User guide

1 Introduction

The Freedom Sensor Toolbox - Community Edition (STB-CE) is the visualization and evaluation software tool in the Sensor Toolbox ecosystem. It enables quick and easy demonstration and evaluation of NXP sensors.

Features

Out of Box Sensor Demonstration

Out of Box Sensor Demonstration enables quick visualization of sensor data and other sensor outputs based on preconfigured sensor settings in the firmware. The IoT Sensing SDK(ISSDK) based firmware and the GUI projects are automatically loaded, providing a plug and play experience.

- Real Time Sensor Evaluation Real Time Sensor Evaluation enables changing critical sensor settings (ODR, FSR, power modes) and data logging during sensor data streaming.
- Register Interface

Register interface provides a register map for the sensors and allows quick read and write of different register bits, allowing detailed sensor evaluation.

2 Installing STB-CE

- 1. Download the Freedom Sensor Toolbox (CE) installer from <u>www.nxp.com/</u> sensortoolboxcommunityedition.
- 2. Run the installer (FreedomSensorToolbox(CE)Installer.exe).
- 3. In the Freedom Sensor Toolbox (CE) Setup dialog box, click **Next** to extract the installer and proceed with the installation process.

💗 Freedom Sensor Toolbox (CE) Setup					
This installs the Freedom Sensor Toolbox - Community Edition version 2.0 and its required components on your computer.					
The installation process may require a system restart. As a result, it is recommended that all other applications are closed before continuing.					
Click the 'Next' button to continue or the 'Cancel' button to exit the installation.					
Choose a custom install directory					
Free disk space : 82 GB					
Required disk space : 464 MB					
Cancel Nullsoft Install System v2.50					
aaa-028259					

a. The Freedom Sensor Toolbox installer downloads and installs the following runtime engines (if they are not currently installed).



- Visual C++ Redistributable for Visual Studio 2012 (6.25 MB) installs the runtime components required for C++ DLLs built in Visual Studio 2012 to run.
- Visual C++ Redistributable for Visual Studio 2013 (6.20 MB) installs the runtime components required to execute the applications using Visual Studio 2013 DLLs.
- VISA Runtime Engine 17 (124 MB) installs the components required to communicate with instrumentation buses like Serial, GPIB, USB, and Ethernet.
- LabVIEW 2017 32-bit Runtime Engine (366 MB) installs the components for a LabVIEW built application/executable to run.
- Microsoft .NET Framework 4.0 installs the components for a LabVIEW built application/executable to run.

Advanced Note for installation in multiple PCs: The runtime engines are downloaded to the *Dependencies* folder, parallel to the Freedom Sensor Toolbox Installer setup file. When installing on multiple computers, the runtime engines (*Dependencies* folder) can be manually copied from one PC to another to save download time.

- b. The Freedom Sensor Toolbox installer installs the STB-CE application, along with the core plugins and sample projects, in the C:\Program Files (x86)\NXP\Freedom Sensor Toolbox (CE) folder.
- 4. Complete the STB-CE installation.
 - a. If the runtime engines were installed during setup, a dialog box appears indicating that the system needs to be restarted to complete the installation. When prompted to restart your computer, click **Yes**. Following the system restart, the application is ready to use.
 - b. If runtime engines are already present in the system, a dialog box appears indicating that the installation has completed successfully. Click **OK**. The application is ready to use.

3 Connecting to a sensor demonstration kit

Refer to the <u>GETTING STARTED</u> tab to install the required drivers and get started with standard sensor demonstration kits.

All standard NXP sensor demonstration kits are available at <u>www.nxp.com/</u> <u>sensorevaluationboards</u>.

For FRDM Boards: After following the steps, the **Freedom board** is detected and a removable disk in Windows Explorer appears as a FRDM board virtual COM port under the Device Manager/Ports group. The drive name varies depending on the Freedom board connected.

Freedom Sensor Toolbox - Community Edition



aaa**-**028260

For the LPCXpresso54114 and QN908x_DK boards: Allow about 30 seconds for the board to enumerate for the first time. It is not necessary to check the Hardware Manager, however if this is done, there will be the following device:

- Ports
 - LPC-LinkII UCom Port

4 Running STB-CE

Run STB-CE by double clicking the **Freedom Sensor Toolbox (CE)** shortcut located on the desktop.



A selection window appears with two choices:

Out of Box Sensor Demonstration

Out of Box Sensor Demonstration includes automatic board detection, connection and running of the project.

Install Available Updates

Choosing Install Available Updates directs the user to NXP website for application, projects or plugins updates that include the latest version, installed version and package type information.

4.1 Launch the Sensor Demo GUI

- 1. Click the Out of Box Sensor Demonstrations icon.
- 2. If prompted, connect the sensor demonstration kit. STB-CE checks if any supported sensor demonstration kit is connected to the computer.



