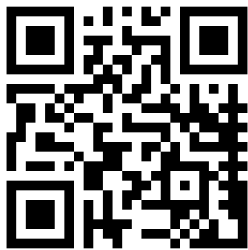
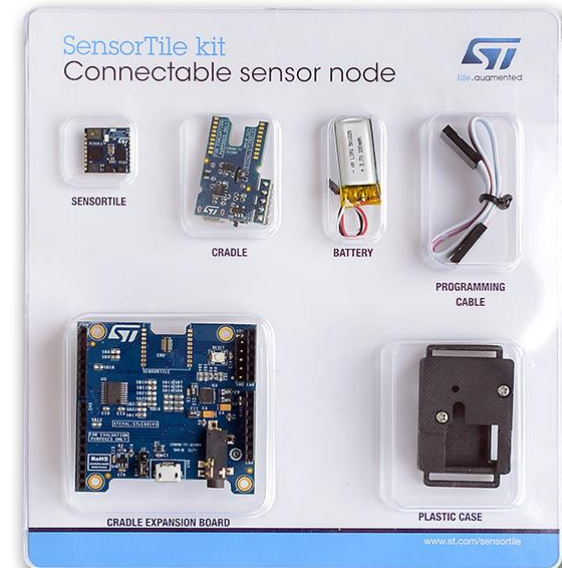


Quick Start Guide

SensorTile Kit - STEVAL-STLKT01V1



www.st.com/sensortile

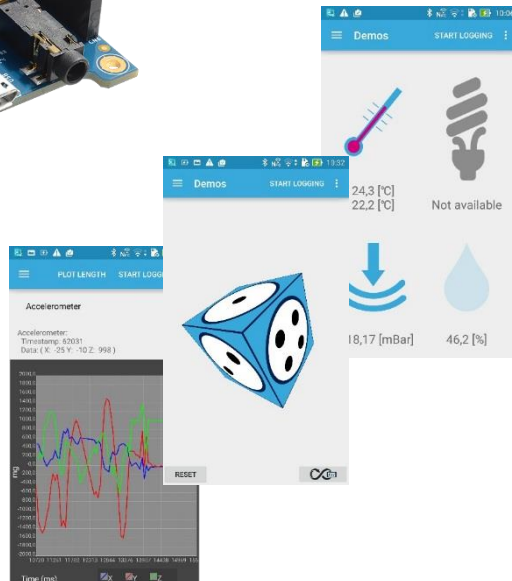
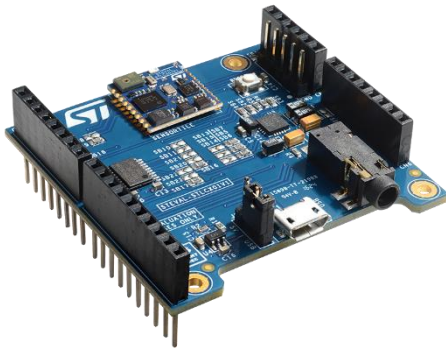


What do you want to do?

