

# RH4Z2501-KIT

## Evaluation Board Quick Start Guide

This document provides a step by step guide to use the RH4Z2501-KIT, its main features, and the necessary hardware setup to implement an IO-link network using different approaches.

Target Device: RH4Z2501: IO-Link transceiver with integrated protection.

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## 1. Requirements

The hardware and software ecosystem have been developed to provide you a quick start and an easy understanding of the IO-Link fieldbus functionalities and specificities. Contact the local Renesas representatives to obtain the described devices and development boards.

### 1.1 Hardware Requirements

The following hardware are necessary to fully evaluate the possibilities of the RH4Z2501:

- RH4Z2501-EVB
- SSC Communication Board (SSC-CB). For detailed information, refer to: [SSC-CB - SSC Communication Board | Renesas](#)
- An IO-Link Master Gateway: available from a 3rd party company:
  - In this document, we are using 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:

The PC tools can be downloaded here: [IO-Link Device Tool - TMG Technologie und Engineering GmbH](#)

## 2. Setup and Configuration of ZSSC328x

### 2.1 Hardware Setup

Follow these steps to setup the Evaluation Board as shown on 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 a M12 cable

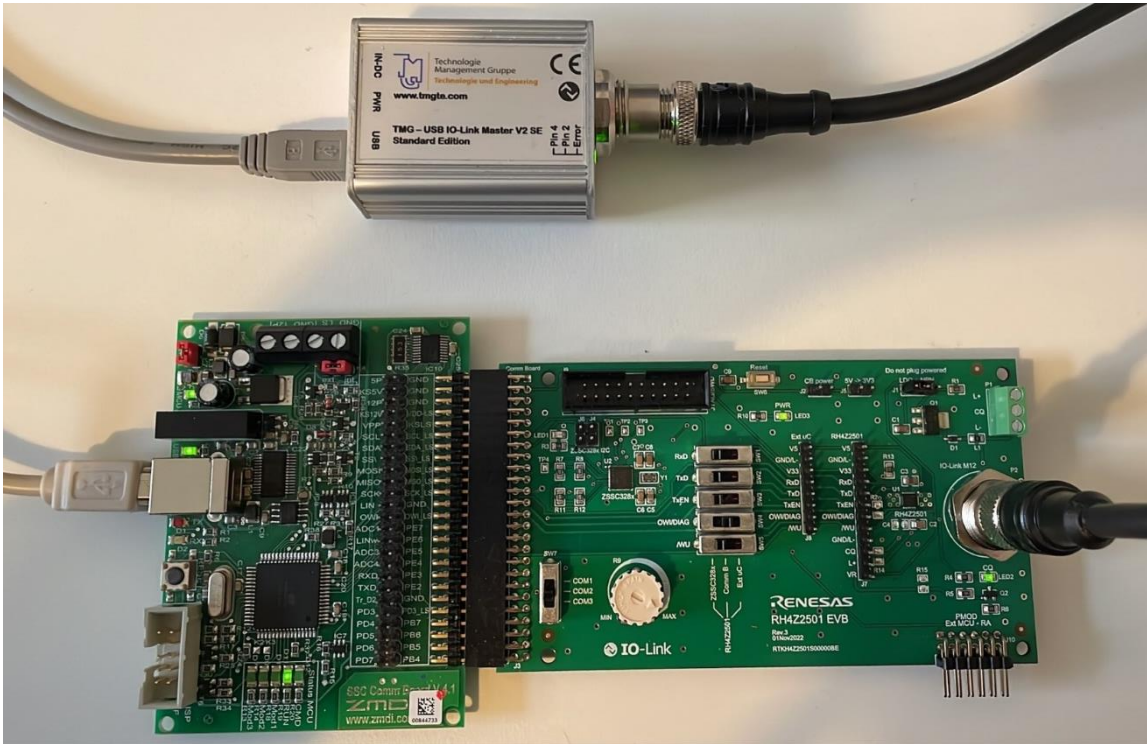


Figure 1. Hardware Setup

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 do not provide the binary file to be flashed to the target for confidentiality reasons. Therefore, no Firmware updates needs 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

Follow these 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 by the following steps:
  - a. Open the 'Import IODD' window by clicking on 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.

