

UM2409 User manual

Quick start guide STKNX evaluation board (EVALKITSTKNX)

Introduction

The EVALKITSTKNX is a hardware platform to evaluate and to develop applications for the STKNX miniature transceiver with the STM32F103 microcontroller.

This document gives an overview of the software architecture and describe how to use this software with the evaluation kit.

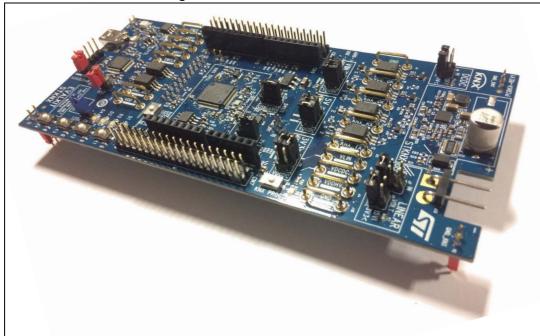


Figure 1. STKNX evaluation board

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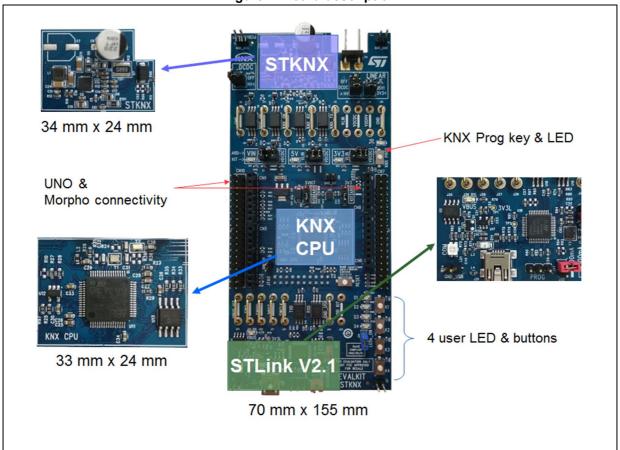
UM2409 Overview

1 Overview

1.1 EVALKITSTKNX development platform overview

Board description

Figure 2. Board description



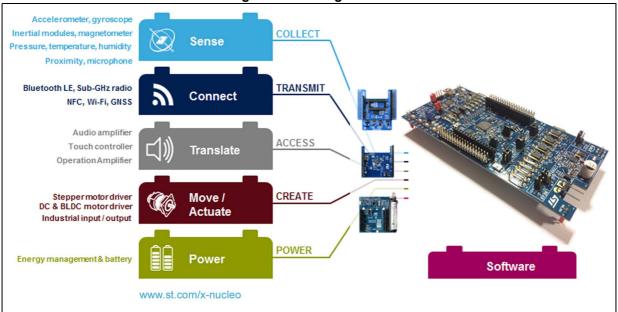
Overview UM2409

1.2 Development platform spirit

• The **EVALKITSTKNX** has been developed in the spirit of the STM32[™] Nucleo boards.

 Expansion boards with additional functionality can be plugged directly on top of the Eval Kit development board or stacked on another expansion board.

Figure 3. Building blocks



2 Software overview and setup

2.1 Software components

- The **EVALKITSTKNX** comes with a complete software package. A sample application is provided.
- Access to hardware features is simplified with the utilization of the STM32 Standard Peripheral Libraries (SPL)
- A demonstration version of the TAPKO's KNX protocol stack is provided as a binary file.
- The software package is compatible with two free GCC-based IDEs: Ac6 System
 Workbench for the STM32 and Atollic TrueSTUDIO[®]. Versions of these two IDEs
 exist for the Linux[®] and Windows OS.

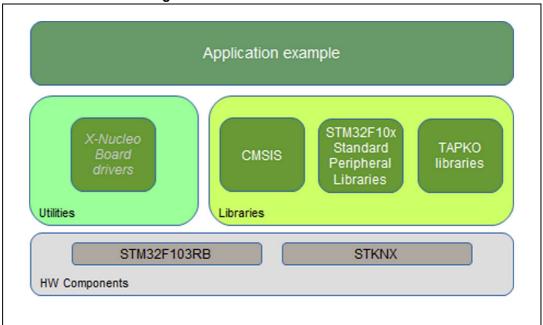
Figure 4. System architecture GCC-based IDEs: Ac6 System Workbench for Tools & **IDEs** STM32 and Atollic TrueSTUDIO Applications Sample applications STM32 expansion board TAPKO middleware Middleware KNX Protocol stack library STM32 expansion middleware Hardware STM32 Standard Peripheral Libraries (SPL) Abstraction STM32 Nucleo expansion boards (X-NUCLEO) Hardware EVALKITSTKNX Development board

2.2 Software overview

STM32F103RB-STKNX software description

- This software, running on the STM32F103, demonstrates the STKNX capabilities.
- It is built on the top of the STM32 Standard Peripheral Libraries (SPL) that eases access to STM32 features.
- It uses a demonstration version of the TAPKO KNX protocol stack.
- Example to demonstrate actuator and sensor.

