UM11910

Introduction to KIT-STBI-A8971 sensor toolbox development board

Rev. 2 — 12 August 2024 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 KIT-STBI-A8971 sensor toolbox development board for FXLS8971CF 3-axis accelerometer. This document also provides instructions to get started with KIT-STBI-A8971 board.

1 Introduction

This document describes the details of the KIT-STBI-A8971 sensor toolbox development board for the FXLS8971CF[2] three-axis accelerometer. This user manual also provides instructions to get started with the KIT-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 KIT-STBI-A8971 sensor development board for the FXLS8971CF is offered along with supported software collaterals through the sensor toolbox ecosystem.

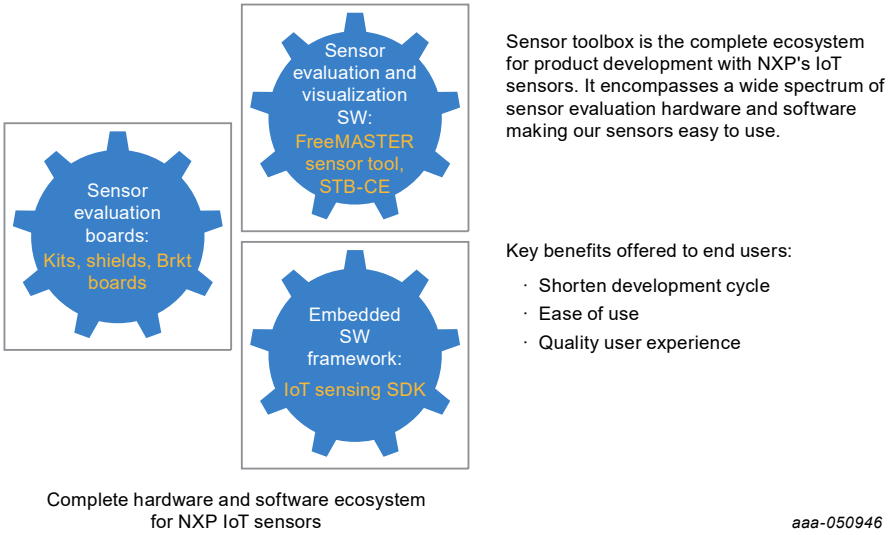

Figure 1. Sensor development ecosystem

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 KIT-STBI-A8971 sensor toolbox development board is available at https://www.nxp.com/KIT-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 KIT-STBI-A8971 development board, including the downloadable assets referenced in this document.

3 Getting ready

3.1 Kit contents

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

- KIT-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 KIT-STBI-A8971 board:

- Get Started with KIT-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 KIT-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 accelerometer for high performance over temperature

The KIT-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 KIT-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.

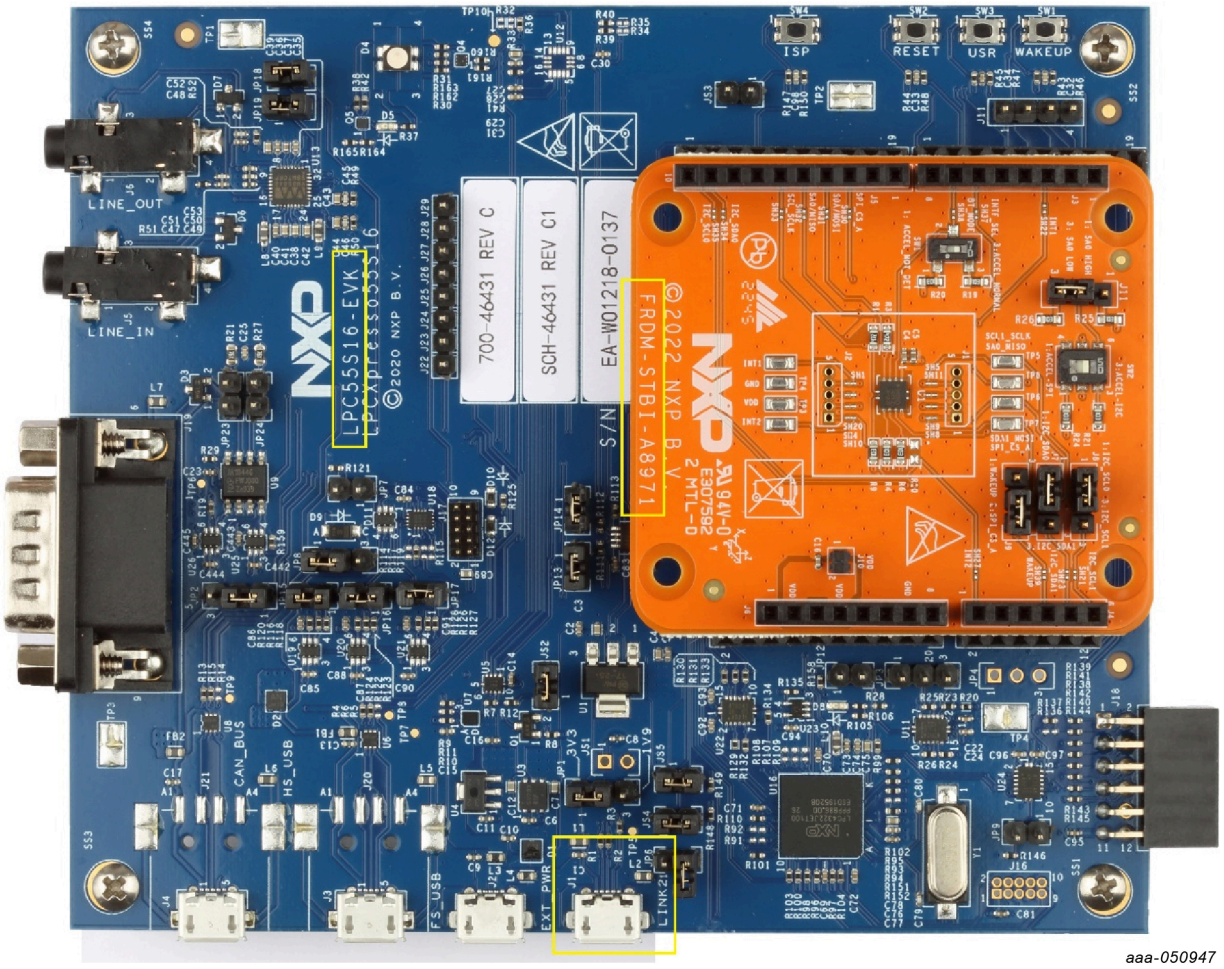

Figure 2. Stacking the shield board

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 KIT-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 shield board.
   - 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 shield board.
   - Connect pins 2-3 of SW1 on the shield board 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 (KIT-STBI-A8971) to a windows PC via the USB cable between the LINK2 USB port on the LPC55S16-EVK MCU board and the USB connector on the PC.

6 References

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

[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

7 Revision history

Table 1. Revision history

Rev	Date	Description
UM11910 v.2	08 August 2024	• The format and organization of UM11910 v.2 was modified to meet revised NXP documentation standards and branding guidelines. • References to "FRDM-STBI-A8971" were revised to "KIT-STBI-A8971" throughout the document. • Section 4.1, revised "3-axis digital accelerometer" to "3-axis accelerometer for high performance over temperature". • Section 5, item 1, revised "FRDM-STBI-A8971" to "shield board" on the first and third bullets and added "on the shield board" to the fourth bullet. • Section 6, removed "Or Accelerometers" from the end of the first reference. • Updated Legal information
UM11910 v.1	31 March 2023	initial release

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