 Follow the on-screen prompts. The appropriate ISSDK firmware is loaded to the MCU (if necessary), and then the corresponding sensor GUI launches.

4.1.1 Relaunching the STB-CE software

- 1. Click the **Relaunch Auto Detection** icon [≦], located in the upper right corner of the application window.
- 2. Disconnect and then reconnect the board or connect a different board.

4.2 Project window

The Project window consists of two screens that allow the user to communicate with the currently connected sensor demonstration kit.

- Form screen
- Register screen (Not applicable for FXLC95000, MMA8491, data logger and orientation GUIs)

Freedom Sensor Toolbox - Community Edition

WIWA86	52 Acceler	ometer Demo	1	
Power Control STANDBY Mode Normal 💌	Range/ODR Label	Range/OOR Label Landscope/Portrait All: Pulse/Tap X: Y: 2: Freefall X: Y: 2: Transient X: Y: 2:	Start/Stop Streaming	Device Offset and Noise Calculation Before clicking on the Calculate Offset and Noise' button below, moke sure to place the hardware kit in Z +1g orientation on a flat surface. Do not move the board while the calculation is in progress.
Data Logging** :	Projects\MMA8652 Accelerometer Dem	nooss Fotor File Name	Record	Calculate Offset and Noise
1 800m- 9 600m- 200m- 0 0		Time(s)	■ 28 内 ○ A 20 ○ A 20 ○ A 20 11-6	X, Offset (mg) X, Noise ms (mg)*** 0 V, Offset (mg) Z, Noise ms (mg)*** 0 Z, Offset (mg) Z, Noise ms (mg)*** 0 0 0
		(((•)))	44~~~~	*** Noise Density = Noise rms/ sqrt (00R/2)
Change the static orientation or sensor configuration changes in Recommended ODR and Mode fo * Max ODR supported for looging i	Perform a Freefall Register Page Tab, the device must be in r default embedded block settings is 100H is 400 Hz.	Standby Mode. z and High Resolution Mode	Perform a quick jerk motion	(mg/rtHz)

4.2.1 Form screens

A form screen is a user interface screen consisting of widgets and analysis functions.

- **Widgets:** Widgets display data and provide interaction with the user. A form screen may contain multiple widgets.
- **Analysis Functions:** Analysis functions post process and analyze the data. These routines are added to a form to process data before producing a desired result.

Each project can contain any number of form screens.

4.2.2 Sensor register screens

A sensor register screen is a special predefined form that provides the user low-level access to the sensor registers. The sensor register screen consists of the following areas:

- Register Details
- Parameter Details
- Description
- Sensor Details
- Register Operations

Freedom Sensor Toolbox - Community Edition

		M	lagneto	ometer						FXOS8700.R	egister Page			
Select All Register														
Register Details						Parameter	Details							Name
Group/Register Name	Address	Access	Size	Data		7	6	5	4	3	2	1	0	FXOS8700
Group 1					ini.	A FEMT F	A FEMT O	A FEMT 7	A FEMT Y	A FEMT X	UNUSED	UNUSED	UNUSED	Interface Type
STATUS/F STATUS	0x00	R	0x08	0xFF		LE	AE	EFE	EFE	EFE				120
OUT_X_MSB	0x01	R	0x08	0x01		0	1	0	0	1	1	0	0	Slave Address
OUT_X_LSB	0x02	R	0x08	0xB0		Latch	Motion	Disabled	Dirabled	Enabled				Slave Address
OUT_Y_MSB	0x03	R	0x08	0xFF		Disabled	Widtion	Disableu	Disableu	chabled			-	0x1E
OUT_Y_LSB	0x04	R	0x08	0x58		2.5ubicu		1	1					Write Data
OUT_Z_MSB	0x05	R	0x08	0x3E	U								,	4C 🚔
OUT_Z_LSB	0x06	R	0x08	0x50		Description	n							
Reserved	0x07	R	0x08	0x00		Description				<i>c c</i>				Write
F_SETUP	0x09	R/W	0x08	0x00		A_FF_MI_0	LFG :- Freefal	II/Motion fur	nctional block	configuratio	in		A	
TRIG_CFG	A0x0	R/W	0x08	0x00		UNUSED								Read Data
SYSMOD	0x0B	R	0x08	0x01		UNUSED								× 0
INT_SOURCE	0x0C	R	0x08	0x01		UNUSED								
WHO_AM_I	0x0D	R	0x08	0xC7		A FFMT_X	EFE:-0 X-axis	Event detect	ion disabled	default). 1 Ra	aise event fla	g on measure	ed X-axis	Deed Deed
XYZ_DATA_CFG	0x0E	R/W	0x08	0x00		acceleratio	n value beyo	ond preset the	reshold					Nead
HP_FILTER_CUTOFF	0x0F	R/W	0x08	0x00		A_FEMT_Y	EFE:-0 Y-axis	Event detect	ion disabled	(default). 1 Ra	ise event fla	g on measure	ed Y-axis	
PL_STATUS	0x10	R	0x08	0x00		acceleratio	n value beyo	ond preset the	reshold					Read All
PL_CFG	0x11	R/W	0x08	0x80		A_FFMT_Z	EFE:-0 Z-axis	Event detect	ion disabled	(default). 1 Ra	ise event fla	g on measure	ed Z-axis	~
PL_COUNT	0x12	R/W	0x08	0x00		acceleratio	n value beyo	ond preset the	reshold			-		
PL_BF_ZCOMP	0x13	R/W	0x08	0x84		A FFMT O	AE:-Selects b	oetween Mot	ion (logical C	R combinatio	on) and Freet	all (logical A	ND	Save Config
P_L_THS_REG	0x14	R/W	80x0	0x44		combinati	on) detection	n. 0 Freefall fl	ag (Logical A	ND combinat	tion) (default). 1 Motion f	lag	
A_FF_MI_CFG	0x15	R/W	80x0	0x00		(Logical O	R combinatio	on)					-	Load Config
A_FF_MI_SKC	0x16	K	0x08	0000		A_FFMT_E	LE:-Event flag	gs are latched	d into FF_MT_	SRC register.	0 Event flag	latch disable	d	
A_FF_MI_IHS	0x1/	K/W	0x08	00x00		(default). 1	Event flag la	tch enabled						
A_FF_MI_COUNI	0x18	K/W	0x08	00x00										
TRANSIENT_CFG	0x1D	K/W	0x08	00x00										
TRANSIENT_SRC	OXIE	K	0x08	00x00										
TRANSIENT_THS	0x1F	R/W	80x0	00x00										
TRAINSIENT_COUNT	0x20	N/ W	0x08	000	V								Ψ	

