MAXREFDES42#
IO-Link RTD Temp Sensor
Quick Start Guide

(IQ^2 IO-Link Master Version)

Rev 0; 1/15



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 IQ^2 Development that your version of Windows is supported before purchasing their software.)**
- MAXREFDES42# board
- IQ^2 Development iqInterface® IO-Link® master with corresponding USB and power cables (This must be purchased separately.)
- IQ^2 Development IO-Link iqTool® (tested with version 1.1.0.4 and comes with the iqInterface IO-Link master)
- One IO-Link cable (This must be purchased separately.)
- One A-to-B Type USB cable
- RD42_RL78_V01_XX.ZIP (Maxim-MAXREFDES42-20140824-IODD1.1.html), where XX = minor version



Figure 1. MAXREFDES42# Board Connected to an IQ^2 Development IO-Link Master

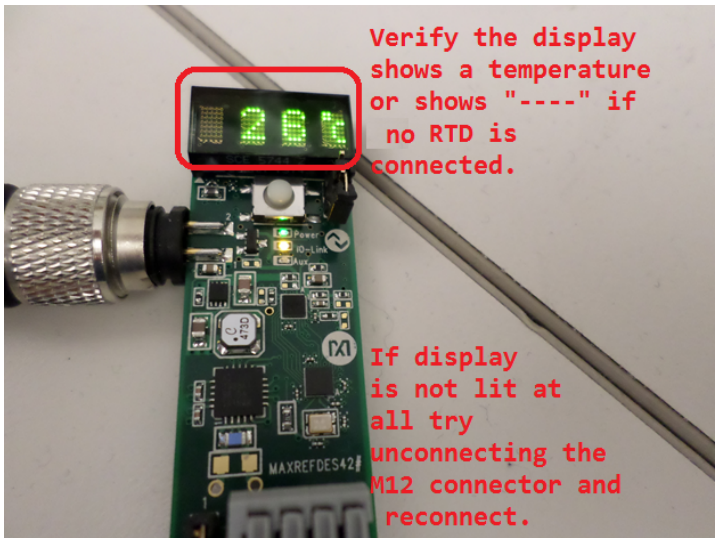


Figure 2. Green Display is Lit

2. Overview

1. Connect power and all the cables to the iqInterface IO-Link Master as shown in Figure 1.

2. Connect the MAXREFDES42# proximity sensor board to the other side of the IO-Link cable. Make sure the green display is lit as shown in Figure 2.

3. Download the latest "all design files" **RD42V01_XX.ZIP** file located on the **Design Resources** tab at **www.maximintegrated.com/MAXREFDES42**. Alternatively, you can download the design files from **http://www.iq2-development.com/downloads/.**

4. Install the IQ^2 Development IO-Link iqTool onto your Windows PC by referring to IQ^2 Development's iqInterface User Manual located at **http://www.iq2-development.com/downloads/**.

5. Connect the MAXREFDES42# IO-Link RTD temperature sensor as a device in the IQ^2 Development IO-Link iqTool.

6. Read and write to the desired indexes by referring to IQ^2 Development's .html index definition file (Maxim-MAXREFDES42-20140824-IODD1.1.html).

3. Included Files

The **RD42_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. See Figures 3 to 6 for project structure and key filenames.

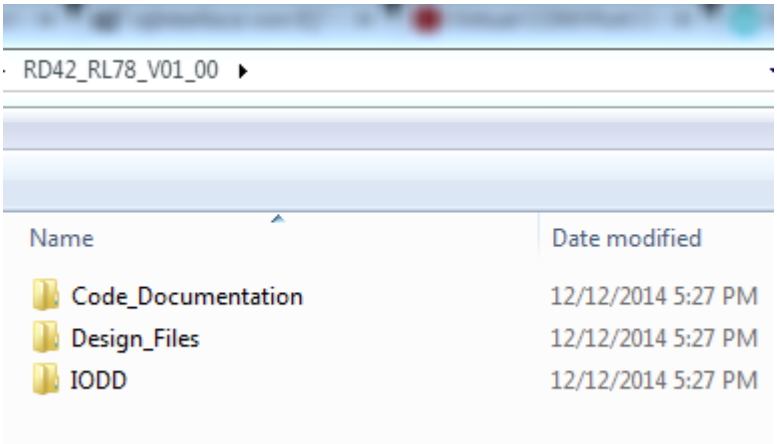


Figure 3. Directories inside RD42_RL78_VXX_XX.ZIP.

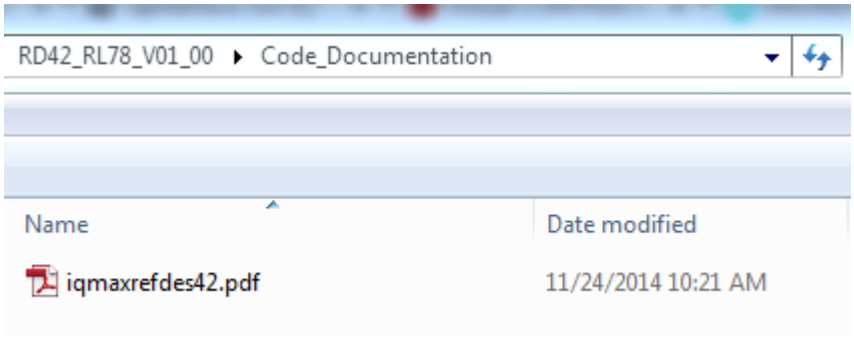


Figure 4. File inside the Code_Documentation directory.

