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### MAXREFDES79# IO-Link Master Quick Start Guide

Rev 0; 3/15



For pricing, delivery, and ordering information, please contact Maxim Direct at 1-888-629-4642, or visit Maxim Integrated's website at www.maximintegrated.com.

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#### 1. Required Equipment

- PC with Windows® 7 or Windows 8 (Verify with TEConcept that your version of Windows is supported before purchasing their software license. See Section 4 Software License Keys.)
- MAXREFDES79# (Box Contents)
  - MAXREFDES79# 4-Port IO-Link® Master
  - AC-to-DC 24V/1A output power converter
  - USA-to-Euro power adapter
  - Two Black 1 meter IO-Link cables (1 meter)
  - Micro-USB cable (2 meters)
- Necessary downloadable software includes:
  - TEConcept IO-Link Control Tool (CT) Software (see note)
  - STM32F4 VCP Driver (see note)
- An IO-Link compliant sensor or actuator (MAXREFDES27# IO-Link proximity sensor was used in this document, but any IO-Link compliant sensor or actuator from any company can be used. Other Maxim options are MAXREFDES23#, MAXREFDES36#, MAXREFDES37#, or MAXREFDES42#.)

# Note: Download files from the Design Resources tab at: www.maximintegrated.com\MAXREFDES79.



Figure 1. MAXREFDES79# box contents.



Figure 2. MAXREFDES79# system connected and running.

#### 2. Overview

- 1. Install the **TEConcept CT** software (**TC\_Installer.msi**).
- 2. Install the STM32F4 VCP driver.
- 3. Connect the Micro-USB cable from the PC to the MAXREFDES79#.
- 4. Connect the AC-to-DC 24V DC power converter.
- 5. Connect the MAXREFDES27# to Port 1 of the MAXREFDES79# IO-Link master.
- 6. Run the **TEConcept CT** software and connect to the MAXREFDES79#.
- 7. Load in the IODD file for your sensor or actuator.
- 8. Press the **IO-Link** button to connect to sensor or actuator.
- 9. Read and write to sensor or actuator parameters.

#### 3. Procedure

- 1. Download the **TEConcept CT** software and **STM32F4 VCP** driver from the **DESIGN RESOURCES** tab at <u>www.maximintegrated.com/MAXREFDES79</u>.
- 2. Install the **TEConcept CT** software (**TC\_Installer.msi**).
- 3. Install the appropriate **STM32F4 VCP** driver depending on the version of Windows operating system (32-bit or 64-bit) as shown in <u>Figure 3</u>.

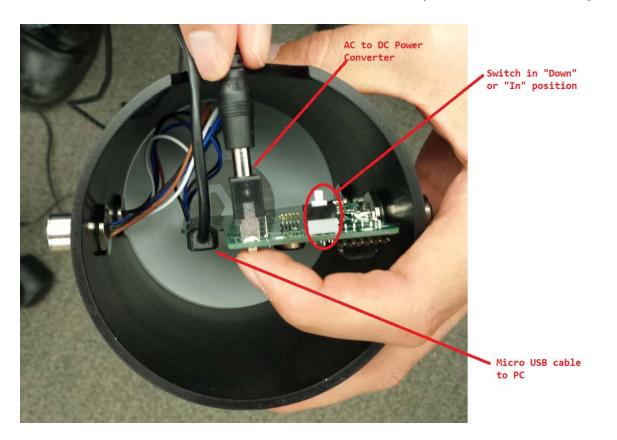
STM32F4 VCP Driver provided by TE Concepts + stsw-stm32102 + stsw-stm32102								
Name	Date modified	Туре	Size					
📄 readme.txt	12/31/2014 12:31	Text Document	2 KB					
VCP_V1.3.1_Setup.exe	12/31/2014 12:31	Application	6,345 KB					
VCP_V1.3.1_Setup_x64.exe	12/31/2014 12:31	Application	6,345 KB					
version.txt	12/31/2014 12:31	Text Document	2 KB					

#### Figure 3. STM32F4 VCP Driver for 32-bit and 64-bit Windows 7/Windows 8.

4. Connect the Micro-USB cable from the PC to the MAXREFDES79# as shown in Figure 4.



Figure 4. Connect the Micro-USB cable from underneath the MAXREFDES79# and then connect it to the PC.



