Santa Cruz (MAXREFDES23#)
Quick Start Guide

Rev 0; 2/14

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1. Required Equipment

- PC with Windows® 7 (*Verify with Balluff that your version of Windows is supported before purchasing their software.*)
- Santa Cruz (MAXREFDES23#) board
- One Balluff USB IO-Link® master (silver box) with corresponding USB and power cables. This must be purchased separately.
- Balluff IO-Link Device Tool (tested with version 2.11.1 and comes with the Balluff USB IO-Link master)
- One IO-Link cable (yellow). This must be purchased separately.
- RD23_RL78_V01_XX.ZIP (Renesas-RL78-Maxim-Sample-20131007-IODD1.0.1.xml), where XX = minor version

2. Overview

Below is a high-level overview of the steps required to quickly get the Santa Cruz design running by connecting it to the Balluff USB IO-Link master and Balluff software. Detailed instructions for each step are provided in the following pages. **The Santa Cruz (MAXREFDES23#) subsystem reference design will be referred to as Santa Cruz throughout this document.**

1) Connect the A-to-B Type USB cable from the PC and yellow IO-Link cable to the Balluff USB IO-Link master (silver box with part number BNI USB-901-000-A501) as shown in Figure 1.
2) Connect the Santa Cruz light sensor board to the other side of the yellow IO-Link cable. Make sure the green LED is lit as shown in <u>Figure 2</u>. The red and yellow LEDs do not need to be lit.
3) Download the latest "all design files" **RD23V01_XX.ZIP** file located at the Santa Cruz page.
4) Extract the **RD23V01_XX.ZIP** file to a directory on your PC.
5) Install the Balluff IO-Link Device Tool.
6) Add the Santa Cruz light sensor as a device into the Balluff IO-Link Device Tool.
7) Connect to the Santa Cruz by pressing the online connection button.

Figure 1. Santa Cruz Board Connected to a Balluff USB IO-Link Master

Figure 2. Green LED Is Lit

3. Included Files

The **RD23_RL78_V01_XX.ZIP** contains the corresponding IO-Link Device Descriptor (IODD) files. The IODD contains information on communication properties, device parameters, identification, process, and diagnostic data. It includes an XML file, an image of the device, an icon image, and the manufacturer's logo. The IODD structure is the same for all devices of all manufacturers, and is always represented in the same way by the IODD interpreter tools.
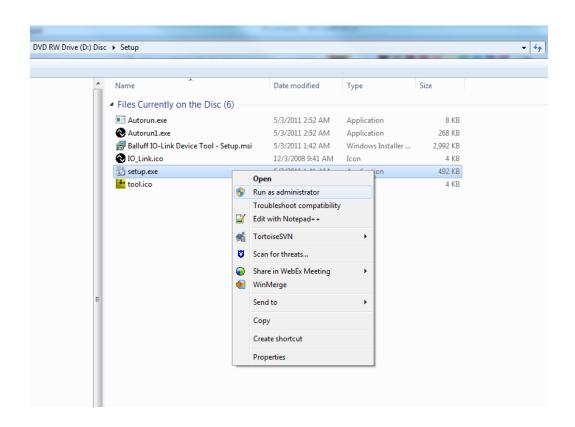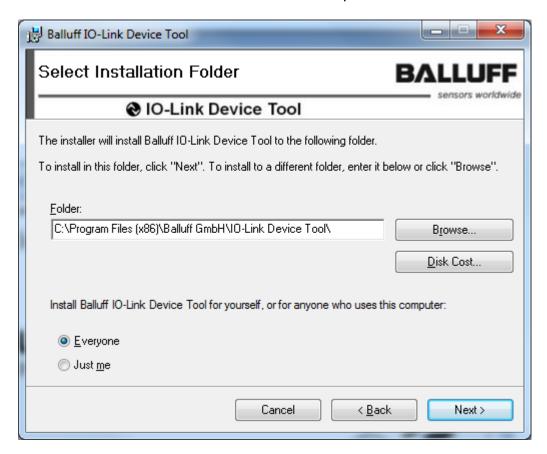

Figure 3. Block Diagram of System

4. Procedure

1. Connect the A-to-B Type USB cable from the PC and yellow IO-Link cable to the Balluff USB IO-Link master (silver box with part number BNI USB-901-000-A501) as shown in Figure 1.

