



# Sensor Toolbox: The Complete Hardware and Software Ecosystem for NXP Sensors

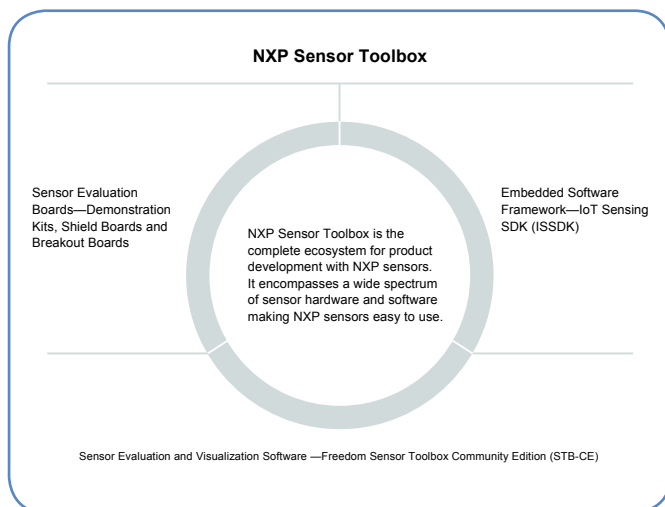
## OVERVIEW

NXP Sensor Toolbox is a complete system for product development with NXP sensors. It encompasses a wide spectrum of sensor boards and software tools for various, compatible, Kinetis® microcontrollers. This enables easy to develop sensor demonstrations, evaluation, application development and prototyping. The variety and breadth of the NXP sensor and microcontroller portfolio means that the Sensor Toolbox can be used to address sensing needs across a wide range of use cases.

[www.nxp.com/sensortoolbox](http://www.nxp.com/sensortoolbox)

## WHAT IS THE SENSOR TOOLBOX?

The Sensor Toolbox enables customers to achieve quick time-to-market products with NXP sensors. The Sensor Toolbox includes evaluation boards and an embedded software framework.



## HARDWARE: SENSOR EVALUATION BOARDS

Sensor Toolbox provides sensor enablement hardware including a demonstration kit, shield development board and breakout board. This hardware can be combined with different sensors from NXP:

### Demonstration Kit (Shield + Microcontroller)

- Combination of a sensor shield development board and a Freedom development board
- Complete solution for quick sensor demonstrations and evaluations, using the Sensor Toolbox-Community Edition (STB-CE) software



### Sensor Shield Development Board

- Pin compatible across most Freedom and Arduino® development boards
- Pins available as test points for evaluating pin signals such as VDD, GND, I<sup>2</sup>C, SPI, INT etc.



### Breakout Board

- Small form factor with identical shield design, ideal for product prototyping
- Test points not only for pin signal evaluation but also for wiring the board to the host MCU.

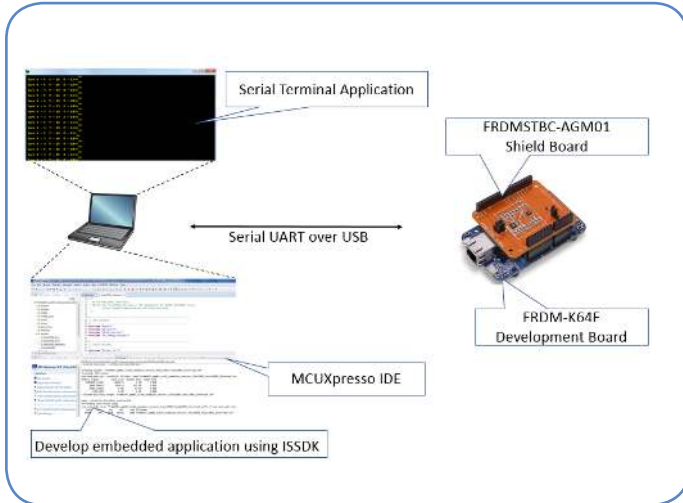


## EMBEDDED SOFTWARE FRAMEWORK

IoT Sensing Software Development Kit (ISSDK) is the embedded software platform for the Sensor Toolbox. It is the go-to solution for convenient development of an embedded application/firmware on Kinetis MCUs with NXP sensors. It combines a set of robust sensor drivers and algorithms along with example applications to allow users to start using NXP sensors quickly. ISSDK is offered as a middleware option in MCUXpresso Configuration Tools [mcuxpresso.nxp.com](http://mcuxpresso.nxp.com).

