STM32Cubemonitor를 이용한 런타임 변수 모니터링
STM32 discovery day online track 2020

Huisu LEE

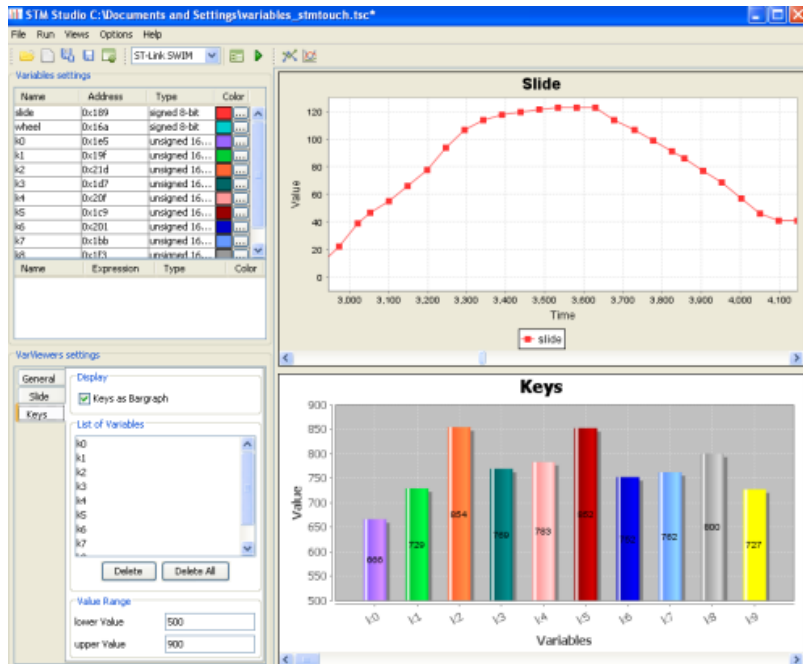# Agenda

#1 STM32CubeMonitor

#2 STM32CubeMonitor-Demo
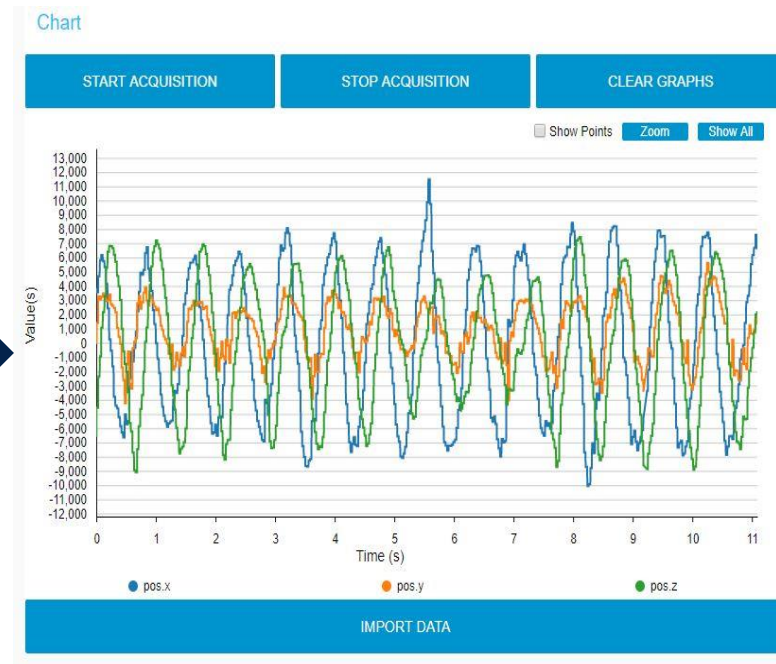
#3 STM32CubeMonitor-Power

#4 STM32CubeMonitor-Power-Demo

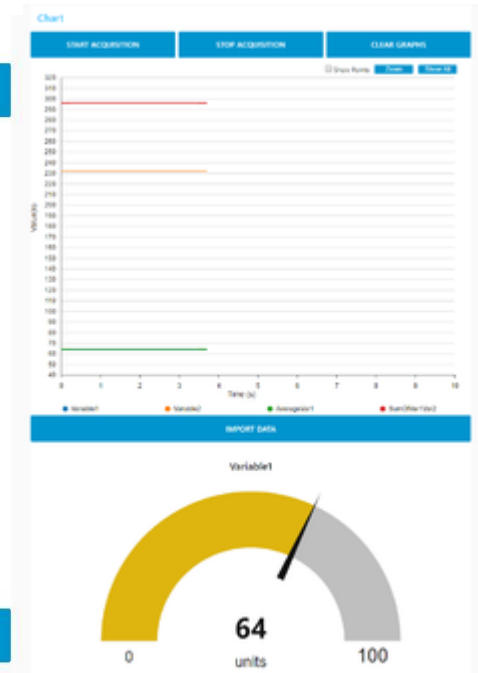# Software monitoring tool for STM32 devices

- **STM32CubeMonitor** replaces <u>STM-STUDIO-STM32</u> for the runtime variable monitoring and visualization tool with Multi-OS Flexibility

