

UM11980

P3T2030xUK-ARD EVB evaluation board

Rev. 1.0 — 27 November 2023

User manual

Document information

Information	Content
Keywords	P3T2030xUK, I ² C/I3C-bus, I3C IBI, temperature resolution of 0.0625 °C, 12-bit A-to-D conversion, 2 °C temperature accuracy.
Abstract	The P3T2030XUK-ARD evaluation board is easy to test and designed for the P3T2030xUK which is an I3C, I ² C-bus, 2 °C accuracy, digital temperature sensor. This evaluation board, along with the MIMXRT685-EVK MCU board provides an easy to use evaluation platform.



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1 Introduction

The P3T2030XUK-ARD evaluation board features an I3C, I²C-bus, 2 °C accuracy, digital temperature sensor. A graphical interface allows the user to easily explore the different functions of the driver. The board can be connected in parallel with other I²C-bus demoboard to create an evaluation system.

The IC communicates to the host via the industry standard I²C-bus port. The evaluation software runs under Microsoft Windows 7, 8, and 10 PC platform.

2 Features

- A complete evaluation platform for the P3T2030XUK I3C, I²C-bus, 2 °C accuracy, digital temperature sensor
- Easy to use GUI based software demonstrates the capabilities of the P3T2030XUK
- On-board temperature sensor for system thermal management experiments
- Convenient test points for easy scope measurements and signal access
- USB interface to the host PC
- Power supply from USB port (x2) or external power supply can be used to power P3T2030XUK-ARD evaluation board

3 Finding kit resources and information on the NXP web site

NXP Semiconductors provides online resources for the evaluation board and its supported device(s) on <http://www.nxp.com>.

The information page for P3T2030XUK-ARD evaluation board is at <http://www.nxp.com/P3T2030XUK-ARD>. The information page provides overview information, documentation, software and tools, parametric, ordering information and a **Getting Started** tab.

The Getting Started tab provides quick-reference information applicable to using the P3T2030XUK-ARD evaluation board, including the downloadable assets referenced in this document.

3.1 Collaborate in the NXP community

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4 Getting ready

Working with the P3T2030XUK-ARD evaluation board requires the kit contents, additional hardware, and a Windows PC workstation with installed software.

4.1 Kit contents

- Assembled and tested evaluation board in an antistatic bag
- Quick Start Guide

4.2 Assumptions

Familiarity with the SPI-bus is helpful but not required.

4.3 Static handling requirements

CAUTION

This device is sensitive to ElectroStatic Discharge (ESD). Therefore care should be taken during transport and handling. You must use a ground strap or touch the PC case or other grounded source before unpacking or handling the hardware.

4.4 Minimum system requirements

- PC Pentium processor (or equivalent)
- One USB port (either 3.0 or 2.0 or 1.1 compatible)
- Windows 7, 8, or 10
- OM13089 MCU board (from www.nxp.com)

4.5 Power requirements

The MIMXRT685-EVK MCU board obtains power from the PC USB port; two USB parts can be connected to the MIMXRT685-EVK MCU board simultaneously. Please use external power supply option if exceeding the USB port current capabilities.

5 Hardware installation

5.1 P3T2030XUK-ARD EV board and MIMXRT685-EVK MCU board connection

P3T2030XUK-ARD evaluation board is connected to the MIMXRT685-EVK MCU board using four connectors (J1/J2/J3/J4 on P3T2030XUK-ARD board and J27/J28/J29/J30 on MIMXRT685-EVK board) for I²C-bus and power supply, and one connector (J9 on P3T2030XUK-ARD board and J18 on MIMXRT685-EVK board) for I3C-bus.

The MIMXRT685-EVK MCU board communicates with P3T2030XUK demo GUI through PC USB port and uses I²C or I3C-bus to communicate to P3T2030XUK.