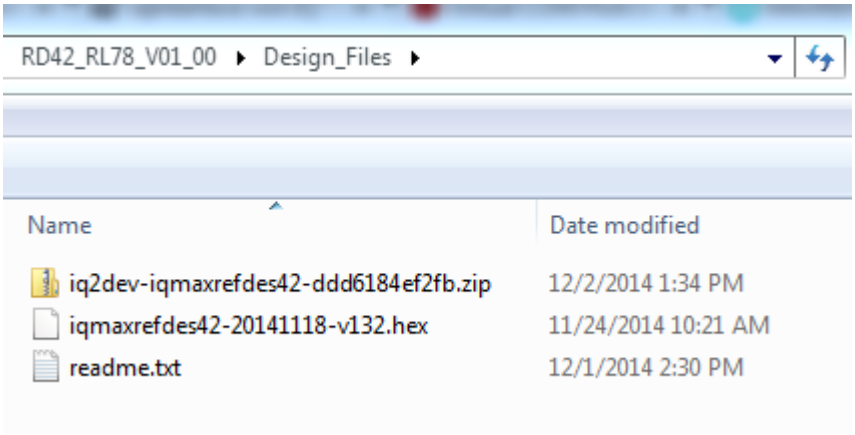


Figure 5. Files inside the Design_Files directory. Source files are in the zip file.

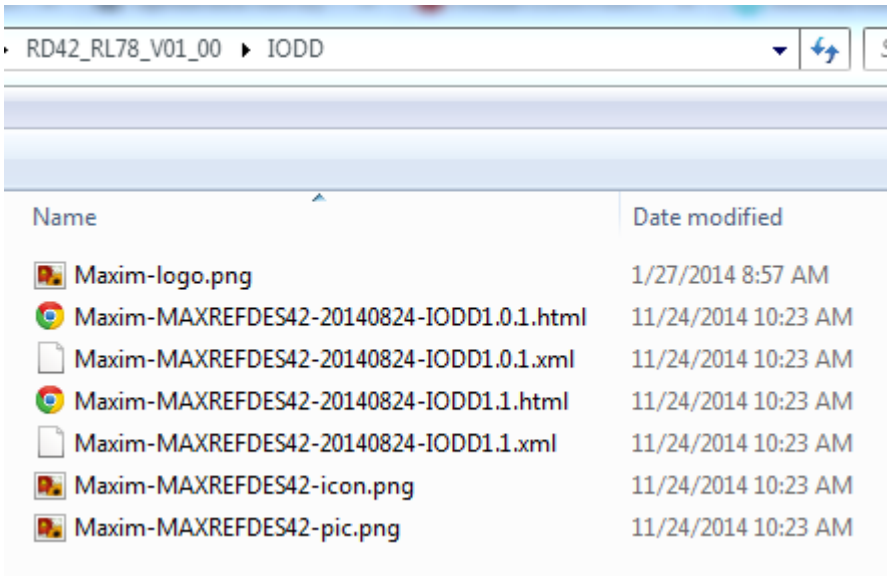


Figure 6. Files inside the IODD directory. The .xml files are the IODD files and the .html files are the IQ^2 Development's .html index definition files.

4. Procedure

1. Connect the A-to-B Type USB cable from the PC to the iqInterface IO-Link Master as shown in Figure 1.

2. Connect an IO-Link cable to the iqInterface IO-Link Master as shown in Figure 1.

3. Connect 24V DC and GND to the orange terminal block on the iqInterface IO-Link Master as shown in Figure 1. Pin 1 is +24V and pin 2 is GND.

4. Connect the MAXREFDES42# proximity sensor board to the other side of the IO-Link cable. Make sure the green display is lit as shown in Figure 2.

5. Download the latest "all design files" **RD42V01_XX.ZIP** file located on the **DESIGN RESOURCES** tab at **www.maximintegrated.com/MAXREFDES42**. Alternatively, you can download the design files from **http://www.iq2-development.com/downloads/.**

6. Extract the **RD42V01_XX.ZIP** file to a directory on your PC.

7. Install the IQ^2 Development IO-Link iqTool onto your Windows PC as shown in Figure 7 by referring to IQ^2 Development's iqInterface User Manual located at **http://www.iq2-development.com/downloads/**.