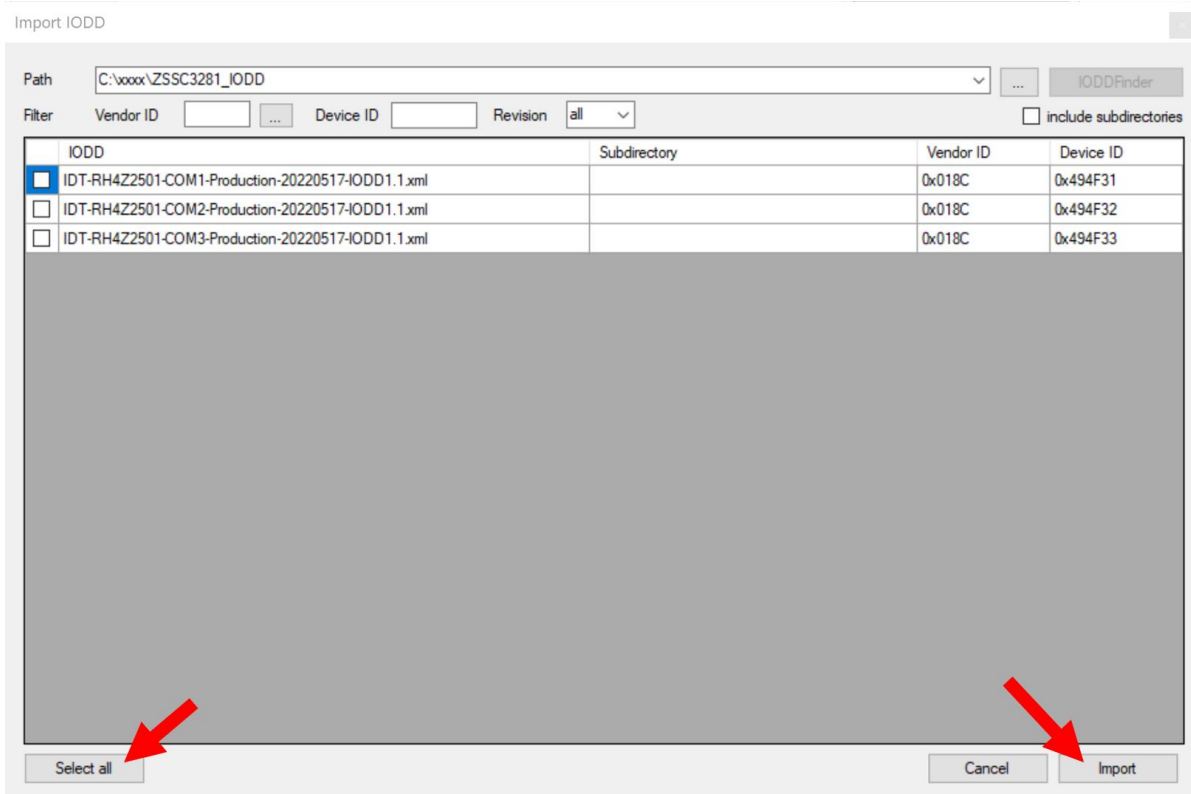


Figure 2. Importing IODD Files into TMG IO-Link device tool

- d. The IODD files are imported in the tool.
3. Detect the IO-link device by following these steps:
  - a. Click on 'Search Master' in the main 'IO-Link Device Tool VS5.1 – xE' window, see Figure 3. The 'Master Discovery' window pops-up. The IO-Link Masters in use are listed in the window.

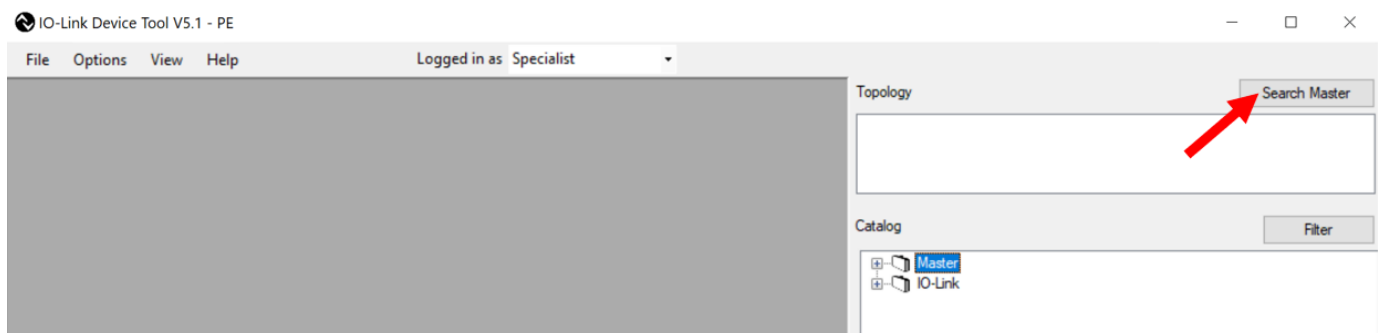


Figure 3. Search Master

- b. Select the correct IO-Link Master in the 'Master Discovery' window, with a double click, see Figure 4.

