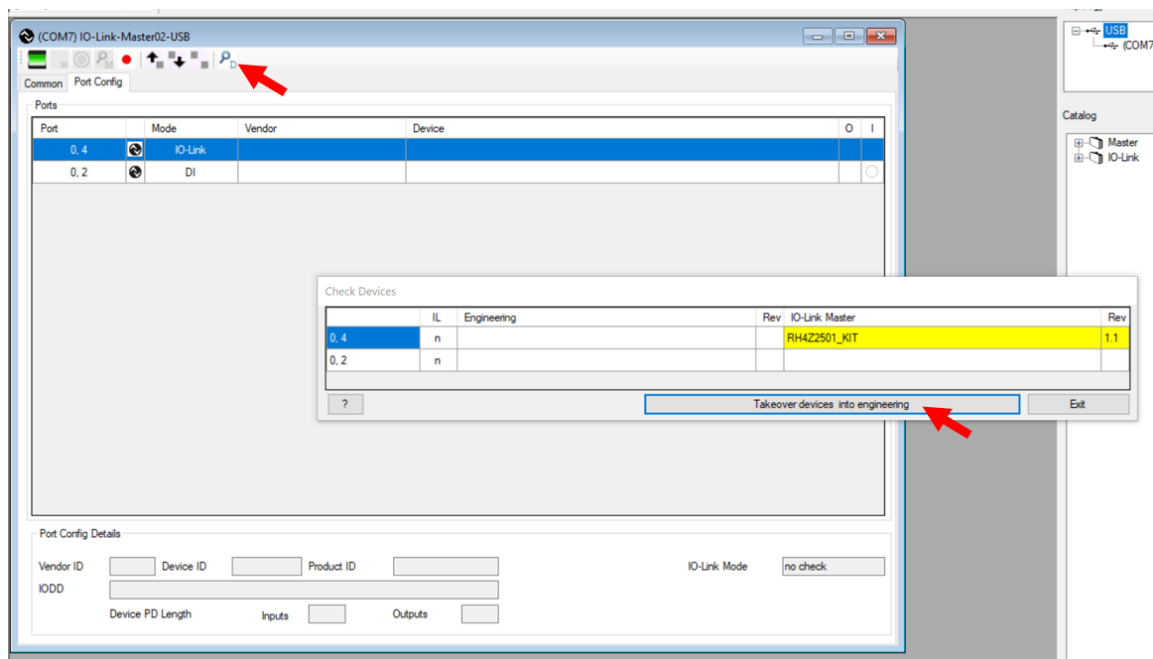


Figure 12. New Device Takeover

The changed COM mode is visible in the “Bitrate” field of the “RH4Z2501_KIT” window (see Figure 13).