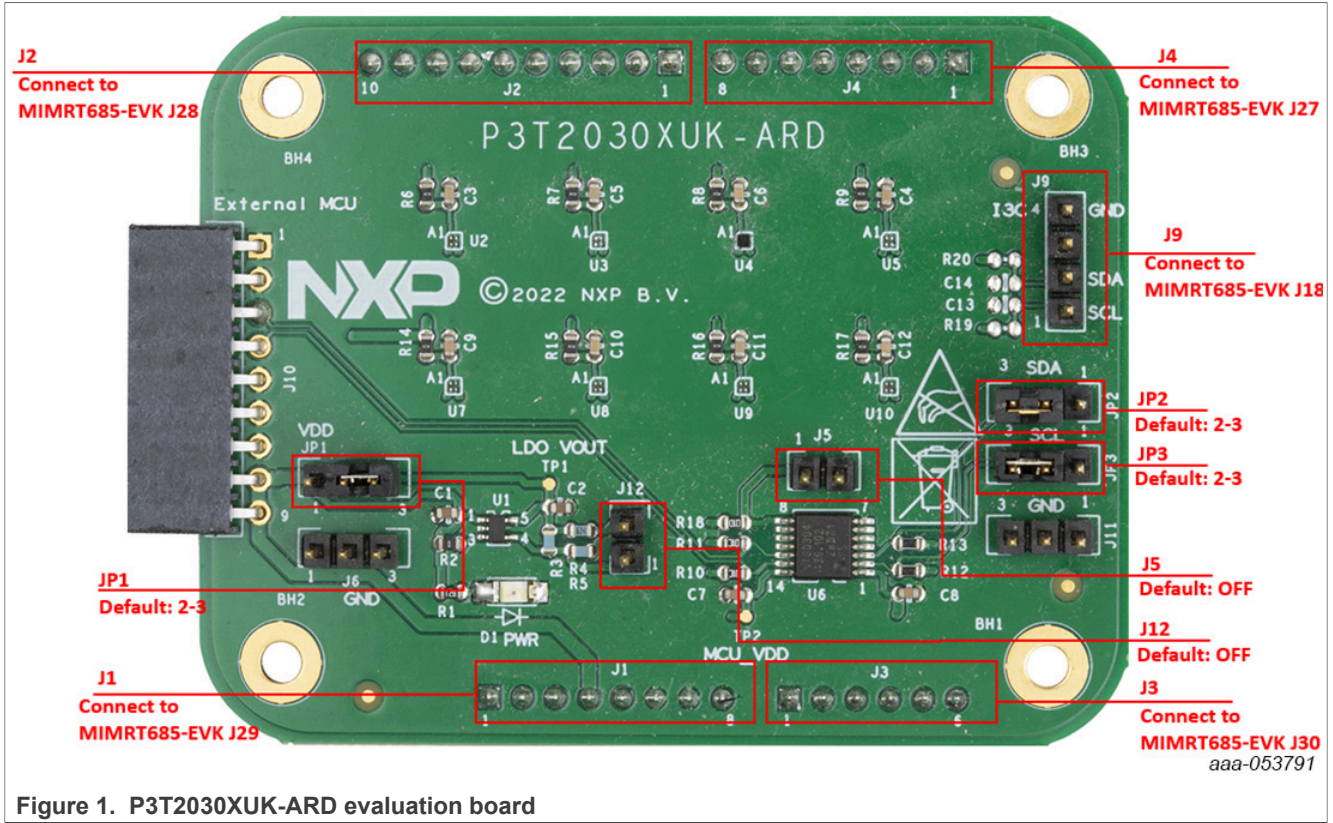


Figure 1. P3T2030XUK-ARD evaluation board

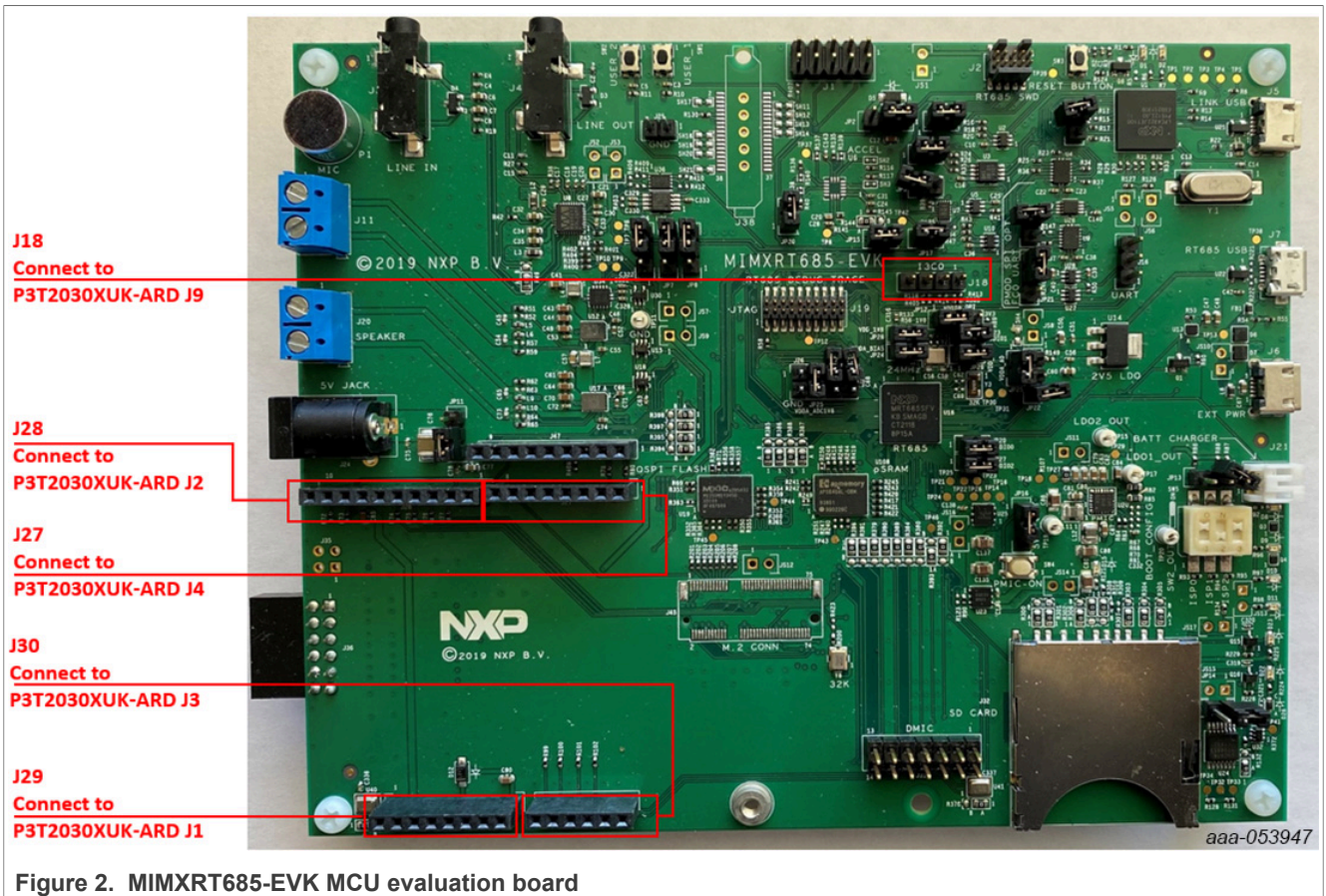
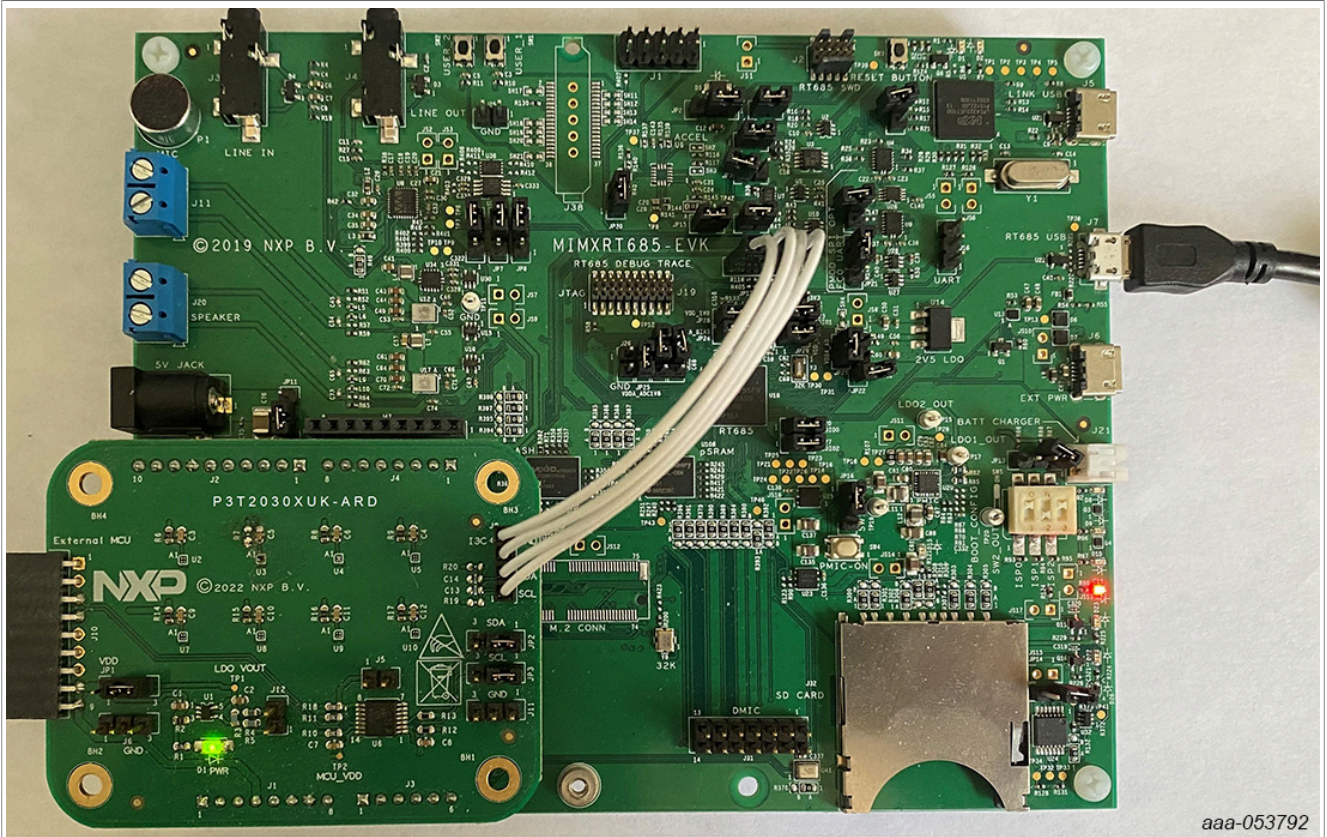