2. Connect the Santa Cruz light sensor board to the other side of the yellow IO-Link cable. Make sure the green LED is lit as shown in <u>Figure 2</u>. The red and yellow LEDs do not need to be lit.

3. Download the latest "all design files" **RD23V01_XX.ZIP** file at **www.maximintegrated.com/Santa-Cruz**. All files available for download are available at the bottom of the page.

4. Extract the **RD23V01_XX.ZIP** file to a directory on your PC. The location is arbitrary but the maximum path length limitation in Windows (260 characters) should not be exceeded.

5. Install the Balluff IO-Link Device Tool. This tool comes with the purchase of the Balluff USB IO-Link master (silver box with part number BNI USB-901-000-A501). Run the **setup.exe** file using the **Run as administrator** mode.
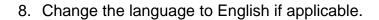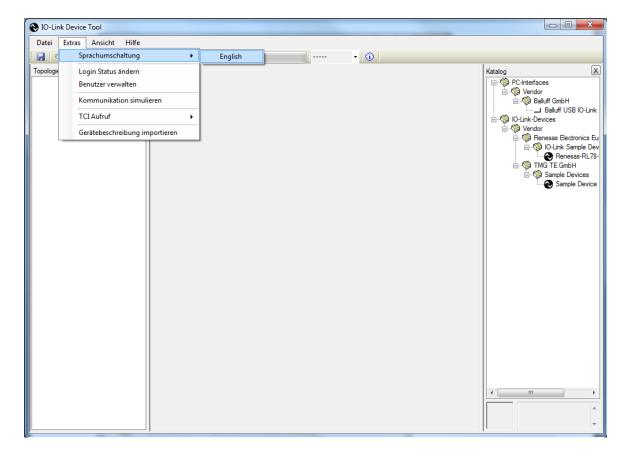
6. Choose the default installation **Folder** and press the **Next** button.

7. Press the **Next** button.

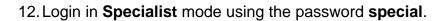8. Change the language to English if applicable.

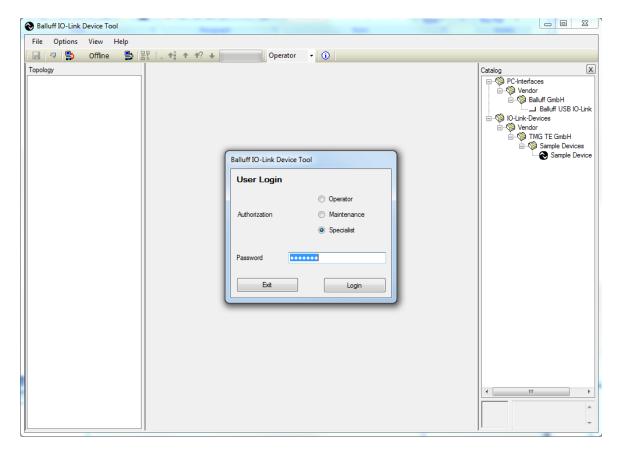9. Close the program by clicking the **X** in the top right corner.