2

Unbox and run
default demo

Page 3



Start designing
your application

Page 5

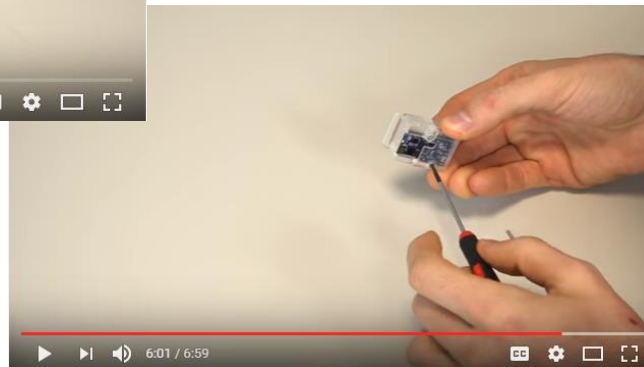
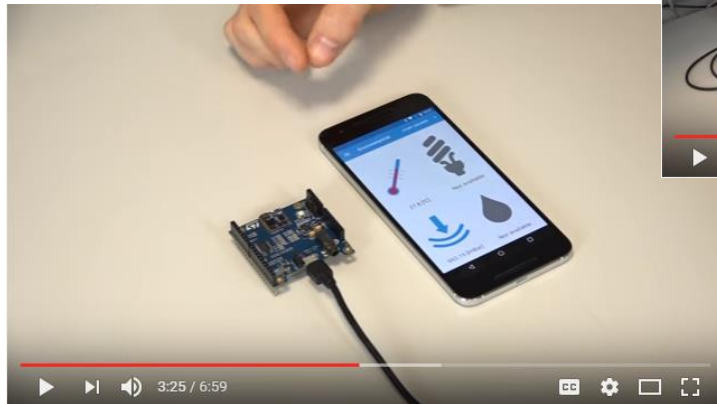
A screenshot of the IAR Embedded Workbench IDE. The left pane shows the project structure with 'main.c' selected. The right pane shows the code for 'main.c', which includes comments for STM32L4xx HAL library initialization and system clock configuration. The bottom pane shows the output window with a table of sensor data.

```
97  /* @brief Main program
98  * @param None
99  * @retval None
100  */
101  int main( void )
102  {
103      uint32_t msTick, msTickPrev = 0;
104      uint8_t doubleTap = 0;
105
106      /* STM32L4xx HAL library initialization:
107       - Configure the Flash prefetch, instruction and Data caches
108       - Configure the SysTick to generate an interrupt each 1 msec
109       - Set NVIC Group Priority to 4
110       - Global MSP (MCU Support Package) initialization
111      */
112      HAL_Init();
113
114      /* Configure the system clock */
115      SystemClock_Config();
116
117      if (SendOverUSB)
118      {
119          /* Acc X(mg): -18  Y(mg): 9  Z(mg): 983
120           * Gy X(mg): 280  Y(mg): 280  Z(mg): 840
121           * Mag X(μgauss): 350  Y(μgauss): 803  Z(μgauss): -504
122           * ALS_1 (lux): 625  Prev_1 (m): 255
123           * ALS_2 (lux): 622  Prev_2 (m): 255
124           * dB Noise (dB): 46
125           * Pinbar: 1003.54  H(x): 34.34  TIC: 33.49  UV(index): 0
126           * Acc X(mg): -9  Y(mg): 11  Z(mg): 982
127           * Gy X(mg): -630  Y(mg): 1470  Z(mg): 630
128           * Mag X(μgauss): 355  Y(μgauss): 805  Z(μgauss): -522
129           * ALS_1 (lux): 630  Prev_1 (m): 255
130           * ALS_2 (lux): 629  Prev_2 (m): 255
131           * dB Noise (dB): 40
132           * Pinbar: 1003.41  H(x): 34.16  TIC: 33.45  UV(index): 0
133           * Acc X(mg): -4  Y(mg): 14  Z(mg): 982
134           * Gy X(mg): -420  Y(mg): 1330  Z(mg): 630
```

First Setup – Unboxing Video

3

- Have a look at the SensorTile Unboxing Video on Youtube which covers unboxing and first use of the SensorTile Kit:
 - <https://youtu.be/4yQgL8UQPOw>



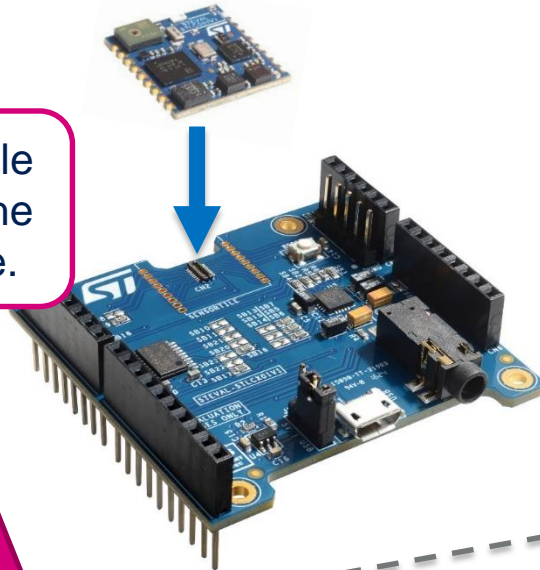
First Setup – Run the preloaded Demo

4

- The preloaded demo on SensorTile Kit is the BlueMicrosystem2

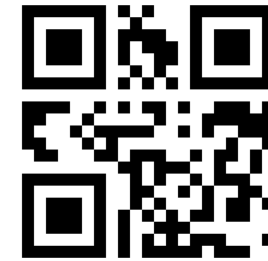
Step 1

Plug the SensorTile Core System on the Expansion Cradle.