Figure 2. MIMXRT685-EVK MCU evaluation board



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Use J7 (USB Micro-B connector) on MIMXRT685-EVK for power supply and GUI communication port.

Figure 3. P3T2030XUK-ARD evaluation board connecting to the MIMXRT685-EVK MCU board

6 Hardware description

- J1/J2/J3/J4 are connected to the MIMXRT685-EVK MCU board for P3T2030XUK-ARD power supply and I²C-bus interface.
- J9 is connected to the MIMXRT685-EVK MCU board for P3T2030XUK-ARD I3C-bus interface.
- JP1 selects P3T2030XUK VDD power supply.
- J5 selects enable/disable VLT (NTS0304EPWJ)
- J12 selects VDD voltage (1.8V/1.4V)
- JP2/JP3 select I²C or I3C-bus interface.

Table 1. P3T2030XUK-ARD EVboard main components

Device	Description	Location
P3T2030XUK	I3C, I ² C-bus, 2 °C accuracy, digital temperature sensor	U2
TPS71701DCKT	Adjustable output voltage LDO	U1
NTS0304EPWJ	4-bit dual supply translating transceiver	U6
Green LED	Power supply on LED	D1

Table 2. Jumper settings

Jumper	Default setting	Comment
J1-J4		Arduino connector
J5	Open	VLT (NTS0304EPWJ) select pin - enable(open)/disable(short)
J6		Ground test pins
J9		I3C connector
J10		External MCU interface connector
J11		Ground test pins
J12	Open	VDD voltage select pin - 1.8V(open)/1.4V(short)
JP1	2-3	1-2: VDD = 3.3V, 2-3: VDD = 1.8V/1.4V
JP2	2-3	1-2: SDA = SDA_I3C, 2-3: SDA = SDA_I2C
JP3	2-3	1-2: SCL = SCL_I3C, 2-3: SCL = SCL_I2C

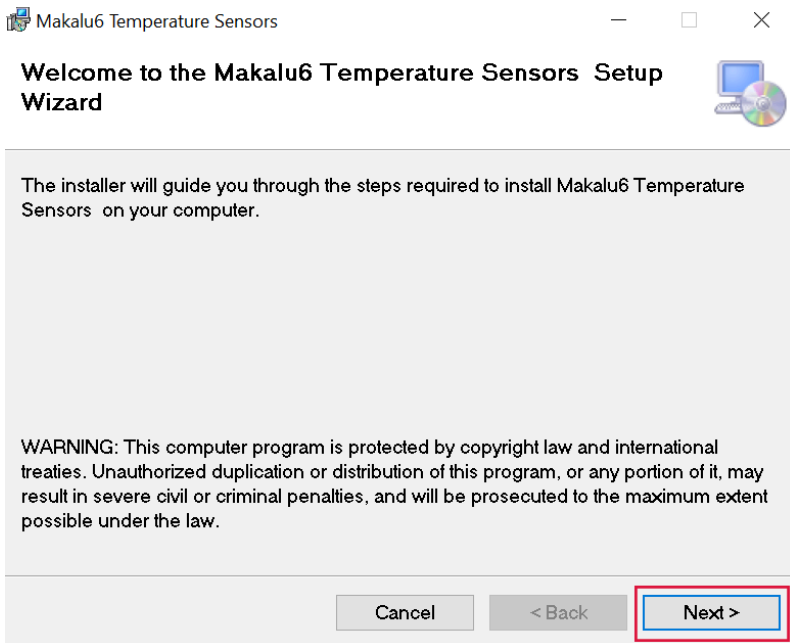
7 Schematic

The schematic diagram of P3T2030XUK-ARD is available at URL: <http://www.nxp.com/P3T2030XUK-ARD>