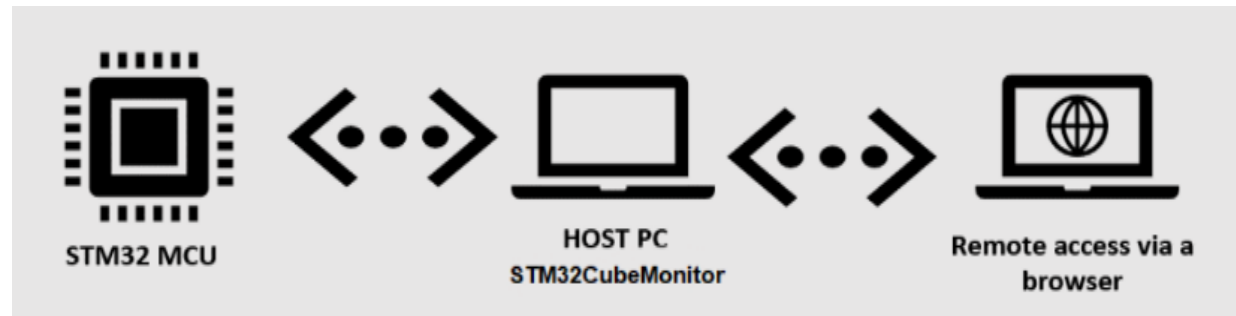
STM-STUDIO-STM32

STM32 Cube Monitor

How to access

- Run on a host PC directly connected to an STM32 target
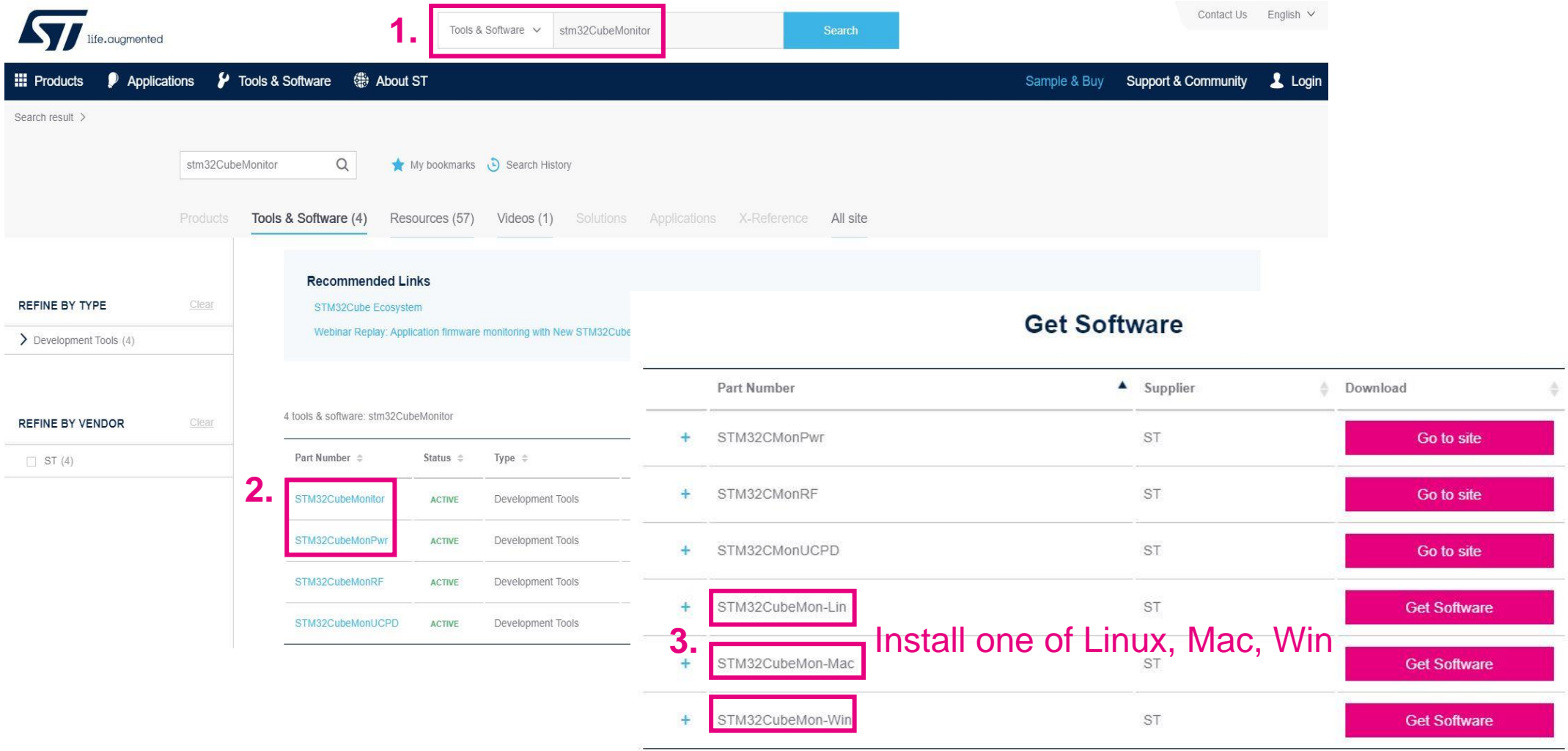

Local access

- Run remotely from a web browser using the IP address of the host PC

Remote access
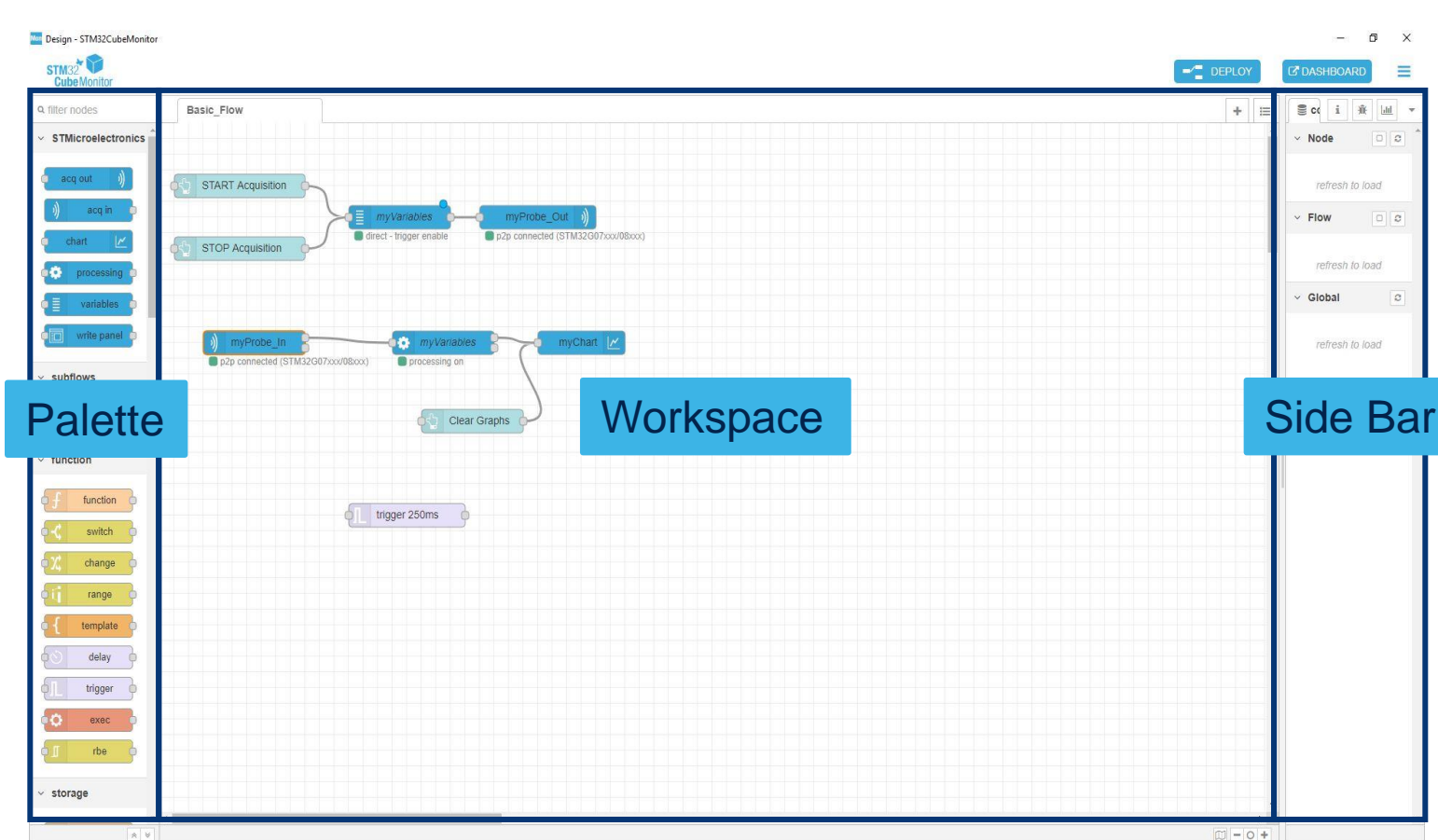
Installing STM32CubeMonitor