• Register Details

The Register Details area lists the registers available in the selected sensor under groups, along with the following details for each register:

- Name
- Address in hexadecimal format
- Access R, W or R/W
- Size in bits
- Data in hexadecimal format

Use the check boxes to select single or multiple registers or use the Select All Register check box to select all the registers. Multiple selection allows the user to read from or write to a set of registers.

NOTE: When more than one register is selected, no information is displayed in the Parameter Details area and the Description area.

Freedom Sensor Toolbox - Community Edition

oup/Register Name	Address	Access	Size	Data
Group 1				
STATUS/F STATUS	0x00	R	0x08	0x00
V OUT X MSB	0x01	R	0x08	0x00
V OUT_X_LSB	0x02	R	0x08	0x00
V OUT_Y_MSB	0x03	R	0x08	0x00
OUT Y LSB	0x04	R	0x08	0x00
V OUT_Z_MSB	0x05	R	0x08	0x00
V OUT_Z_LSB	0x06	R	0x08	0x00
Reserved	0x07	R	0x08	0x00
F_SETUP	0x09	R/W	0x08	0x00
TRIG_CFG	0x0A	R/W	0x08	0x00
SYSMOD	0x0B	R	0x08	0x00
✓ INT_SOURCE	0x0C	R	0x08	0x00
WHO_AM_I	0x0D	R	0x08	0x00
XYZ_DATA_CFG	0x0E	R/W	0x08	0x00
HP_FILTER_CUTOFF	0x0F	R/W	0x08	0x00
PL_STATUS	0x10	R	0x08	0x00
PL_CFG	0x11	R/W	0x08	0x00
PL_COUNT	0x12	R/W	0x08	0x00
PL_BF_ZCOMP	0x13	R/W	0x08	0x00
P_L_THS_REG	0x14	R/W	0x08	0x00
FF_MT_CFG	0x15	R/W	0x08	0x00
FF_MT_SRC	0x16	R	0x08	0x00
FF_MT_THS	0x17	R/W	0x08	0x00
FF_MT_COUNT	0x18	R/W	0x08	0x00

aaa-028265

Parameter Details

The Parameter Details display the following parameter level (field level) details of the selected register.

- Bit position
- Parameter name
- Bits value 0 or 1. For any write register, user can click on each cell to toggle the bit value.
- Parameter value For any write register, clicking on this row will show a list or numeric control. The user can use this to easily update the parameter value.
 - If a parameter is of list type, when the user clicks on the parameter value row, a list of the choices is displayed. Each choice in the list has an equivalent numeric value. Choosing from the list automatically updates the parameter value and bit value.

Parameter Det	ails						
7	6	5	4	3	2	1	0
DR[2]	DR[1]	DR[0]	OS[1]	OS[0]	FR	TM	AC
1	0	0	1	1	0	1	0
<4>			12	28	Full Value	Trigger <u>Measur</u> ement	STANDBY
•					✓ Full Value R Fast Read	ead	4

aaa-028266

 If a parameter is of numeric type, when user clicks on the parameter value row, a numeric control is displayed. The user can enter a numeric value directly using the numeric control. The minimum and maximum value supported is based up on the parameter size. Entering a value in the numeric control automatically updates the parameter value and the bit value.