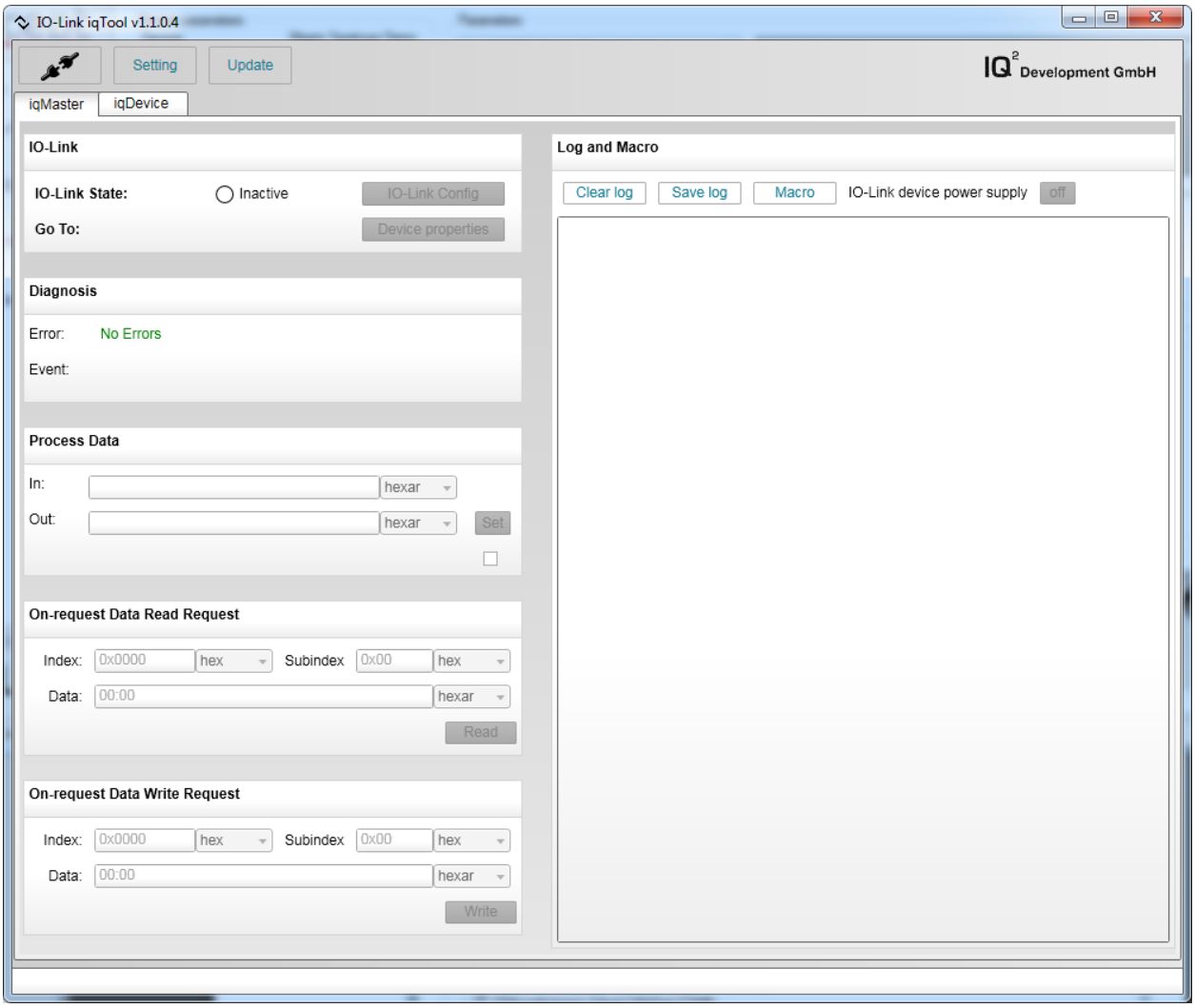


Figure 7. Newly installed IQ^2 Development IO-Link iqTool.

8. Make sure you are in the **iqMaster** tab, then press the **Setting** button. In the **IQ Connection Settings** window, select **auto** in the **Comport / USB** drop-down menu. Press **OK** to save setting as shown in Figure 8.

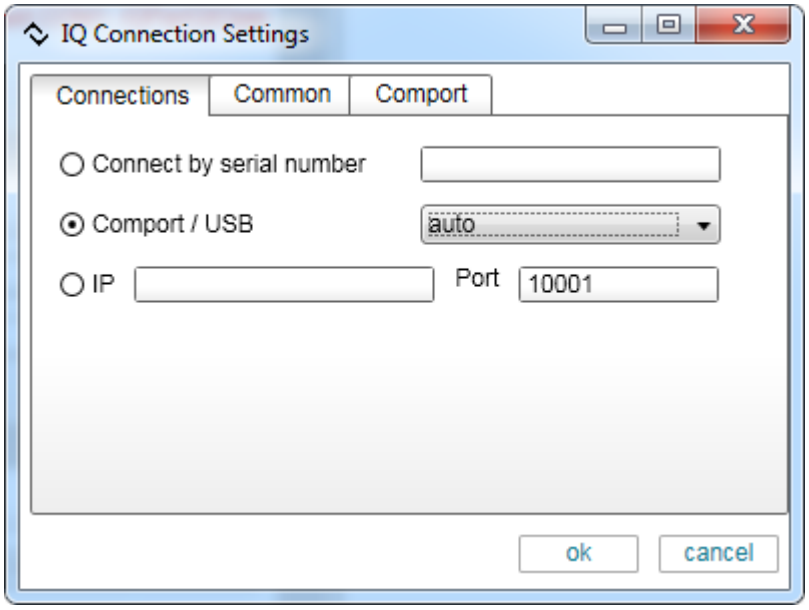


Figure 8. IQ Connection Settings window.