"www.st.com"

1. Tools & Software | stm32CubeMonitor | Search

2. STM32CubeMonitor

3. Install one of Linux, Mac, Win

Overview

- [Palette] – Lists of nodes that are available to use

- [Workspace] – Flow are developed by dragging and wiring them together

- [Side bar] – Data & error messages between nodes

Basic flow – How does it work?

"Start Acquisition" clicked:

1. The data is sent to probe out and configure the probe

2. The data is received by probe in and filtered by processing node

3. Each input message representing one measurement of a group of variables into one message every 50ms per variable containing one or several duplets(x and y)

4. Chart node is received these messages and render it in the dashboard
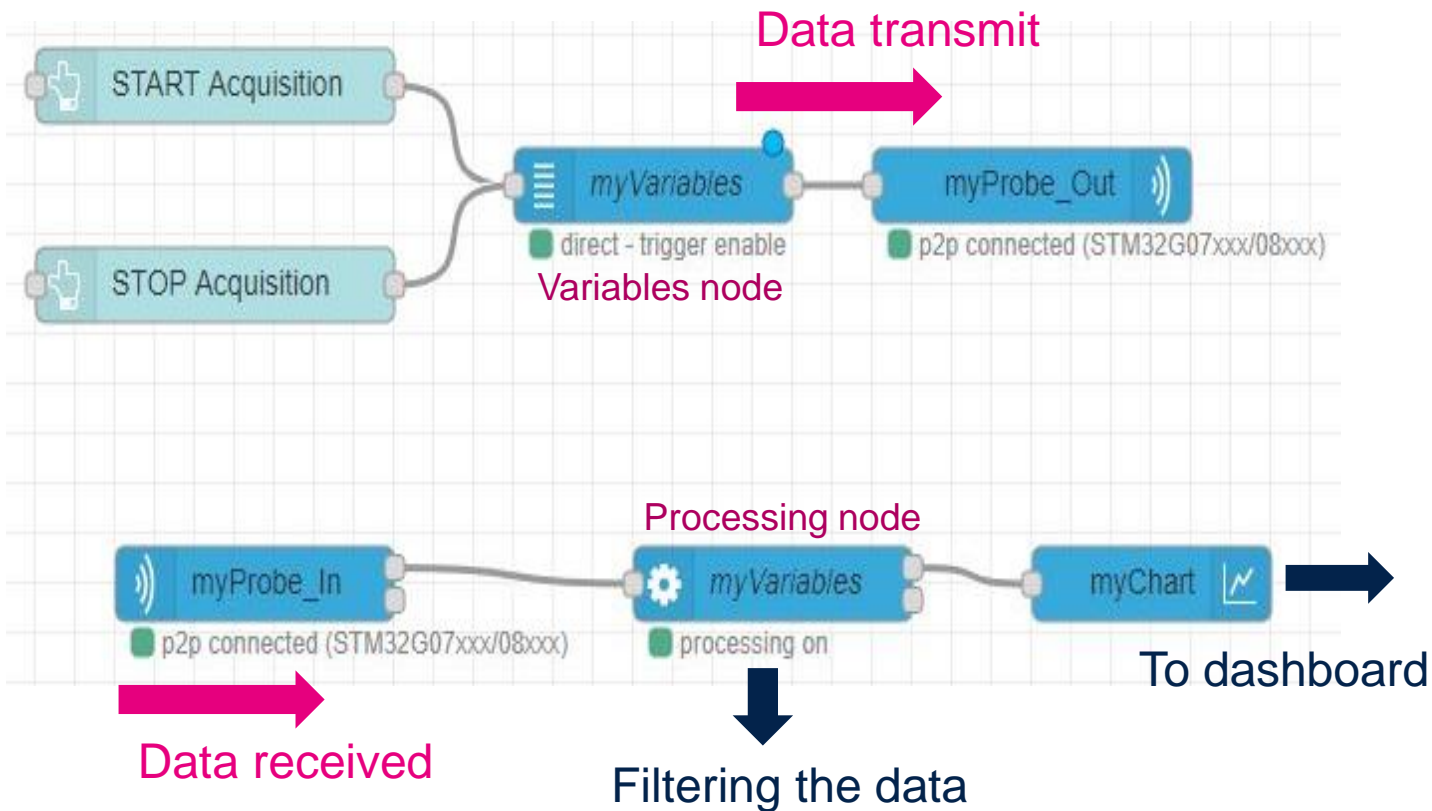
"Configuration needed for variables and processing nodes priority"

ST nodes

acq out))) Define probe configuration(probe name, protocol and frequency)

))) **acq in** Probe configuration, designed to be back-linked with processing nodes

"ST-Link is configured in acquisition out & acquisition in"

**variables** Configuring variables and parameters for communication with the target

"What variables are you watching?"

processing Transforming each input messages into one message every 50ms

"Calculations between the variables"

chart Allowing input values to be plotted on a chart

"How to set the type of results"

