UM11910

Introduction to FRDM-STBI-A8971 sensor toolbox development board

Rev. 1 — 31 March 2023 User manual

Document information

Information	Content
Keywords	FXLS8971CF, 3-axis accelerometer, sensor toolbox development board, precision leveling, angle measurement
Abstract	This document describes details about FRDM-STBI-A8971 sensor toolbox development board for FXLS8971CF 3-axis accelerometer. This document also provides instructions to get started with FRDM-STBI-A8971 board.

Revision history

Rev	Date	Description
v.1	20230331	initial release

1 Introduction

This document describes the details of the FRDM-STBI-A8971 sensor toolbox development board for the FXLS8971CF[2] three-axis accelerometer. This user manual also provides instructions to get started with the FRDM-STBI-A8971 board to accelerate evaluation and development with the FXLS8971CF.

The Sensor Toolbox Ecosystem[3] offers enablement and development flexibility with software and tools to simplify a customer's evaluation, development, and design using NXP's sensors. The FRDM-STBI-A8971 sensor development board for the FXLS8971CF is offered along with supported software collaterals through the sensor toolbox ecosystem.

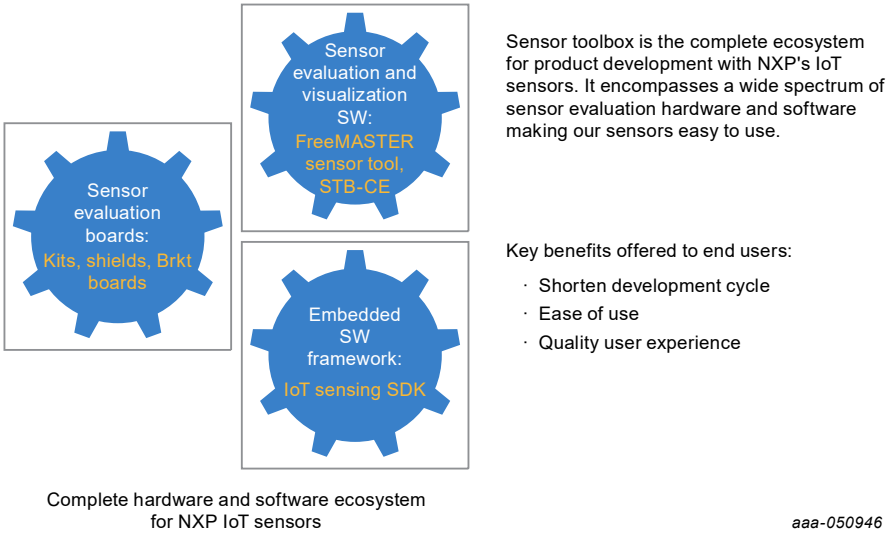

Figure 1. Sensor development ecosystem

2 Finding kit resources and information on the NXP web site

NXP Semiconductors provides online resources for this evaluation board and its supported device(s) on sensors evaluation boards page[4].

The information page for the FRDM-STBI-A8971 sensor toolbox development board is available at www.nxp.com/FRDM-STBI-A8971. The information page provides overview information, documentation, software and tools, ordering information, and a Getting Started tab. The Getting Started tab provides quick-reference information applicable to using the FRDM-STBI-A8971 development board, including the downloadable assets referenced in this document.

3 Getting ready

3.1 Kit contents

The FRDM-STBI-A8971 sensor toolbox development board includes:

- FRDM-STBI-A8971: FXLS8971CF sensor shield board
- LPC55S16-EVK: MCU board
- USB cable
- Quick Start Guide

3.2 Developer resources

The following developer resources are recommended to jump-start the evaluation or development using the FRDM-STBI-A8971 board:

- Get Started with FRDM-STBI-A8971 evaluation board
- Get Started with IoT Sensing SDK
- Get Started with FreeMASTER-Sensor-Tool

4 Getting to know the hardware

4.1 Kit overview

The FRDM-STBI-A8971 sensor evaluation board is offered as a sensor kit with the LPC55S16-EVK.

The sensor shield board includes the following sensor part:

- FXLS89671CF[2]: 3-axis digital accelerometer

The FRDM-STBI-A8971 sensor kit enables quick customer evaluation of the FXLS8971CF using the sensor toolbox enablement software and tools.

4.2 Board features

- Sensor evaluation and development kit for the FXLS8971CF.
- Enables quick sensor evaluation and helps accelerate quick prototyping, development using NXP sensors.
- Compatible with Arduino® and most NXP Freedom development boards.
- Allows evaluation of current consumption and pin-voltage characteristics.
- Supports I^2C and SPI communication interface with the host MCU.
- Supports hardware configurability to Switch Accelerometer mode (normal vs motion detect) and I^2C/SPI Interface mode.
- Supports multiple test points on the board.

4.3 Kit featured components

The combination of a shield development board and a freedom development MCU board enable a complete solution for quick sensor evaluation, prototyping, and development using the sensor toolbox development ecosystem.

The board is designed to be fully compatible with Arduino I/O headers and optimized for the operating conditions. The FRDM-STBI-A8971 sensor shield board is powered up by the LPC55S16-EVK MCU board by stacking the shield board on top of the MCU board using Arduino I/O headers, as shown in Figure 2, and connecting the LPC55S16-EVK to the PC via the USB cable between the LINK2 USB port on the MCU board and the USB connector on the PC.