Step 2

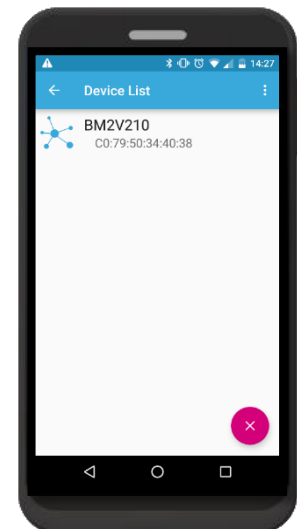
Power it via **USB**



www.st.com/bluems

Step 3

Download and run **ST BlueMS App** (Android or iOS)



Programming the SensorTile – Two choices

5

Starter Firmware

Page 6

- Very simple to use
- Basic features
- 3 example projects
 - DataLog: USB or SDCard
 - AudioLoop: microphone acquisition and audio output
 - BLE_SampleApp: Bluetooth Low Energy sample app (compatible with BlueMS App)

BlueMicrosystem2

Page 7

- More complex to use
- Complete source code of the preloaded demo
- Advanced features
 - Compiled libraries
 - Advanced algorithms
- Compatible with STM32 Open Development Environment

See also:

Hardware Setup for
board programming

Page 8

Starter Firmware – STSW-STLKT01

6

Step 1

Download the Starter Firmware from www.st.com/sensortile

Tools and Software

EMBEDDED SOFTWARE

EVALUATION TOOL SOFTWARE

Part Number	Manufacturer	Description
STSW-STLKT01	ST	Basic firmware application for STEVAL-STLKT01V1

Step 2

Unzip the package on your PC

Step 3

Open one of the the projects examples with your favorite IDE

- ▶ AudioLoop
- ▶ BLE_SampleApp
- ▶ DataLog

EWARM

IAR Embedded Workbench

Inc

MDK-ARM

ARM KEIL μVision IDE

Src

SW4STM32

System Workbench for STM32



- STSW-STLKT01
 - _htmresc
 - binary
 - Documentation
 - Drivers
 - Middlewares
 - Projects
 - SensorTile
 - Applications
 - AudioLoop
 - BLE_SampleApp
 - DataLog
 - Utilities



Advanced Firmware – BlueMicrosystem2

7

Step 1

Download the BlueMicrosystem2 Firmware from www.st.com/sensortile

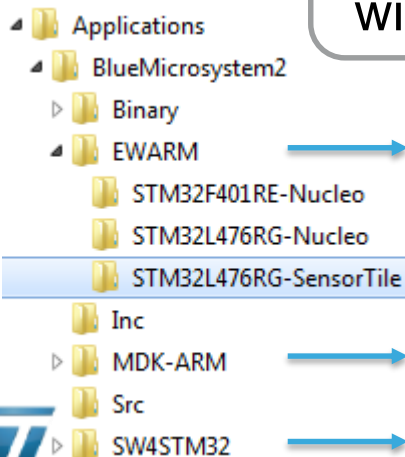
MEMS AND SENSORS SOFTWARE		
Part Number	Manufacturer	Description
BLUEMICROSYSTEM1	ST	Bluetooth low energy and sensors software expansion for STM32Cube
BLUEMICROSYSTEM2	ST	Bluetooth low energy and sensor software expansion for STM32Cube

Step 2

Unzip the package on your PC

Step 3

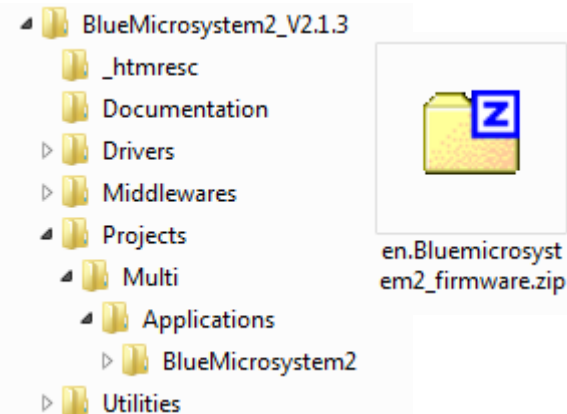
Open the SensorTile version of the project with your favorite IDE