Functions of STM32CubeMonitor

- Record and replay data

- Additional calculations

- Using multiple probes

- Sending data to a gauge

- Optimize acquisition speed

- Trigger for starting an acquisition

- Modify frequency of acquisition

- Acquisition in snapshot mode/ direct mode
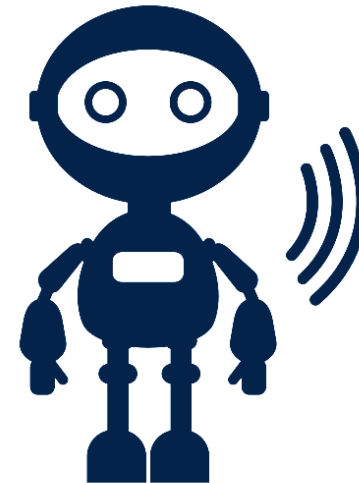
Trigger setting

- "You need to set these 3 things"

1. The start mode

2. Trigger name

3. The trigger threshold value

"Trigger starts with rising edge"

"Trigger starts with falling edge"
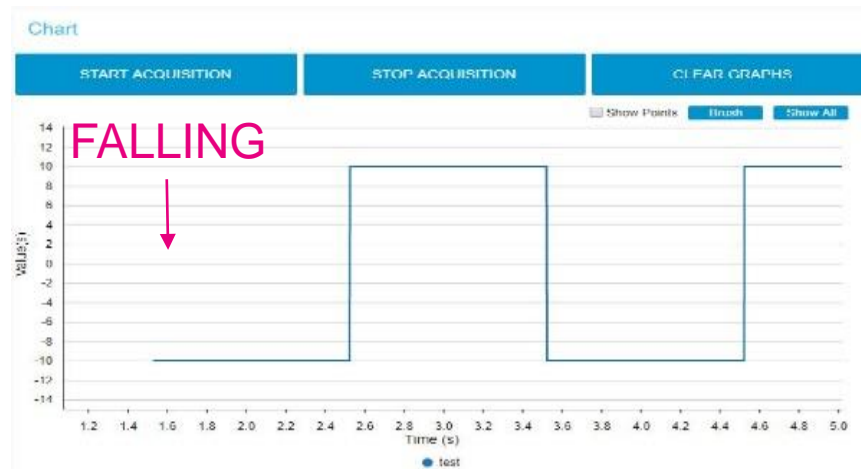
Additional calculations on measurements

Operations in expression sheet

Mathematical ▼	Trigonometry ▼	Logical ▼
+	acos()	and
-	acosh()	not
*	asin()	or
/	asinh()	xor
%	atan()	=
mod	atanh()	? :
^	atan2()	==
!	cos()	
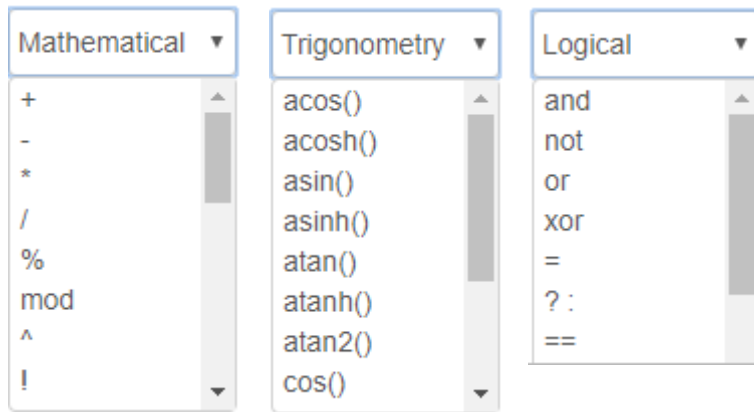
Function in statistic sheet

Min ▼
Min
Max
Average
Std_Dev
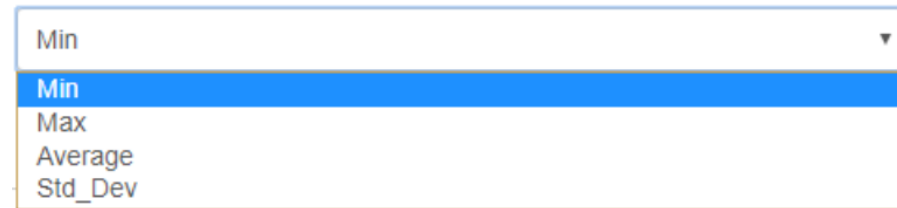
The scope
- The entire acquisition
- Last N points of the acquisition

"These are configured in the processing node"