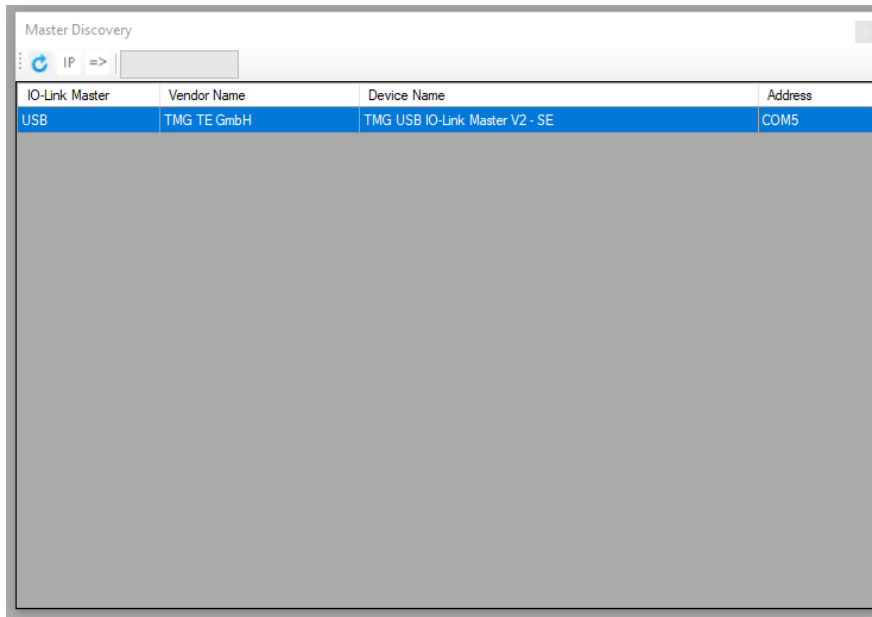


Figure 4. Master Discovery Window

- c. Click on the green lecture button and on the loop to run a device detection, see Figure 5. The 'Check Devices' window pops-up.

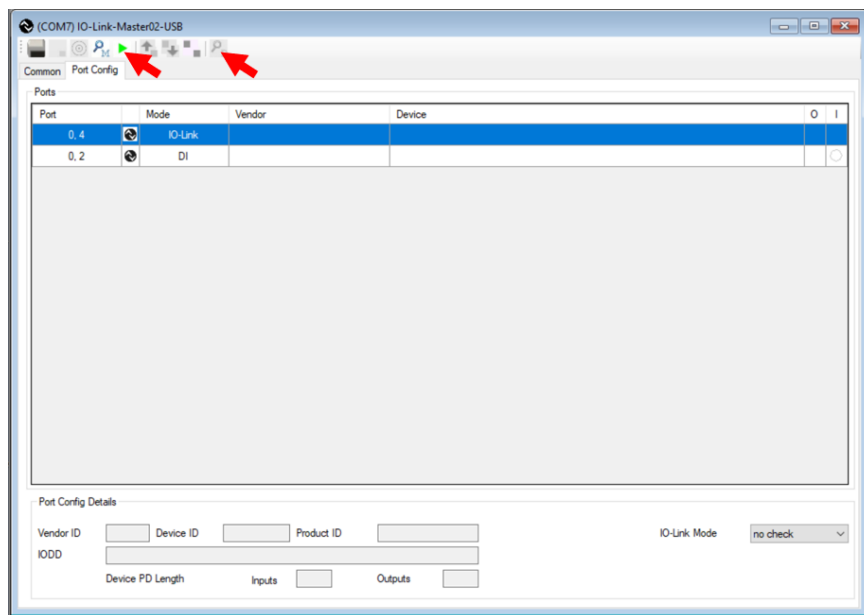


Figure 5. Device detection

- d. Click on 'Takeover devices into engineering', see Figure 6. Figure 7 will then appear.