8 P3T2030XUK demo GUI

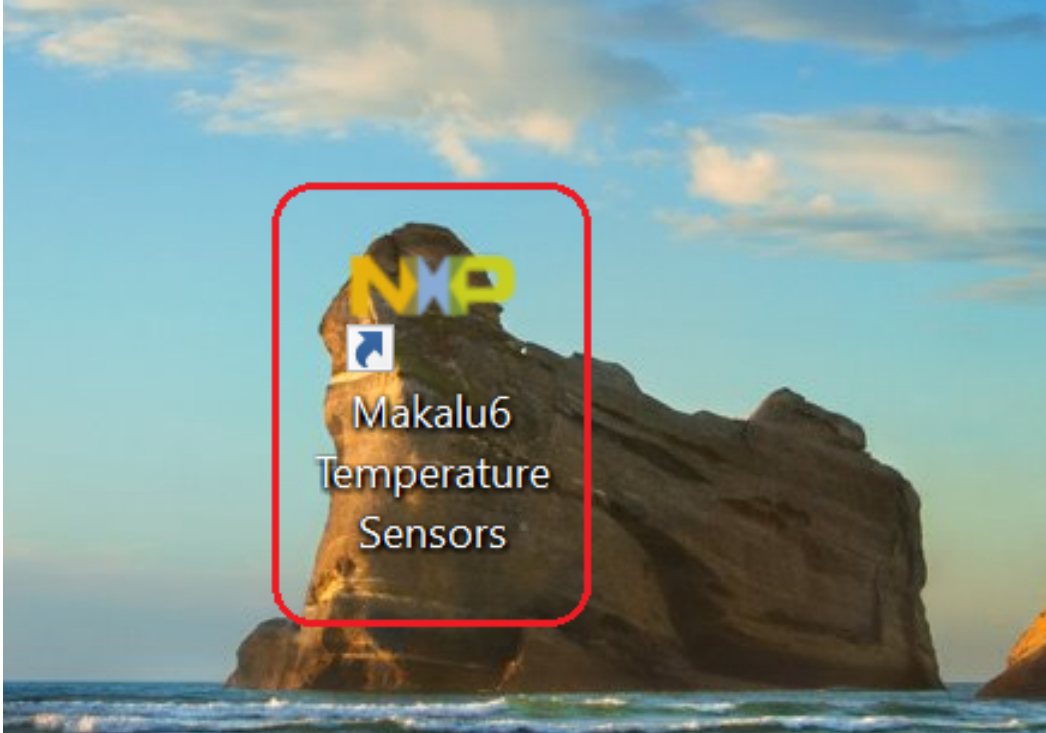
8.1 Install P3T2030XUK-ARD demo GUI

- Double click on “setup.exe” to install P3T2030XUK-ARD demo GUI
- Click “Next” button three times to complete installation