Additional calculations on measurements – Expression

Add Click

SumOfVar1Var2 = Var1 + Var2

Additional calculations on measurements – Statistic
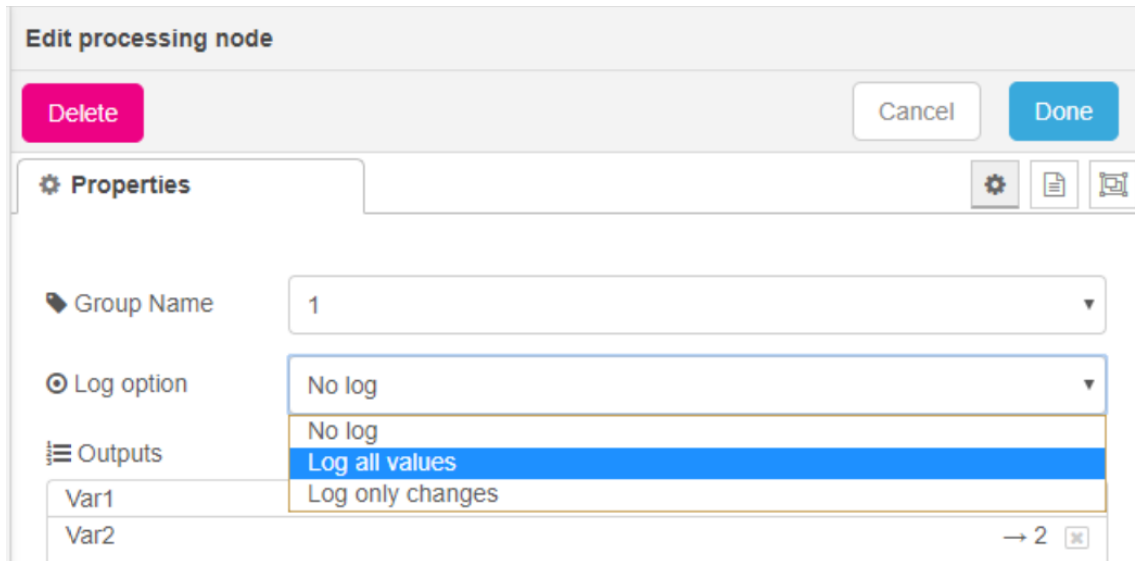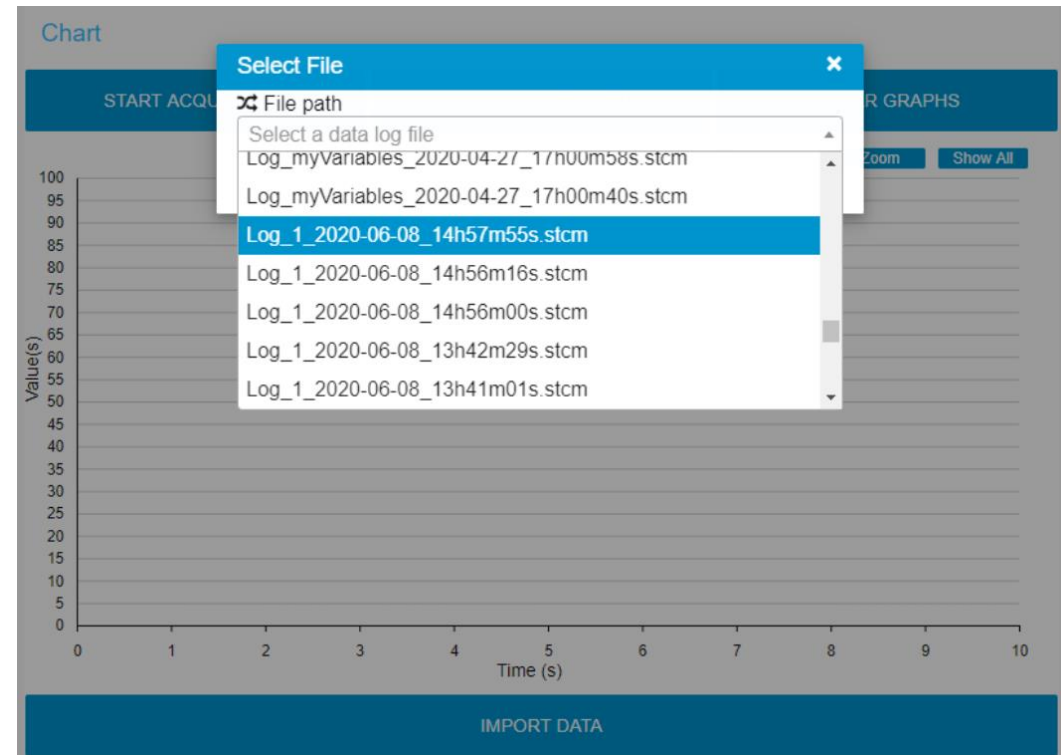