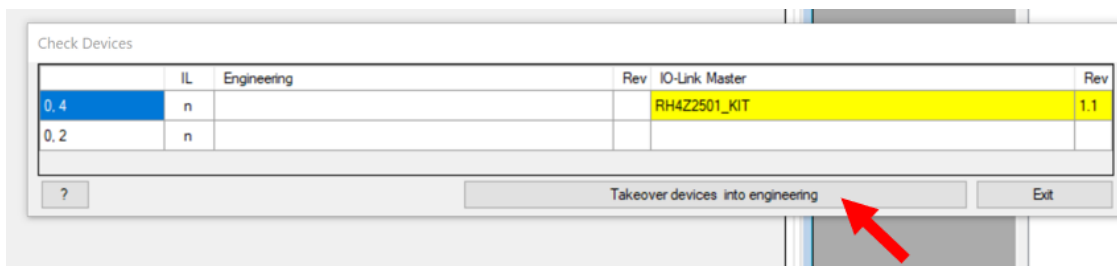


Figure 6. Takeover Devices

4. Process data readings by following these steps:
  - a. Open the 'Process Data' tab in the 'RH4Z2501\_KIT' window, see Figure 7.

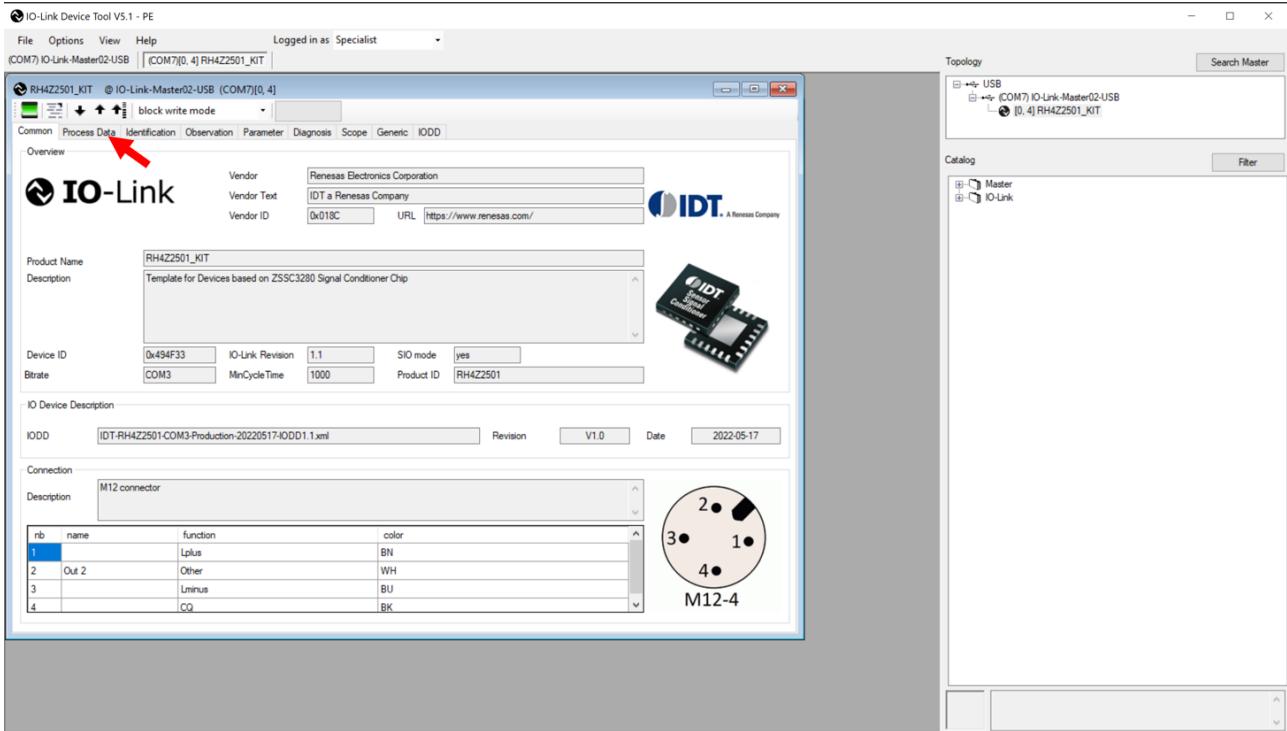


Figure 7. Opening Process Data Tab

- b. Select the necessary values, see Figure 8.