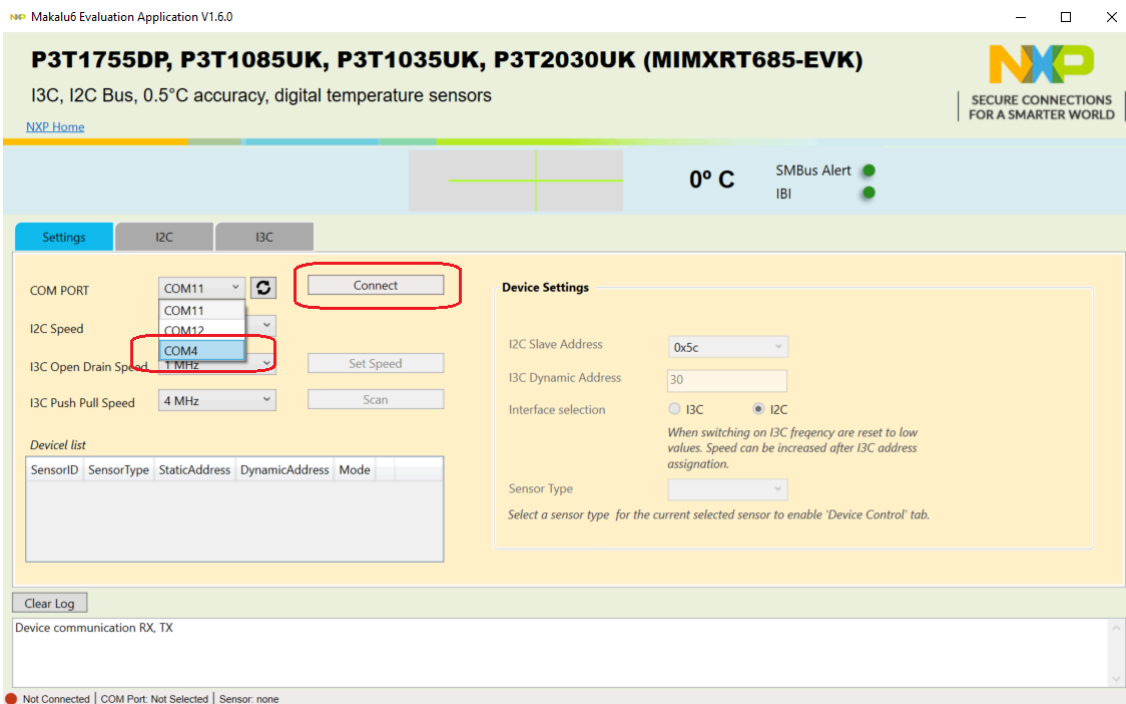


8.2 Run Makalu6 Temperature Sensors GUI on Windows 7,8,10 PC

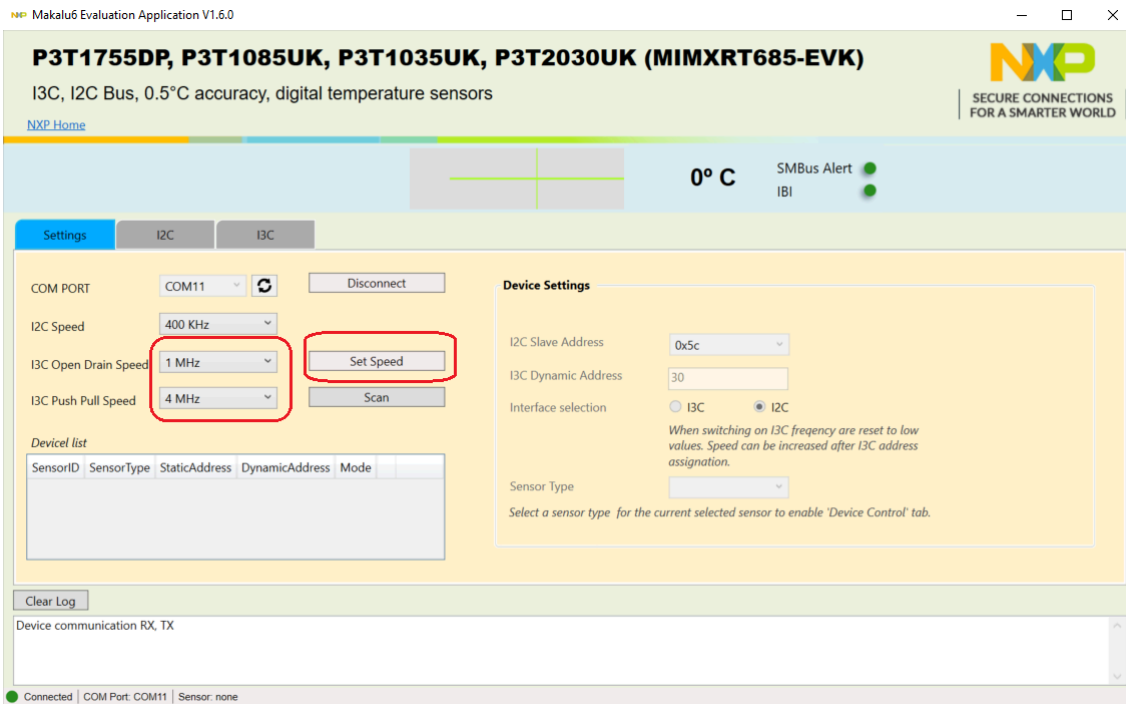
1. Double click on “Makalu6 Temperature Sensors” icon to start GUI.



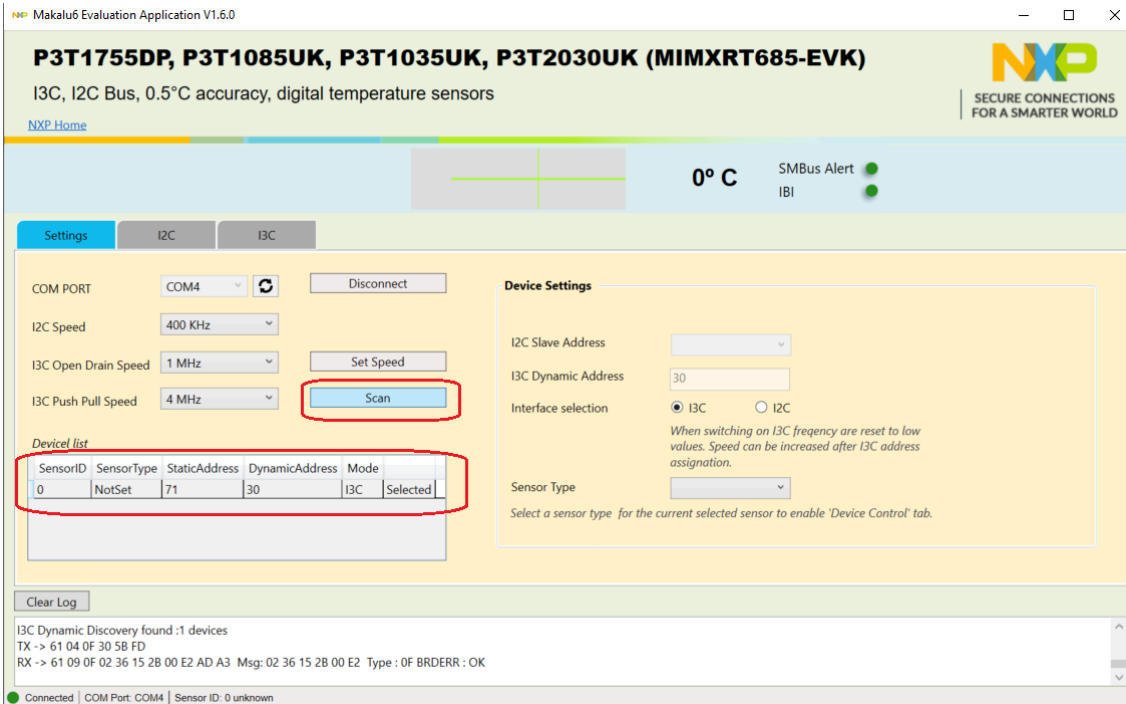
2. Select proper COM port (last COM port normally) and click “Connect” button to connect MIMXRT685-EVK board.



