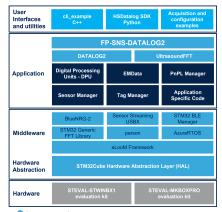




## STM32Cube function pack for high speed datalogging and ultrasound processing







### **Product summary** Software example STEVAL-FP-SNS-DATALOG2 STWINBX1 and STEVAL-**MKBOXPRO** STWIN.box - SensorTile STEVAL-STWINBX1 Wireless Industrial Node Development Kit Sensortile.box STEVAL-MKBOXPRO **PRO** Firmware runs STM32U585AII6Q on: - Keil FW development - IAR Embedded environments Workbench - STM32CubeIDE STBLESensor mobile Other utilities Android/iOS app Condition Monitoring / Predictive **Applications** Maintenance Sensing

### **Features**

- High-rate (up to 6 Mbit/s) data capture software suite:
  - Python and C++ real-time control and data analysis
  - Dedicated Python SDK, ready-to-use for integration into any data science design flow
  - Compatible with STBLESensor app for system setup and real-time control
  - Able to configure and enable ISM330DHCX and LSM6DSV16X machine learning core unit and ISM330IS intelligent sensor processing unit (ISPU)
  - Synchronized timestamping and labeling mechanisms common to all sensors
- Generic FFT library middleware to enable frequency domain analysis for any kind of sensor through fast Fourier transform (with programmable size, overlapping, and windowing)
- AzureRTOS: ThreadX, FileX, USBX
- Easy portability across different MCU families, thanks to STM32Cube
- Firmware modular examples based on eLooM (embedded light object oriented framework for STM32) to enable code reusability at application level
- Free, user-friendly license terms

### **Description**

The FP-SNS-DATALOG2 function pack for the STEVAL-STWINBX1 and STEVAL-MKBOXPRO represents an evolution of FP-SNS-DATALOG1. It provides a comprehensive solution to save data from any combination of sensors and microphones configured up to the maximum sampling rate.

It also natively supports STEVAL-C34KAT1, STEVAL-C34DIL24 and STEVAL-MKI230KA add-ons for the STEVAL-STWINBX1.

FP-SNS-DATALOG2 is based on application-level modules (SensorManager, PnPLManager, DPU Digital Processing Units) that a final user can reuse and easily extend to build its custom application. These application modules adopt state-of-theart design patterns and support natively low-power modes.

To enable this solution, the function pack has been built on top of eLooM, an embedded light object oriented framework for STM32 applications specifically designed for embedded low power applications powered by STM32.

The DATALOG2 application allows storing sensor data onto a microSD™ card (secure digital high capacity - SDHC) formatted with the FAT32 file system, or stream to a PC via USB (WinUSB class) using the companion host software (cli\_example) provided for Windows and Linux. It can also configure the ISM330DHCX and the LSM6DSV16X machine learning core unit (MLC) and the ISM330IS intelligent sensor processing unit (ISPU) to read the output of the selected algorithm.

This application allows downloading the selected configuration from a JSON file to the board as well as starting and controlling data acquisition. The same set of commands can be operated from a host via Command Line Interface or via Bluetooth using the STBLESensor app (available for Android and iOS from v4.17 and above), which lets you manage the board and sensor configurations, start/stop data acquisition on SD card, and control data labeling.

To read and process sensor data acquired using FP-SNS-DATALOG2, a few easy-to-use scripts in Python are provided within the software package.



The scripts have been developed and tested with Python 3.10.

The package also includes an example of ultrasound condition monitoring (UltrasoundFFT) for STEVAL-STWINBX1 that calculates the FFT of the IMP23ABSU analog microphone signal and streams the result to a PC GUI via USB. The microphone sampling rate is set by default to 192 kHz whereas the microphone bandwidth is up to 80 kHz.

The software is available also on GitHub, where the users can signal bugs and propose new ideas through **[Issues]** and **[Pull Requests]** tabs.

DB4865 - Rev 3 page 2/4



# **Revision history**

Table 1. Document revision history

Date	Revision	Changes
24-Jan-2023	1	Initial release.
01-Mar-2023	2	Updated Section Description.
03-Apr-2023	3	Updated Title, Features and Description in cover page. Updated Product summary.

DB4865 - Rev 3 page 3/4



#### **IMPORTANT NOTICE - READ CAREFULLY**

STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST's terms and conditions of sale in place at the time of order acknowledgment.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of purchasers' products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. For additional information about ST trademarks, refer to www.st.com/trademarks. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2023 STMicroelectronics – All rights reserved

DB4865 - Rev 3 page 4/4