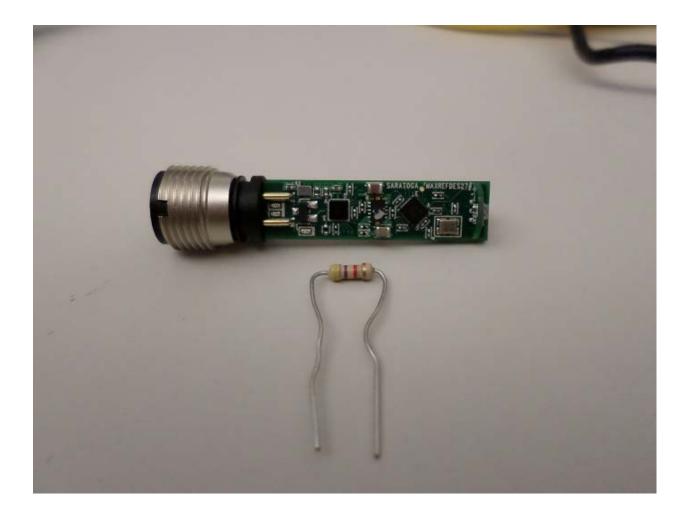


MAXREFDES27# IO-Link Proximity Sensor Quick Start Guide

Rev 0; 4/14



Maxim Integrated cannot assume responsibility for use of any circuitry other than circuitry entirely embodied in a Maxim Integrated product. No circuit patent licenses are implied. Maxim Integrated reserves the right to change the circuitry and specifications without notice at any time.

Maxim Integrated 160 Rio Robles, San Jose, CA 95134 USA 1-408-601-1000

© 2014 Maxim Integrated Products, Inc. Maxim Integrated and the Maxim Integrated logo are trademarks of Maxim Integrated Products, Inc.

Table of Contents

1.	Required Equipment	. 3
2.	Overview	. 3
3.	Included Files	.5
4.	Procedure	.6
5.	Appendix A: Project Structure and Key Filenames	25
6.	Trademarks	25
7.	Revision History	26

1. Required Equipment

- PC with Windows® 7 (Verify with Balluff that your version of Windows is supported before purchasing their software.)
- Saratoga (MAXREFDES27#) 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.)
- RD27_RL78_V01_XX.ZIP (Maxim-Saratoga-20140318-IODD1.0.1.xml), where XX = minor version

2. Overview

Below is a high-level overview of the steps required to quickly get the Saratoga 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 Saratoga (MAXREFDES27#) subsystem reference design will be referred to as Saratoga 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.
- Connect the MAXREFDES27# proximity 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" **RD27V01_XX.ZIP** file located at the Saratoga page.
- 4) Extract the RD27V01_XX.ZIP file to a directory on your PC.
- 5) Install the Balluff IO-Link Device Tool.
- 6) Add the Saratoga proximity sensor as a device into the Balluff IO-Link Device Tool.
- 7) Connect to the Saratoga by pressing the online connection button.



Figure 1. MAXREFDES27# Board Connected to a Balluff USB IO-Link Master



Figure 2. Green LED Is Lit

3. Included Files

The **RD27_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.

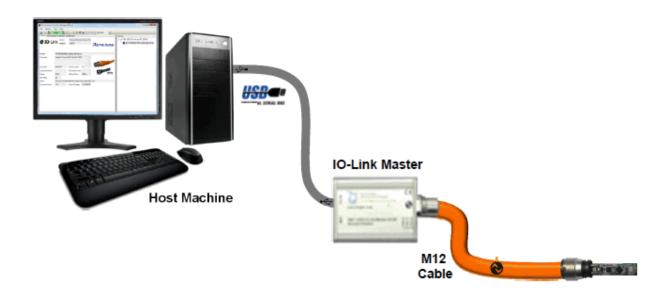


Figure 3. Block Diagram of System

4. Procedure

- 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 <u>Figure 1</u>.
- Connect the MAXREFDES27# proximity 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.
- Download the latest "all design files" RD27V01_XX.ZIP file at <u>www.maximintegrated.com/AN5868</u>. All files available for download are available at the bottom of the page.
- 4. Extract the **RD27V01_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.