IAR Embedded Workbench

ARM KEIL μVision IDE

System Workbench for STM32

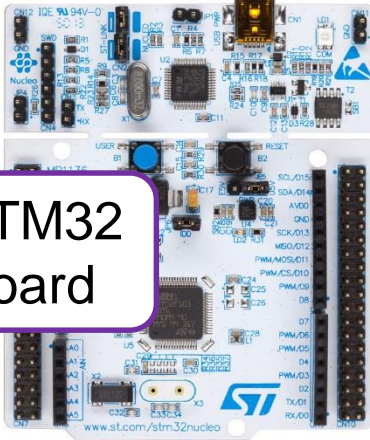


Hardware Setup for board programming

8

Step 1

Take an STM32 Nucleo board



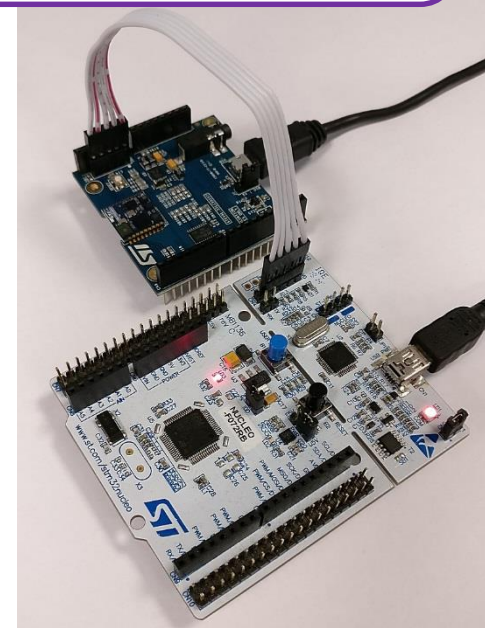
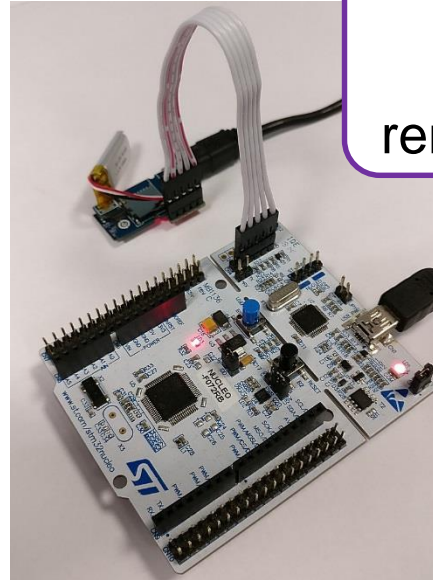
Step 3