Add statistic
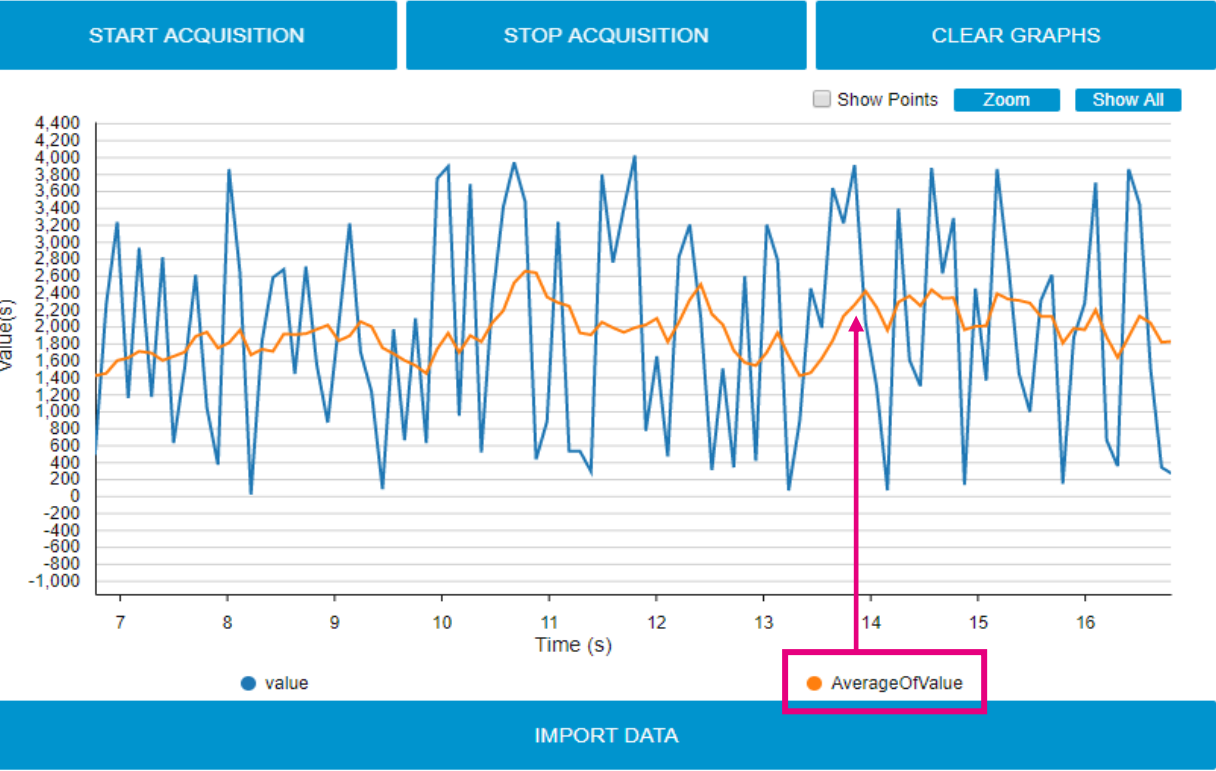
AverageVar1

Record & replay data

Activating the data log

Importing the data log

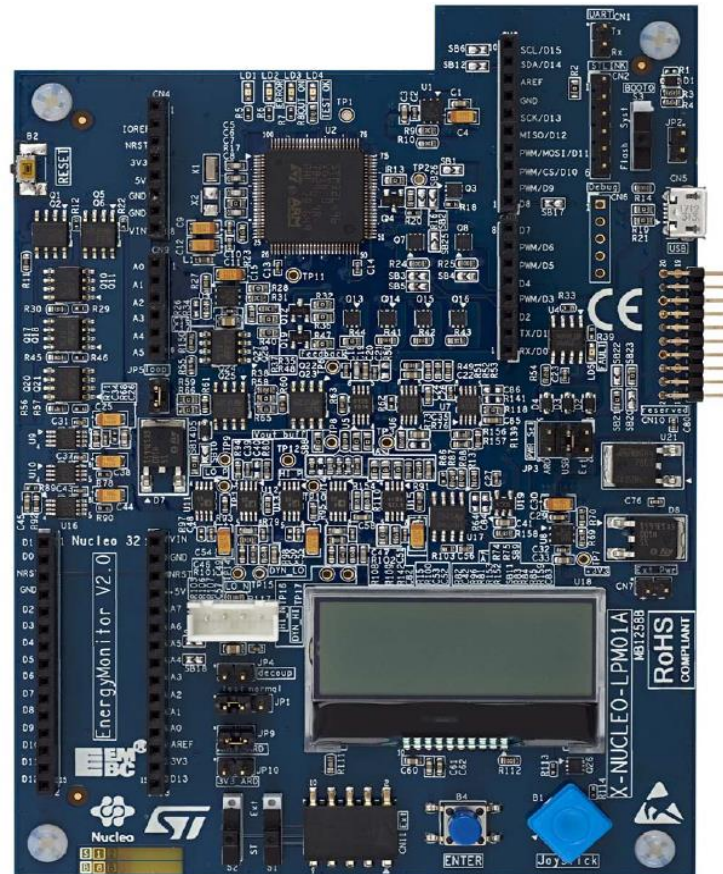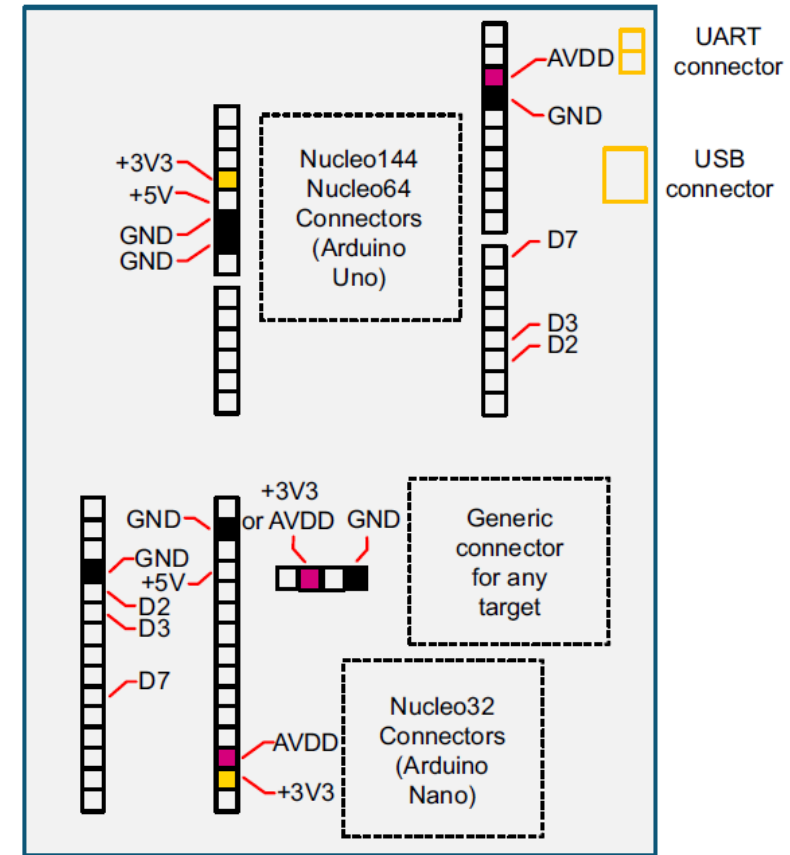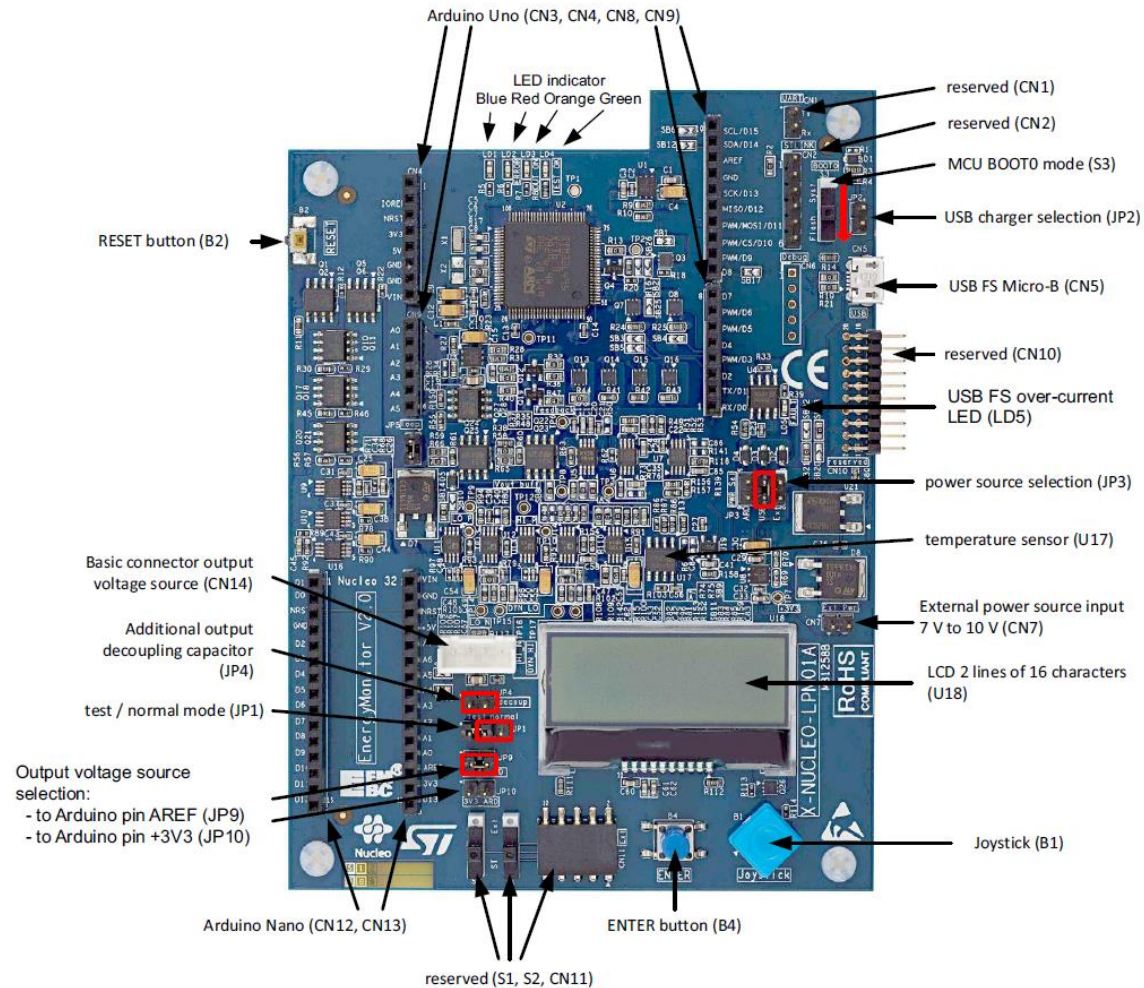**"These are configured in the processing node"**