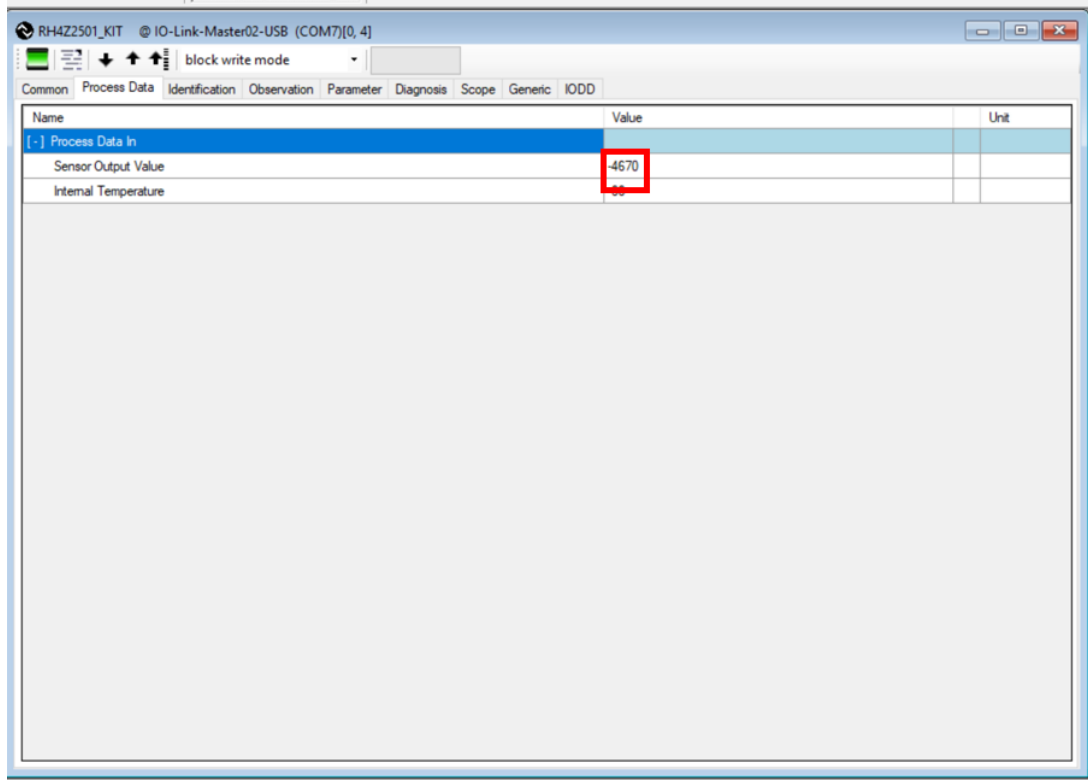


Figure 8. Reading Data Values

5. Select the COM mode by following these steps:
  - a. Set the Switch 7 to the selected COM mode, see Figure 9.

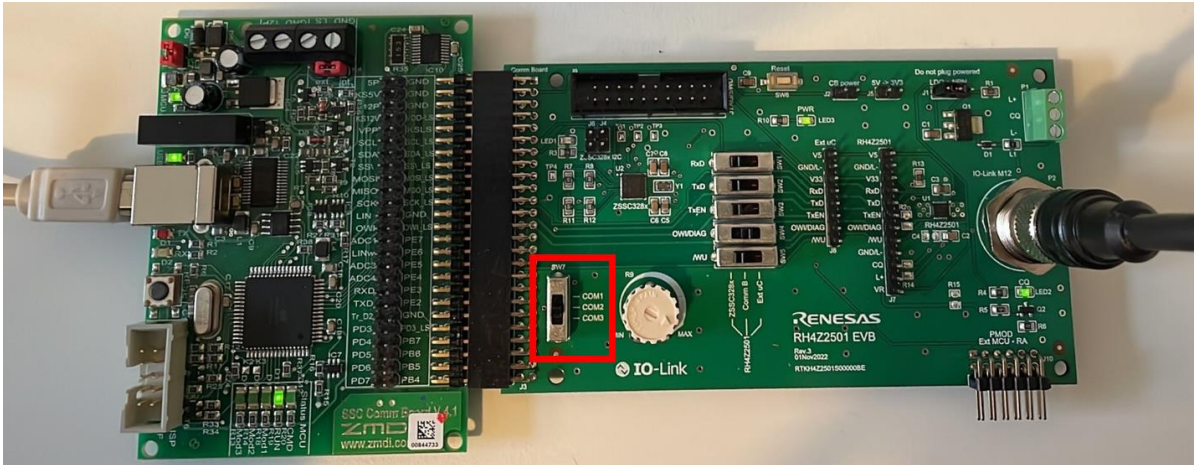


Figure 9. Selecting COM Mode by SW7

- b. Press Switch 6 to reset the ZSSC328x firmware, see Figure 10.

