Quick Start Guide

STEVAL-BCN002V1B - BlueTile kit

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www.st.com/bluetile

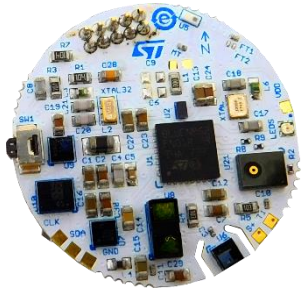
What do you want to do?

Unpack and run the default demo

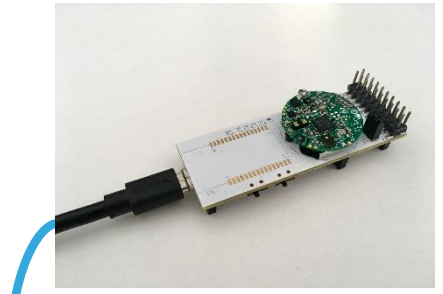
Go to page 8

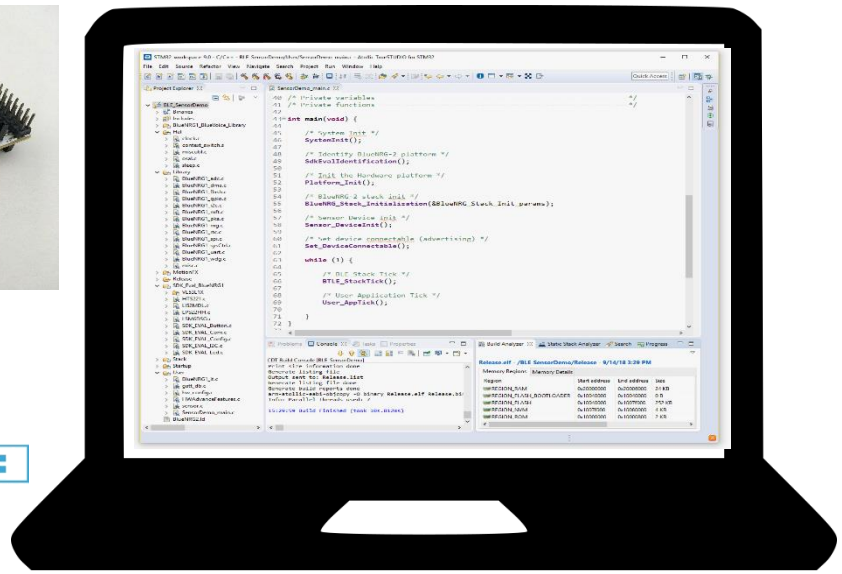
Start designing your application

Go to page 10



www.st.com/bluetile





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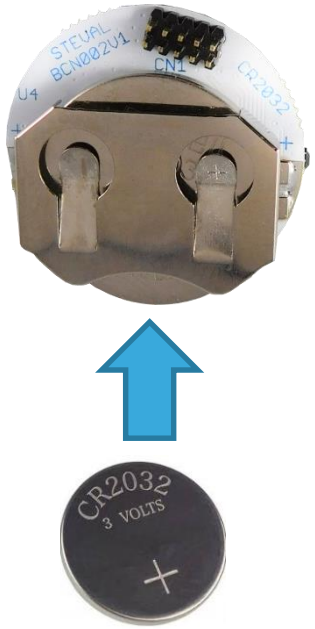
Run the preloaded Demo

- The preloaded demo on Bluetile is the **BLE_SensorDemo** available in the SDK software development kit

Step 1

To power the system, slide the battery inside the holder.



Step 2

Download and run the **ST BLE Sensor** app from the iOS or Android store

ST BLE Sensor

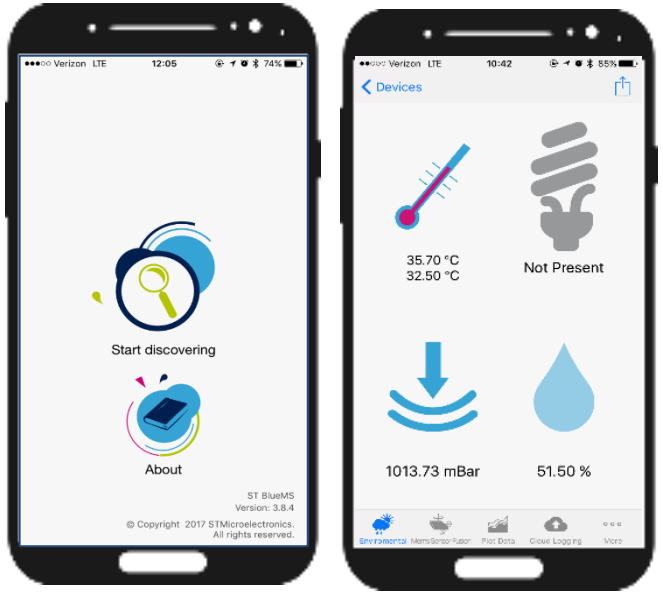
Download on the App Store

GET IT ON Google Play

www.st.com/bluems

Step 3

Discover, connect and see the data in real time; swipe for more



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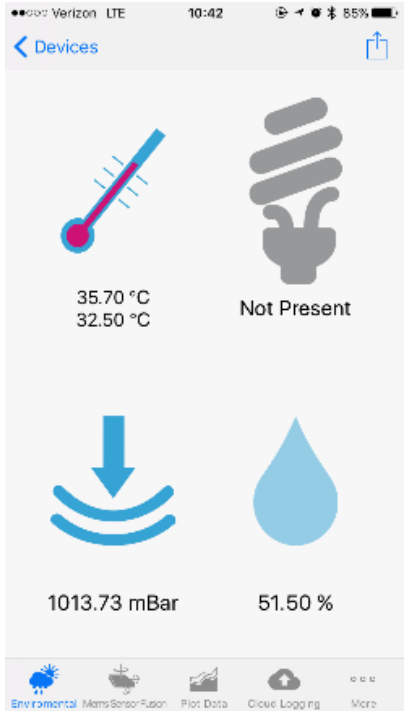
Run the preloaded Demo

References for libraries embedded in the demo

- **UM2220** Getting started with **MotionFX** sensor fusion library
- **UM2382** / **UM2196** Getting started with **BlueVoice** full/single duplex