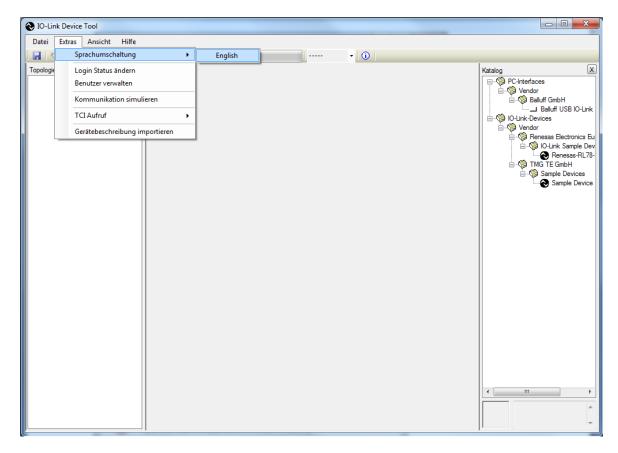
DVD RW Drive (D:) Disc 🔸 Setup						√ 4 ₇
^						
Name		Date modified	Туре		Size	
 Files Currently on the Disc (6)) —					
E Autorun.exe		5/3/2011 2:52 AM	Applicat	tion	8 KB	
Autorun1.exe		5/3/2011 2:52 AM	Applicat	tion	268 KB	
🔂 Balluff IO-Link Device Tool - Set	up.ms	i 5/3/2011 1:42 AM	Window	s Installer	2,992 KB	
NIO_Link.ico		12/3/2008 9:41 AM	Icon		4 KB	
🔂 setup.exe		Open	A 12 1	ion	492 KB	
tool.ico		Run as administrator			4 KB	
	<u> </u>	Troubleshoot compatibility				
		Edit with Notepad++				
	۴ů	TortoiseSVN	+			
	U	Scan for threats				
	0	Share in WebEx Meeting	+			
	1	WinMerge				
=		Send to	•			
		Сору				
		Create shortcut				
		Properties				
	_			·		

6. Choose the default installation folder and press the **Next** button.

Balluff IO-Link Device Tool
Select Installation Folder BALLUFF
֎ IO-Link Device Tool
The installer will install Balluff IO-Link Device Tool to the following folder.
To install in this folder, click "Next". To install to a different folder, enter it below or click "Browse".
Eolder: C:\Program Files (x86)\Balluff GmbH\IO-Link Device Tool\ B <u>r</u> owse
Disk Cost
Install Balluff IO-Link Device Tool for yourself, or for anyone who uses this computer:
Everyone
─ Just me
Cancel < <u>B</u> ack Next >

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.



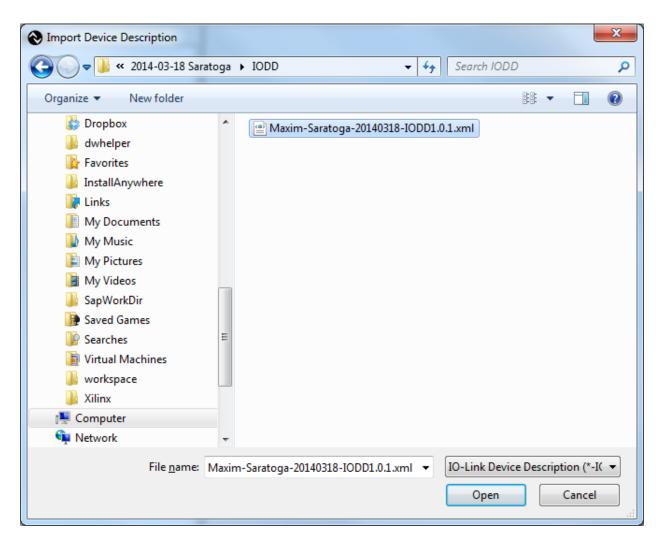
Balluff IO-Link Device Tool	Angest 1 Angest 1	
File Options View Help		
🔄 🔄 💐 🔛 Offline 📑 🗄	• + +? + Operator → 10	
Topology	Balluff IO-Link Device Tool User Login Operator Authorization Maintenance	Catalog