9. Next, press the **Connect** button as shown in Figure 9.

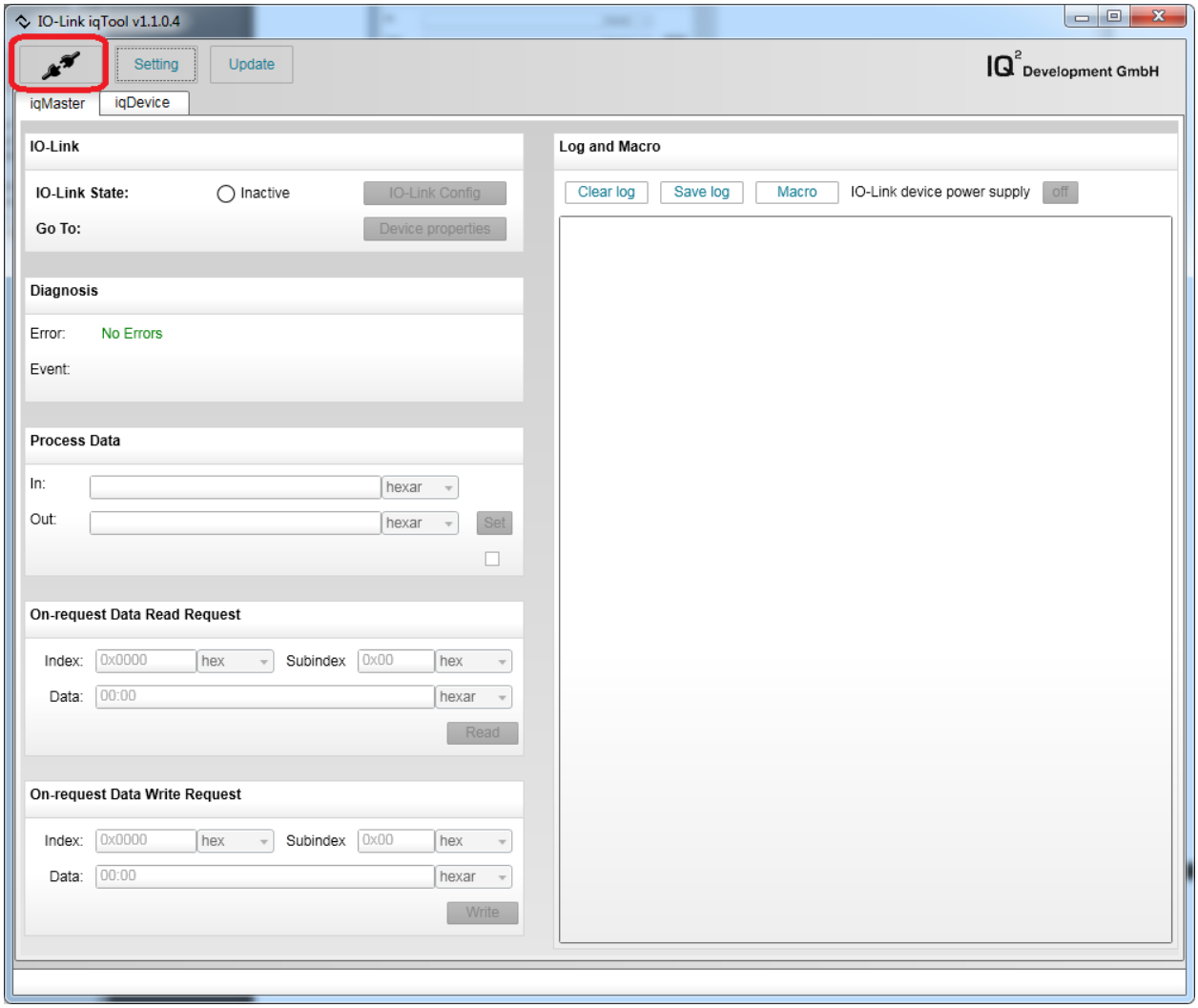


Figure 9. Press the Connect button in the iqTool.

10. If the COM port is not found automatically, open **Device Manager** in your Windows operating system as shown in Figure 10 to verify to which COM port the iqInterface hardware is connected. Then manually set that COM port in the **IQ Connection Settings** window and press the **Connect** button again. If you still cannot connect after doing this step, contact IQ^2 Development's technical support or refer to IQ^2 Development iqInterface user manual located at **http://www.iq2-development.com/downloads/**.

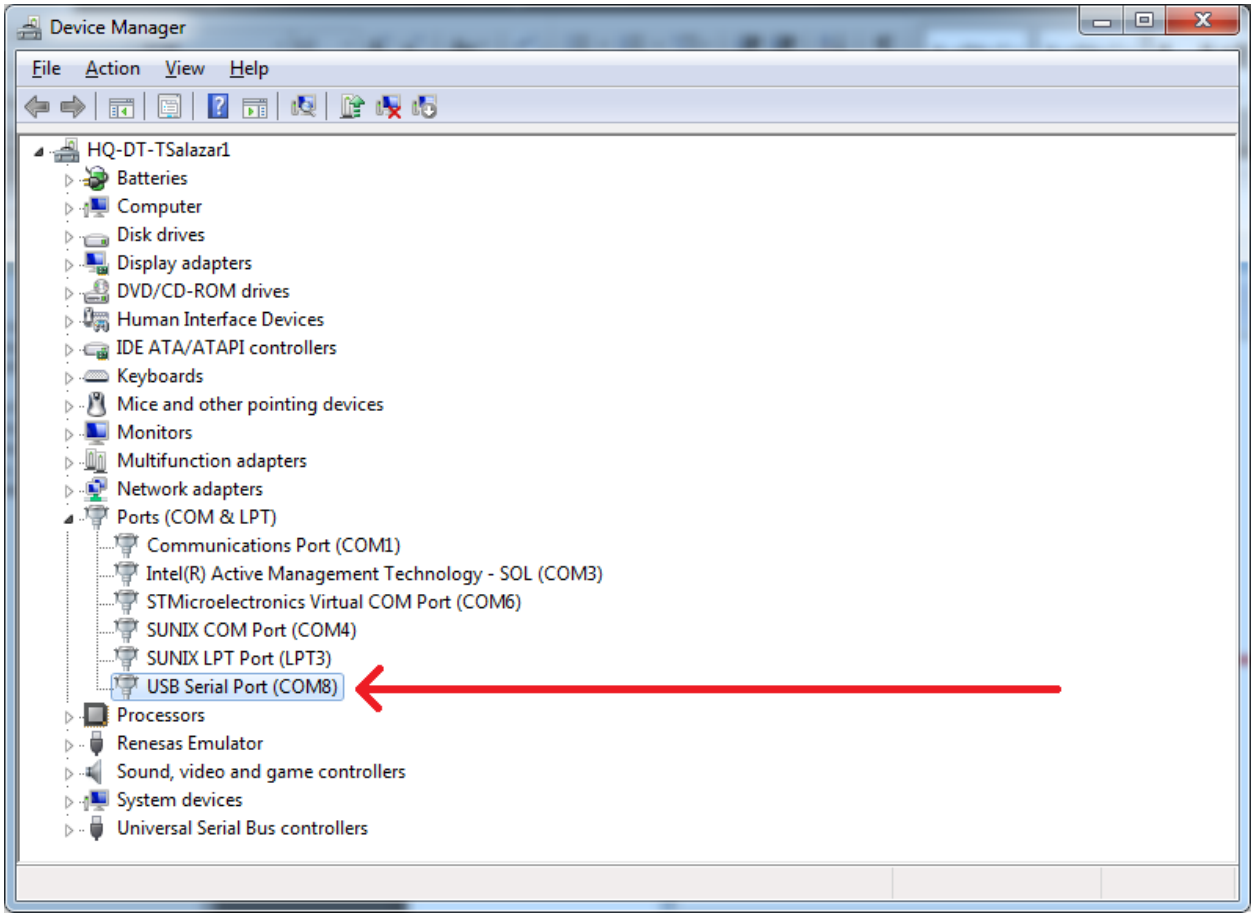


Figure 10. Device Manager built into Windows.