Connect to the PC and download the firmware with your IDE

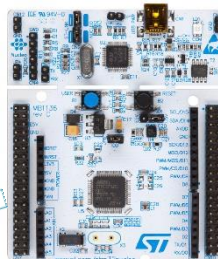


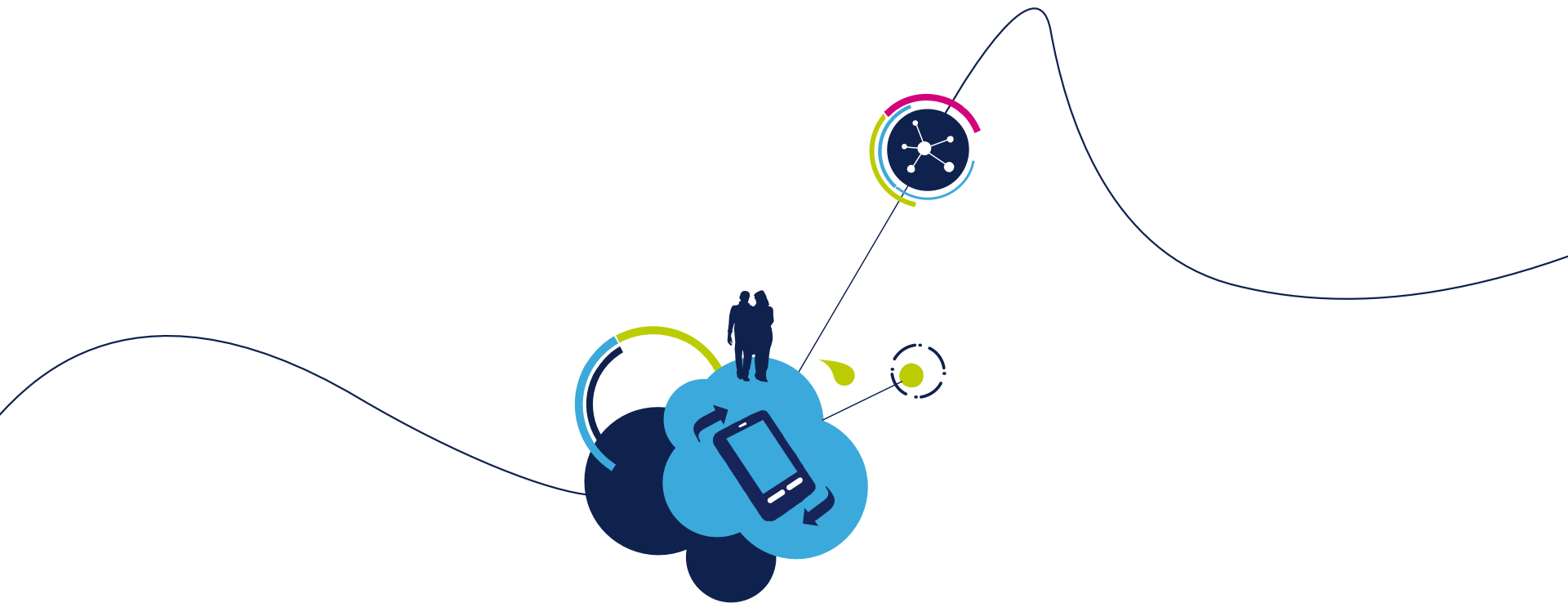
Step 2

Connect it to the SensorTile and remove CN2* jumpers



* See page 14 for details





More information

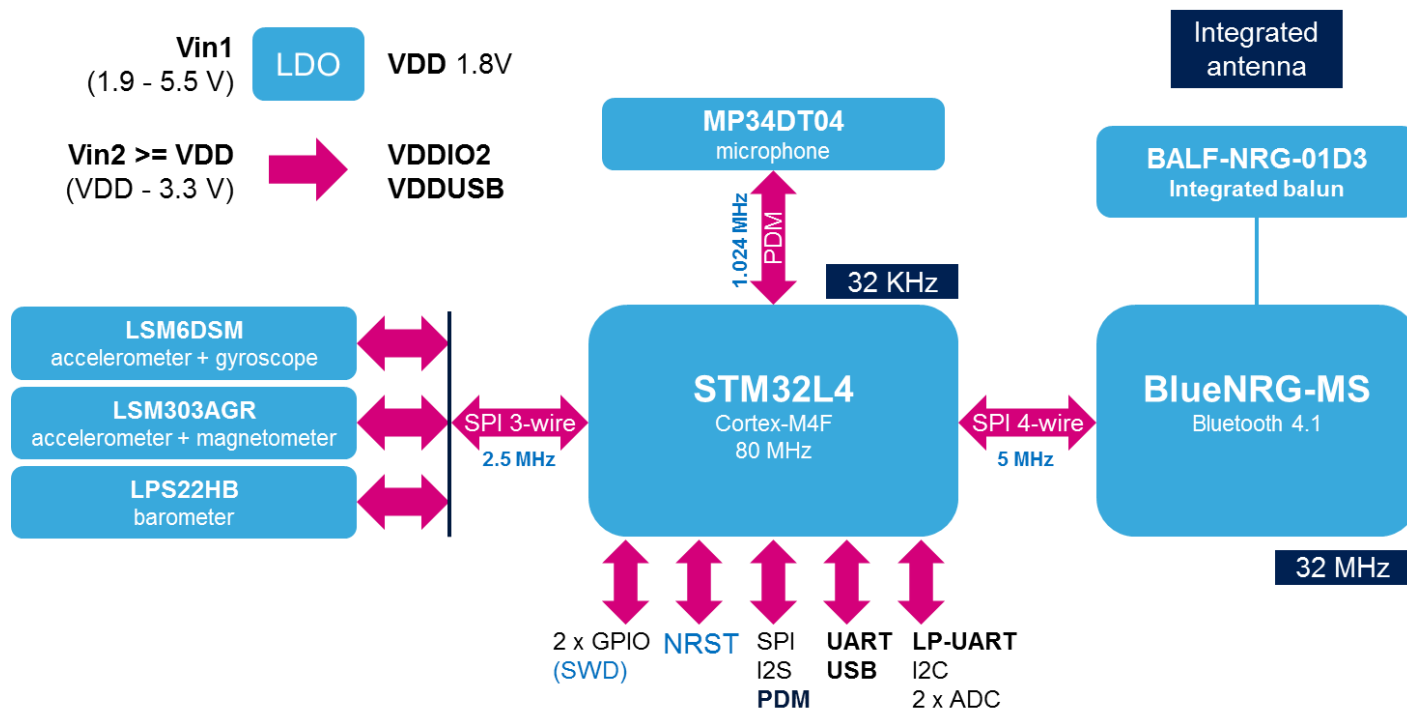
SensorTile Platform – Hardware overview

10

STEVAL-STLKT01V1 Hardware Description

- STEVAL-STLKT01V1 is the development kit for the SensorTile board (STEVAL-STLCS01V1), a highly Integrated Development Platform with