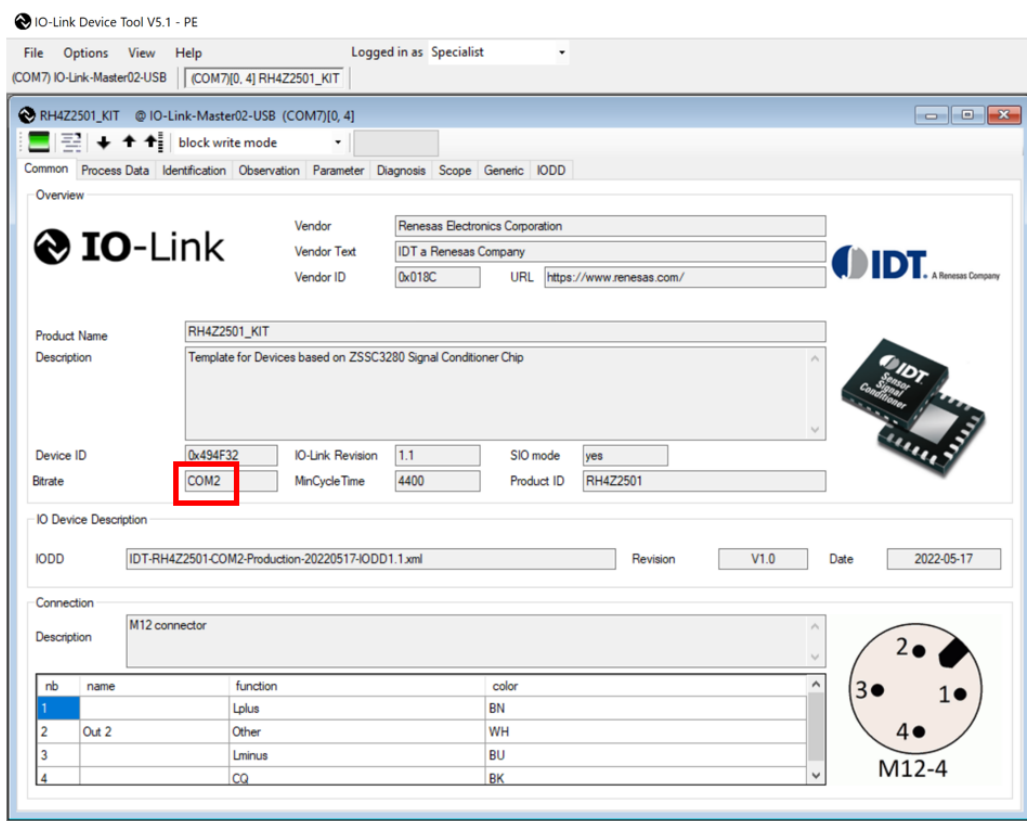


Figure 13. Changed COM Mode

6. Activate the output data threshold by completing the following steps:
 - a. Open the “Parameter” tab of the “RH4Z2501_KIT” window.
 - b. Set the thresholds in the tables by entering the values in the fields (see [Figure 14](#)).
 - c. Write the NVRAM by clicking on the icon (see [Figure 14](#)).

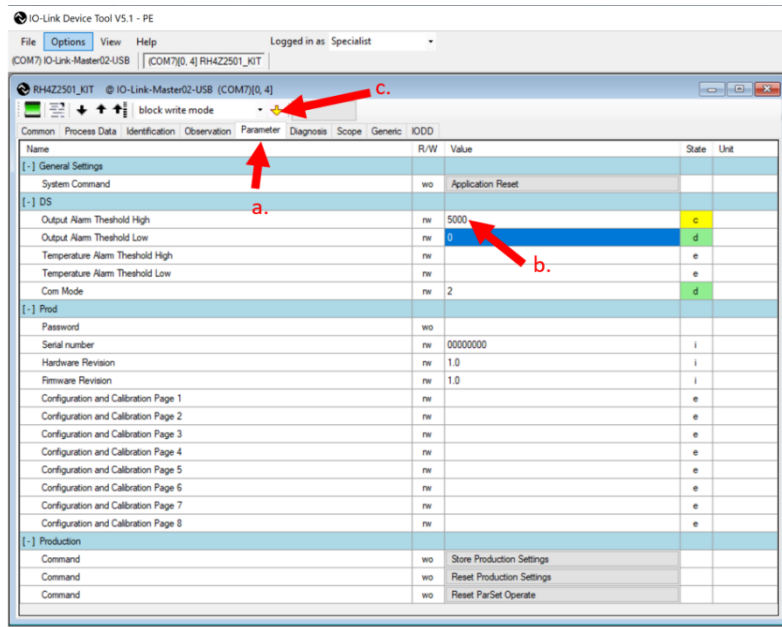


Figure 14. Changing Parameter Values

- d. Upon successful update, the state becomes green (see [Figure 15](#)).

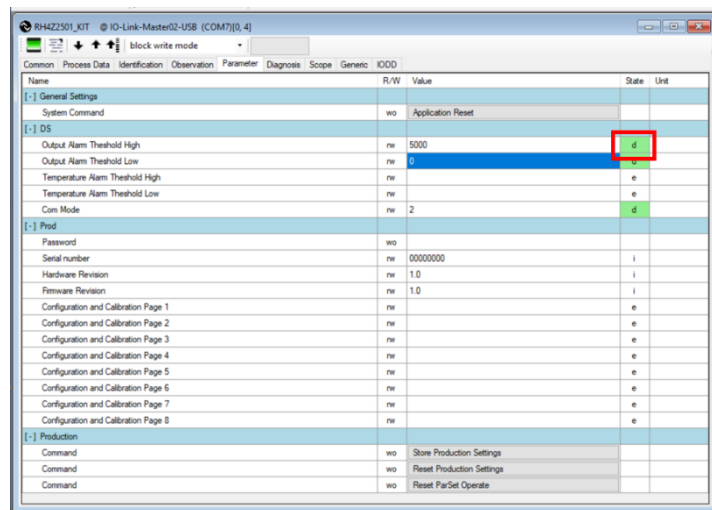


Figure 15. Parameter Transfer Status Verification

- e. Turn the potentiometer to have the PD fit the set thresholds.
 - i. The read values are visible in the “Process Data” tab of the “RH4Z2501_KIT” window (see [Figure 16](#)). LED1 is switched on.

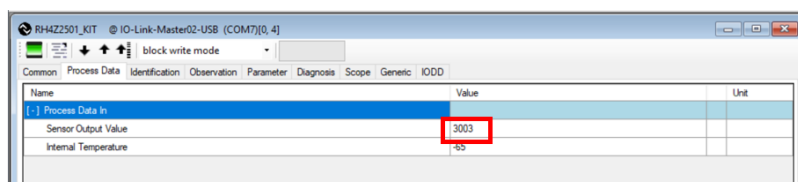


Figure 16. Read Values

3. Glossary

Term	Description
AFE	Analog Front End
GUI	General User Interface
IODD	Input Output Device Description
OWI	One Wire Interface

4. Revision History

Revision	Date	Description
2.00	Sep 4, 2026	Added support for the RH4Z2502
1.00	Jun 23, 2023	Initial release

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