Freedom Sensor Toolbox - Community Edition

Parameter D	etails						
7	6	5	4	3	2	1	0
PLT[4]	PLT[3]	PLT[2]	PLT[1]	PLT[0]	HYS[2]	HYS[1]	HYS[0]
1	0	1	1	0	0	0	0
		22				0	
•							Þ
							aaa-028267

NOTE: When more than one register is selected, no information is displayed in the Parameter Details area.

Description

The Description area displays the information about the selected register and its parameters.

NOTE: When more than one register is selected, no information is displayed in the Description area.

Sensor Details

The Sensor Details area displays the sensor name, interface type and slave address.

- **Register Operations** allows the user to send command and access the sensor registers. If the value is changed in the register, it will update the linked control in the form and vice versa.
 - Write Data Used to get the value that needs to be written to the register(s) from the user. The value must be in hexadecimal format. If the parameter bits/values are changed, Write Data automatically updates.
 - Write Clicking the Write button writes the value in Write Data to the selected register(s) in the sensor.
 - Read Data Used to display the selected register's value, read from the sensor, in hexadecimal format.
 - Read Clicking the Read button reads the value(s) of the selected register(s) from the sensor.
 - Read All Clicking the Read All button reads the value of all the registers in the active sensor page from the sensor.
 - Save Configuration Clicking the Save Configuration button saves the configuration of the selected register(s) in the active sensor page to the disk which can be loaded later.
 - Load Configuration The Load Configuration button is used to load back the previously saved sensor configuration. On loading, sensor configuration updates based on the selected configuration file.

NOTE: Each the register write operations is followed by the read operation of same register. This updates the register details with real time values.

4.2.3 Viewing multiple screens

To view multiple screens simultaneously, right-click the **Form Navigation** tab, and then select **Pop Out Screen**.



STBCEUG

© NXP B.V. 2018. All rights reserved

Freedom Sensor Toolbox - Community Edition

The form or register screen displays as a separate window. While this separate window is displayed, the corresponding tab in the GUI project window is disabled.

To restore the screen in the GUI project window, close the popped-out screen window.

4.3 Error window

When an error occurs, the status bar turns red and the error indicator turns to a red exclamation mark.



Clicking the error indicator opens the Error Log window.

	LITOI COUE	Error Source	Description
1	8000	SModuleName - Board Engine SCaseName - Initialize Transport Plugin SOccurrenceTime - 05:20:43:735 PM SBoardInstanceName - K64F_Demo SCustomError - Error in Connection, Unable to connect to hardware resource '(No COM port was selected)' in board instare 'K64F_Demo''. Kindly recheck the connection.	Error in Connection, Unable to connect to hardware resource "(No COM port was selected)" in board instance "K64F_Demo". Kindly recheck the connection.
			Show Call
			E Show Ca

The **Error Log** window shows the details of any errors that have occurred in the application since the last project launch. Clicking the **Clear** button clears all the errors. Clicking the **Close** button closes the error log window.

NOTE: Show Call Chain is an advanced option. Checking this option shows the exact location of the error source.

5 STB-CE menus

User can use the menu items in the STB-CE application to perform various actions on the projects, forms, and plugins. The STB-CE menu bar contains the File, Tools, View, and Help menus. Menu items are enabled depending on the current active screen.

5.1 File menu

In the Project Configuration screen, the **File** menu has access to Project/Form operations and Exit.

NOTE: Exit is the only menu option applicable to the out of box sensor demonstration.

File	Tools	View	Help
N	ew Proje	ect	
N	ew Form	1	
0	pen Proj	ect	
0	pen Forr	m	
Sa	ave Proje	ect	Ctrl+P
Sa	ive As Pr	roject	
Sa	ave Form	1	
Sa	ave As Fo	orm	
Sa	ave All Fo	orms	
Ex	at		Ctrl+Q
			aaa-028271

Exit – Choosing Exit closes the STB-CE application.

5.2 Help menu

The Help menu gives access to the User Guide and the About screen.



aaa-028272

6 Run custom standalone projects

Apart from Out of Box Sensor Demonstrations, this tool also supports running standalone STB-CE GUI projects. A standalone project is provided by NXP as a separate package(*.stbpkg).

Freedom Sensor Toolbox - Community Edition

Package Installer		(
Demo Launcher Creation			
_			
Create Demo Launcher?			
emo Launcher Location			
C:\Users\User\Desktop		—	
emo Launcher Details			
Project Name	Demo Launcher	Name 🔺	
Acceleration Signal	Acceleration Signal		
		¥.	
	Previous 🔊 Install	Cancel	
	instan		

aaa-028273

During the project package installation, check **Create Demo Launcher** if a project shortcut is desired. Usually, the shortcut name is same as the project name, and its default location is on the desktop.