11. After the iqTool has connected to the correct COM port, press the **Auto** button as shown in Figure 11.

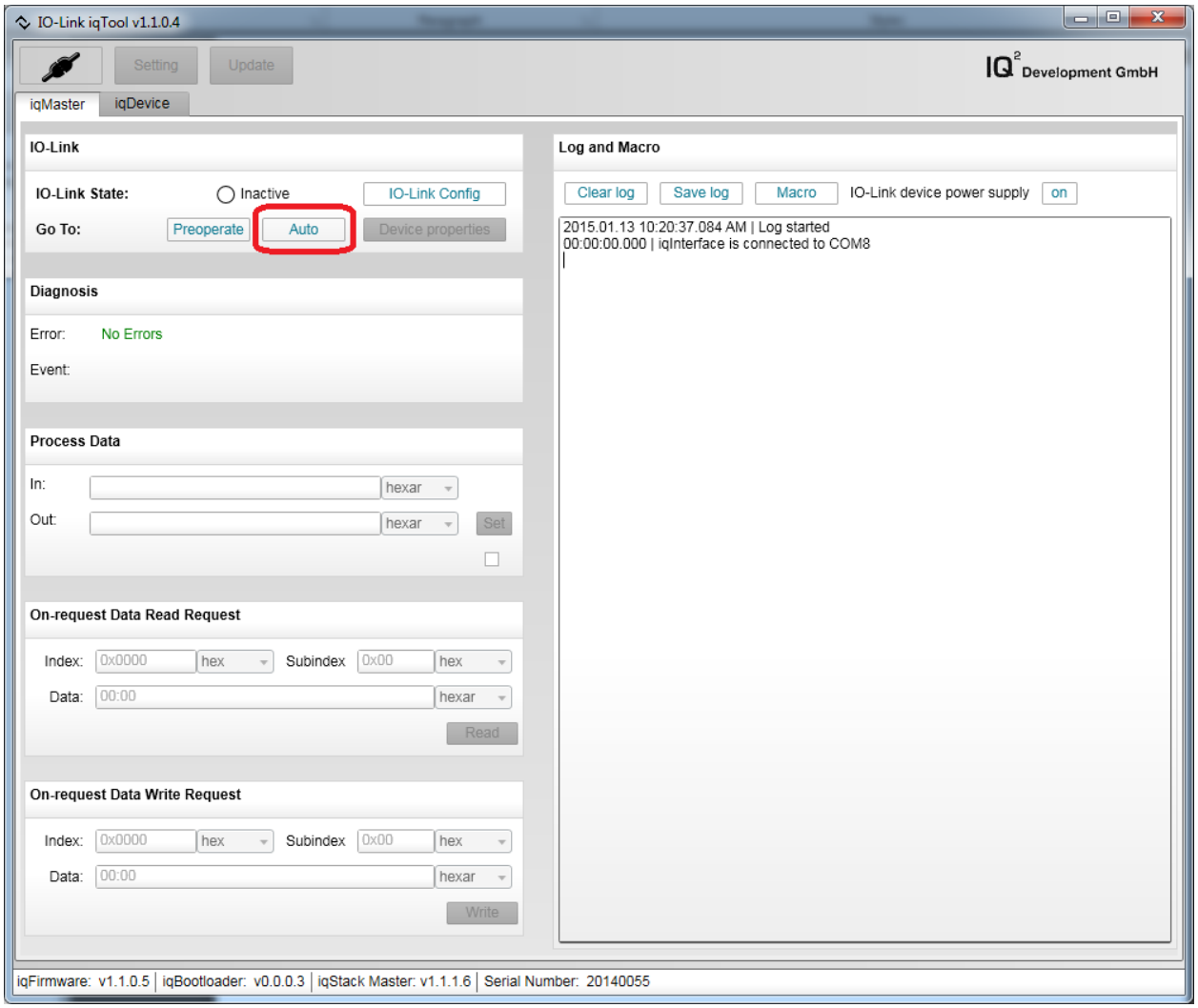


Figure 11. iqTool Auto button.

12. You should now see a flashing green **Operate** circle and the **On-request Data Read Request** group should have become active (ungrayed out) as shown in Figure 12.