5. Ensure that switch SW1 is in the "Down" or "In" position as shown in Figure 5.

# Figure 5. Verify the SW1 position and connect the AC-to-DC 24V DC power converter.

- 6. Connect the AC-to-DC 24V DC power converter as shown in Figure 5.
- 7. Connect the MAXREFDES27# to Port 1 of the MAXREFDES79# IO-Link master. Port 1 is the top M12 female connector on the LED side of the IO-Link master.

8. Open Windows **Device Manager** and verify the connected COM port number connected as **STMicroelectronics Virtual COM Port (COMx)** shown in <u>Figure 6</u>.

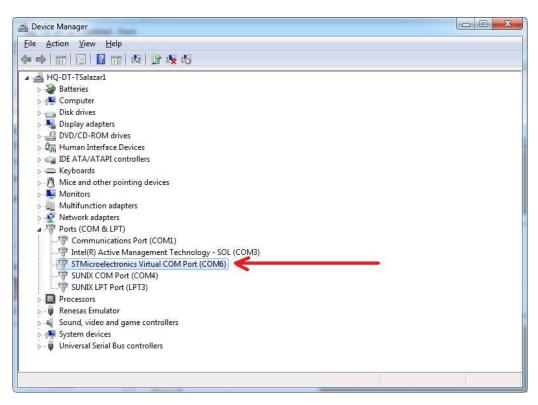


Figure 6. Verify COM port connected as "STMicroelectronics Virtual COM Port (COMx)." It may be a different COM port number on your PC.

 Run the TEConcept CT software as shown in <u>Figure 7</u>. Press the connection settings icon, which is a gray gear. (COM port may be different on your PC.) Press the Connect button and it will show a flashing green COM connection label at the bottom of the GUI once connected.

TEConcept GmbH - IO-Link Control To	ool (CT) - version 1.0.53.0			8 haar 18 h		and the second	
File View Master settings Firm	ware upgrade Tools Help						
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Connection settings	Port 1 Port 2 Port 3 Port 4						
Comm. port: COM3 -	Device parameters	Parameters					
TCP settings COM3 COM1	Device: -			SubInd, Name	Diabe	s Type Valu	
	IO-Link revision: -			Subinu.   Name	Tagri	s type vaic	10
IP address: COM4 COM6	Bit rate: -						
Port: TCP/IP Aardvark	Min cycle time: -						
Aardvark interface	SIO / ISDU / DS:						
	Select device						
	Device configuration	Custom ISDU request		(20)%			
	Operating mode: FIXEDMODE	Index: 0	Ť				DS upload
Disconnect	Port cycle: FREE RUNNING -	Subindex: 0					
Topology	Inspection level: NO CHECK						Write
	DS activation state: DS DISABLED -	Data:					Read
TEConcept	DS download enable: DISABLE			1			1000
	DS upload enable: DISABLE	Process data					
	Cycle time (µs):	Name	Process data	Unit	1		
E-Port 1	Power OFF Power ON	Neme	1100033 0818	1 One	Process data collection:	•	Plot PD
- Device isn't selected					Raw Process Data In:	=	
Inactive	Inactive DI DO IO-Link	-					
Port 2 — Device isn't selected	Connected device state				Raw Process Data Out:		PDO invalid
Inactive	Vendor ID: -				and the second second		
E-Port 3	Device ID: - Product ID: -				🔿 Low 🔘 High		Send
Device isn't selected Inactive	Serial number: -	-					
⊟- Port 4	Vendor name: -	Events		T - Constanting		1	
- Device isn't selected	Product name: -	Time Event coo	e Mode	Туре	Source	Instance	
I Inactive	Cycle time: -						
• III	Port state: -						
A TO Link	Operate in IO-Link: No						
😢 IO-Link	Fault: NOFAULT						
IO-Link Master status: Not connected							

Figure 7. TEConcept IO-Link CT Software. Tested with version 1.0.53.0.

10. Load in the IODD file for your sensor or actuator. In this case, we will show the MAXREFDES27# IO-Link proximity sensor not included. First, press the Select device button. In the Device selector window, press the Import button and select the sensor's \*1.1.xml IODD file. Highlight the IODD file in the IO-Link Devices box and press the Select device button. See Figure 8 and Figure 9.