Figure 5. Overall software architecture



2.3 Software prerequisites

- A Linux computer or a Windows computer with one of the supported development toolchains:
 - Atollic: TrueSTUDIO (Link)
 - Ac6 System Workbench for STM32: SW4STM32 (Link)
- Or a Mac OSX computer with Ac6 System Workbench for STM32
- EVALKITSTKNX firmware example
- ST-LINK/V2-1 USB driver (*Link*)
- ST-LINK/V2-1 firmware upgrade (*Link*)
- KNX ETS5 (engineering tool software) application (*Link*)

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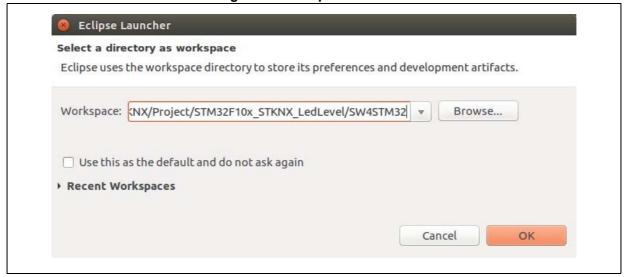
2.4 Install and build firmware with Ac6 System Workbench

1. Download the STM32F103RB-STKNX package and extract it in your file system.

Open the AC6 System Workbench for the STM32 and when requested to select a directory as workspace, browse to:

<your path>/STM32F103RB-STKNX/Project/STM32F10x_STKNX_LedLevel/SW4STM32

Figure 6. Workspace selection



2. In the **Project Explorer** panel, right click and select $Import \rightarrow General \rightarrow "Existing Projects into Workspace".$

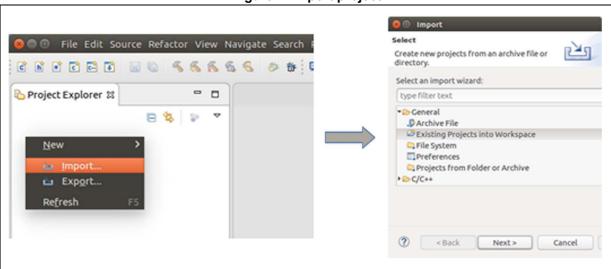
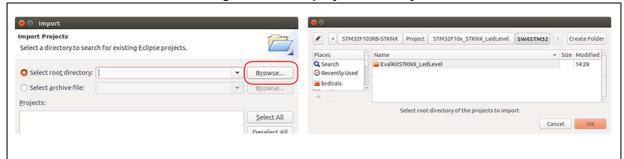


Figure 7. Import project

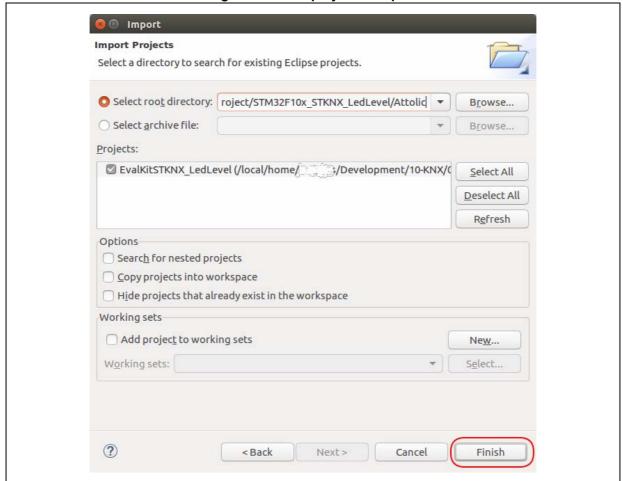
3. In the **Import** windows, click on *Browse* and on *OK* in the next window.

Figure 8. Select project directory



4. The project to import has been automatically selected. You can now click on *Finish*. The project is imported.

Figure 9. Select project to import





5. Select the project name in the **Project Explorer**, and click on the Clean icon select *Clean Project* in the contextual menu.



6. Click on the build icon



or select Clean Project in the contextual menu.