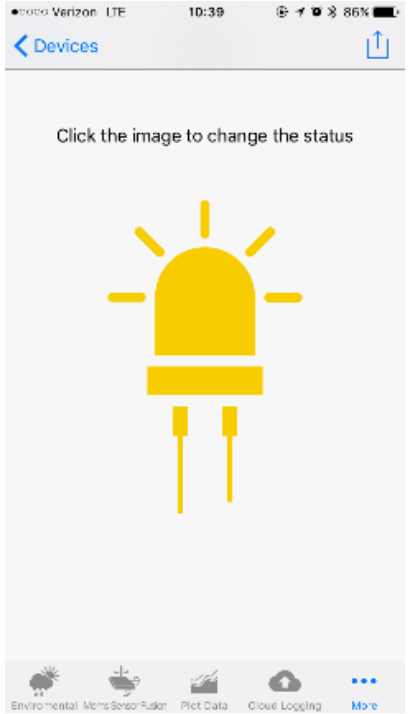
Environmental sensors



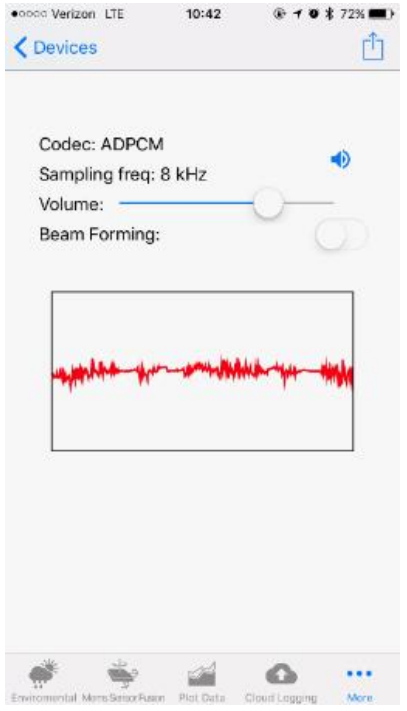
Inertial sensor and **MotionFX** fusion

Accelerometer events

LED control



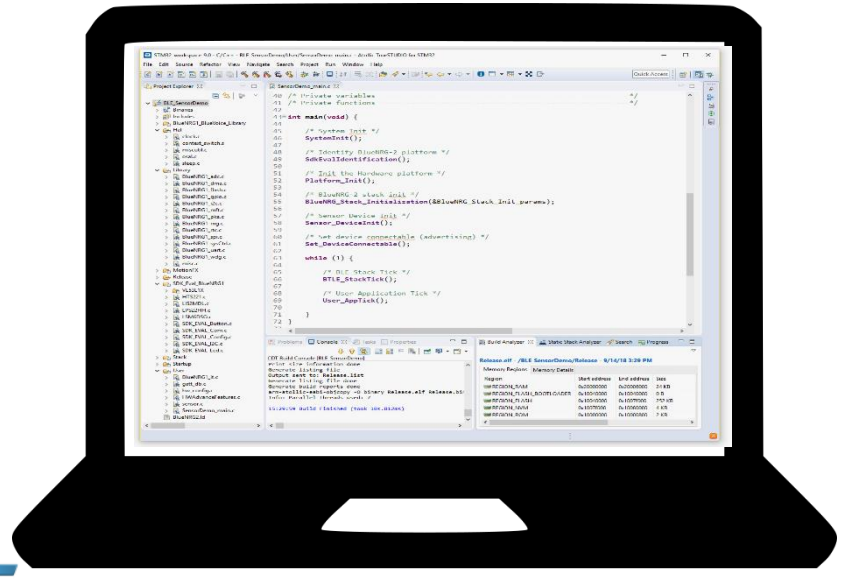
Voice over BLE **(BlueVoice)**



Start designing your application

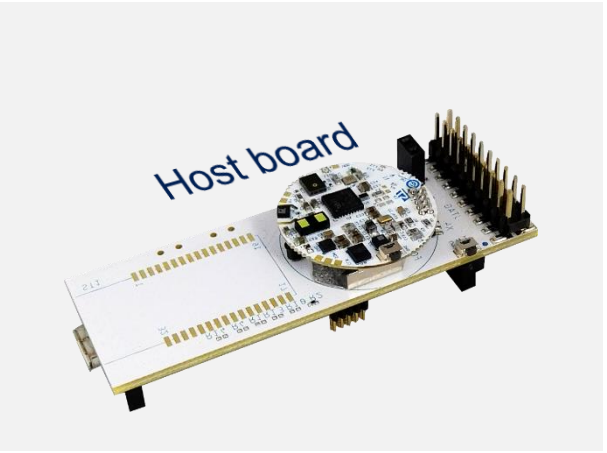
Software setup
SDK & IDE

Go to page 11

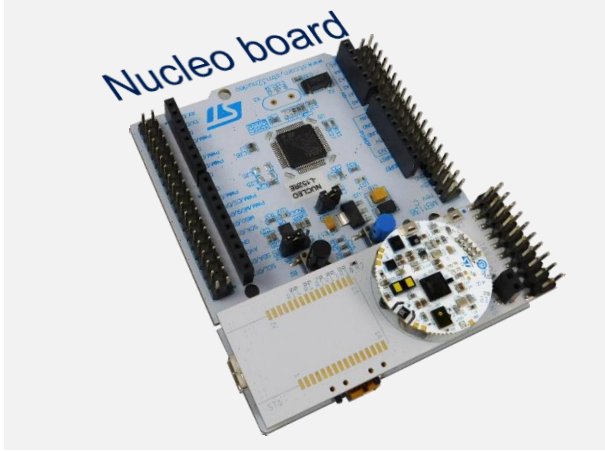


Hardware setup
Flash & Debug

Go to page 12



Flash only
using the host board



Flash & **Debug**
using the host board
and ST-Link on a Nucleo

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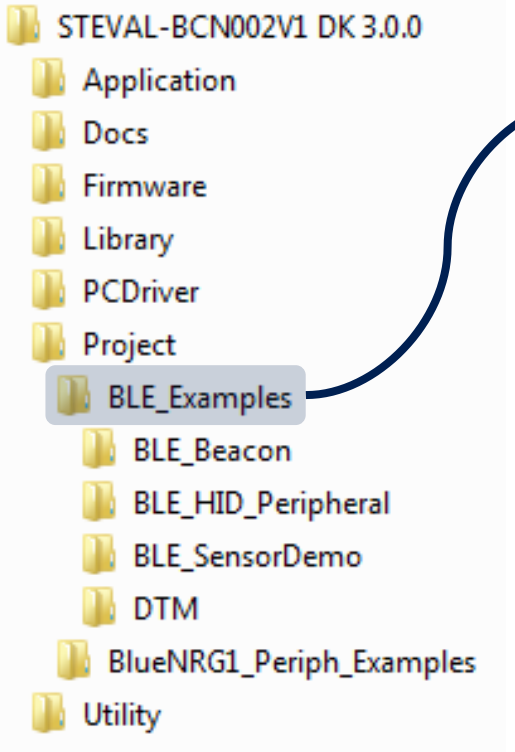
Software setup: SDK & IDE