~		•	Search IODD	
rganize 🔻	<ul> <li>New folder</li> </ul>		855	• 🔟 🤅
٠ ال	Name	Date	Туре	Size
	属 Maxim-logo.png	12/10/2014 5:28 PM	PNG image	6 K
	Maxim-Saratoga-20140318-IODD1.0.1.xml	12/10/2014 5:28 PM	XML Document	15 K
	Maxim-Saratoga-20140318-IODD1.1.xml	12/10/2014 5:28 PM	XML Document	16 K
C	📭 Maxim-Saratoga-icon.png	12/10/2014 5:28 PM	PNG image	5 K
9 % 9 9				

Figure 8. Sensor IODD file (\*1.1.xml).

Device basic data	οηςε			10-Link <mark>data</mark>			Maxim-Saratoga-20 Maxim-SanFranciso	co-20140127-IODD1.1
Vendor:	Maxim Integrated Prod	ucts, Inc.		Bit rate:	COM3		SICK-DT50-2-2014	
Device:	Maxim Saratoga Demo			10-Link Version:	1.1	1 <b>1</b>	Maxim-ServoInterfa	ice-20140910-IODD1.1
				MinCycleTime:	2000 µs			
Vendor ID:	478			SIO mode:	yes			
Device Id:	2	M inte	kim j			_7.		
Hardware Revision:		inte	grated	-	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1			
imware Revision:				C C				
Description:	Proximity and Ambiant MAX14821, RL78 and	Light Sensor with Ma TMG TE IO-Link Der	x44000, vice Stack		A A A A A A A A A A A A A A A A A A A			
	1							
ODD <mark>data</mark>	]							
	Maxim-Saratoga-2014	0318-IODD1.1						
ODD:	Maxim-Saratoga-20144 2014-03-18	D318-IODD1.1 Document version:	V2.0					
ODD: Release date:		Document version:	V2.0					
ODD: Release date: elected device.com	2014-03-18 esponds with connected of	Document version:	V2.0					III Delete
IODD data IODD: Release date: elected device corre IOD checked and v	2014-03-18 esponds with connected of	Document version:	V2.0				ODD Check	

Figure 9. Press the Select device button when imported IODD files are highlighted.

11. The **IO-Link** button becomes active once the IODD file is assigned to a port and the MAXREFDES79# is connected to the PC. Press the **IO-Link** button once it becomes active as shown in Figure 10.

TEConcept GmbH - IO-Link Control To	ool (CT) - version 1.0.53.0	and the second s	And Indiana		
File View Master settings Firmw	vare upgrade Tools Help				10
0000					
Topology	Port 1 Port 2 Port 3 Port 4				
TEConcont	Device parameters	Parameters			
Pot 1 Pot 1 Pot 2 Pot 3 Pot 3 Pot 3 Pot 3 Pot 3 Pot 3 Pot 4 Pot 3 Pot 3 Pot 4 Pot 3 Pot 4 Pot 3 Pot 3 Pot 3 Pot 4 Pot 3 Pot 4 Pot 3 Pot 3 Pot 4 Pot 3 Pot 3 Pot 4 Pot 4 Pot 3 Pot 4 Pot 3 Pot 4 Pot 3 Pot 4 Pot 4 Pot 3 Pot 4 Pot 3 Pot 4 Pot 4 Pot 4 Pot 3 Pot 4 Pot 4 Pot 4 Pot 4 Pot 3 Pot 4 Pot 4	Device: Maxim Saratoga IO-Link revision: 1.1 Bit rate: COM3 Min cycle time: 2000 µa SIO / ISDU / DS: ✓ ✓ ✓ Select device Device configuration Operating mode: Port cycle: FREE RUINNING ▼ Inspection level: NO CHECK ▼ DS softwalon state: DS DISABLED ▼ DS supload enable: DISABLE ▼	Control C	Subind.   Name	Rights   Type	Value
	Cycle time (µ): Power OFF Power OFF Power ON DO DO DO DO Power ON DO DO DO DO DO DO DO DO DO DO	Process data	ss data Unit - - -	Process data collection: PD Raw Process Data In: -	Virte Read
	Operate in IO-Link: No Fault: NOFAULT			Raw Process Data Out:	PDO invalid Send
		Events			
			Mode Type	Source Instance	
e m r			1)90		C. C
🚷 IO-Link					

IO-Link Master status: Connected at COM6 (vendor: MAXIM Integrated, product name: MAXREFDES79, product ID: 0001, serial number: 001, hw rev: 1, sw rev: 2)

Figure 10. IO-Link button becomes active once an IODD is assigned to a port and the MAXREFDES79# is connected to the PC.