a broad range of functionalities aiming to improve system design cycle and accelerate delivery of results
- Two host boards are also provided as part of the kit, both featuring SWD programming interface

SensorTile Block Diagram



SensorTile Core System

11

SensorTile Core System: STEVAL-STLCS01V1

MP34DT04

Microphone
64dB SNR, 120dB SPL

STM32L476

Cortex-M4
Up to 100DMIPS 80MHz
100uA/MHz@24MHz in run mode

LSM6DSM

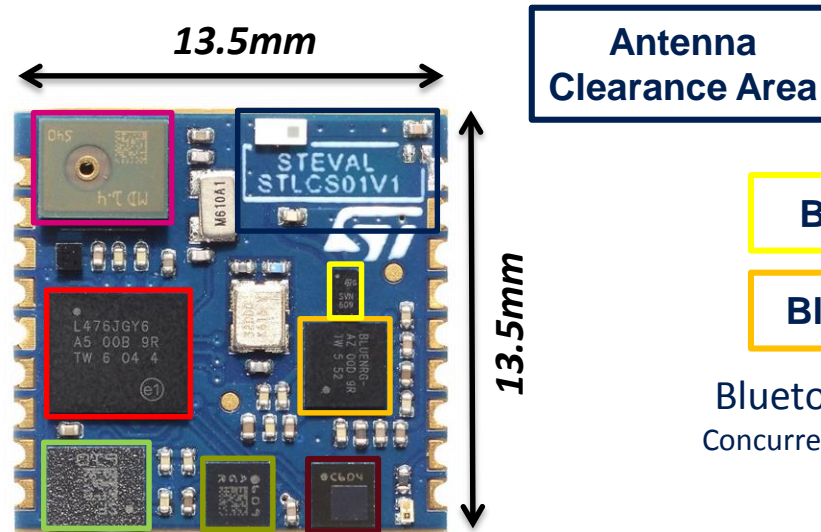
3DAcc+3DGyro
0.65mA @ 1.6kHz - 9uA @ 12.5Hz