Step 1

- Download and unzip the **Bluetile SDK** (software development kit) from www.st.com/bluetile



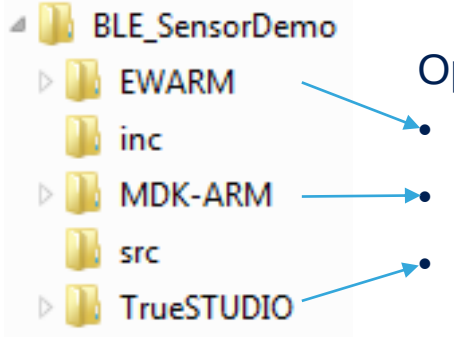
Step 2

Select the most appropriate project in **BLE_Examples** directory

- **BLE_Beacon** to advertise programmable data
- **BLE_HID_Peripheral** to emulate a wireless keyboard or mouse
- **BLE_SensorDemo** to stream sensor data to the reference app **ST BLE Sensor**
- **DTM** to enable BlueNRG-2 control in real-time using **STSW-BNRGUI** software tool

BLE_SensorDemo is the default firmware preloaded for demo purposes

Step 3



Open the project file corresponding to your favorite IDE

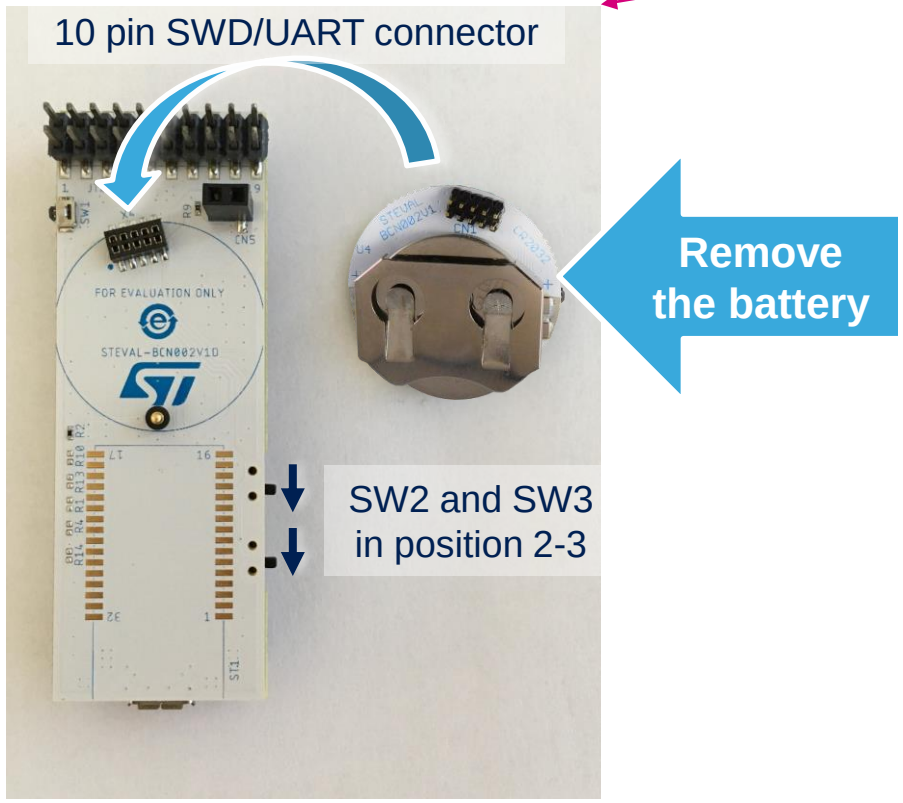
- **EWARM** for IAR Embedded Workbench by IAR
- **MDK-ARM** for KEIL uVision by ARM
- **TrueStudio** for TrueStudio by Atollic

Hardware setup: Flash & Debug

Flash

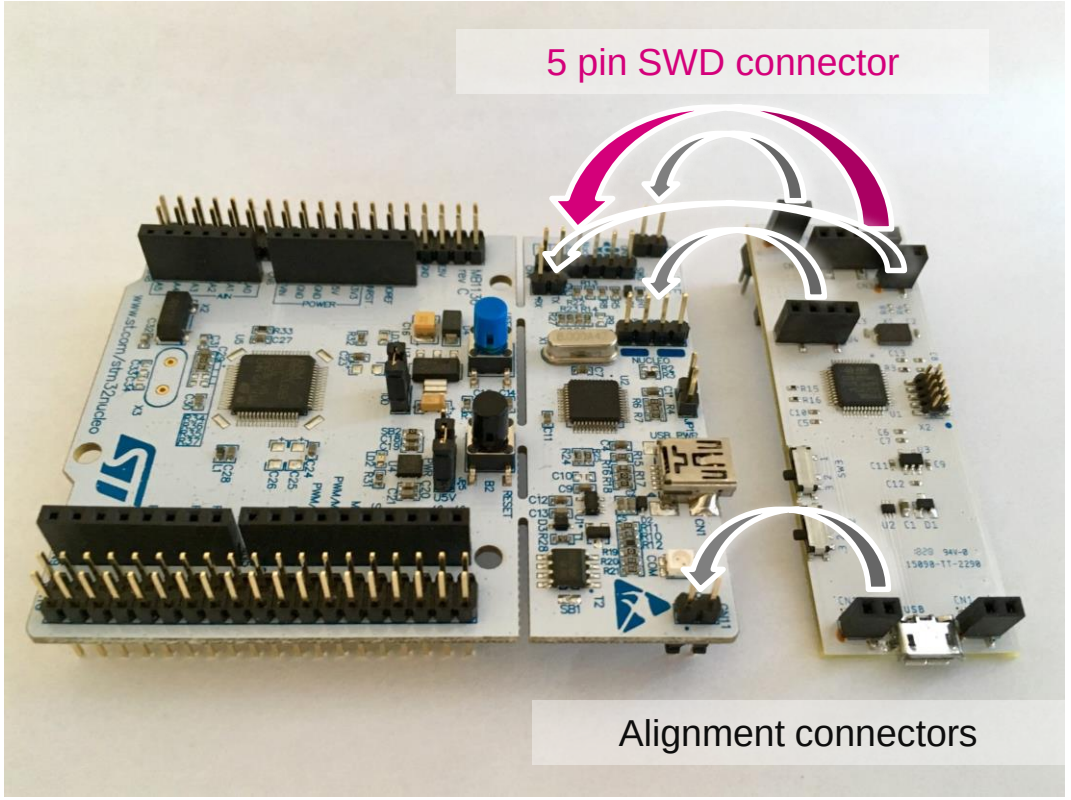
Remove the battery and plug the BlueNRG-Tile on its host board, move switch SW2 and SW3 in position 2-3