12. Read and write to parameters by selecting a parameter in the **Parameters** box and then use the **Read** button to read the parameter. The value gets displayed in the **Value** field circled in <u>Figure 11</u>. Also, when writing to a parameter, first edit the value in the **Value** field using the mouse/keyboard and then press the **Write** button. Verify by pressing the **Read** button. See <u>Figure 11</u>.

) 🧿 🎯 🖸	Port 1 Port 2 Port 3	Dea 4							
and the second	Device parameters	101.4	Parameters		_				
PC MAXREFDES73 Pot 1 Maxim Saratoga Demo IO-Link Pot 2 Device ian't selected Inactive Pot 3 Device ian't selected Inactive Pot 4 Device ian't selected Inactive Pot 5 Pot 1 Device ian't selected Inactive	Device: IO-Link revision: Bit rate: Min cycle time: SIO / ISDU / DS:	Maxim Saratoga 1.1 COM3 2000 ja V V V t device FIXED MODE FREE RUNNING V NO CHECK DS DISABLE V V DISABLE V V DISABLE V V DISABLE DISABLE DISABLE DISABLE DISABLE DISABLE DISABLE		nversion Time D Current 12 Mode Ibient Light Tex xximity Value erating Mode m Gain n trim green ch	ach Value	00 Pro	During Value RV		DS uplead
	Connected device state Vendor ID:	0x01DE				1			(1000
	Device ID: Product ID:	0x000002	Process data	1	Process data	Unit			-
	Serial number:	MAXIM_RL78_02 0123456789	Digital Out		Frocess data	Unit	Process data collection:		Plot PD
	Vendor name: Product name: Cycle time: Port state:	Maxim Integrated Maxim Saratoga 2 000 μs <b>IO-Link</b>	Sensor Switch Value		True 252		Raw Process Data In:	0x03 0x1-2	
	Operate in IO-Link:	Yes							_
	Fault:	NOFAULT					Raw Process Data Out:		PDO invali
							🔘 Low 💮 High		Send
			Events						
				vent code	Mode	Туре	Source	Instance	
									Clark

IO-Link Master status: Connected at COM6 (vendor: MAXIM Integrated, product name: MAXREFDES79, product ID: 0001, serial number: 001, hw rev: 1, sw rev: 2)

#### Figure 11. Read and write to parameters by using the Read and Write buttons.

#### 4. Software License Keys

The**TEConcept** IO-Link master stack ships with a finite time license displayed by the **TEConcept CT** software. The MAXREFDES79# ships with more than 9000 minutes of use time. When the time in the **Remained time** field goes to 0 minutes, the Master switches off all the IO-Link ports and shows the error message: **LICENSEFAULT**.

A new infinite time license can be easily purchased from TEConcept GmbH for less than a quarter of the price of the MAXREFDES79# by providing them a valid **Hardware ID** and **Key number**. Press the **Export hardware ID** button located in the **License key management** window. Provide the **hardwareID.txt** file when requesting the infinite time license from TEConcept GmbH. Contact info for TEConcept GmbH is provided below.

Hardware ID:	Key number:	Remained time:	
32 35 34 37 32 33 47 04 00 38 00 25	0	0	mins
License key:		Period:	
			mins

Figure 12. License key management window.

### TEConcept GmbH Wentzingerstr. 21 D-79106 Freiburg Tel. +49 761 21443640 Fax +49 761 21443631 E-Mail: <u>info@teconcept.de</u> http://www.teconcept.de/Contact.php

#### Figure 13. TEConcept GmbH contact information.

#### 5. Trademarks

IO-Link is a registered trademark of ifm electronic GmbH.

Windows is a registered trademark and registered service mark of Microsoft Corp.

### 6. Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	3/15	Initial release	—