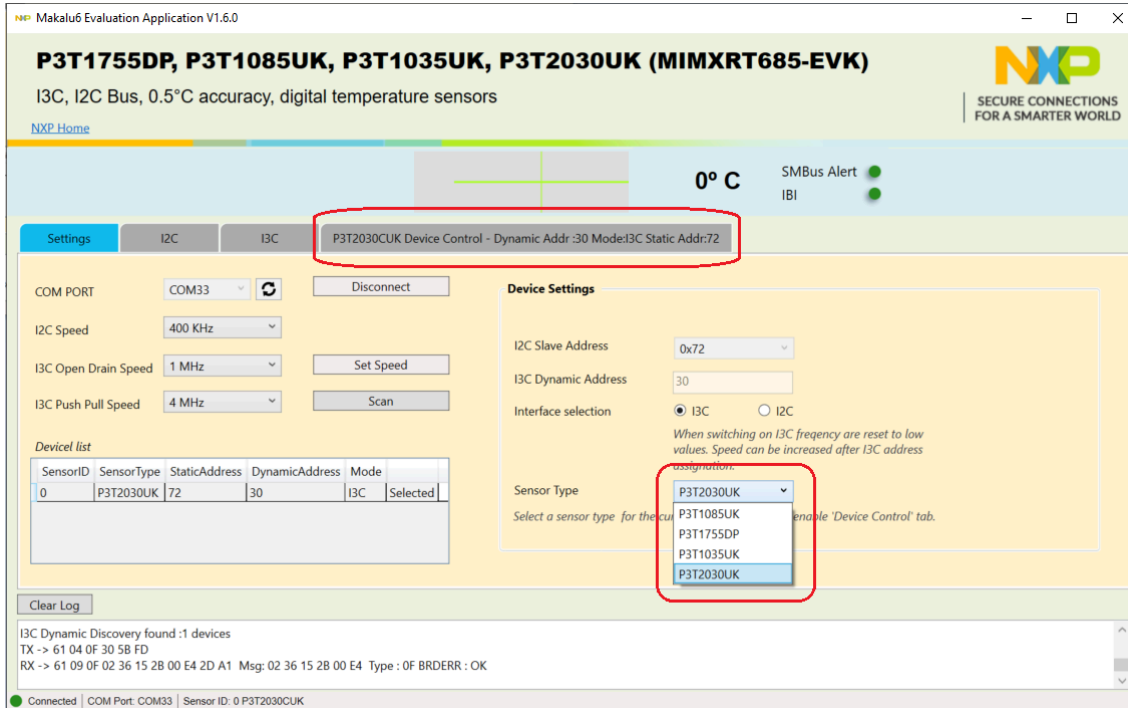
3. Use Setting tab to select I²C and I3C-bus speed, and click on the “Set Speed” button



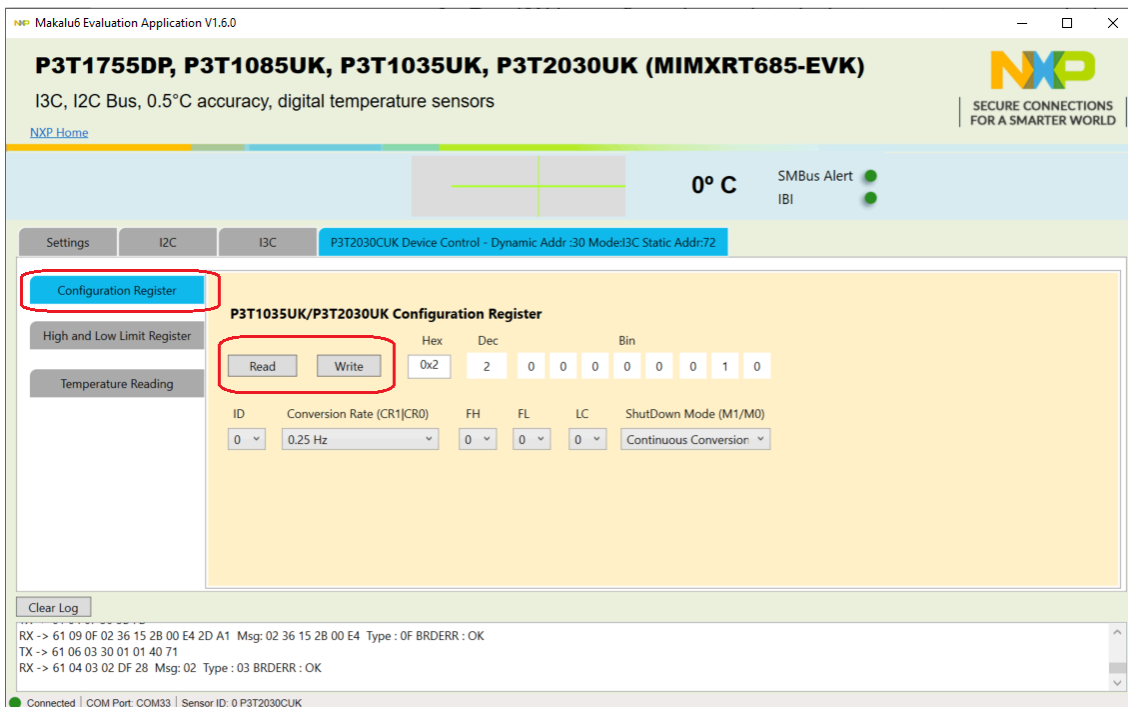
4. Click on “Scan” button to discover any NXP temperature sensor target address on the evaluation board



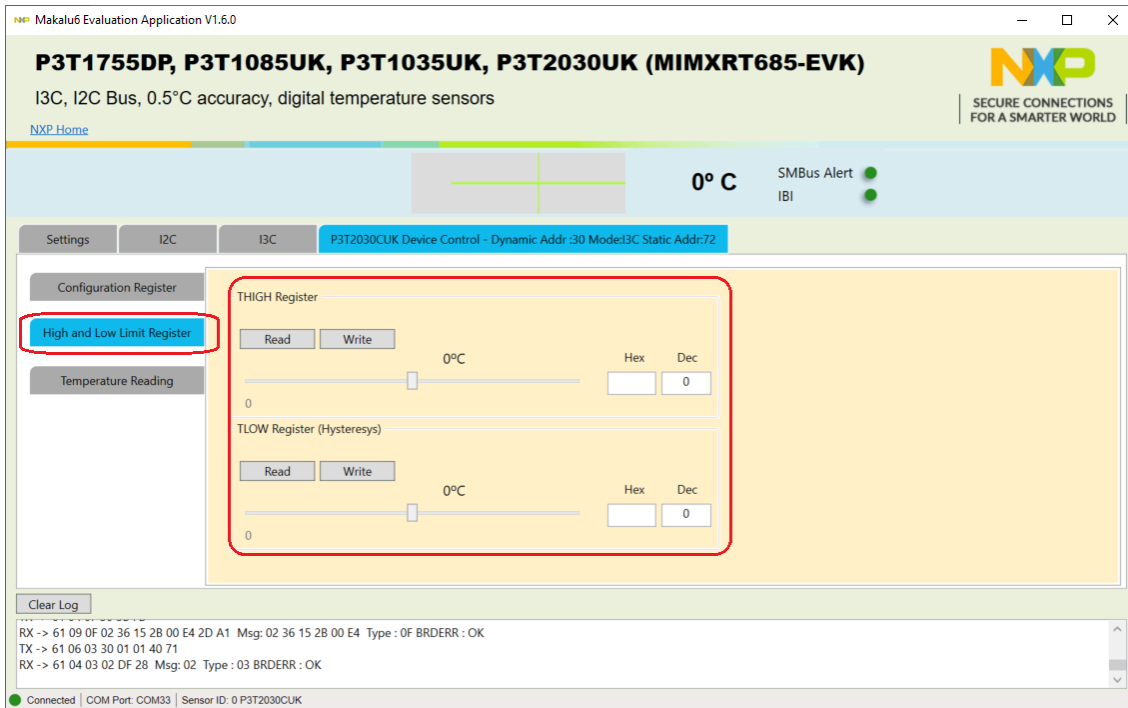
5. Use Sensor Type to select which temperature sensor to be tested on the evaluation board