Step 1



Flash & Debug with supported IDEs

Remove the battery and plug the BlueNRG-Tile on its host board, plug the host board on any Nucleo ST-Link



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Hardware setup: Flash & Debug

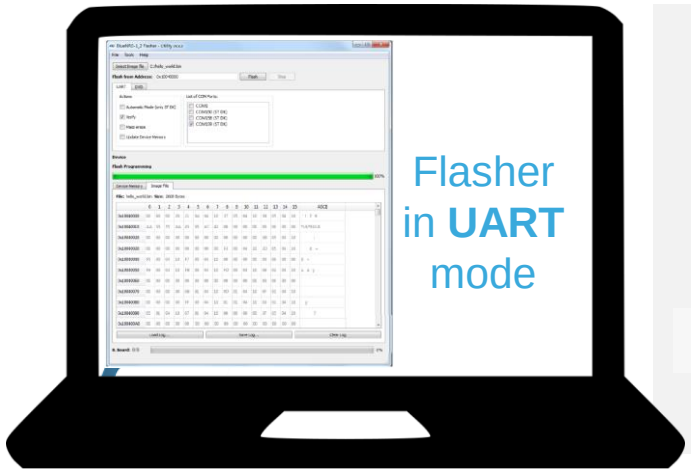
Flash

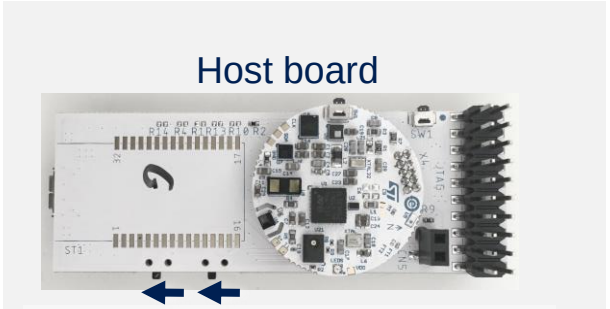
Connect the USB of the host board to the laptop

not needed for **Window 10**

Download and install **STSW-STM32102** Virtual COM port driver (VCOM)

Download, install, run **STSW-BNRGFLASHER** to Flash BlueNRG-2(reference manual UM2406)





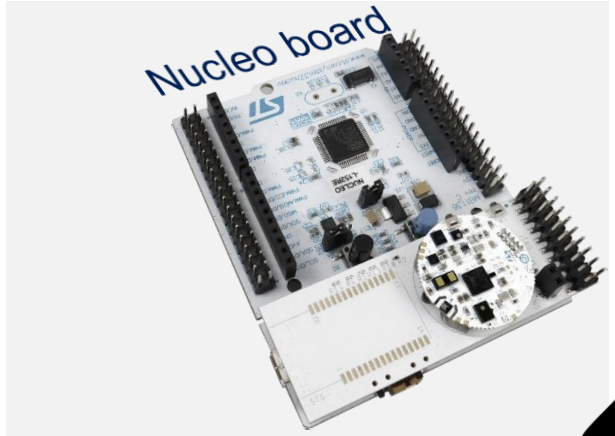
Flash & Debug with supported IDEs

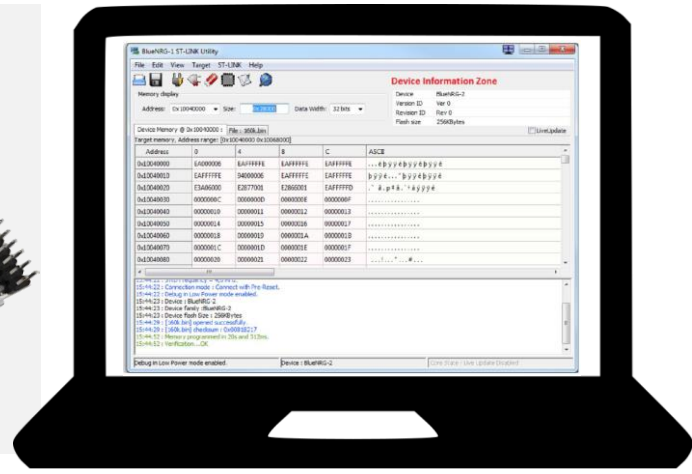
Step 1 — Connect the USB of the host board to the laptop, also connect the USB of the Nucleo ST-Link to the laptop

Step 2 — Flash & Debug using **supported IDEs** (IAR, Keil, Atollic TrueSTUDIO) or…

Step 3 — Download, install and run **STSW-BNRG1STLINK** to Flash BlueNRG-2 (reference manual UM2109)

If BlueNRG-2 is in deep sleep, it is not possible to Flash & Debug
(use STSW-BNRGFLASHER to Flash - see next slide)