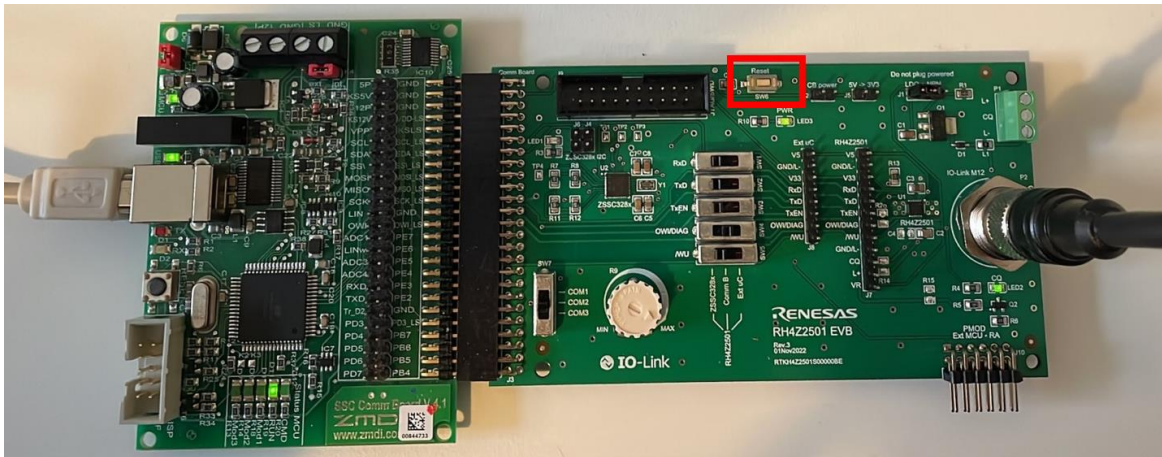


Figure 10. Reset by SW6

- c. Delete old IODD by 'right click->delete' and clicking 'Yes' in the pop-up confirmation window, see Figure 11.

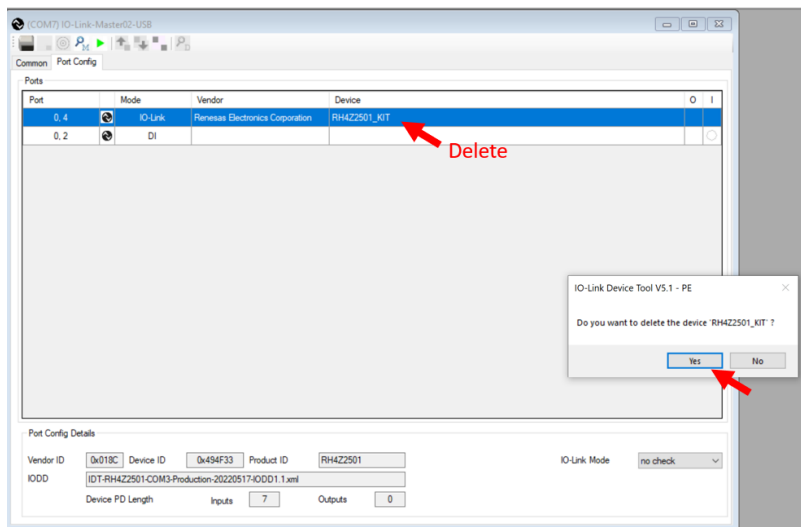


Figure 11. Deleting IODD Files

- d. Re-run a device detection by clicking on the loop and then on 'Takeover devices into engineering', see Figure 12.