Double click a project shortcut to directly launch the project in the STB-CE application.

NOTE: To successfully run the custom GUI project, the MCU must have the appropriate firmware loaded.

7 Troubleshooting guide

This chapter provides a general overview of troubleshooting software or communication problems, including information on troubleshooting system crashes and viewing system messages.

- Freedom Boards getting 'bricked' on Windows 10
- Firmware not successfully downloaded message
- <u>Time out error message displays when issuing Read All or Read Register or Write</u> <u>Register operations</u>
- Hardware error is displayed upon clicking Start Streaming
- LabVIEW Runtime Engine could not be found message appears during initial installation
- <u>STB-CE Installer getting corrupted</u>

7.1 Freedom Boards getting 'bricked' on Windows 10

For Windows 10 systems, ensure the latest OpenSDA Bootloader and Firmware Application is on the FRDM board being used. The older versions of the OpenSDA drivers could get corrupted when the board is plugged on a Windows 10 machine. As a result, many boards might get not detected as a MSD or a COM port on Win 10. The latest versions of the OpenSDA software are compatible with Windows 10.

Obtain the latest OpenSDA drivers for FRDM boards from <u>http://www.nxp.com/opensda</u>. Locate the section "**Download – OpenSDA Bootloader and Application**" and select your FRDM Board from the dropdown list. Strictly follow the provided instructions to program the board.

The FRDM Boards supported by STB-CE are:

- FRDM-K64F, FRDM-K22F, FRDM-KW41Z and FRDM-KE15Z: MBED/DAPLINK OpenSDA drivers (default)
- FRDM-KL25Z and FRDM-KL27Z: PEmicro OpenSDA drivers (default)
- RD-KL25-AGMP01: FRDM-KL25Z board with MBED/DAPLINK OpenSDA drivers (default)

Note: The current FRDM-K64F, FRDM-K22F, FRDM-KL25Z and RD-KL25-AGMP01 boards come with an older version of OpenSDA drivers from the factory and **require** a mandatory OpenSDA update from the links above.

7.2 Firmware not successfully downloaded message

The following message is displayed during the firmware download process, before autolaunching the GUI.

Freedom Sensor Toolbox - Community Edition



This can happen when the default OpenSDA bootloader is not loaded on the Freedom based sensor demonstration kits. The default OpenSDA bootloader firmware for these kits is as follows:

- DAPLink: FRDM-K22F, FRDM-K64F, FRDM-KW41Z, FRDM-KE15Z, RD-KL25-AGMP01
- **PEmicro:** FRDM-KL25Z, FRDM-KL27Z

Refer to the OpenSDA update to the FRDM boards to ensure that the latest and the correct OpenSDA firmware is loaded on the appropriate FRDM boards. The OpenSDA Update to the FRDM boards is available at <u>http://www.nxp.com/OPENSDA</u>. Choose the FRDM Board from the dropdown list, download the latest OpenSDA drivers and strictly follow the provided instructions to program the board.

Note: In case of kits based on LPCXpresso54114 (such as LPCXpresso54114 with FRDM-STBC-AGM01 and LPCXpresso54114 with FRDM-STBC-AGMP03) the jumper JP5 on LPCXpresso54114 board should be left open without a shunt to avoid this firmware download error.

7.3 Time out error message displays when issuing Read All or Read Register or Write Register operations

When issuing Read All, Read Register, or Write Register operations from the tool, the following time out error message may appear.

Freedom Sensor Toolbox - Community Edition

			Showing Last Z z Error(s) of Z
S.No	Error Code	Error Source	Description
1	7026	SModuleName - Register Page SOccurrenceTime - 01:08:10.955 PM SCommand - Read All SRegisterPage - A8700.FXOS8700	Device has Timed out, so Read All operation is aborted in Register Page "A8700.FXOS8700"
2	7004	SModuleName - Register Page SOccurrenceTime - 01:08:10:955 PM SCommand - Read Register SRegisterPage - A8700,FXOS8700 SRegisterName - STATUS/F_STATUS	Time out has occurred for command "Read Register" in Register Page "A8700.FXOS8700"
			The second secon
			Show Call Chain?

aaa-028276

This happens when the MCU board is unable to complete any register transaction with the sensor on the board. There are multiple scenarios for this problem:

- The jumper settings on the shield board are different from what is expected for the MCU and shield board combination. Find the recommended hardware settings for each sensor demonstration kit used with STB-CE in <u>Table 1</u>.
- The MCU's UART serial connection with Windows has not been established correctly. If the serial connection is not established, the tool will not be able to send a register command to the MCU and the sensor. Refer to <u>Section 7.1</u> and <u>Section 7.2</u> to update the latest OpenSDA drivers to ensure proper COM port detection.
- The MCU is unable to send a register command to the sensor. This is possible if the shield board has not been wired to the MCU correctly or the sensor demonstration kit does not match the sensor GUI being launched. A potential solution is to ensure that the correct sensor GUI is launched corresponding to the sensor demonstration kit available.