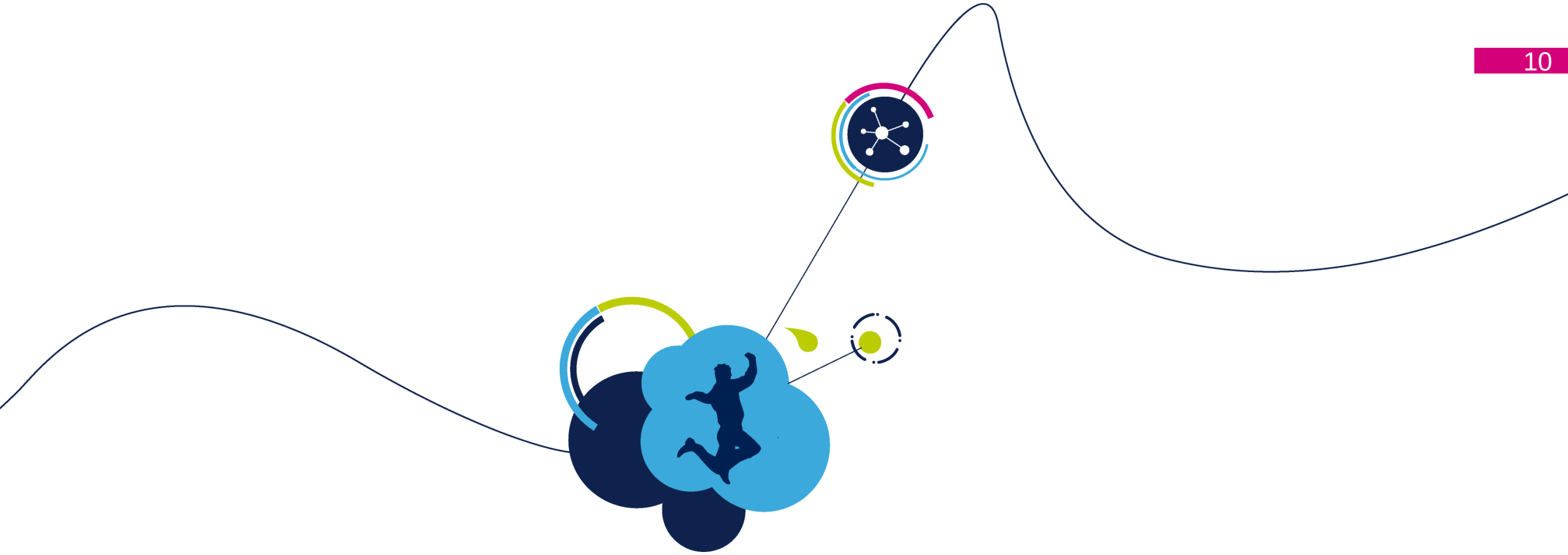




Hardware setup: Flash & Debug

- If BlueNRG-2 is in deep sleep
  - It is not possible to Flash & Debug with STSW-BNRG1STLINK: the SWD interface is shut down and the ST-Link will not detect BlueNRG-2
    - Use STSW-BNRGFLASHER to Flash then Debug with supported IDEs
    - Use STSW-BNRGFLASHER to mass erase then Flash & Debug with supported IDEs
  - When debugging, custom firmware should not enter deep sleep: as soon as the deep sleep mode is activated the SWD interface will be shut down and the ST-Link will be disconnected
  - When the BlueNRG-Tile is plugged on its host motherboard, the reference firmware automatically disables deep sleep mode to enable Flash & Debug with the ST-Link

- BlueNRG-2 is not an STM32 microcontroller!
  - The standard ST-Link Utility **STSW-LINK004** will NOT work with BlueNRG-2
  - Use the BlueNRG ST-Link Utility **STSW-BNGR1STLINK** or **STSW-BNRGFLASHER**



More information

BlueTile Kit overview

STEVAL-BCN002V1B

- The BlueNRG-Tile development kit **(STEVAL-BCN002V1B)** includes the BlueNRG-Tile board (**STEVAL-BCN002V1**), a highly integrated development platform with a broad range of functionality aimed at improving system design cycles and accelerating results

- The BlueNRG-Tile host board (**STEVAL-BCN002V1D**) is also provided as part of the kit; it features:
  - a USB connector to Flash,
  - SWD connectors for debugging with external ST-LINK or a NUCLEO ST-LINK or an ST-LINK Stamp V3 module (when soldered on-board)

FCC ID S9NSTEBCN2V1
IC ID 8976C-STEBCN2V1

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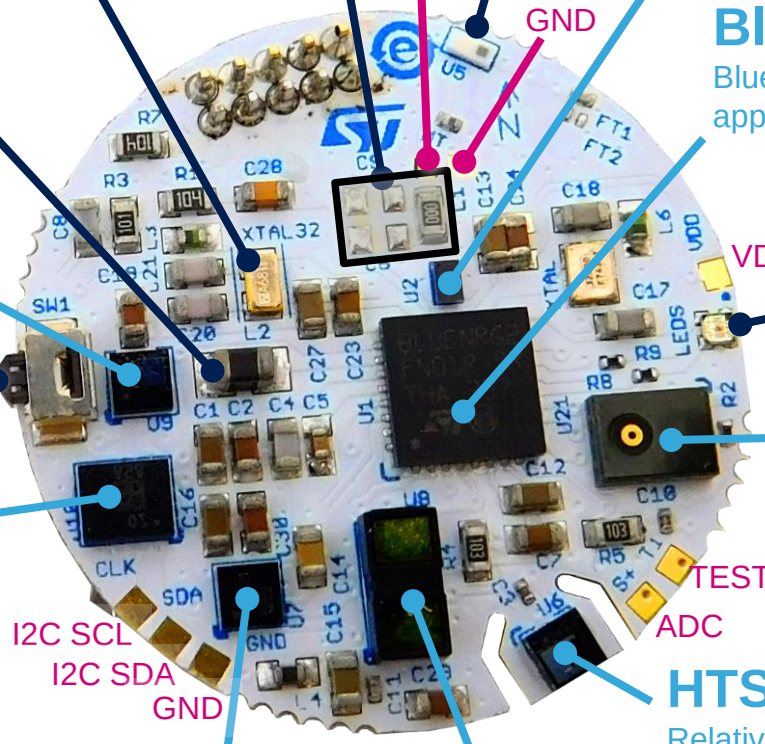
BlueTile- STEVAL-BCN002V1



32kHz crystal
To enable lowest power BLE sleep mode

Inductor
To enable lowest power BLE active mode

Π-network (not populated)

SMD antenna

BALF-NRG-02D3
Integrated balun and matching network

BlueNRG-2
Bluetooth 5.0 network and application processor

Cortex-M0 32 MHz
256 kB Flash 24 kB RAM
Up to +8dB, 96 dB link budget
0.9 uA sleep, 1.9 mA active
8.3 mA peak TX at -2 dBm
15 mA peak TX at +8 dBm

260-1260 hPa range
0.007 hPa RMS noise
0.025-0.9 hPa rel/abs accuracy
Moisture & dust resistant
Down to 4 uA at 1 Hz