STM32CubeMonitor demo

STM32CubeMonitor-Power

- Programmable power supply source (from 1.8 V to 3.3V)

- Consumption averaging (static measurement from 1 nA to 200 mA) as well as real-time analysis
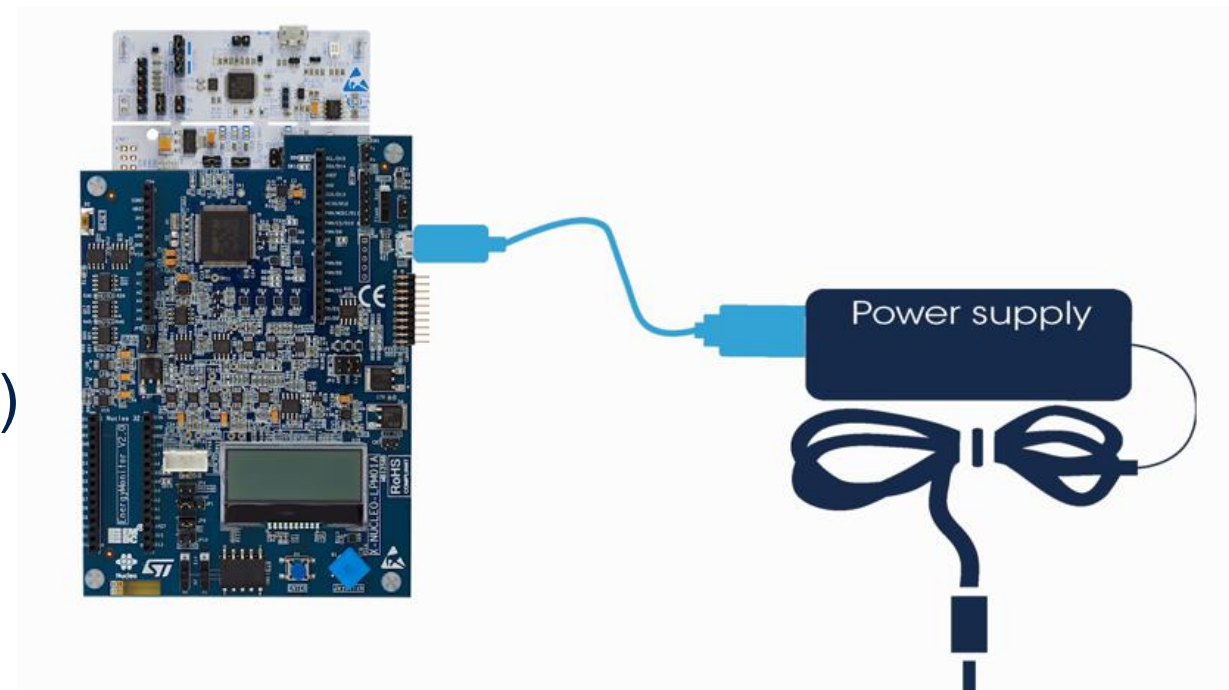
- Standalone mode & PC mode

Arduino Uno (CN3, CN4, CN8, CN9)

LED indicator
Blue Red Orange Green

RESET button (B2)

Basic connector output voltage source (CN14)

Additional output decoupling capacitor (JP4)

test / normal mode (JP1)

Output voltage source selection:
- to Arduino pin AREF (JP9)
- to Arduino pin +3V3 (JP10)

Arduino Nano (CN12, CN13)

ENTER button (B4)

reserved (S1, S2, CN11)

reserved (CN1)
reserved (CN2)
MCU BOOT0 mode (S3)
USB charger selection (JP2)
USB FS Micro-B (CN5)
reserved (CN10)
USB FS over-current LED (LD5)
power source selection (JP3)
temperature sensor (U17)
External power source input 7 V to 10 V (CN7)
LCD 2 lines of 16 characters (U18)
Joystick (B1)

UART connector
USB connector

AVDD
GND

+3V3
+5V
GND
GND

Nucleo144
Nucleo64
Connectors
(Arduino Uno)

D7
D3
D2

GND
GND
+5V
D2
D3
D7

+3V3 or AVDD GND

Generic connector for any target

AVDD
+3V3

Nucleo32 Connectors (Arduino Nano)

Standalone mode

- Communication interface

- Reset, Enter / Start buttons

- Joystick (five push buttons)

- LCD display (Tow lines of 16 characters)

- Refer to 'UM2269' for detail

Standalone mode

- **First line: voltage, current**

- **Second line**

- Current average with integration time

- Current max

- Current min

- Power (Watt)