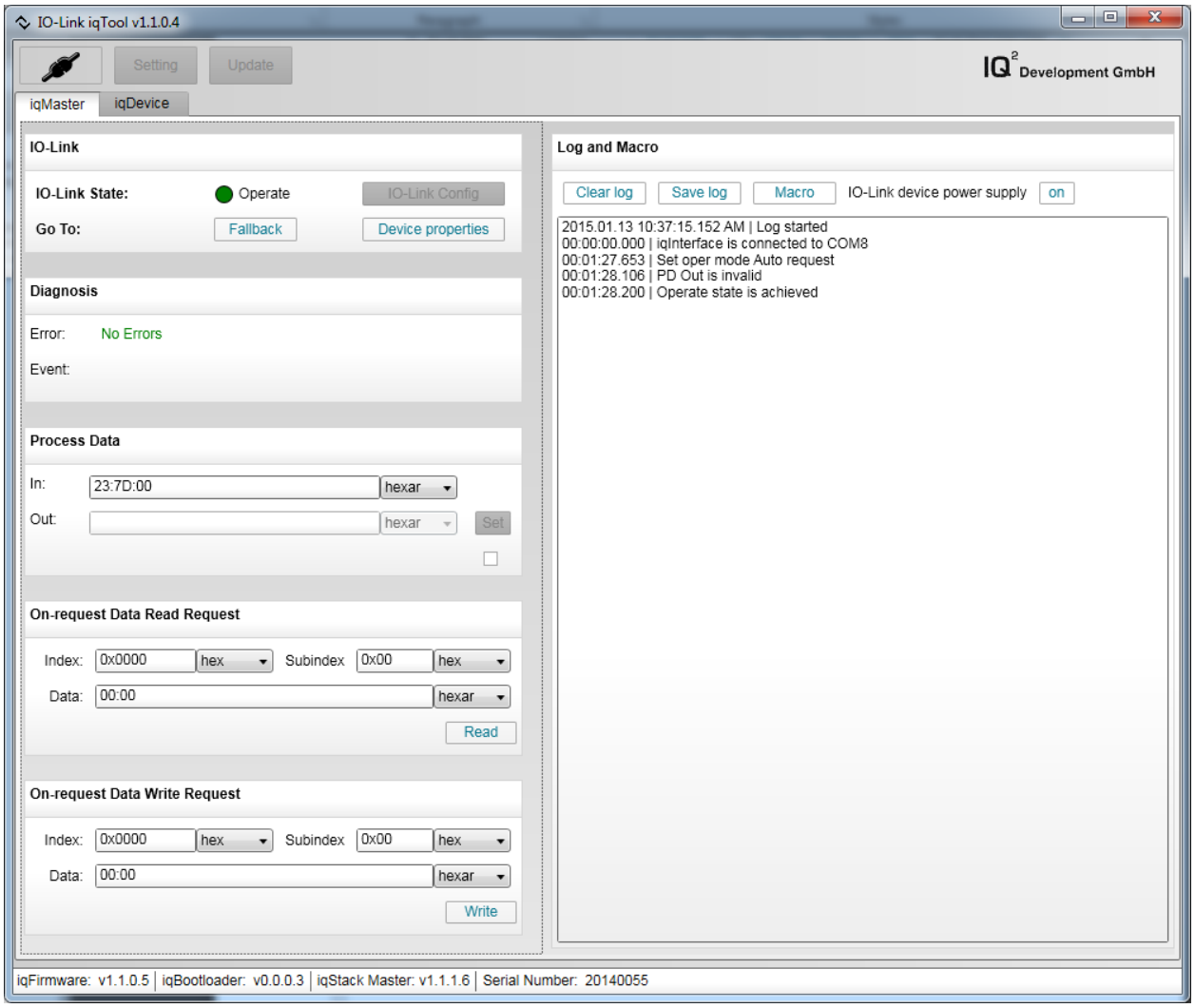


Figure 12. iqTool Operate state.

13. Open the **Maxim-MAXREFDES42-20140824-IODD1.1.html** file to view the index numbers and data formats. Go to the index 261, which is the MAX31865 RTD code register value variable as shown in Figure 13. **Note: RTD code register value is shifted by 1 bit so the value read back needs to be divided by two.**

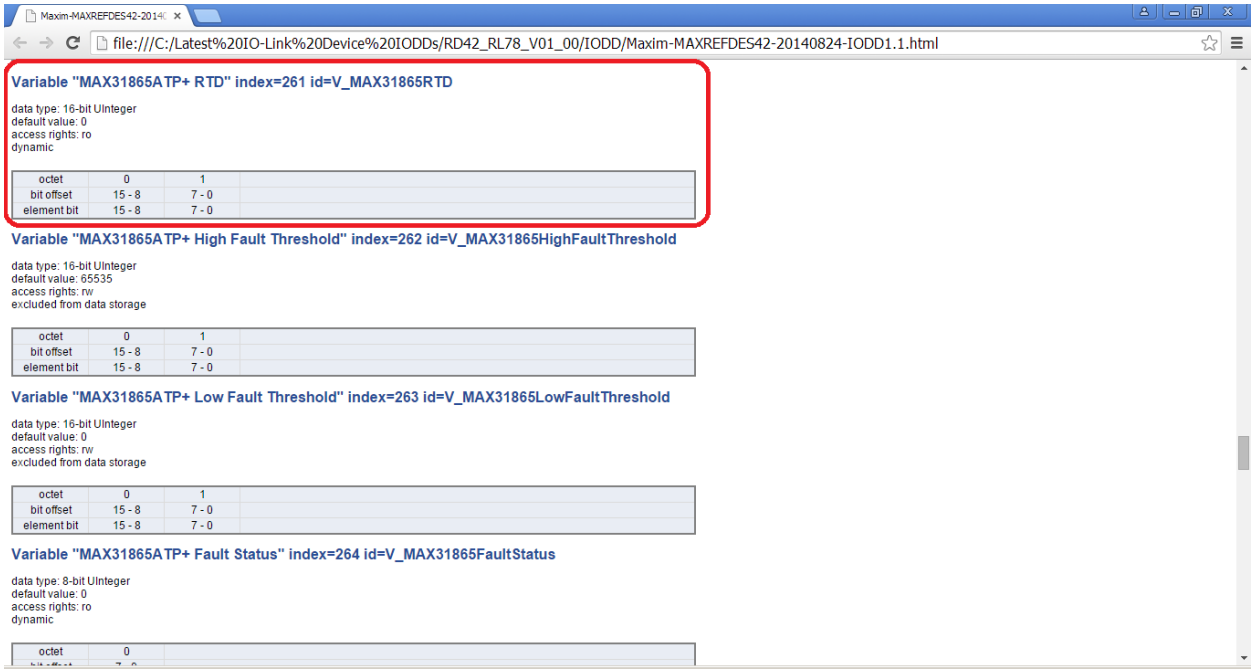


Figure 13. .html index definition file – Index 261.

14. Read the RTD code by performing the operations in the **On-request Data Read Request** group below, as shown in Figure 14.
    - Change **Index** type to **uint16**.
    - Enter **261** in the **Index** field.
    - Change the **Data** type to **uint16**.
    - Press the **Read** button.

    Note: RTD code register value is shifted by 1 bit so the value read back needs to be divided by two.