LPS22HH
Ambient pressure

User button

RGB LED

MP34DT05-A
Top-port digital microphone

122.5 dBSPL AOP
64 dB SNR and 0.2% THD+N
0.7% THD+N at 110 dB SPL
PDM output

0.55 mA acc+gyro at 6.6 kHz
3.8 mdps/sqrtHz gyro noise density
70 ug/sqrtHz acc noise density
Embedded acc event detection
Up to 16 Finite State Machines

LSM6DSO
Smart accelerometer and gyroscope

HTS221
Relative Humidity and temperature

+/-3.5% RH accuracy
+/-0.5 degC temp accuracy
Down to 2 uA at 1 Hz

Up to 150 Hz
50 Gauss dynamic range
3 mGauss RMS noise
Embedded offset cancellation

LIS2MDL
Magnetometer

VL53L1
Proximity by Time-of-flight

Up to 50 Hz ranging frequency
4-400 cm ranging
20-25 mm ranging error

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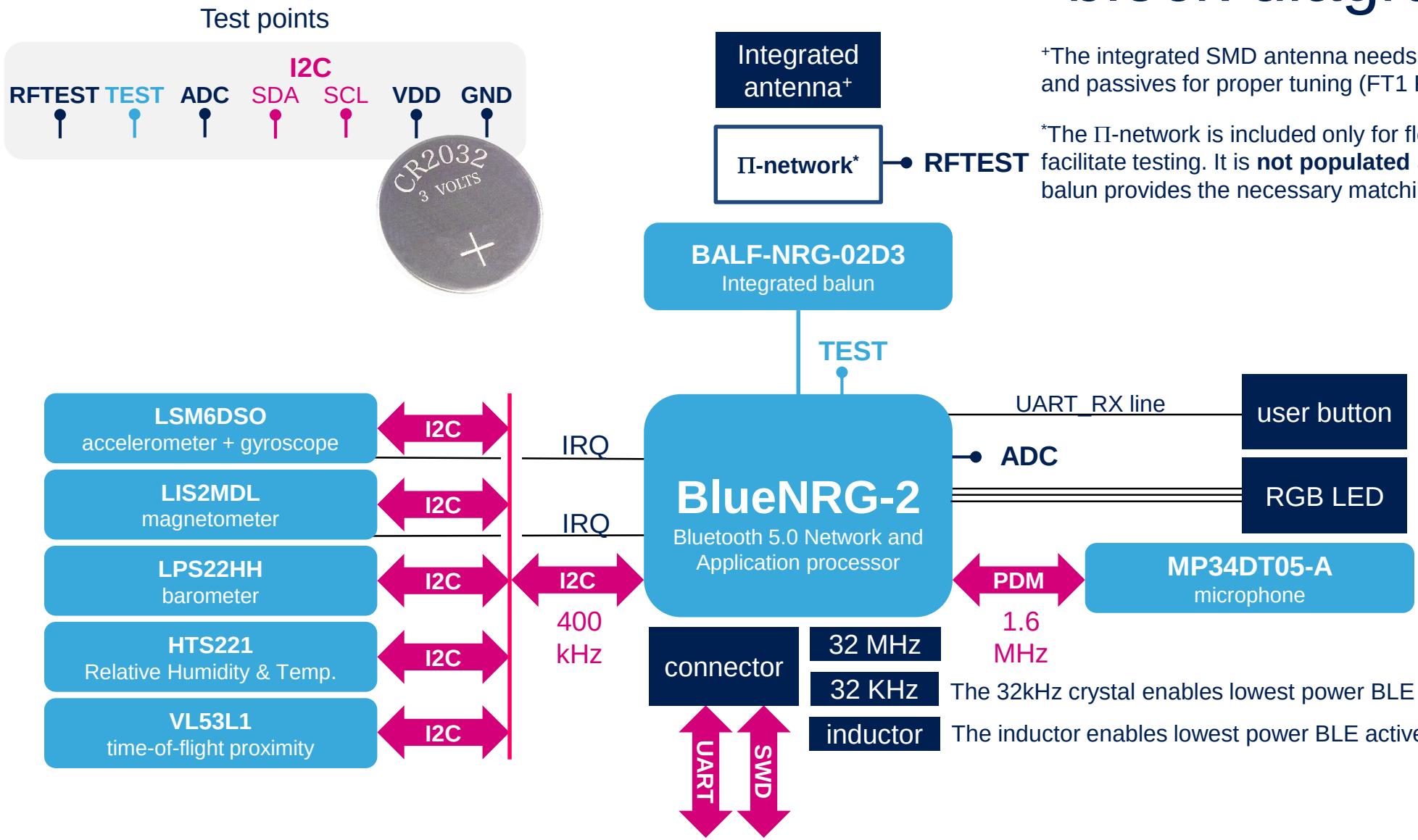
BlueTile- STEVAL-BCN002V1 block diagram



+The integrated SMD antenna needs clearance area and passives for proper tuning (FT1 FT2 and MT).

*The Π-network is included only for flexibility and to facilitate testing. It is **not populated** as the integrated balun provides the necessary matching.

The 32kHz crystal enables lowest power BLE sleep mode.

The inductor enables lowest power BLE active mode.