NXP Semiconductors

STBCEUG

Freedom Sensor Toolbox - Community Edition

able 1. Haruwale settings				
Demonstration kit	Recommended hardware settings			
FRDM-K22F-AGMP03	FRDM-STBC-AGMP03 shield board			
	 Ensure that the shunts on jumpers J7 and J8 are at 2-3 position (default) 			
	 Ensure that the shunt for jumper J9 is at 1-2 position (default) 			
	 Ensure that the shaft of the switch SW2 is towards ACCEL NORMAL 			
	 Ensure that the shaft of the switch SW3 is towards ACCEL-GYRO I2C 			
LPCXpresso54114	FRDM-STBC-AGMP03 shield board:			
with FRDM-STBC-	• Ensure there are shunts on jumpers J7 and J8 to 1-2 position (default position 2-3)			
AGMP03	 Ensure the shunt for jumper J9 is at 1-2 position (default) 			
	 Ensure that the shaft of the switch SW2 is towards ACCEL NORMAL 			
	 Ensure that the shaft of the switch SW3 is towards ACCEL-GYRO I2C 			
	LPCXpresso54114 board - Ensure that the jumper JP5 is left open (default)			
FRDM-KW41Z with	FRDM-STBC-AGMP03 shield board			
FRDM-STBC-AGMP03	• Ensure that the shunts on jumpers J7 and J8 are at 1-2 position (default position 2-3)			
	• Ensure that the shunt for jumper J9 is at 1-2 position (default)			
	 Ensure that the shaft of the switch SW2 is towards ACCEL NORMAL 			
	 Ensure that the shaft of the switch SW3 is towards ACCEL-GYRO I2C 			
FRDM-KI 277 with	FRDM-STBC-AGMP03 shield board			
FRDM-STBC-	• Ensure that the shunts on jumpers J7 and J8 are at 2-3 position (default)			
AGMP03 ^[1]	• Ensure that the shunt for jumper J9 is at 1-2 position (default)			
	Ensure that the shaft of the switch SW2 is towards ACCEL NORMAL			
	 Ensure that the shaft of the switch SW3 is towards ACCEL-GYRO I2C 			
FRDM-K22F-AGM01	FRDM-STBC-AGM01 shield board			
	• Ensure that the shunts on jumpers J5, J6 and J7 are at 2-3 position (default)			
FRDM-K64F-AGM01	FRDM-STBC-AGM01 shield board			
	 Ensure that the shunts on jumpers J5, J6 and J7 are at 2-3 position (default) 			
QN90980DK with	FRDM-STBC-AGM01 shield board			
FRDM STBC-AGM01	 Ensure that the shunts on jumpers J6 and J7 are at 1-2 position (default) 			
	 Ensure that the shunt on jumpter J5 is at 2-3 position (default) 			
LPCXpresso54114	FRDM-STBC-AGM01 shield board			
with FRDM-STBC-	• Ensure that the shunts on jumpers J6 and J7 are at 1-2 position (default position is 2-3)			
AGM01	• Ensure that the shunt on jumper J5 is at 2-3 position (default)			
	LPCXpresso54114 board - Ensure that the jumper JP5 is left open (default)			
FRDM-K64F with	FRDM-FXS-MULT2B shield board			
FRDM-FXS-MULT2B	• Ensure that the shunts on jumpers J27 and J28 are at 2-3 position (default)			
	• Ensure that the shunts on jumper J3 is at 2-3 position (default is Open)			
	• Ensure that the shunts on jumper J4 is at 2-3 position (default is Open)			
	• Esnure that the shunts on jumper J5 is left open (default is Open)			
	• Ensure that the shunts on jumper J6 is at 2-3 positioin (default is Open)			