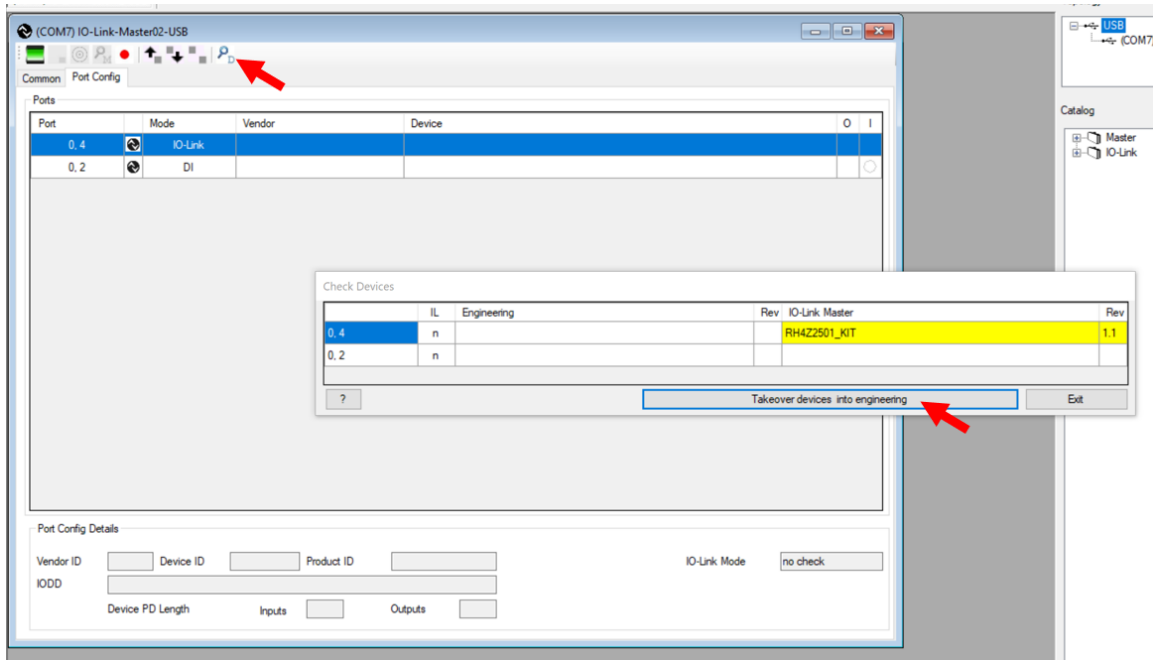


Figure 12. New Device Takeover

The changed COM mode is visible in the 'Bitrate' field of the 'RH4Z2501\_KIT' window, see Figure 13.

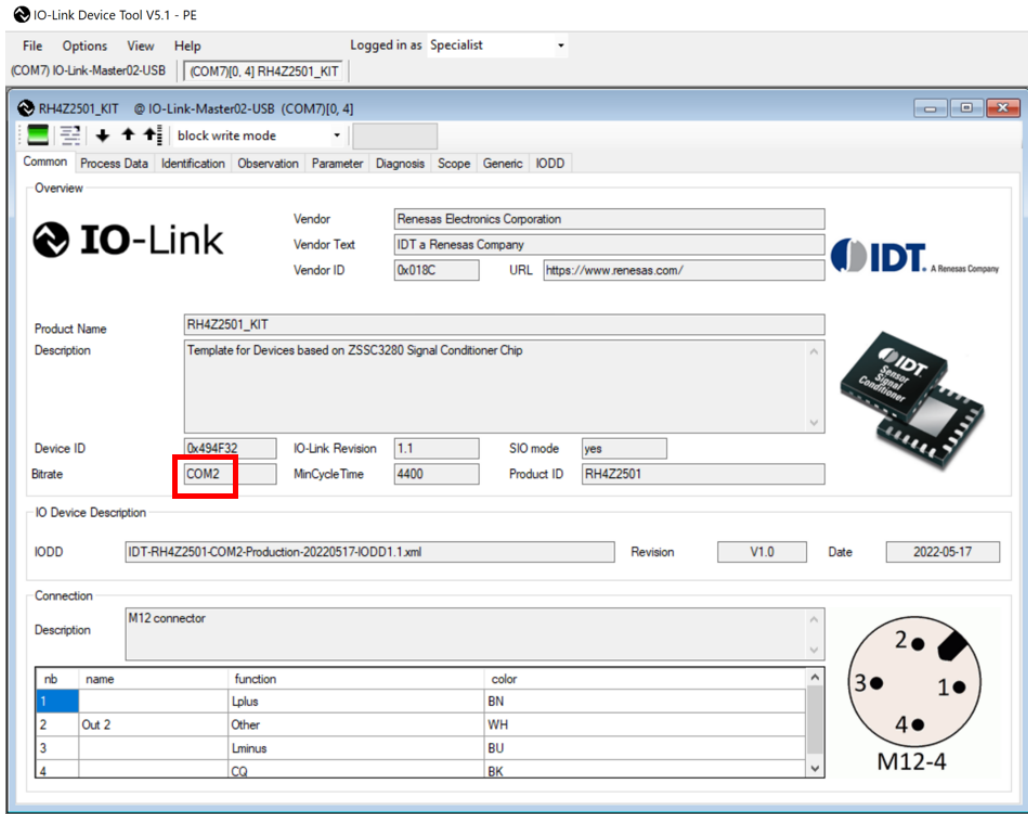


Figure 13. Changed COM Mode



6. Activate output data threshold by following these steps:
  - a. Open the 'Parameter' tab of the 'RH4Z2501\_KIT' window.
  - b. Set the thresholds in the tables by entering the values to the fields, see Figure 14
  - c. Write the NVRAM by clicking on the icon, see Figure 14.