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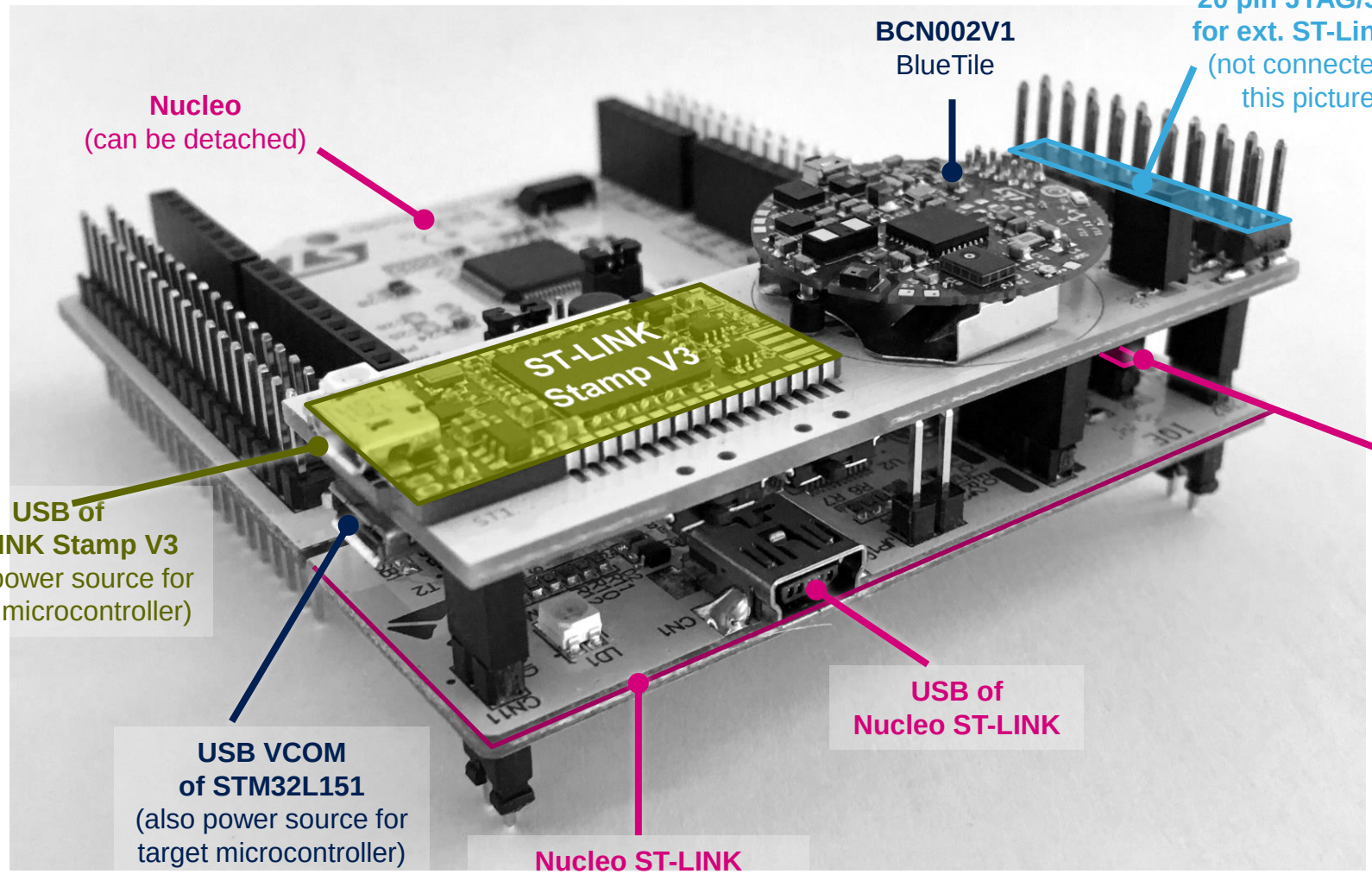
BlueTile host board - STEVAL-BCN002V1D



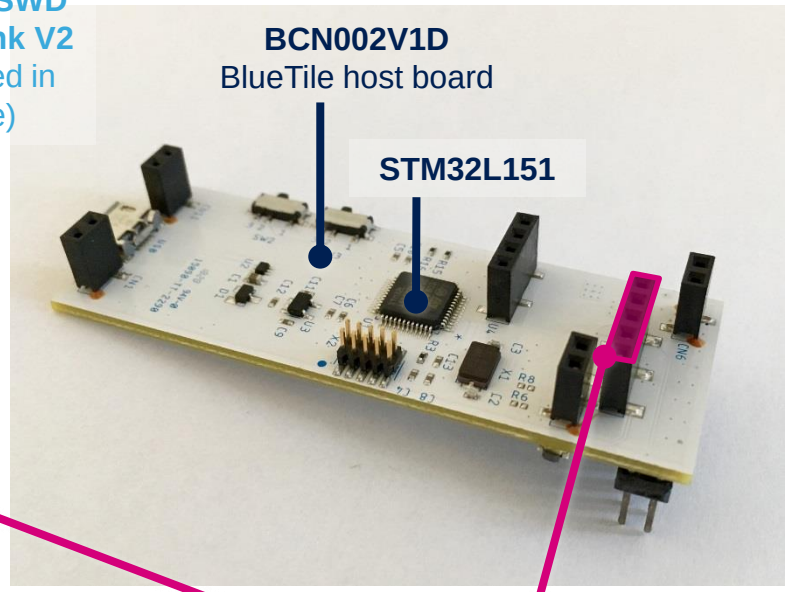
BCN002V1
BlueTile

20 pin JTAG/SWD for ext. ST-Link V2
(not connected in this picture)

Nucleo
(can be detached)

BCN002V1D
BlueTile host board

STM32L151



USB of ST-LINK Stamp V3
(also power source for target microcontroller)

USB VCOM of STM32L151
(also power source for target microcontroller)

USB of Nucleo ST-LINK

5 pin JTAG/SWD for Nucleo ST-LINK
(connected in this pitcture)

Nucleo ST-LINK
(the rest of the NUCLEO board can be detached)