- Energy (Joule) with integration time

- ULP bench score

- Temperature

- Power shield in slave mode, host pc in master mode

- Power shield is sending data, All calculations are done on host side
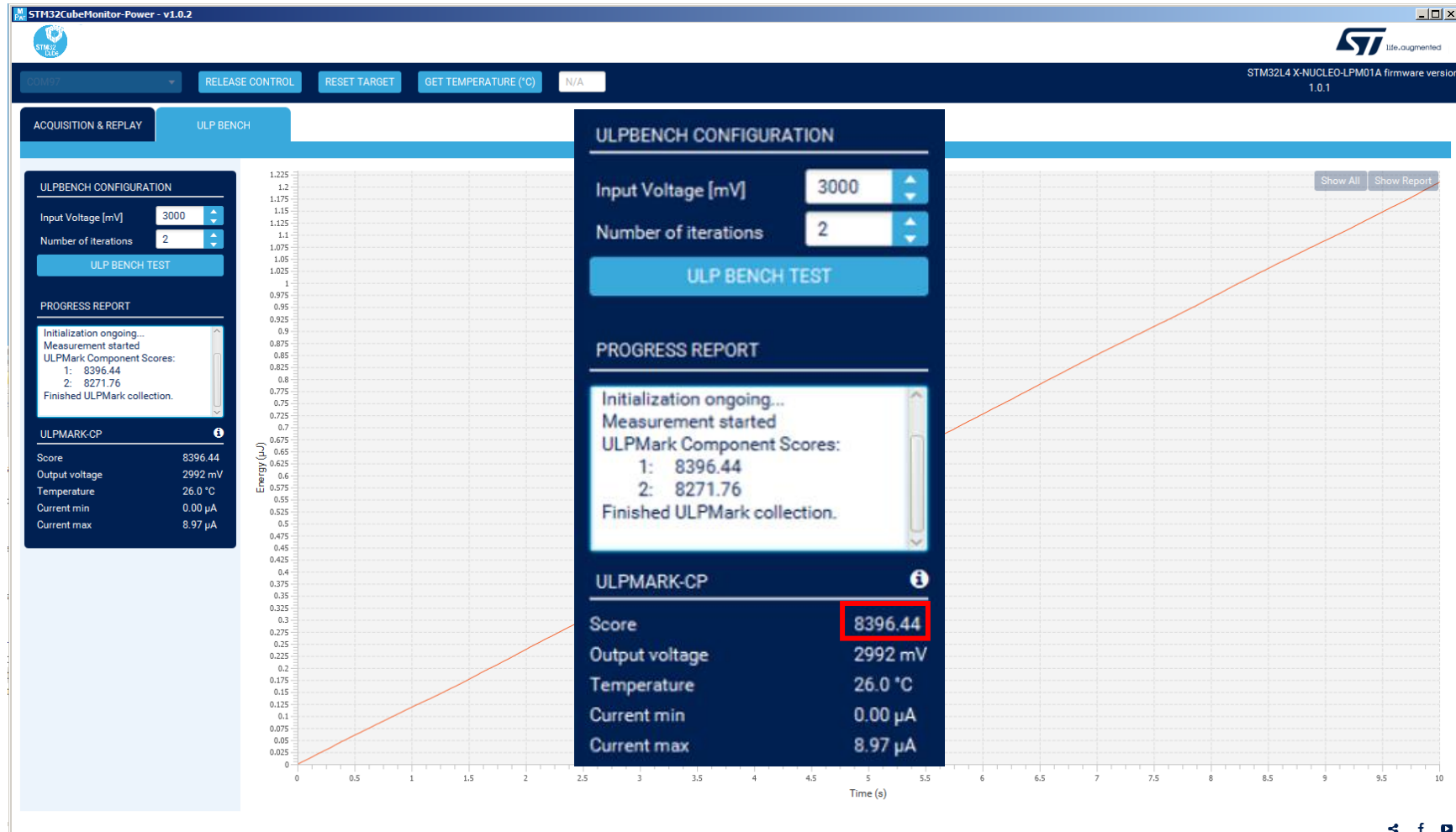
- All buttons on the board are disabled

Target board

Host

X-NUCLEO-LPM01A
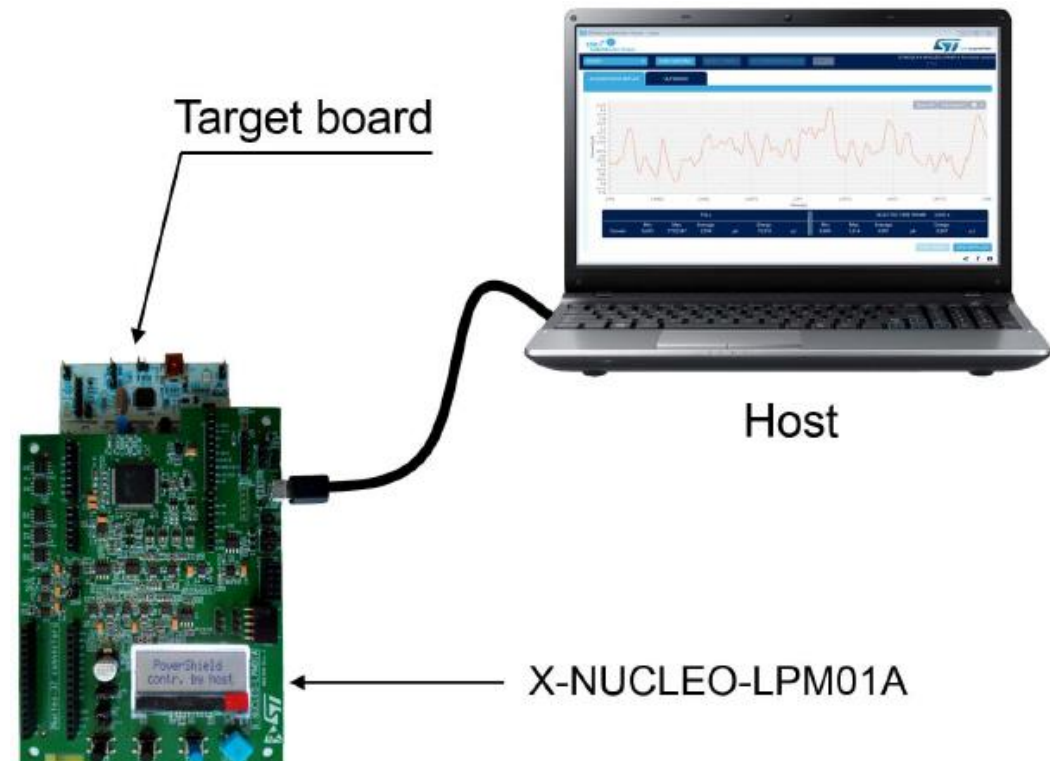
STM32CubeMonitor-Power

"This example is the current consumption in STOP1 Mode."

1. Set the configuration
2. Click "Start acquisition"

"Set the ULPBENCH CONFIGURATION first, and then click the ULP BENCH TEST."

STM32CubeMonitor-Power demo

Thank you

life.augmented