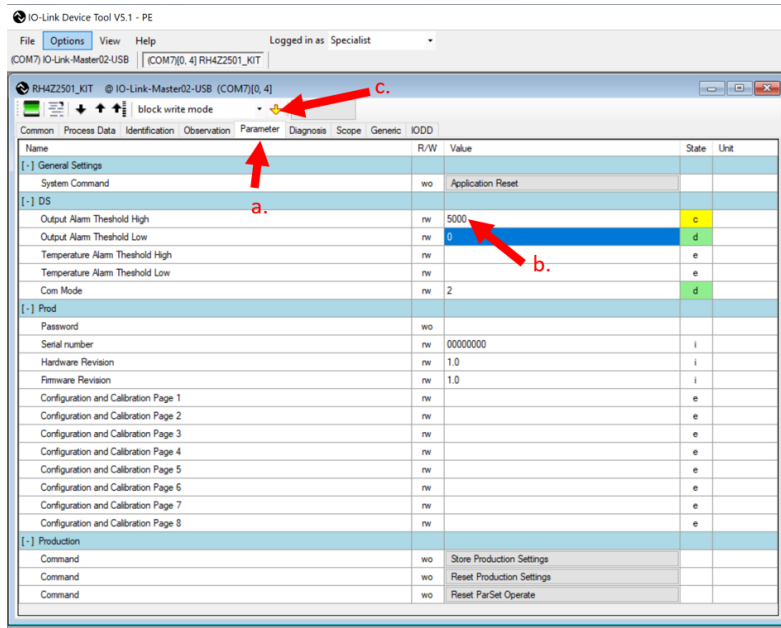


Figure 14. Changing Parameter Values

- d. Upon successful update, the state becomes green, see Figure 15.

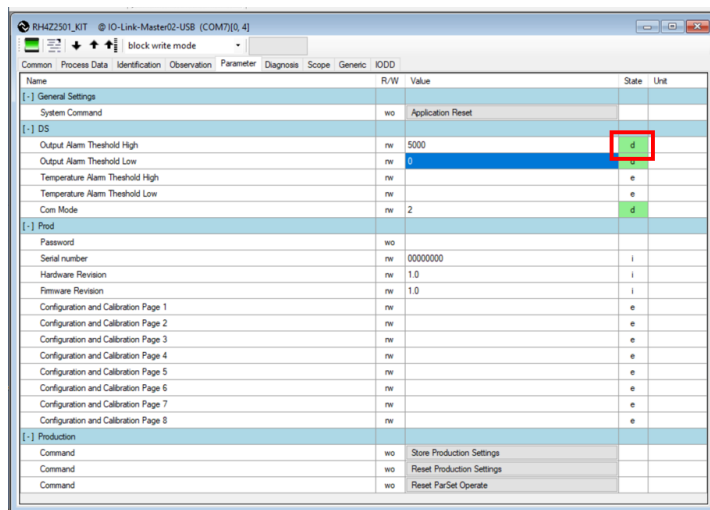


Figure 15. Parameter Transfer Status Verification

- e. Turn the potentiometer to have the PD fit the set thresholds. The read values are visible in the 'Process Data' tab of the 'RH4Z2501\_KIT' window, see Figure 16. LED1 is switched on.

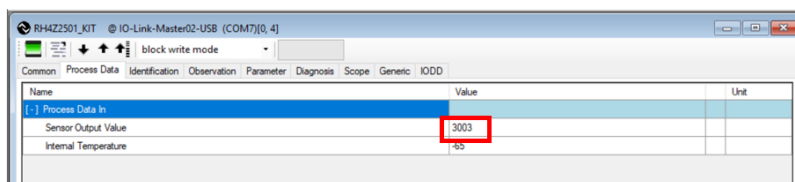


Figure 16. Read Values

### 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
1.0	Jun 23, 2023	Initial release.

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