12. The User Login should be in Specialist mode. Password is special.

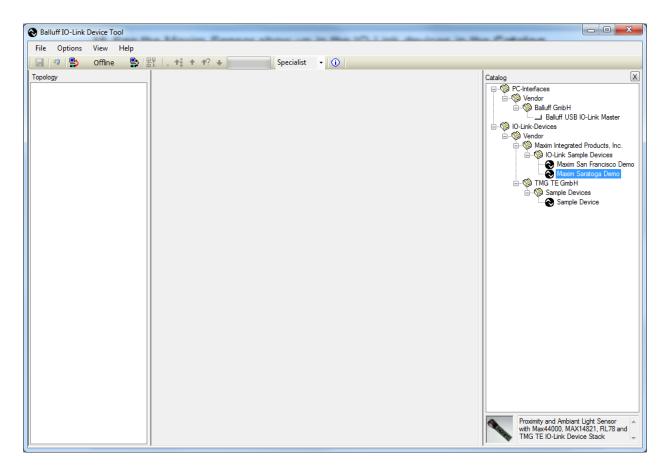
13. Import the IODD xml file for the Maxim sensor. In this case, the file is Maxim-Saratoga-20140318-IODD1.0.1.xml and can be located in the RD27_RL78_V01_00.ZIP file.

Balluff IO-Link Device Tool File Options View Help	
	0
Topolo, Change Login Status User Management	Catalog
Import Device Description	E-Se Vendor Galiufi USB IO-Link Ma Jo-Link-Devices Sample Devices Sample Devices Sample Devices Sample Devices
	Sample Device
	<

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.



Salluff IO-Link Device Tool	
File Options View Help	
	pecialist 🔹 🕕
Open	Catalog
Save Save as	ifaces Indor
	Balluff GmbH
Properties	Balluff USB IO-Link Master -Devices
Exit	ndor
	Renesas Electronics Europe G -1 Participation - 1 Renesas Electronics Europe G
	└────────────────────────────────────
	Sample Devices
	Sample Device
	4 III Þ

16. Select File | Properties.

Balluff IO-Link Device Tool File Options View Help	i Negati i	And the second sec	
	器 . + + +? + Specia	ilist 🔹 🕕	
opology	Project Description Changes		Catalog
	Project Name		rfaces
	Author	Version	Balluff GmbH
	Company	created	-Devices
	Organzation	Project Description	ndor Renesas Electronics Europ
		*	O-Link Sample Device Renesa-RL78-Ma TMG TE GmbH Sample Devices Sample Device Sample Device
			< <u> </u>
		-	

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.

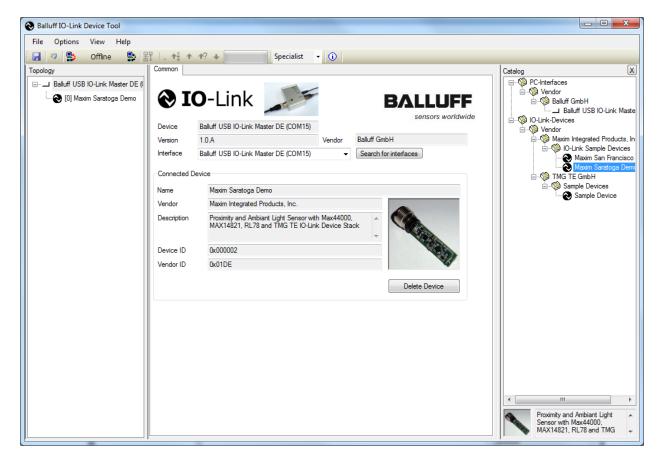
Balluff IO-Link Device Tool File Options View Help Image: State S	음입 . +1 + +? + Specialist • ①	
Topology	Common Common Evice Balleff USB IO-Link Master DE (COM15) Version Research for interfaces Connected Device Name Vendor Description Vendor ID Delete Device Delete Device	Catalog Catalo
		<