- Enables rapid prototyping and production applications using NXP sensors
- Leverages Kinetis SDK 2.2 drivers and project release infrastructure
- IDEs supported: MCUXpresso (RedEye), KDS, IAR, Atollic®, Keil®, ARM® GCC
- Host OS supported: Windows®, Mac® and Linux® OS
- Supports bare metal development and FreeRTOS®
- Pedometer and sensor fusion algorithms supported
- Supports sensor data visualization and data analysis using STB-CE software.

## EMBEDDED APPLICATION DEVELOPMENT USING ISSDK



Get started with embedded application development here:

[Getting started with ISSDK](#)

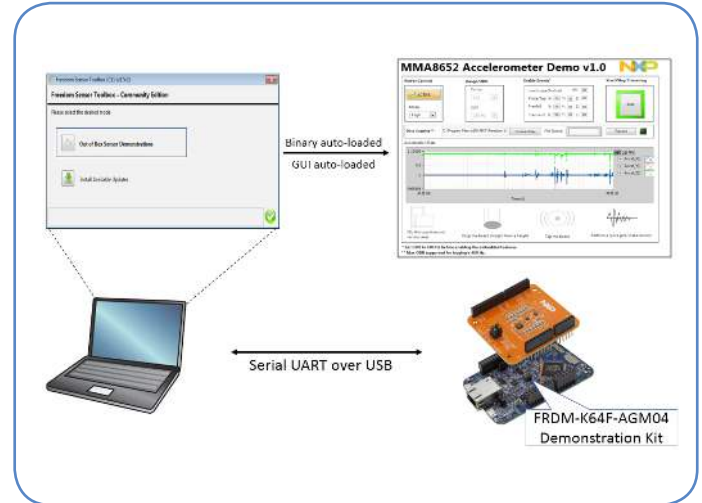
## EVALUATION AND VISUALIZATION SOFTWARE

Sensor Toolbox-Community Edition (STB-CE) is visualization and evaluation software for Sensor Toolbox. It enables quick and easy sensor demonstration, evaluation, and sensor data analysis.

Quick demonstration and evaluation are enabled on the available sensor demonstration kits. The firmware and the GUI project are auto-loaded, providing a plug-and-play experience.

- Quick sensor demonstration: enables quick visualization of sensor data and other sensor outputs based on the pre-configured sensor settings in the firmware
- Real time sensor evaluation: enables easy changes to critical sensor settings (ODR, FSR, power modes) and data logging during sensor demonstrations
- Register Level Interface: provides a register map for the sensors allowing quick read and write of different register bits, enabling detailed sensor evaluation