Table 1. Hardware settings

NXP Semiconductors

STBCEUG

Freedom Sensor Toolbox - Community Edition

Demonstration kit	Recommended hardware settings
FRDMKE15DP300x	 FRDMSTBC-A8491 shield board Ensure that the shunts on jumpers J7 and J8 are at 2-3 position (default) Ensure that the shunts on jumpers J10 are at 2-3 position (default) Ensure that the shunts on jumpers J11 and J12 are at 1-2 position (default) Ensure that the jumpers J9, J13, J14 are left open (default)
FRDMSTBC-A845x with FRDM-K64F	FRDMSTBC-A845x shield board - Ensure that the shunts on jumpers J7 and J8 are at 2-3 position (default)
FRDM-K64F-AGM04	FRDM-STBC-AGM04 shield board - Ensure that the shunts on jumpers J7 and J8 are at 2-3 position (default)
FRDM KL25Z-P3115 ^[1]	FRDMSTBC-P3115 shield board - Ensure that the shunts on jumpers J7 and J8 are at 2-3 position (default)
FRDMKL27-B3115 ^[1]	FRDMSTBI-B3115 shield board - Ensure that the shunts on jumpers J7 and J8 are at 2-3 position (default)
FRDM KL25Z-A8491 ^[1]	FRDMSTBC-A8491 shield board - Ensure that the shunts on jumpers J7 and J8 are at 2-3 position (default)
FRDM KL25Z-A8471 ^[1]	FRDMSTBC-A8471 shield board - Ensure that the jumper J9 is left open (default)
FRDM-K22F-SA9500	 FRDM-STBC-SA9500 shield board: Ensure that the shunts on jumpers J8 and J9 are at 2-3 position (default) Ensure that the shunt for jumper J10 is at 3-4 position (default) Ensure that the switch SW1 in ON state.
FRDM-KL25Z	No recommended hardware settings
FRDM-KL27Z	No recommended hardware settings
RD_KL25-AGMP01	No recommended hardware settings

[1] For KL25Z and KL27Z based kits, if the shield board jumper settings are incorrect, the auto-detection will go ahead and open the GUIs corresponding to their respective on-board sensors. To open the GUIs corresponding to the sensor shield board, ensure the sensor shield boards have appropriate jumper settings, as mentioned above.

Note:

For the above kits, if the jumper settings are different from what is recommended, follow these steps:

- 1. Close the error message, and then close the GUI.
- 2. Disconnect the kit from the PC.
- 3. Switch the jumper shunt positions to recommended settings.
- 4. Reconnect the kit to the PC.
- 5. Relaunch the GUI.

7.4 Hardware error is displayed upon clicking Start Streaming

The following error message can appear under the following circumstance:

The GUI is closed while the sensor is streaming (without clicking the Stop Streaming button), and then the GUI is relaunched without power cycling the kit.

Freedom Sensor Toolbox - Community Edition

				Showing Last 2 🚔 Error(s) of	2
S.No	Error Code	Error Source		Description	4
1	Hardware Error	Command not successful	Status Byte - 0x00		
2	Hardware Error	Command not successful	Status Byte - 0x00		
					-
					-
					- 1
					-
					Ŧ
				Show Call C	hain
				🦗 Clear 🛛 🔀 Cle	ose

aaa-028277

When clicking Start Streaming while the sensor is already streaming, this hardware error occurs.

When this error occurs:

- 1. Clear the error message, and then close the diaglog window.
- 2. Continue to use the GUI as required.

To avoid this error, click Stop Streaming before closing the GUI.

7.5 LabVIEW Runtime Engine could not be found message appears during initial installation

The LabVIEW Runtime Engine could not be found message appears while installing STB-CE for the first time on a PC.

This error can occur when the PC has a 64-bit LabVIEW Runtime Engine installed prior to STB-CE Installation. STB-CE uses 32-bit Runtime Engine and displays this message when it identifies a previously installed 64-bit version.

Follow the instructions in the error message window to download and manually install the VISA Runtime Engine 5.4 and the LabVIEW 2017 Runtime Engine (32-bit). After performing the installation of these components, STB-CE is ready to use.

7.6 STB-CE Installer getting corrupted

The STB-CE installer is built using NSIS. The NSIS error shown below may occur under one of the following conditions:

- Software files downloaded from the Internet are not complete.
- Downloaded software files have been modified from the original version.
- Your PC is infected with a virus.
- Physical media being used to install the program is damaged.
- Required hardware (For example, CD/DVD drive) is malfunctioning.

Freedom Sensor Toolbox - Community Edition

Use one of the following methods to fix this issue:

Method 1: Repeat the download and try installing again.

Method 2: Clear the cached data in your web browser and temporarily disable the antivirus software running on the computer. Download and install the executable files. Check if the issue persists.



8 Revision history

Table 2. Revision history					
Revision number	Date	Description			
v.1.3	20180510	Minor updates throughout the document with extensive changes to <u>Section 7</u> <u>"Troubleshooting guide"</u> and support for new kits.			
v.1.2	20170914	Changed Figure 1 title from Project window with two forms (Main, Magnetometer) and one register screen to Project window with two forms: Main and one Register Screen			
v.1.1	20170912	Updated the document for STB v2.0 release			
v.1	20170324	Initial version of the document			

Freedom Sensor Toolbox - Community Edition

9 Legal information

9.1 Definitions

Draft — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. NXP Semiconductors does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

9.2 Disclaimers

Limited warranty and liability - Information in this document is believed to be accurate and reliable. However, NXP Semiconductors does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information. NXP Semiconductors takes no responsibility for the content in this document if provided by an information source outside of NXP Semiconductors. In no event shall NXP Semiconductors be liable for any indirect, incidental, punitive, special or consequential damages (including - without limitation - lost profits, lost savings, business interruption, costs related to the removal or replacement of any products or rework charges) whether or not such damages are based on tort (including negligence), warranty, breach of contract or any other legal theory. Notwithstanding any damages that customer might incur for any reason whatsoever, NXP Semiconductors' aggregate and cumulative liability towards customer for the products described herein shall be limited in accordance with the Terms and conditions of commercial sale of NXP Semiconductors.