    RTD = (Code * 400) / 2^15 = (18174 / 2) * 400/ 2^15 = 110.925 Ohms

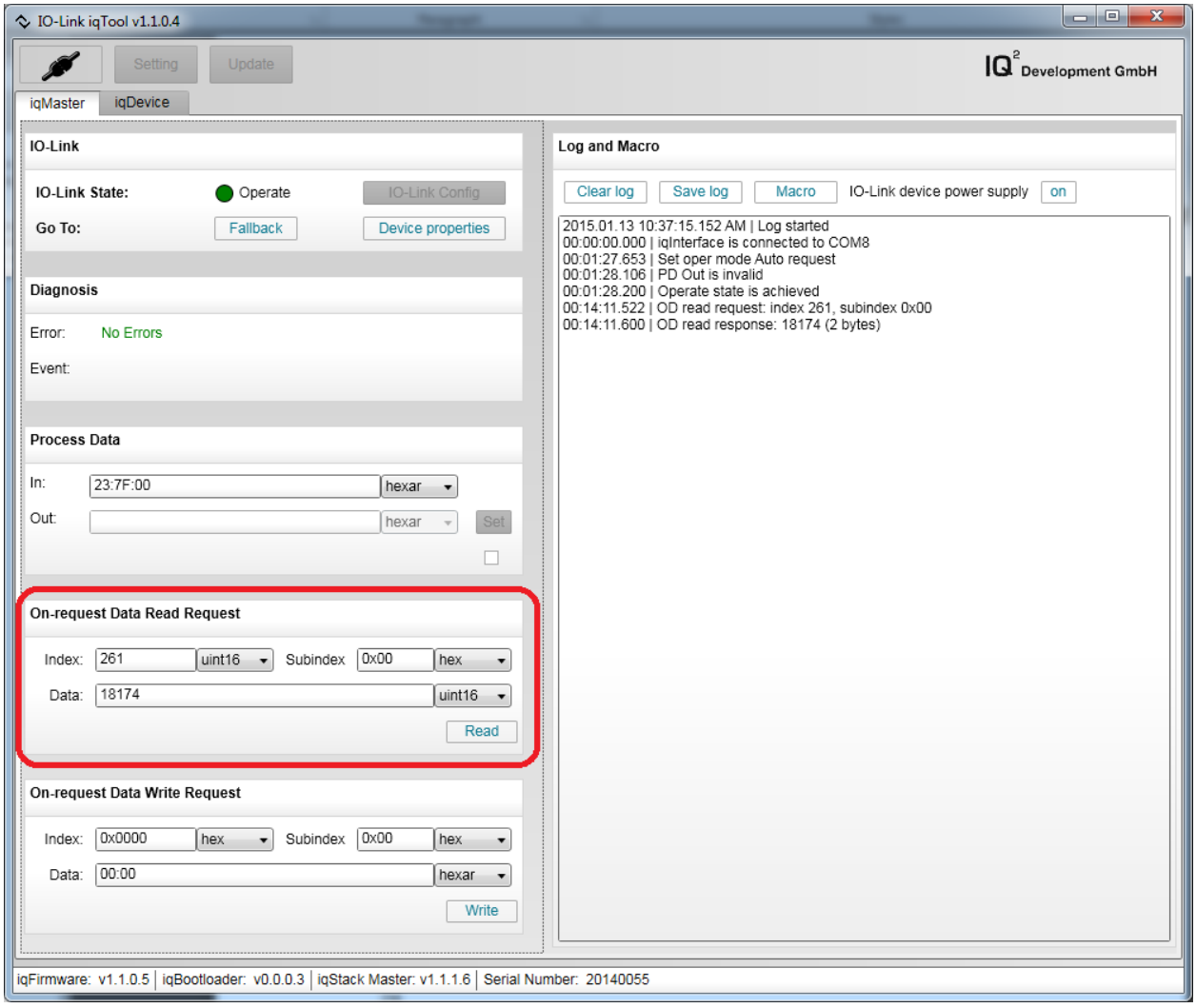


Figure 14. iqTool - On-request Data Read Request group – Index 261.

15. Next, go to index 268 in the **Maxim-MAXREFDES42-20140824-IODD1.1.html** file , which is the ambient temperature in degree C variable, as shown in Figure 15.