10. Press the **Close** button to complete the installation.

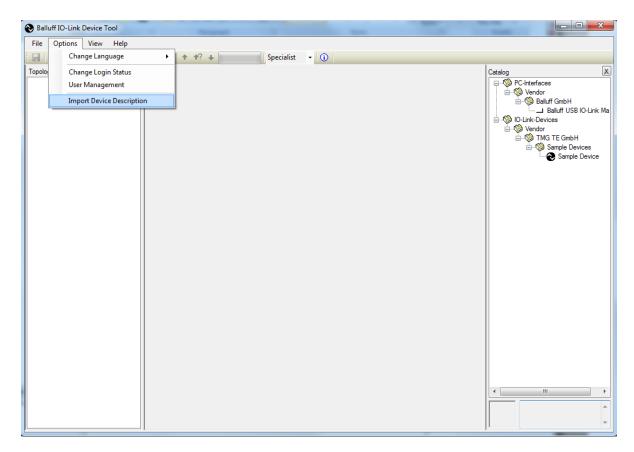11. Verify the version of the IO-Link Device Tool. In this case, version 2.1.11 was used.
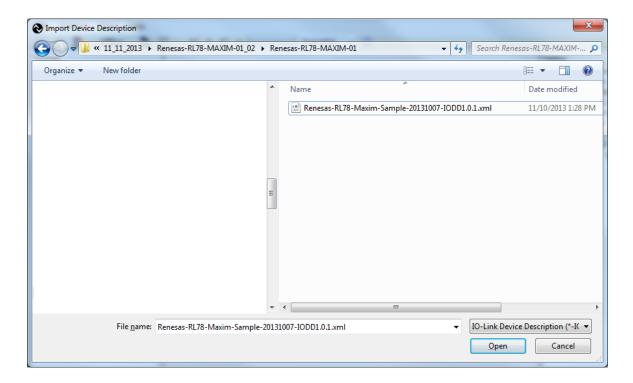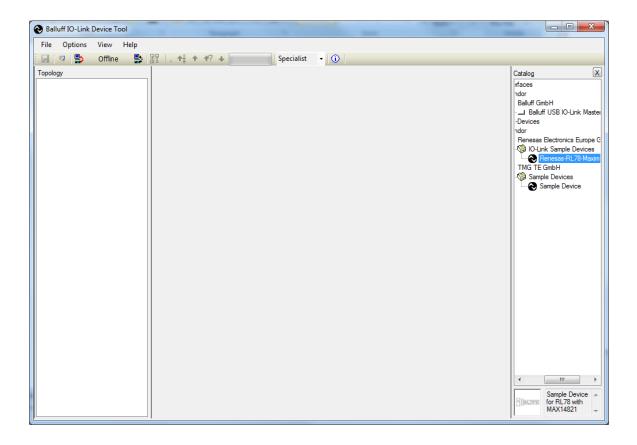
12. Login in **Specialist** mode using the password **special**.

13. Import the IODD xml file for the Maxim sensor. In this case, the file is **Renesas-RL78-Maxim-Sample-20131007-IODD1.0.1.xml** located in the **RD23_RL78_V01_00.ZIP** file.
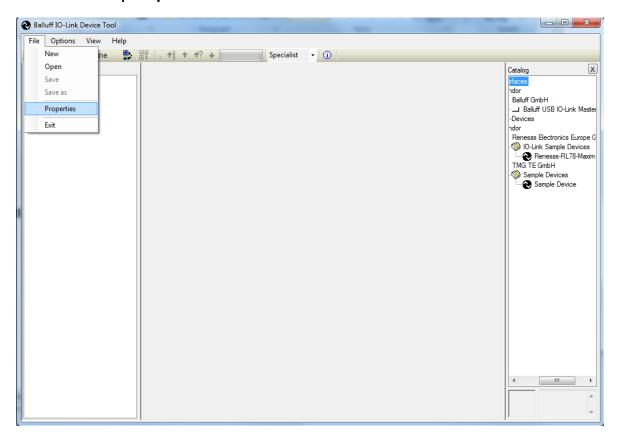
14. In this case, this is the IODD file shown below, but may be a different .xml file if a different Maxim sensor is used.
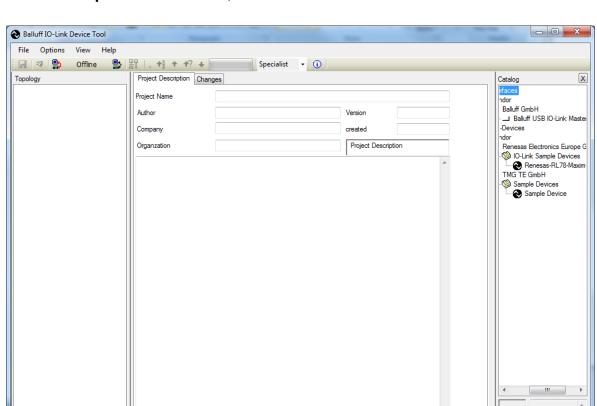
15. See the Maxim Sensor show up in the IO-Link devices in the **Catalog** window.
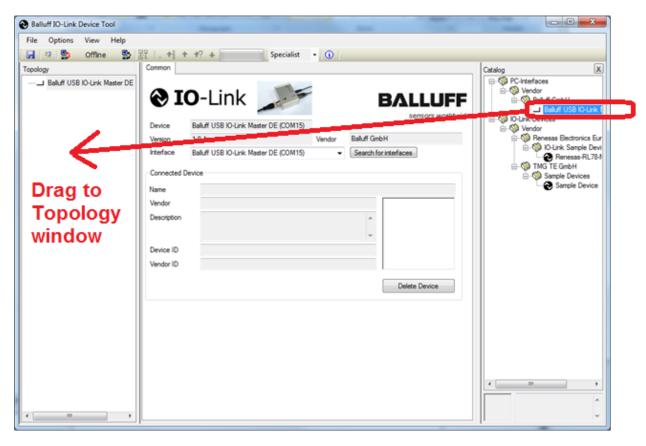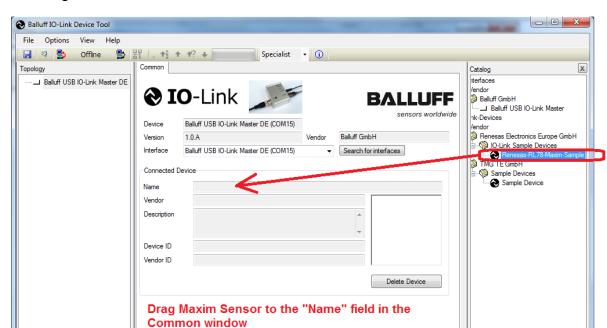
16. Select **File | Properties**.