Figure 10. Console view

```
🦹 Problems 🧔 Tasks 📮 Console 🛭 🔲 Properties
  CDT Build Console [EvalKitSTKNX_LedLevel]
CDT Build Console [EvalKitSTKNX_LedLevel]
arm-atollic-eabi-gcc -c .../.../.../Libraries/STM32F10x_StdPeriph_Driver/src/stm32f10x_rtc.c -mthumb -mcpu=cortex
arm-atollic-eabi-gcc -c .../.../.../Libraries/STM32F10x_StdPeriph_Driver/src/stm32f10x_spi.c -mthumb -mcpu=cortex
arm-atollic-eabi-gcc -c .../.../.../Libraries/Tapko/dev_mod/07B0/dat_07B0.c -mthumb -mcpu=cortex-m3 -std=gnul1 -I
arm-atollic-eabi-gcc -c .../.../.../Libraries/Tapko/dev_mod/07B0/app_07B0.c -mthumb -mcpu=cortex-m3 -std=gnul1 -I
arm-atollic-eabi-gcc -c .../.../.../Libraries/Tapko/dev_mod/07B0/app_07B0.c -mthumb -mcpu=cortex-m3 -std=gnul1 -I
arm-atollic-eabi-gcc -c .../.../../Libraries/Tapko/dev_mod/07B0/knx07B0_if.c -mthumb -mcpu=cort
arm-atollic-eabi-gcc -c .../.../.../Libraries/Tapko/dev_mod/07B0/knx07B0_if.c -mthumb -mcpu=cort
arm-atollic-eabi-gcc -c .../.../.../Libraries/Tapko/dev_mod/07B0/knx07B0_if.c -mthumb -mcpu=cortex-m3 -std=gnul1
arm-atollic-eabi-gcc -c .../.../.../Libraries/Tapko/dev_mod/07B0/knx07B0_if.c -mthumb -mcpu=cortex-m3 -std=gnul1
arm-atollic-eabi-gcc -c .../.../.../Libraries/CMSI/COreSupport/core cm3.c -mthumb -mcpu=cortex-m3 -std=gnul1
arm-atollic-eabi-gcc -c .../.../.../Libraries/Tapko/dev_mod/07B0/knx07B0_if.c -mthumb -mcpu=cortex-m3 -std=gnul1
arm-atollic-eabi-gcc -c .../.../.../Libraries/CMSI/COreSupport/core cm3.c -mthumb -mcpu=cortex-m3 -std=gnul1
arm-atollic-eabi-gcc -c .../.../.../Libraries/Tapko/dev_mod/07B0/knx07B0_if.c -mthumb -mcpu=cortex-m3 -std=gnul1
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arm-atollic-eabi-gcc -c ../../../Libraries/CMSI/CM3/CoreSupport/core_cm3.c -mtnumb -mcpu=cortex-m3 -std=gnull arm-atollic-eabi-gcc -c ../../../../Libraries/CMSI/CM3/CoreSupport/core_cm3.c -mtnumb -mcpu=cortex-m3 -std=gnull arm-atollic-eabi-gcc -c ../../.../../Libraries/STM32F10x_StdPeriph_Driver/src/stm32f10x_imdg.c -mthumb -mcpu=cortex-marm-atollic-eabi-gcc -c ../../../../Libraries/STM32F10x_StdPeriph_Driver/src/stm32f10x_rcc.c -mthumb -mcpu=cortex-marm-atollic-eabi-gcc -c ../../../../Libraries/STM32F10x_StdPeriph_Driver/src/stm32f10x_exti.c -mthumb -mcpu=cortex-marm-atollic-eabi-gcc -c ../../../../Libraries/STM32F10x_StdPeriph_Driver/src/stm32f10x_usart.c -mthumb -mcpu=cortex-m3 -g -Wa,--warn -x assembler-with-cpp -o startup/startup_stm32f10x_md.

arm-atollic-eabi-gcc -o EvalkitSTKNX_LedLevel.elf Examples/Src/app_data.o Examples/Src/demo_dimmer.o Examples/Src/mar./cont/Atollic_TrueSTUNIOT_for_STM32_x96_64_9.0 a./ide/irs/bijliox_airs/cont/Atollic_TrueSTUNIOT_for_STM32_x96_64_9.0 a
     opt/Atollic_TrueSTUDIO_for_STM32_x86_64_9.0.0/ide/jre/bin/java -jar /opt/Atollic_TrueSTUDIO_for_STM32_x86_64_9.0.0/,
  Generate build reports...
  Print size information
                                                           data
                                                                                                          bss
                                                                                                                                                       dec
                                                                                                                                                                                                hex filename
             65100
                                                            1750
                                                                                                  2432
                                                                                                                                           69282
                                                                                                                                                                                    10ea2 EvalKitSTKNX_LedLevel.elf
  Print size information done
  Generate listing file
Output sent to: EvalKitSTKNX_LedLevel.list
  Generate listing file done
Generate build reports done
  arm-atollic-eabi-objcopy -O binary EvalKitSTKNX_LedLevel.elf EvalKitSTKNX_LedLevel.bin arm-atollic-eabi-size EvalKitSTKNX_LedLevel.elf
    17:25:31 Build Finished (took 18s.320ms)
```

Once build is finished, you can start debugging the project click on the Clean icon
or select Debug As → Embedded C/C++ Application in the contextual menu.