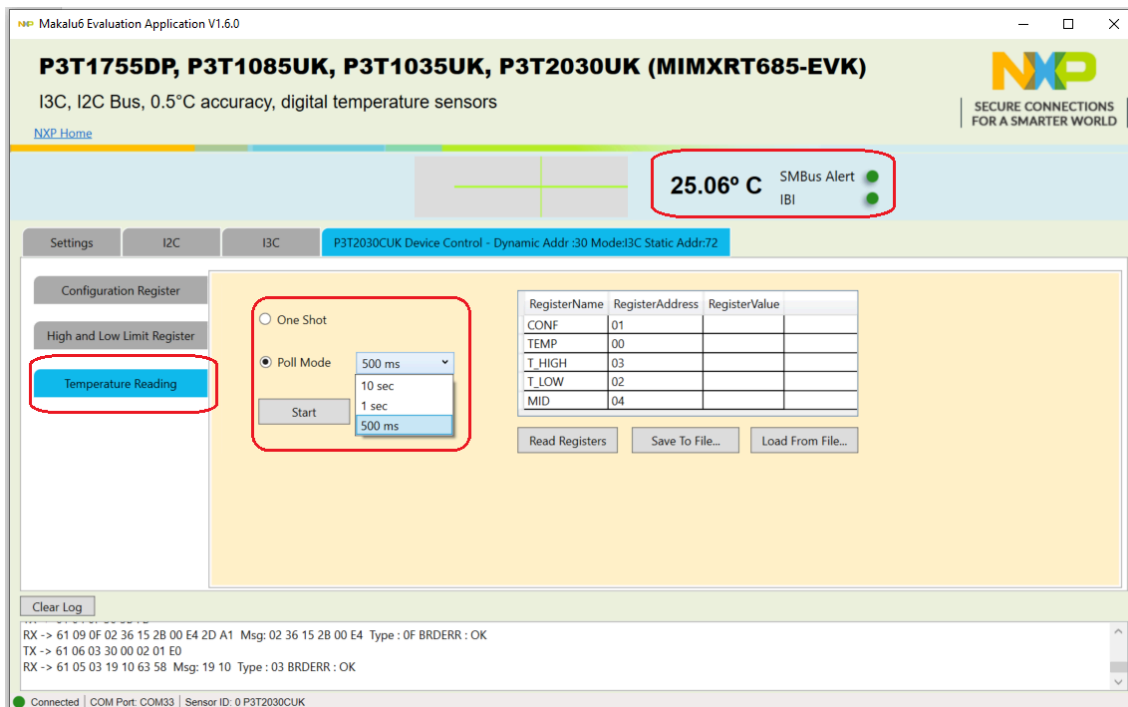
6. Read/Write configuration register in the temperature sensor device control tab.



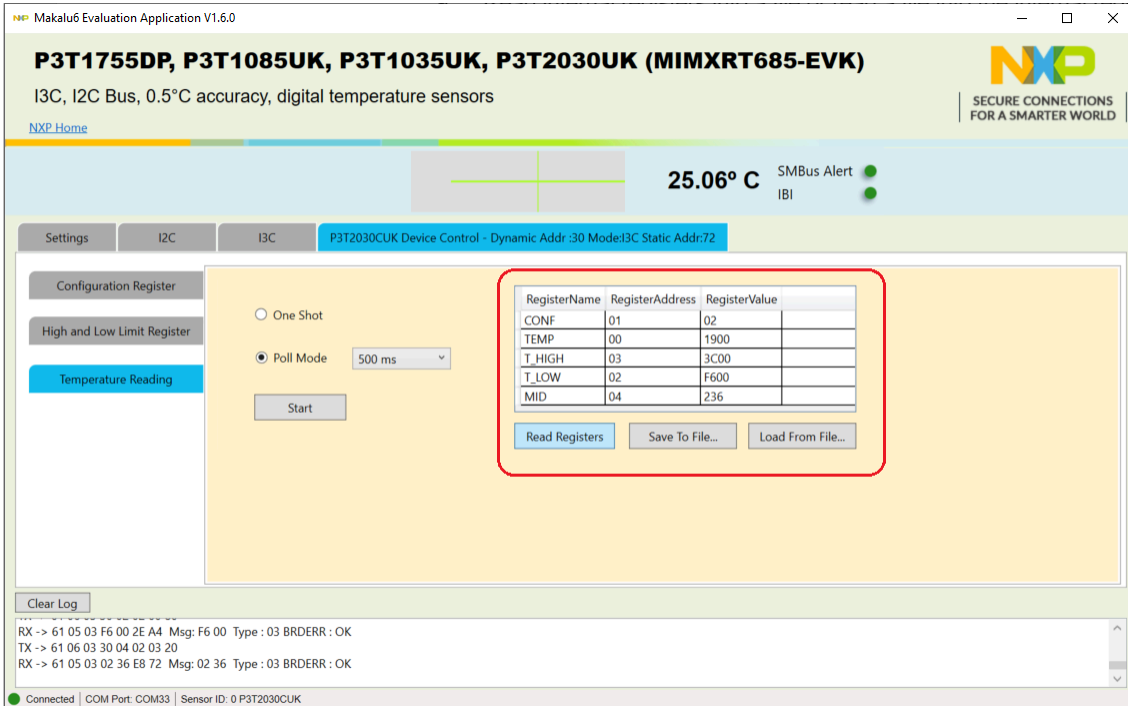
7. Read/Set THIGH (high limit) and TLOW (low limit) registers in the temperature sensor device control tab.