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

Salluff IO-Link Device Tool		×
File Options View Help		
🛛 🛃 🤜 🎒 Offline 🔮 🔢	, +	
Topology	Common	X
Balluff USB IO-Link Master DE (Connected Device Balluff USB IO-Link Master DE (COM15) Version 1.0.A Iterface Balluff USB IO-Link Master DE (COM15) Series ors worldwid Balluff USB IO-Link Master DE (COM15) Connected Device Balluff USB IO-Link Master DE (COM15) Name Series ors worldwid Vendor Balluff USB IO-Link Master DE (COM15) Device ID Device Vendor ID Delete Device Drag the Maxim Sensor to the "Name" field in the Common window.	er nc.
<)	Proximity and Ambiant Light Sensor with Max44000, MAX14821, RL78 TMG TE IO-Link Device Stack	and

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 **Maxim Saratoga Demo**.



Balluff IO-Link Device Tool		
File Options View Help		
:日 🔹 🕒 Offine 🛛 😫 🗆 🕂	+ +? + Specialist ▼ ①	
Topology Common		Catalog
Balluf USB IO-Link Master DE (
[0] Maxim Saratoga Demo	IO-Link BALLUFF	Balluff GmbH Balluff USB IO-Link Maste
Device	Balluff USB IO-Link Master DE (COM15)	i ⊡ 🧐 IO-Link-Devices ⊡ 🎲 Vendor
Version	1.0.A Vendor Balluff GmbH	Axim Integrated Products, In
Interface	Balluff USB IO-Link Master DE (COM15)	Maxim San Francisco
Connect	ed Device	Maxim Saratoga Demo ⊡ 🧐 TMG TE GmbH
Press the Name	Maxim Saratoga Demo	Sample Devices
Setup Online Vendor	Maxim Integrated Products, Inc.	Sample Device
Connection Descripti	on Proximity and Ambiant Light Sensor with Max44000, MAX14821, RL78 and TMG TE IO-Link Device Stack	
Button	D 0x000002	
Device I	D 0x000002	
Vendor I	D 0x01DE	
	Delete Device	
		< >
		^

22. Press the **Connect** button on the Balluff IO-Link Device Tool software.

23. If your sensor has a problem or is unconnected, you will see the below figure.

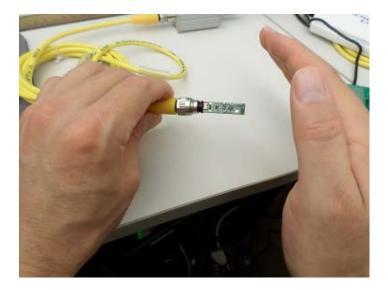
Note: The second		
File Options View Help	Algemein Process Data Parameter Scope IO-Link Hersteller Renesas Bectronics Europe Gml Maxim Vendor ID 0x018C maxim CCENESAS	Catalog PC-Interfaces Catalog Vendor Balluff GmbH Land Balluff USB IO-Link Catalog Vendor Balluff USB IO-Link Catalog Vendor Catalog
	Gerät Renesas-RL78-Maxim-Sample Beschreibung Sample Device for RL78 with MAX14821 Device ID 0x18C001 Hardware-Version 1.0 Baudrate COM3 SIO-Mode yes Dobumentversion V1.0 Okumentversion V1.0	 Image and the second se

24. If you see the green **Online** indication on the software, the sensor has connected. Click on the Maxim sensor device icon to make the **Parameter** tab show up. Change the values as shown in the figure below by right-clicking with the mouse.

