Introduction

The OPTIGA™ Trust X is the best-fit security solution for IoT devices, to protect your business as well as your customers’ data and IP. With an advanced set of features, the OPTIGA™ Trust X supports a broad range of use cases: mutual authentication, secure communication, data store protection, key provisioning, life-cycle management, power management, secure updates, and platform integrity protection.

The product is easy to integrate and work with, reducing your design effort for faster time-to-market. The turnkey set-up comes with full system integration and all key material preprogrammed, and the high-end security controller with OS, embedded application and complete host side integration support.

Features also include a high-end certified security controller with advanced cryptographic algorithms implemented in hardware (ECC256, AES128, SHA-256, TRNG, DRNG), up to 10 kBytes user memory, I2C communication interface, standard (-25°C to 85°C) and extended (-40°C to 105°C) temperature ranges, and a Cryptographic Tool Box based on ECC NIST P256, P384 and SHA256 for flexible implementations.

Link to Datasheet and Product Page
Information

• Supply voltage VCC is max. 7 V, please refer to the OPTIGA™ Trust X datasheet for more details about maximum ratings
• Pin out on top (head) is directly connected to the pins of the OPTIGA™ Trust X
• If head is broken off, only one capacitor is connected to the OPTIGA™ Trust X
• Software compatible with Arduino and library fully integrated into the Arduino IDE
• Sales Name S2GO SECURITY OPTIGA X and OPN S2GOSECURITYOPTIGAXTOBO1

Ensure that no voltage applied to any of the pins exceeds the absolute maximum rating of VCC + 0.3 V
The OPTIGA™ Trust X Security Shield2Go

Legend

- **Information**
- **Labelling of Pins in Datasheet**
- **Pin Number in Datasheet**
- **Physical Pin Number**
- **Warning**
- **Additional Information**
- **NC** (Not Connected)

- **NC** 1
- **NC** 2
- **NC** 3
- **I²C: SDA** 4
- **I²C: SCL** 5
- **Ground** 6
- **Power 3.3V** 7
- **NC** 8
- **NC** 9
- **NC** 10
- **NC** 11
- **NC** 12
- **RST/GPIO2** 13
- **NC** 14
- **NC** 15
- **NC** 16
- **NC** 17
- **VCC** 10
- **GND** 01
- **GND** 09
- **RST** 09
- **RST** 09
- **10.16 mm (0.4")**
- **Red Power LED**

Although labelled as NC, RST is connected to pin 12. This is a mistake of the labelling.

The maximum voltage on VCC pin is 7 V, any other pin VCC+0.3 V.

www.infineon.com
Evaluation Board Schematic

I2C Pull Up

- PWR_3V3
- R1 10k/50V/1%
- PWR_3V3
- R2 10k/50V/1%

SDA

SCL

OPTIGA™ Trust X

- C1
- 0.10uF/6.3Vdc
- GND

- PWR_3V3
- RST
- SDA 3
- SCL 2
- NC3 5
- NC4 6
- EP 11

SLS 32AIA

Power Status Indication

- PWR_3V3
- R3 680R/50V/1%
- D1 SML-211UT

- powered
- not powered

Green area: circuit if head is broken off
Arduino: The Arduino IDE

Arduino IDE

Arduino is a hardware-software prototyping environment IDE developed by arduino.cc:
• Installation Details for Windows: Click here
• Installation Details for Linux: Click here
• Installation Details for Mac OS: Click here
• Installation Details for Portable IDE: Click here

Arduino Quick Start

• What is Arduino? Click here
• Extended information about the Arduino environment. Click here
• How to import libraries? Click here
• How to install additional boards? Click here
• Problems related to Arduino? Click here for troubleshooting
How to download the library for Arduino

Notes

- Open the Arduino IDE
- Navigate to Sketch – Include Library – Manage Libraries
- The Arduino library manager will be opened (see next slide for further instructions)
- Additional notes for installation can be found in the GitHub repository, e.g. if the library manager is not used

https://github.com/Infineon/arduino-optiga-trust-x
How to download the library for Arduino - 2

Notes

• The Arduino library manager is a comprehensive tool to install external libraries for Arduino.
• Search for OPTIGA Trust X in the Filter your search... field.
• Select as Type: All and Topic: All when searching for OPTIGA Trust X.
• As shown in the picture, please choose the respective library and install it.
• Regularly check your installed libraries for updates.
• In case of problems, please visit also our GitHub repository and open an issue to get further help.

https://github.com/Infineon/arduino-optiga-trust-x
Example with XMC 2Go

Notes

• The Shield2Go form factor of the Shield2Go evaluation board is directly compatible with the XMC 2Go board
• Stack the OPTIGA™ Trust X Security Shield2Go board on top of the XMC 2Go as shown in the picture
• The additional pin on the left-top side (designated with NC) is left floating
• Using the XMC-for-Arduino Arduino integration, the Arduino library for the OPTIGA™ Trust X can be directly used

Steps

• Open one of the examples for the OPTIGA™ Trust X from File – Examples and select as board XMC1100 XMC2Go
• Connect the stacked boards to the PC and press the Upload button
• Select the related COM port from Tools – Port and open the serial monitor with the set baud rate (see sketch/code with Serial.begin(<BAUDRATE>));

https://github.com/Infineon/XMC-for-Arduino
https://github.com/Infineon/arduino-optiga-trust-x
Important Note

- The OPTIGA™ Trust X has a maximum rating of 7 V on the VCC supply pin
- The input voltage on any pin should not exceed VCC+0.3 V
- Third party boards with 5 V logic, e.g. the Arduino Uno, can be connected to the OPTIGA™ Trust X Security Shield2Go directly

Additional Software

- There exist more repositories with additional software for OPTIGA™ Trust X

https://github.com/Infineon/appnotes-optiga-trust-x
https://github.com/Infineon/mbedtls-optiga-trust-x
https://github.com/Infineon/optiga-trust-x
https://github.com/Infineon/onchipdtls-optiga-trust-x
Part of your life. Part of tomorrow.