17. After **Properties** is selected, the screen looks like the below screenshot.

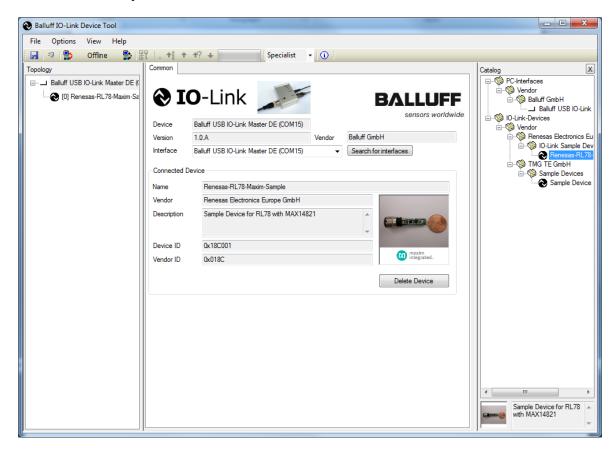18. Verify that the USB cable is plugged into the silver USB IO-Link Master box.

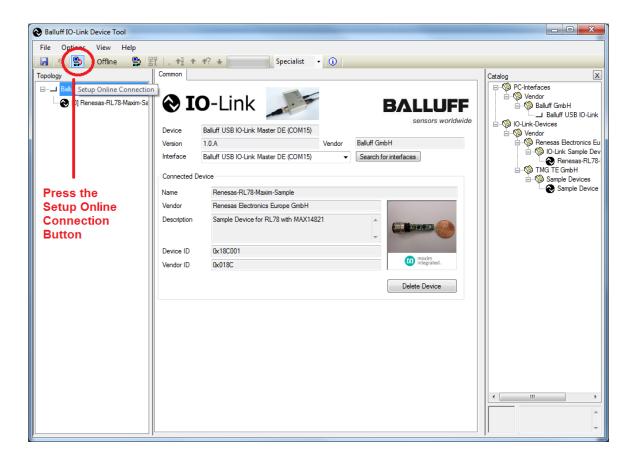19. Drag the Balluff USB IO-Link Master to the Topology window.