## QUICK SENSOR DEMONSTRATION USING STB-CE

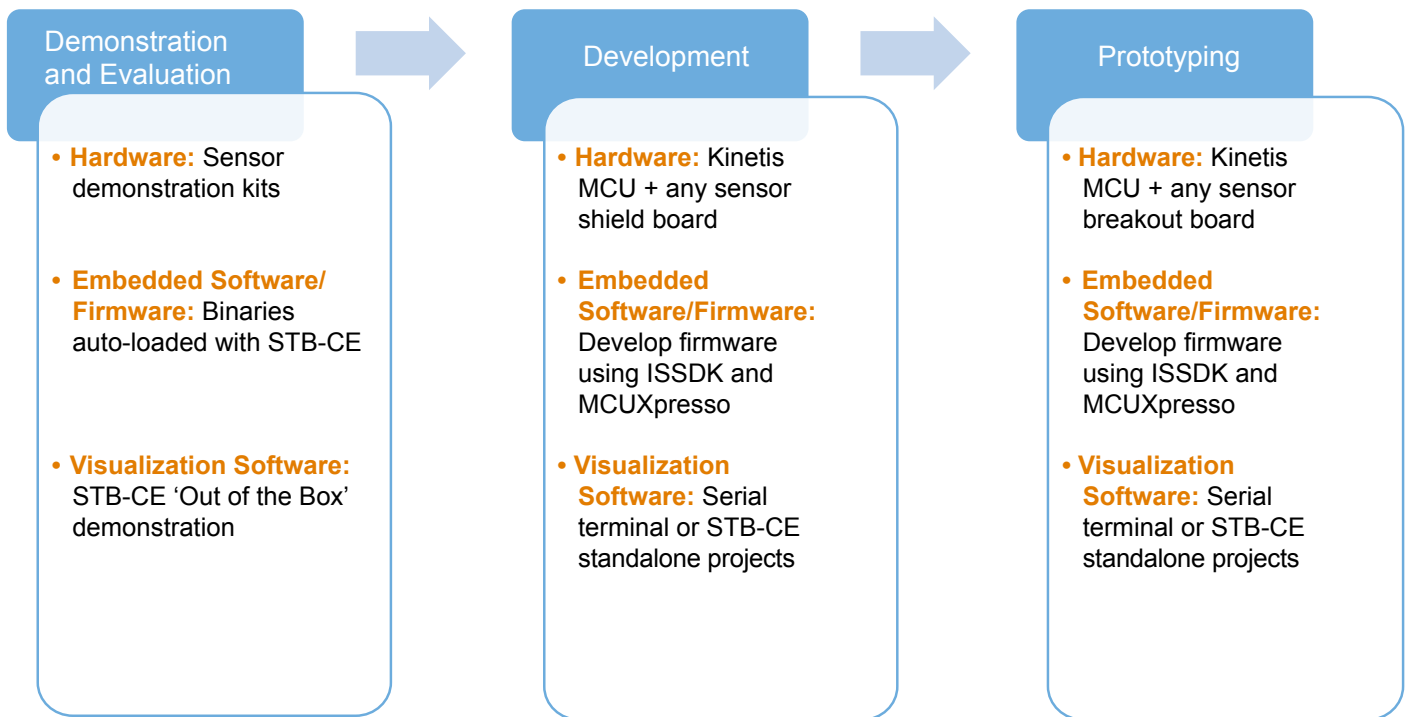


Get started with out of the box sensor demonstrations here:

[Getting started with STB-CE](#)

## HOW DOES THE SYSTEM COME TOGETHER TO DEVELOP YOUR PRODUCTS?

Sensor Toolbox combines hardware and software to facilitate product development.



NXP provides a wide range of sensor boards for different NXP sensors. The table below covers all boards with complete software support for different phases of product development with various NXP sensors and their combinations.