LSM303AGR

3DAcc+3DMag
200uA @ 20 Hz (HR mode)
Accel/Mag independent
power down mode

LPS22HB

Barometer
1-75Hz, 3-12uA @ 1Hz

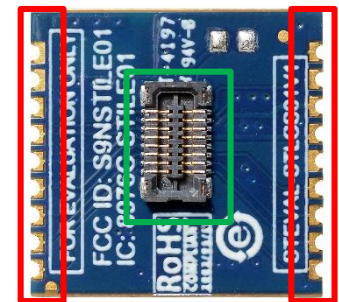


Balun Filter

BlueNRG-MS

Bluetooth low-energy
Concurrent master/slave BT4.1

Solderable



Plug-in

SensorTile Cradle: STLCR01V1

TOP VIEW

SensorTile Footprint

Solderable

HTS221

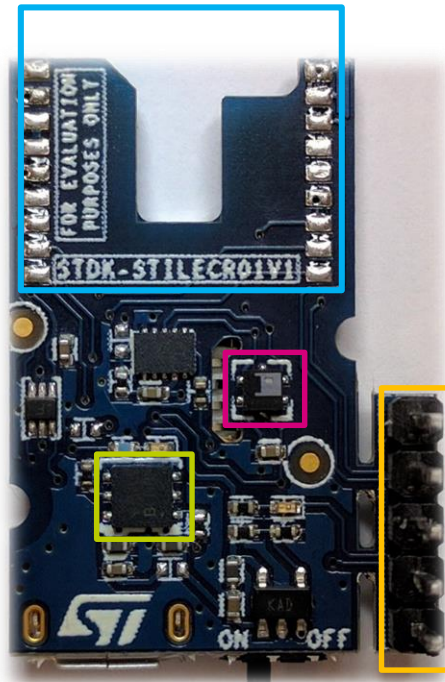
Humidity and
Temperature sensor

STBC08

Li-Ion Battery charger
with thermal regulation

SWD

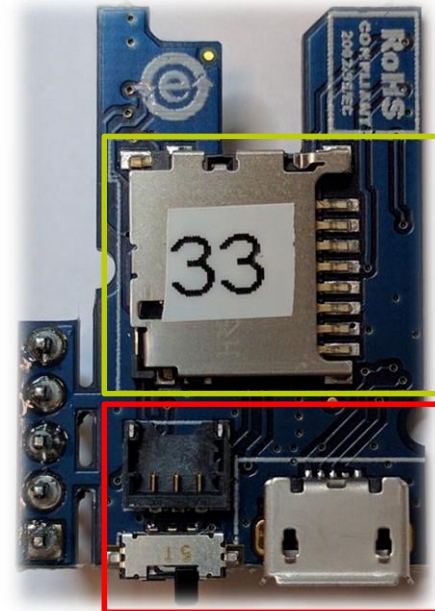
SWD programming
interface



BOTTOM VIEW

Micro-SD Card slot

Micro USB ON/OFF switch Battery Plug



SensorTile Expansion Cradle

13

SensorTile Expansion Cradle: STLCX01V1

SensorTile Footprint

ST2378ETTR

8-Bit Level Translator
3.3V \leftrightarrow 1.8V

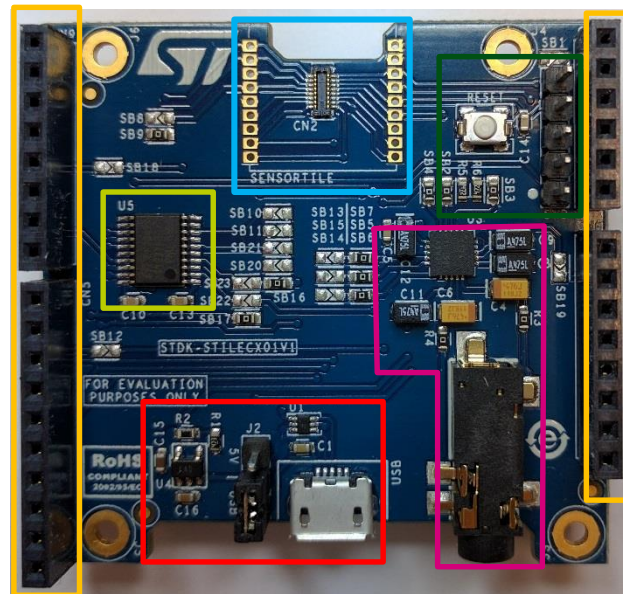
Arduino Connector

SWD & Reset

SWD programming interface
and reset button

**Audio DAC
&
3.5mm jack**

**Micro USB
&
3.3V Regulator**



SensorTile Programming/Debugging

14

- Connect an external ST-Link to the cradles SWD connectors. A 5pin flat cable is provided within the SensorTile Kit package
 - The easiest way is to get an STM32-Nucleo board which includes an ST-Link V2.1
 - Remove CN2 Jumpers from the Nucleo Board
 - Connect the SWD interfaces using the provided cable