20. Drag the Maxim sensor to the **Name** field in the **Common** window.

21. Verify a picture of the sensor shows up with the name **Renesas-RL78-Maxim-Sample**.

22. Press the **Connect** button on the Balluff IO-Link Device Tool Software.
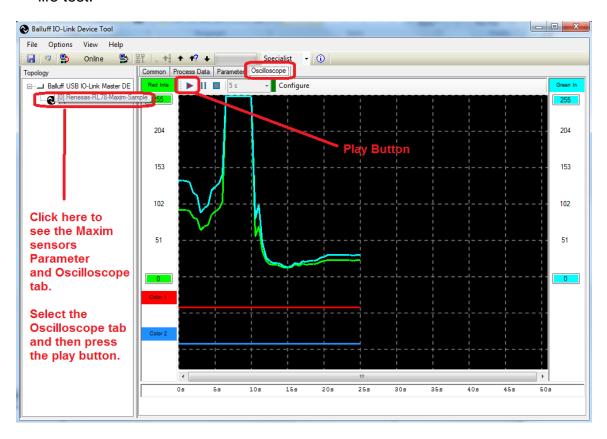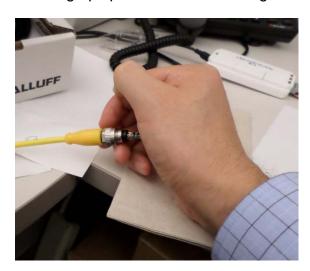
23. If your sensor has a problem or is unconnected, then you will see the below figure.
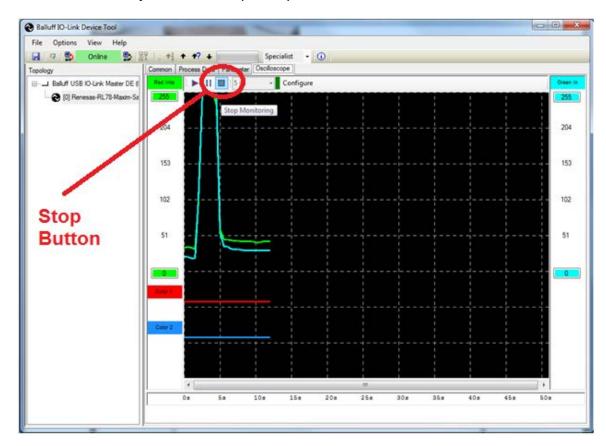
24. If your sensor is working correctly, then click on the Maxim sensor device icon and then the **Oscilloscope** tab. Press the **Play** (triangle button) button. Point the tip of the MAXREFDES23# sensor at the ceiling towards the ceiling lights for a few seconds and then cover the tip of the MAXREFDES23# sensor with your hand, as shown below. Verify that the blue and green waveforms go higher when pointed at the ceiling lights and the waveform goes lower when covered with your hand as shown in the graph below. This is the 8-bit visual life test.
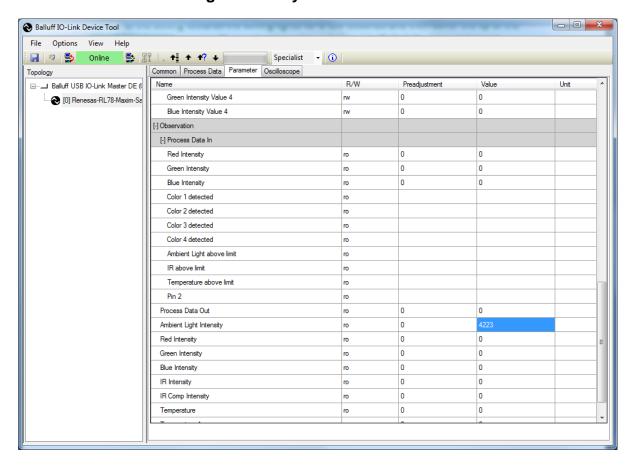
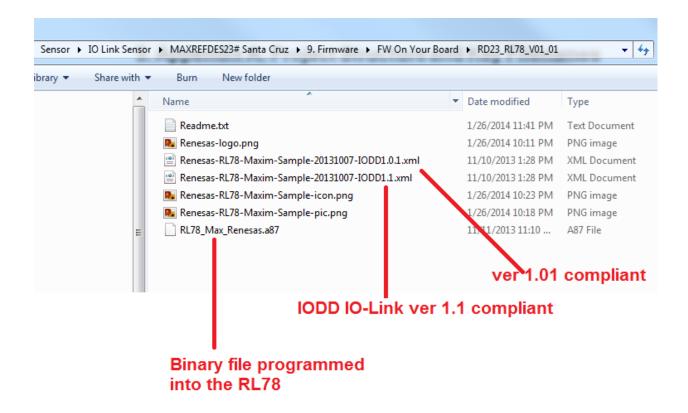Covering up tip of the Santa Cruz light sensor with hand to block light.

25. Press the **Stop** button to stop the quick 8-bit visual life test.

26. Next, press the **Parameter** tab and scroll down to the **Ambient Light Intensity** parameter. Press the **Value** column to see an on-request parameter read of the **Ambient Light Intensity**.

5. Appendix A: Project Structure and Key Filenames

6. Trademarks

IO-Link is a registered trademark of ifm electronic GmbH.
Windows is a registered trademark and registered service mark of Microsoft Corp.

7. Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	2/14	Initial release	—