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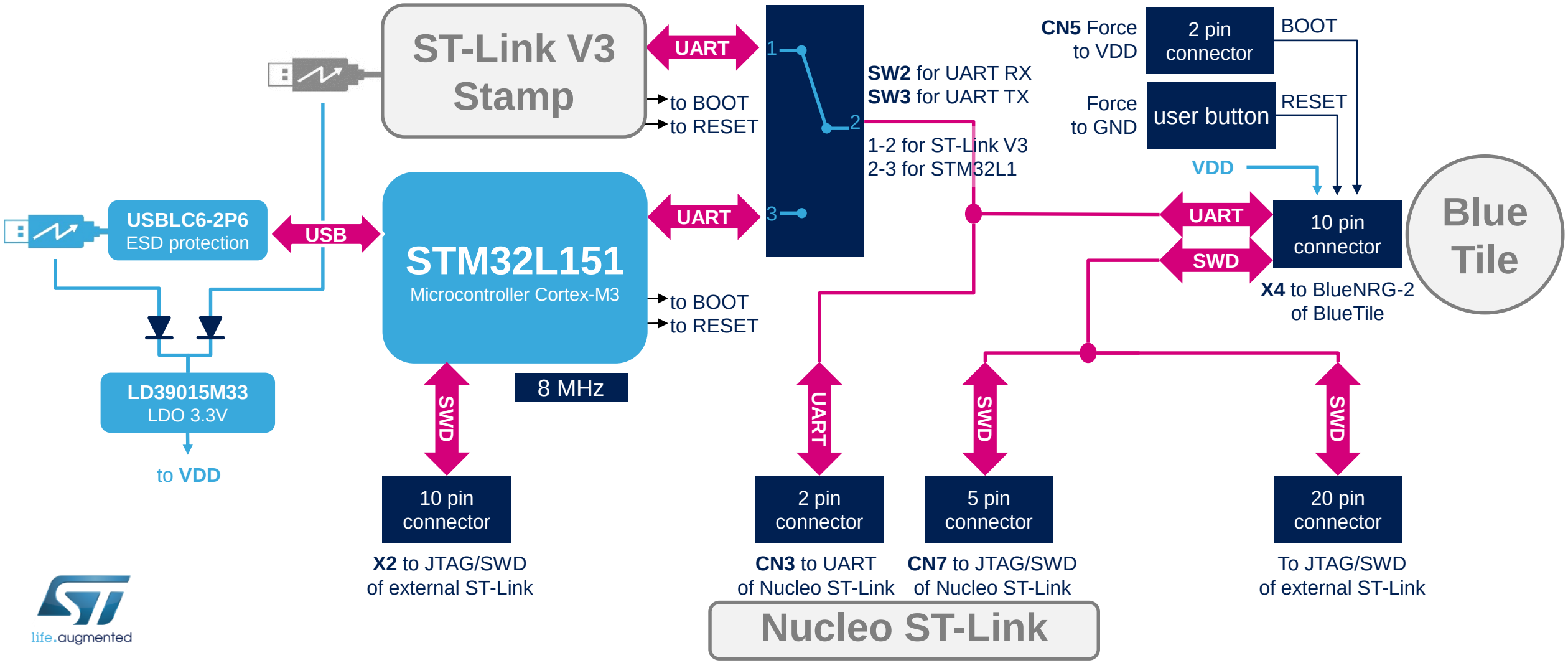
BlueTile host board - STEVAL-BCN002V1D

block diagram



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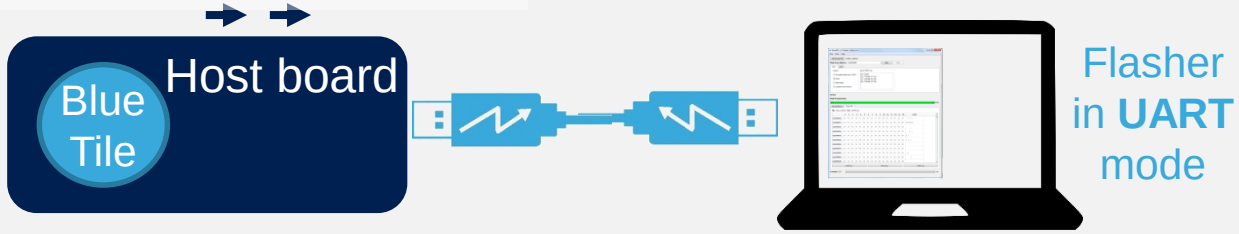
BlueTile host board - STEVAL-BCN002V1D

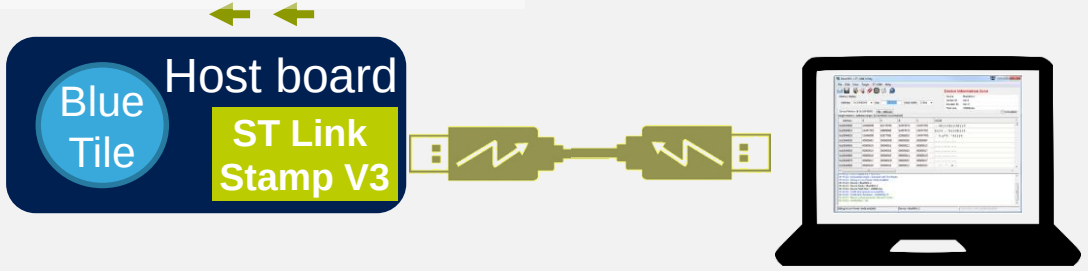
use cases

SW2 and SW3 in position 2-3

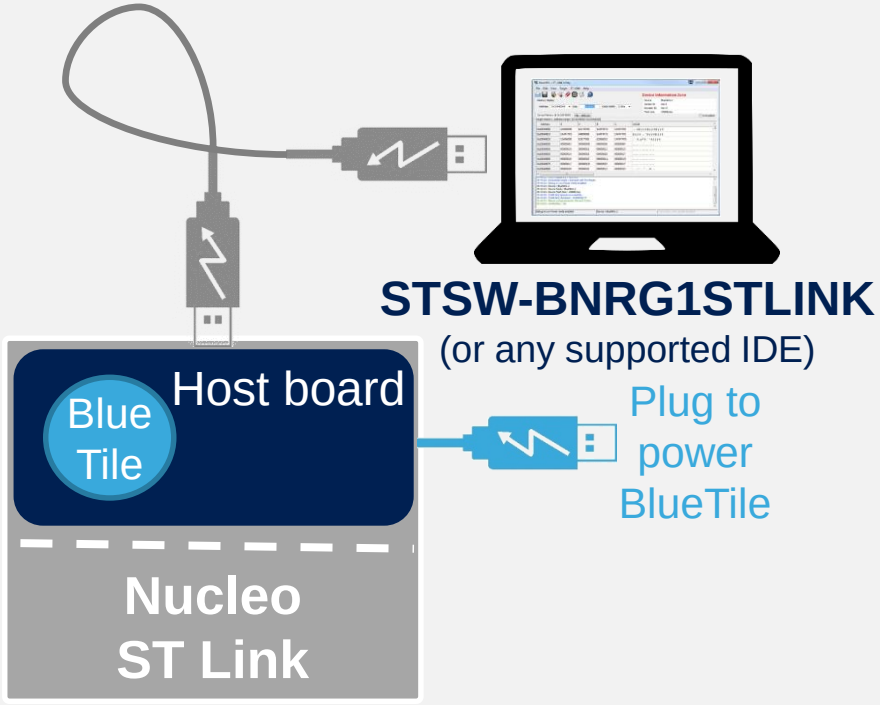


STSW-BNRGFLASHER

SW2 and SW3 in position 1-2



STSW-BNRG1STLINK
(or any supported IDE)



STSW-BNRG1STLINK
(or any supported IDE)

ST-Link Stamp V3, Nucleo ST-Link, ST-Link V2 will not detect BlueNRG-2 if it is in deep sleep.

STSW-BNRG1STLINK
(or any supported IDE)

(or any JTAG debugger)

Thanks