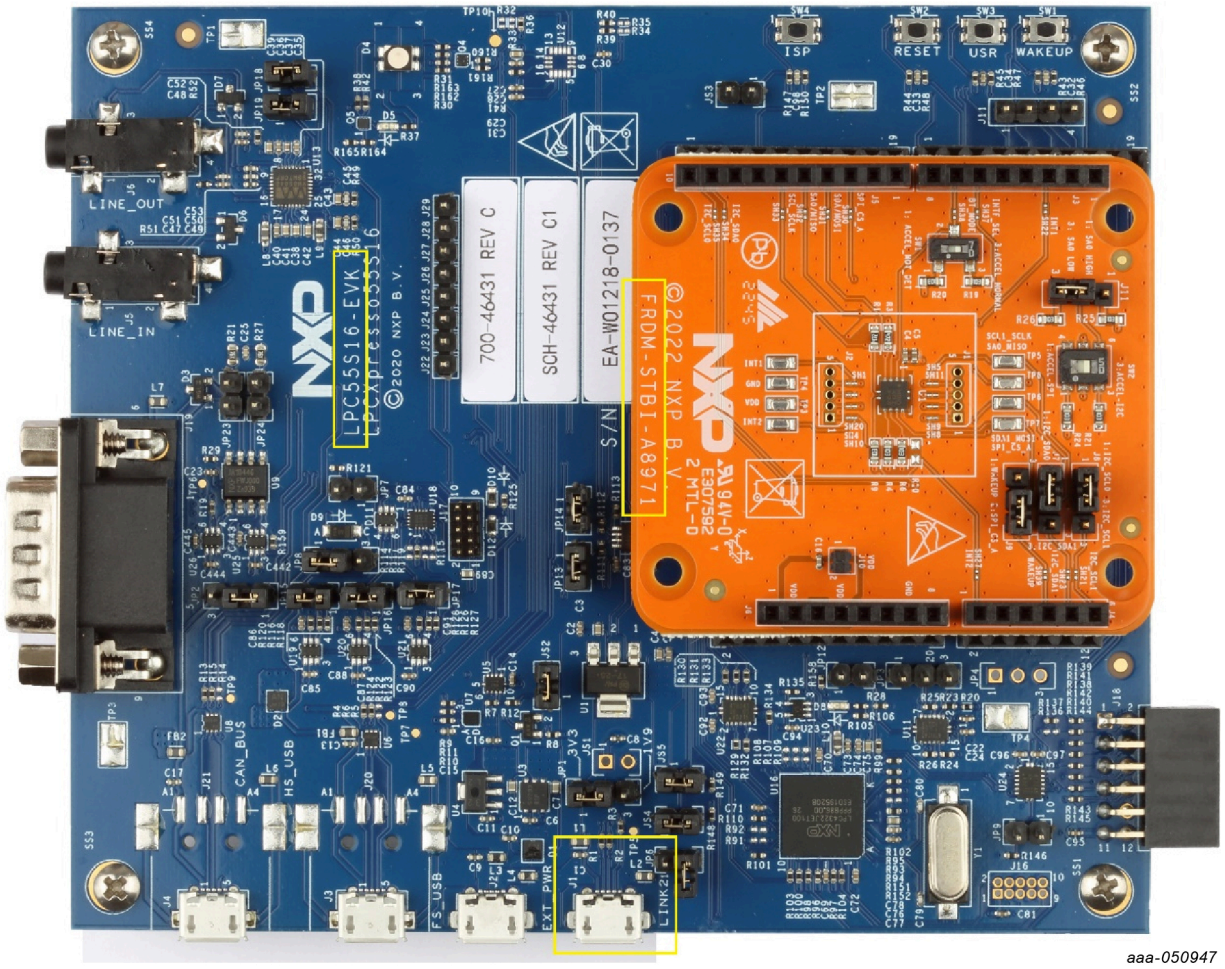

Figure 2. Stacking the shield board

This sensor kit is enabled with the FreeMASTER-Sensor-Tool software tool[6] providing an out-of-box demonstration GUI. The sensor toolbox ecosystem collaterals enable end users to move through each phase of product development quickly and increase ease of use.

4.4 Schematic, board layout and bill of materials

The schematic, board layout and bill of materials for the FRDM-STBI-A8971 evaluation board are available at www.nxp.com/FXLS8971CF.

5 Configuring the hardware

1. Check and confirm the FRDM-STBI-A8971 sensor shield board settings as described below:
   - To select the I^2C digital interface, connect pins 2-3 of SW2 on the FRDM-STBI-A8971.
   - Connect pins J7, J8 pins 1-2 to select I^2C0 pins on the shield board.
   - To select the SPI digital interface, connect pins 1-2 of SW2 on the FRDM-STBI-A8971.
   - Connect pins 2-3 of SW1 to select the default Accelerometer Operating mode, that is, ACCEL NORMAL mode.
2. Connect the FRDM-STBI-A8971 sensor shield board to the LPC55S16-EVK MCU board on the Arduino I/O headers.
3. Connect the sensor evaluation kit (FRDM-STBI-A8971 kitted with the LPC55S16-EVK) to a windows PC via the USB cable between the LINK2 USB port on the board and the USB connector on the PC.

6 References

[1] **Motion sensors** - Accelerometers for IoT, Industrial and Medical applications, Motion-Sensors or Accelerometers

[2] **FXLS8971CF** - 3-axis accelerometer ideal for precision leveling and angle measurement, FXLS8971CF

[3] **Sensors development ecosystem** - Complete ecosystem for product development with NXP's sensors targeted toward IoT, Industrial, Medical applications, Sensor-Toolbox

[4] **Sensor evaluation boards** - Sensor Toolbox Development Kits, Sensor Evaluation Boards

[5] **ISSDK** - IoT Sensing SDK: framework enabling embedded development using sensors, ISSDK

[6] **FreeMASTER-Sensor-Tool** - Sensor evaluation and application development software, FreeMASTER-Sensor-Tool

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