Right to make changes — NXP Semiconductors reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Suitability for use — NXP Semiconductors products are not designed, authorized or warranted to be suitable for use in life support, life-critical or safety-critical systems or equipment, nor in applications where failure or malfunction of an NXP Semiconductors product can reasonably be expected to result in personal injury, death or severe property or environmental damage. NXP Semiconductors and its suppliers accept no liability for inclusion and/or use of NXP Semiconductors products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

Applications — Applications that are described herein for any of these products are for illustrative purposes only. NXP Semiconductors makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification. Customers are responsible for the design and operation of their applications and products using NXP Semiconductors products, and NXP Semiconductors

accepts no liability for any assistance with applications or customer product design. It is customer's sole responsibility to determine whether the NXP Semiconductors product is suitable and fit for the customer's applications and products planned, as well as for the planned application and use of customer's third party customer(s). Customers should provide appropriate design and operating safeguards to minimize the risks associated with their applications and products. NXP Semiconductors does not accept any liability related to any default, damage, costs or problem which is based on any weakness or default in the customer's applications or products, or the application or use by customer's third party customer(s). Customer is responsible for doing all necessary testing for the customer's applications and products using NXP Semiconductors or of the application or use by customer(s). NXP does not accept any liability in this respect.

Export control — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from competent authorities.

Evaluation products — This product is provided on an "as is" and "with all faults" basis for evaluation purposes only. NXP Semiconductors, its affiliates and their suppliers expressly disclaim all warranties, whether express, implied or statutory, including but not limited to the implied warranties of non-infringement, merchantability and fitness for a particular purpose. The entire risk as to the quality, or arising out of the use or performance, of this product remains with customer. In no event shall NXP Semiconductors, its affiliates or their suppliers be liable to customer for any special, indirect, consequential, punitive or incidental damages (including without limitation damages for loss of business, business interruption, loss of use, loss of data or information, and the like) arising out the use of or inability to use the product, whether or not based on tort (including negligence), strict liability, breach of contract, breach of warranty or any other theory, even if advised of the possibility of such damages. Notwithstanding any damages that customer might incur for any reason whatsoever (including without limitation, all damages referenced above and all direct or general damages), the entire liability of NXP Semiconductors, its affiliates and their suppliers and customer's exclusive remedy for all of the foregoing shall be limited to actual damages incurred by customer based on reasonable reliance up to the greater of the amount actually paid by customer for the product or five dollars (US\$5.00). The foregoing limitations, exclusions and disclaimers shall apply to the maximum extent permitted by applicable law, even if any remedy fails of its essential purpose.

Translations — A non-English (translated) version of a document is for reference only. The English version shall prevail in case of any discrepancy between the translated and English versions.

9.3 Trademarks

Notice: All referenced brands, product names, service names and trademarks are the property of their respective owners.

NXP Semiconductors

STBCEUG

Freedom Sensor Toolbox - Community Edition

Contents

1	Introduction	1
2	Installing STB-CE	1
3	Connecting to a sensor demonstration kit	2
4	Running STB-CE	3
4.1	Launch the Sensor Demo GUI	4
4.1.1	Relaunching the STB-CE software	4
4.2	Project window	4
4.2.1	Form screens	5
4.2.2	Sensor register screens	5
4.2.3	Viewing multiple screens	8
4.3	Error window	9
5	STB-CE menus	9
5.1	File menu	10
5.2	Help menu	. 10
6	Run custom standalone projects	. 10
7	Troubleshooting guide	. 12
7.1	Freedom Boards getting 'bricked' on	
	Windows 10	12
7.2	Firmware not successfully downloaded	
	message	. 12
7.3	Time out error message displays when	
	issuing Read All or Read Register or Write	
	Register operations	13
7.4	Hardware error is displayed upon clicking	
	Start Streaming	16
7.5	LabVIEW Runtime Engine could not be	
	found message appears during initial	
		17
7.6 2	SIB-CE Installer getting corrupted	17
8	Revision nistory	. 18
9	Legal information	19

Please be aware that important notices concerning this document and the product(s) described herein, have been included in section 'Legal information'.

© NXP B.V. 2018.

All rights reserved.

For more information, please visit: http://www.nxp.com For sales office addresses, please send an email to: salesaddresses@nxp.com

Date of release: 10 May 2018 Document identifier: STBCEUG