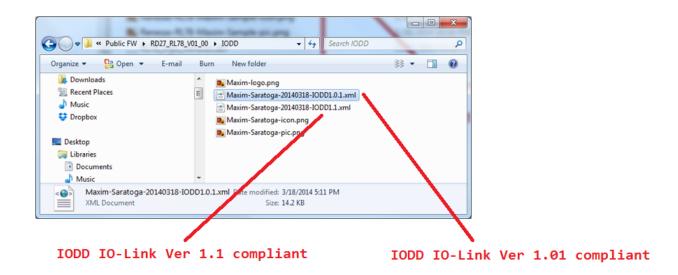
File Options View Help						
🛃 🛛 😫 🔛 Online 🔮 🗄	Specialist	\odot				
Fopology	Common Process Data Parameter Oscilloscope					_
	Name	R/W	Preadjustment	Value	Unit	Â
	[-] Identification					
	Vendor Name	ro	Maxim Integrated Product	Maxim Integrated Product		-
	Vendor Text	ro	http://www.maximintegrat	http://www.maximintegrat		
	Product Name	ro	Maxim Saratoga	Maxim Saratoga		
	Hardware Revision	ro	1.0	1.0		
	Firmware Revision	ro	1.0	1.0		
Click here to	Application Specific Name	nw	USE IO-Link	USE IO-Link		=
make the	[-] Parameter					
Parameters tab	Operating Mode	rw	Proximity Sensor	Proximity Sensor		
	Pin2 Mode	rw	Sensor Switch	Sensor Switch		
show up.	Gain	rw	1x	1x		
	Conversion Time	rw	100	100		
Then click on	Trim Gain	rw	use factory-programmed tri.	use factory-programmed tr		
the Parameters	gain trim green channel	nw	0	0		
tab and change	gain trim IR channel	rw	0	0		
the values as	gain trim green channel factory setting	ro	0	0		
	gain trim IR channel factory setting	ro	0	0		
shown to the	LED Current	rw	disabled	90		1
right.	Ambient Light Teach Value	rw	500	disabled		
	Proximity Value	rw	128	10		
Right Click	System Command <restore factory="" setting=""></restore>	wo		20 30		
the mouse to	System Command <teach></teach>	wo		40		
	[-] Observation			60		
change the values				70		

25. Click on the **Process Data** tab and vary your hand approximately 20mm to 150mm from the tip of the proximity sensor to see the changing value.

•					
Balluff IO-Link Device Tool					
File Options View Help					
	Specialist				
Topology	Common Process Data Parameter Oscilloscope				
Balluff USB IO-Link Master DE ((Name	Processdata	Unit		
[0] Maxim Saratoga Demo	[·] Process Data Inputs	• •			
	Digital Out	false			
	Sensor Switch	false			
	Value	70			
	[-] Process Data Outputs				
	Pin 2 Value	false			



5. Appendix A: Project Structure and Key Filenames



	-	RD27_RL78_V01_0	JU •	✓ Search RD27	7_RL78_V01_00	
Organize 🔻 📄 Open 🛛 Burn	New fold	der			:≡ ▼ 🗍	(
퉬 InstallAnywhere	*	Name	^	Date modified	Туре	Sia
🚺 Links		📗 IODD		4/7/2014 5:23 PM	File folder	
My Documents		📗 UserManual		4/7/2014 5:23 PM	File folder	
My Music		Maxim_Saratog	ja.a87	3/18/2014 5:03 PM	A87 File	
╞ My Pictures 🍺 My Videos 🍌 SapWorkDir		🖺 Readme.txt	\mathbf{N}	4/7/2014 5:24 PM	Text Document	
Baved Games			Binary fil	Le programmed	l into the	
📔 Searches			RL78	re programmet	i inco che	
🝺 Virtual Machines	=		NE70			
🕌 workspace]] Xilinx						

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	4/14	Initial release	

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Maxim Integrated: MAXREFDES27#