Or you can drag and drop the binary (*EvalKitSTKNX_LedLevel.bin*), available in **Debug**, to the virtual drive that is mounted when you connect the EVALKITSTKNX board to your computer. The name of this virtual drive is STKNX.



3 Setup and demonstration examples

3.1 Hardware prerequisites

- One EVALKITSTKNX board
- One KNX sensor: Apricum TAI-KNX 4

Figure 11. Apricum TAI-KNX 4



One KNX power supply

Figure 12. KNX power supply



One KNX TP interface (USB-KNX interface)

Figure 13. KNX TP interface



• A type A to type B USB cable

Figure 14. USB cable



KNX cable

Figure 15. KNX cable



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3.2 Setup a simple KNX network

1. Setup the KNX network in accordance to description in Figure 16.

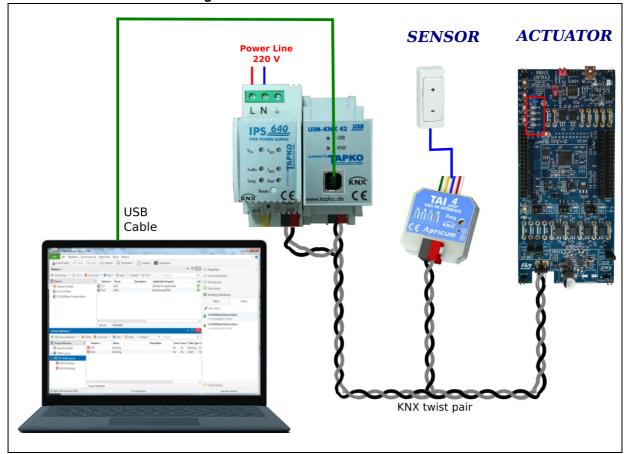
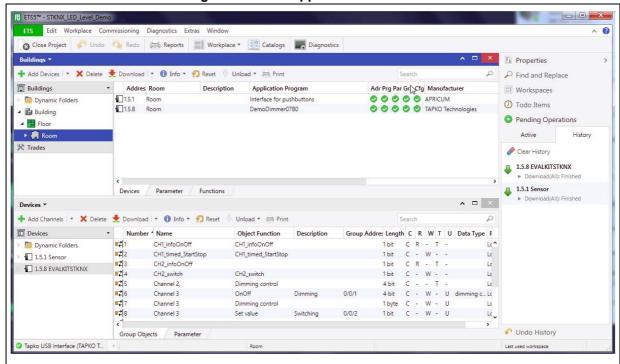


Figure 16. KNX demonstration network

- 2. In the ETS5 application, import the project STKNX_LED_Level_Demo.knxproj available in the:
 - STM32F103RB-STKNX/Project/STM32F10x_STKNX_LedLevel/ETS5_ProjectFile

3. Download the full configuration in both STI and EVALKITSTKNX devices.

Figure 17. ETS5 application screenshot



When asked in the ETS5 application, press the "KNX PROG" button of the EVALKITSTKNX board.

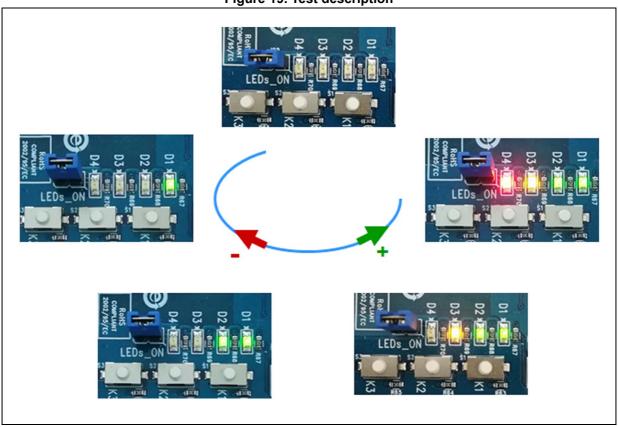
Figure 18. KNX PROG button on EVALKITSTKNX board



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- 5. Tests:
- ON button of the sensor is used to increase the number of the LED switched on.
- OFF button of the sensor is used to decrease the number of the LED switched on.

Figure 19. Test description



Revision history UM2409

4 Revision history

Table 1. Document revision history

Date	Revision	Changes
23-Jul-2018	1	Initial release.

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