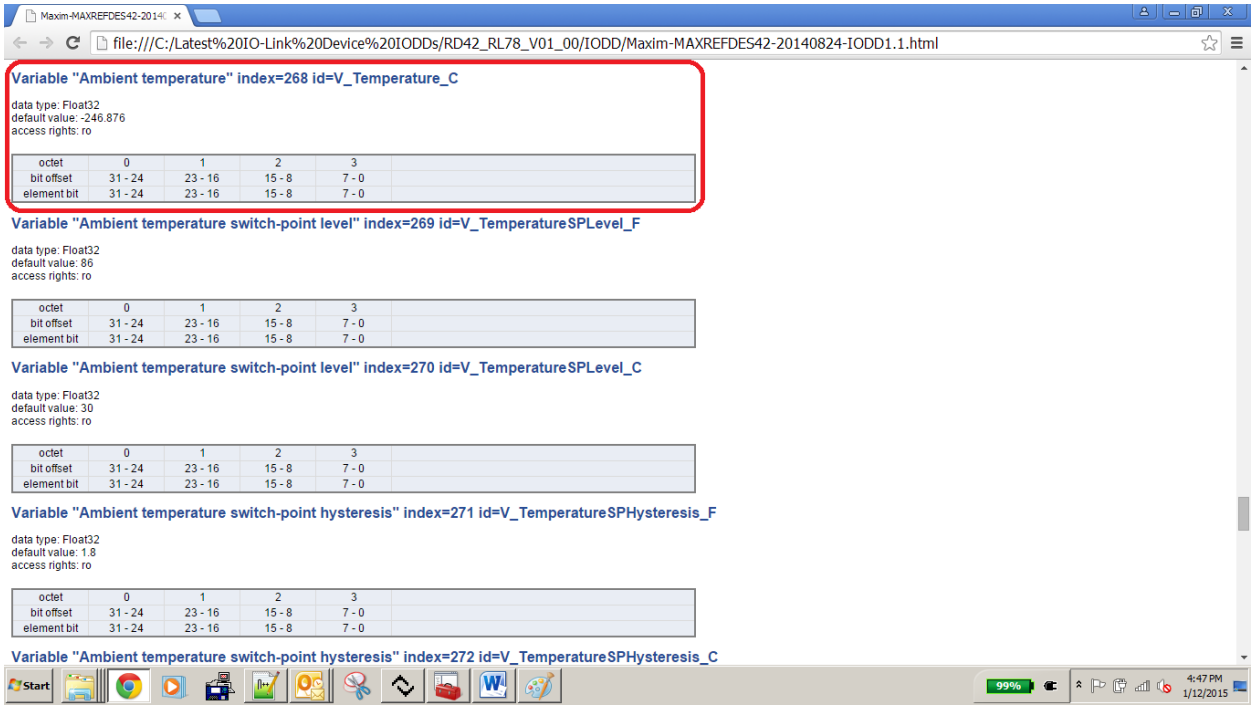


Figure 15. .html index definition file – Index 268.

16. Read the ambient temperature value in degrees C by performing the operations in the **On-request Data Read Request** group below, as shown in Figure 16.
    - Enter **268** in the **Index** field.
    - Change the **Data** type to **hex**.
    - Press the **Read** button.
    - Convert read hex value to float32.

    Temp = 0x41E00E8A = 28.007099 = 28.01 degrees C

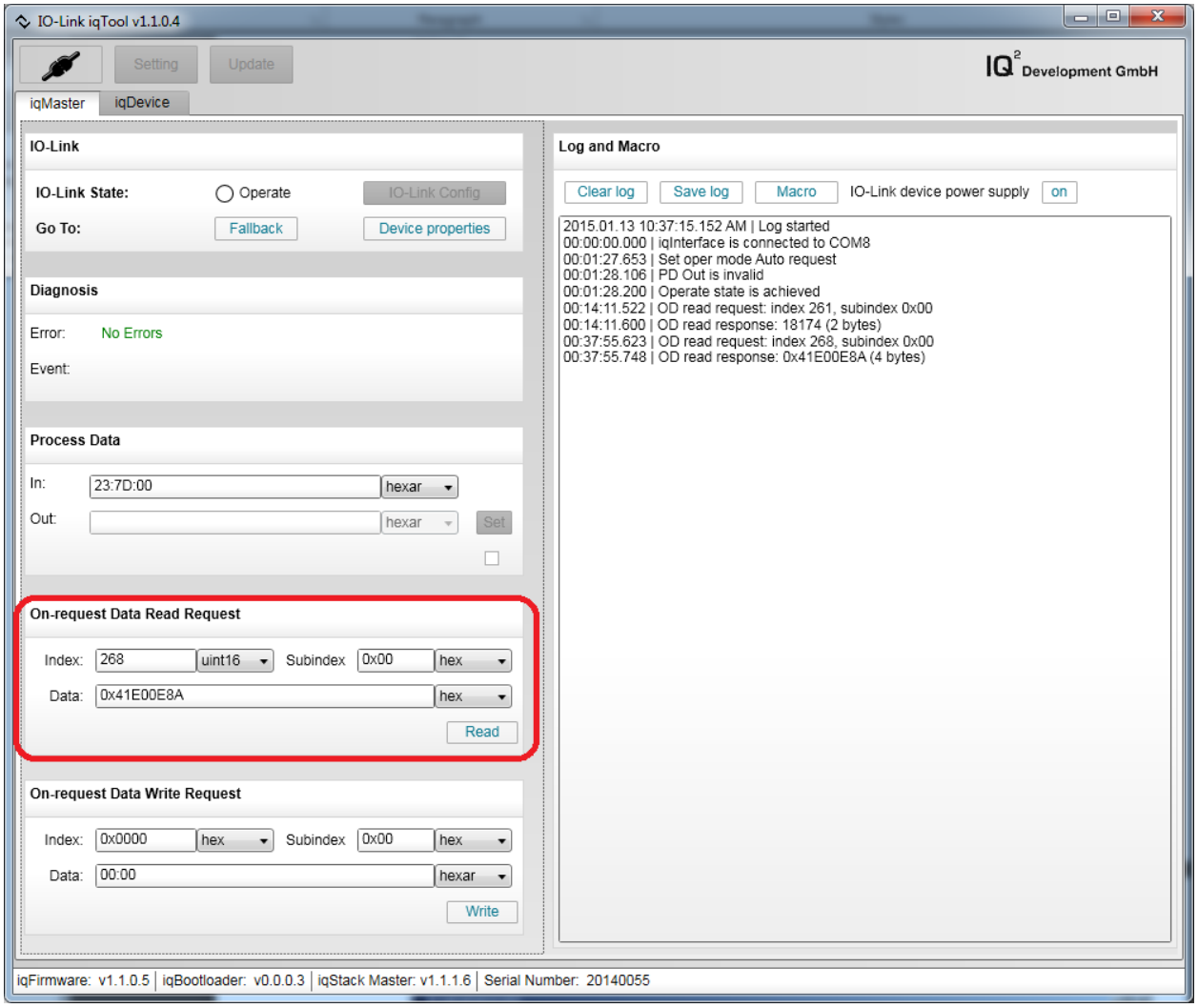


Figure 16. iqTool - On-request Data Read Request group – Index 268.

5. Trademarks

IO-Link is a registered trademark of ifm electronic GmbH.
IQ^2 Development is a registered trademark of IQ^2 Development GmbH.
iqInterface is a registered trademark of IQ^2 Development GmbH.
iqTool is a registered trademark of IQ^2 Development GmbH.
Windows is a registered trademark and registered service mark of Microsoft Corp.

6. Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	1/15	Initial release	—