| Sensor Toolbox Name  | Board Type       | Board Name               | Accelerometer |           |            |          |          |          | Gyroscope | Magnetometer |            | Pressure |              |           | Software   |       |
|--|------------------|--------------------------|---------------|-----------|------------|----------|----------|----------|-----------|--------------|------------|----------|--------------|-----------|------------|-------|
|  |                  |                          | FXLC95000CL   | FXLS8471Q | FXOS8700CQ | MMA8451Q | MMA8491Q | MMA8652Q | MMA9553L  | FXAS21002C   | FXOS8700CQ | MAG3110  | FXPQ3115BVT1 | MPL3115A2 | MPXV5004DP | ISSDK |
| Sensor Toolbox for 9-Axis Solution (1)                                       | Demo kit         | FRDM-K22F-AGM01          |               |           |            |          |          |          |           |              |            |          |              |           |            |       |
|  |                  | FRDM-K64F-AGM01          |               |           |            |          |          |          |           |              |            |          |              |           |            |       |
|  | Shield board     | FRDM-STBC-AGM01          |               |           | ✓          |          |          |          | ✓         |              |            |          |              |           | ✓          | ✓     |
|  | Breakout board   | BRKT-STBC-AGM01          |               |           |            |          |          |          |           |              |            |          |              |           |            |       |
| Sensor Toolbox for 9-Axis Solution (2)                                       | Demo kit         | FRDM-K64F-AGM04          |               |           |            |          |          |          |           |              |            |          |              |           |            |       |
|  | Shield board     | FRDM-STBC-AGM04          |               |           |            |          | ✓        |          | ✓         |              | ✓          |          |              |           | ✓          | ✓     |
|  | Breakout board   | BRKT-STBC-AGM04          |               |           |            |          |          |          |           |              |            |          |              |           |            |       |
| Sensor Toolbox for FXLC95000CL Intelligent Motion Sensor                     | Demo kit         | FRDM-K22F-SA9500         |               |           |            |          |          |          |           |              |            |          |              |           |            |       |
|  | Shield board     | FRDM-STBC-SA9500         | ✓             |           |            |          |          |          |           |              |            |          |              |           | ✓          | ✓     |
|  | Breakout board   | BRKT-STBC-SA9500         |               |           |            |          |          |          |           |              |            |          |              |           |            |       |
| Sensor Toolbox for MMA8451 3-Axis Linear Accelerometer                       | Demo kit         | FRDM-KL25Z<br>FRDM-KL27Z |               |           |            |          |          |          |           |              |            |          |              |           |            |       |
|  | Shield board     | FRDMSTBC-A8451           |               |           |            | ✓        |          |          |           |              |            |          |              |           | ✓          | ✓     |
|  | Breakout board   | BRKTSTBC-A8451           |               |           |            |          |          |          |           |              |            |          |              |           |            |       |
| Sensor Toolbox for FXLS8471Q 3-Axis linear Accelerometer                     | Demo kit         | FRDMKL25-A8471           |               |           |            |          |          |          |           |              |            |          |              |           |            |       |
|  | Shield board     | FRDMSTBC-A8471           |               | ✓         |            |          |          |          |           |              |            |          |              |           | ✓          | ✓     |
|  | Breakout board   | BRKTSTBC-A8471           |               |           |            |          |          |          |           |              |            |          |              |           |            |       |
| Sensor Toolbox for MMA8491Q 3-Axis Digital Accelerometer                     | Demo kit         | FRDMKL25-A8491           |               |           |            |          |          |          |           |              |            |          |              |           |            |       |
|  | Shield board     | FRDMSTBC-A8491           |               |           |            |          | ✓        |          |           |              |            |          |              |           | ✓          | ✓     |
|  | Breakout boards  | BRKTSTBC-A8491           |               |           |            |          |          |          |           |              |            |          |              |           |            |       |
| Sensor Toolbox for MAG3110   | Demo kit         | FRDM-KL27Z               |               |           |            |          |          |          |           |              | ✓          |          |              |           | ✓          | ✓     |
| Sensor Toolbox for FXPQ3115BVT1 High Precision Biocompatible Pressure Sensor | Demo kit         | FRDMKL27-B3115<br>Q42017 |               |           |            |          |          |          |           |              |            |          |              |           |            |       |
|  | Shield board     | FRDMSTBI-B3115<br>Q42017 |               |           |            |          |          |          |           |              |            | ✓        |              |           | ✓          | ✓     |
|  | Breakout board   | BRKTSTBI-B3115<br>Q42017 |               |           |            |          |          |          |           |              |            |          |              |           |            |       |
| Sensor Toolbox for MPL3115A2 Pressure Sensor/ Altimeter                      | Demo kit         | FRDMKL25-P3115           |               |           |            |          |          |          |           |              |            |          |              |           |            |       |
|  | Shield board     | FRDMSTBC-P3115           |               |           |            |          |          |          |           |              |            |          | ✓            |           | ✓          | ✓     |
|  | Breakout board   | BRKTSTBC-P3115           |               |           |            |          |          |          |           |              |            |          |              |           |            |       |
| Sensor Toolbox for MPXV5004DP Analog Pressure Sensor                         | Shield board     | FRDMSTBCDP5004           |               |           |            |          |          |          |           |              |            |          |              |           |            |       |
|  | Breakout board   | BRKTSTBCDP5004           |               |           |            |          |          |          |           |              |            |          |              | ✓         |            | ✓     |
| Sensor Expansion board for multiple sensors                                  | Shield board     | FRDM-FXS-MULT2-B         |               | ✓         | ✓          |          |          | ✓        | ✓         |              | ✓          | ✓        |              |           | ✓          | ✓     |
| 10 axis data logger Reference design   | Reference design | RD-KL25-AGMP01           |               |           | ✓          |          |          |          | ✓         |              | ✓          |          | ✓            |           | ✓          | ✓     |

Find all the above sensor boards here: [nxp.com/sensorevaluationboards](https://www.nxp.com/sensorevaluationboards)