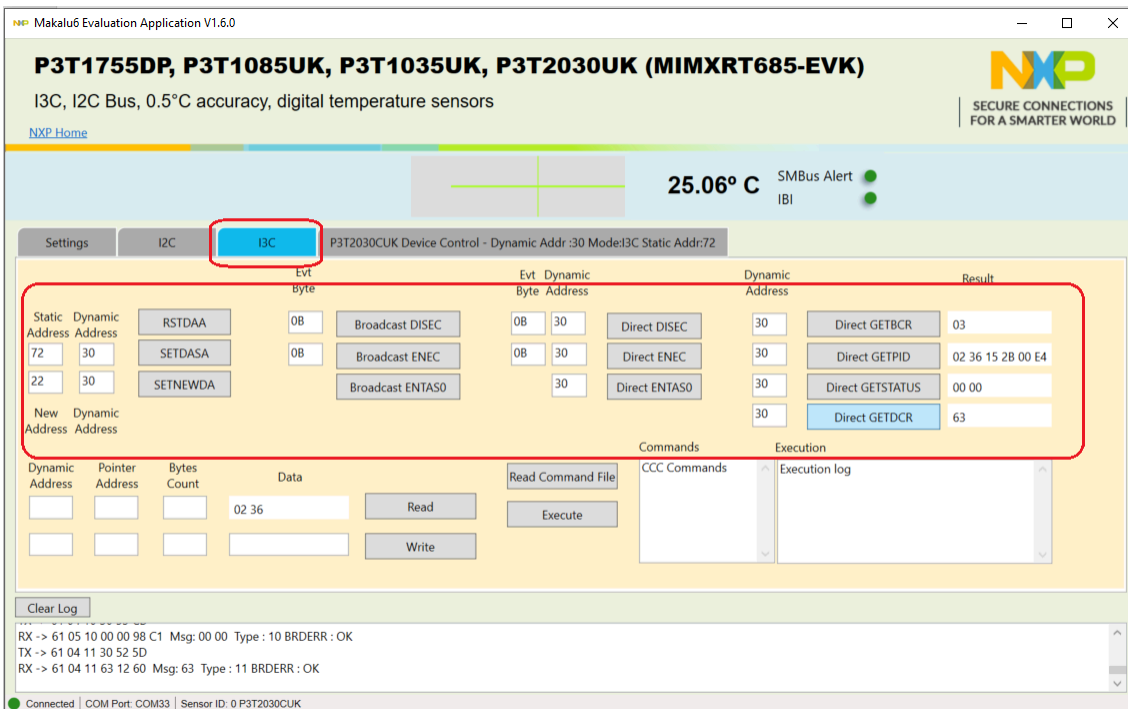
8. Perform one-shot or polling temperature read in the temperature sensor device control tab.



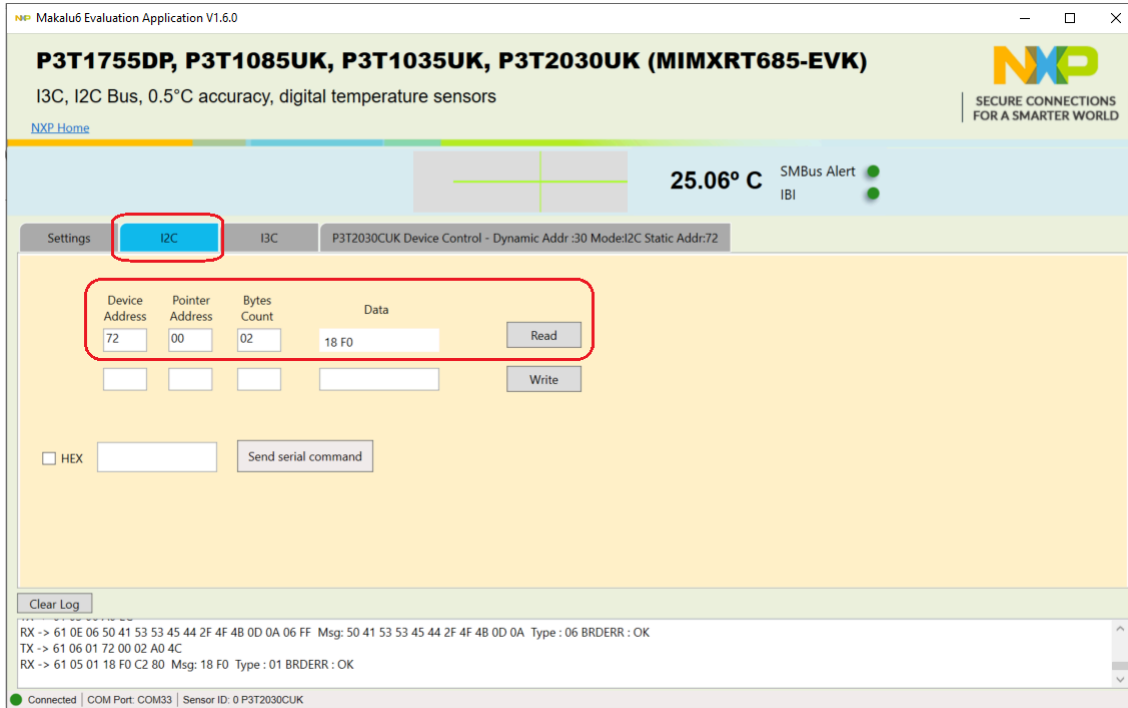
9. Read internal registers into a file or read a file into the internal registers in the in the temperature sensor device control tab.



10. Perform I3C general tests in the I3C tab



11. Perform I²C general tests in the I²C tab



9 Abbreviations

Table 3. Abbreviations

Acronym	Description
ESD	Electro Static Discharge
GUI	Graphical User Interface
I ² C-bus	Inter-Integrated Circuit bus
IC	Integrated Circuit
LED	Light Emitting Diode
PC	Personal Computer
SCL	Serial Clock Line
SDA	Serial Data Line
USB	Universal Serial Bus

10 References

1. P3T1035xUK/P3T2030xUK Product data sheet; NXP Semiconductors

11 Revision history

Table 4. Revision history

Document ID	Release date	Description
UM11980 v.1.0	27 November 2023	• Initial version

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