

# ISSDK v1.6

## Release notes for ISSDK v1.6

Rev. 1.0 — 25 May 2017

Release notes

## 1 Overview

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The IoT Sensing SDK (ISSDK) v1.6 is an optional middleware component included in SDK packages downloaded from MCUXpresso SDK Builder (previously known as Kinetis Expert (KEx)) designed to provide support for Kinetis MCU projects using NXP sensors. ISSDK relies on the SDK 2.2 drivers and project release infrastructure to create a unified user experience. ISSDK v1.6 combines a set of robust Sensor Drivers and Algorithms along with example applications to allow a customer to get started with using NXP sensors quickly.

## 2 Features

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### 2.1 What is new in ISSDK v1.6

- ISSDK enablement on LPC5411x (Niobe2)
  - Added GPIO abstraction layer
  - Added custom kit examples for AGM01 and AGMP03 in MCUXpresso
- ISSDK enablement on KE15Z
  - Added kit examples for MPXV5004DP in MCUXpresso
  - Added sensor driver and sample applications for MPXV5004DP
  - FRDM-KE15Z analog example project for MPXV5004DP
- Added orientation demos with Host I/O support (AGM01)

### 2.2 Delivered in ISSDK v1.5

- ISSDK middleware component integrated with MCU SDK 2.0 Rel6 ecosystem.
- ISSDK project generation module updated to support MCUXpresso IDE (RedEye). ISSDK kits sensor and algorithm example projects now supported with MCUXpresso IDE (RedEye).
- Added additional sensor examples:
  - FRDM-KL27Z on-board MAG3110 examples
  - FXAS21002 SPI example
- Added STB-CE host protocol compliant demo sources supported with STB-CE (Freedom Sensor ToolBox – Community Edition).

### 2.3 Delivered in ISSDK 1.1

- ISSDK middleware component integrated with MCU SDK 2.0 Rel5 ecosystem.
- Adoption of KSDK 2.0 CMSIS driver implementations.
- Added FRDM-K64F-AGM04 kit.
- Created sensor driver for FXPQ3115 pressure/bio-compatible sensor.



- Added FRDMKL27-B3115 kit.
- Added FRDM-KL25Z as an MMA8451 kit.
- Added FRDM-KL27Z as an MMA8451 kit.
- Added FreeRTOS sensor fusion algorithm examples for FRDM-K64F-AGM04.
- Added bare metal sensor fusion algorithm examples for FRDM-K64F-AGM01 and FRDM-K22F-AGM01.
- Added pedometer algorithm example for FRDM-K64F-AGM04.
- Added pedometer algorithm example for FRDM-KL25Z as an MMA8451 Kit and FRDM-KL27Z as an MMA8451 kit.

## 2.4 Delivered in ISSDK 1.0

- ISSDK middleware component introduced and integrated with MCU SDK 2.0 ecosystem.
- Designed ISSDK middleware component design into MCU SDK 2.0 ecosystem.
- Created sensor drivers for MMA845X, MMA865X, FXLS8471, MMA8491, FXLC95000, FXAS21002, FXOS8700, MMA9553 and MPL3115 sensors.
- Added FRDM-K64F-AGM01 kit.
- Added FRDM-K64F-MULT2B kit.
- Added FRDM-K22F-AGM01 kit.
- Added FRDM-K22F-SA9500 kit.
- Added FRDMKL25-A8471 kit.
- Added FRDMKL25-A8491 kit.
- Added FRDMKL25-P3115 kit.
- Added FreeRTOS *sensor fusion* algorithm examples for FRDM-K64F-AGM01, FRDM-K22F-AGM01 and FRDM-K64F-MULT2B kits.
- Added bare metal *sensor fusion* algorithm examples for FRDM-K64F-MULT2B kit.
- Added pedometer algorithm example for FRDM-K64F-AGM01, FRDM-K22F-AGM01 and FRDM-K64F-MULT2B kits.

## 2.5 Supported sensors

The following NXP sensors are supported by ISSDK v1.6:

**Table 1. Sensors supported by ISSDK v1.6**

Sensor part number	Sensor type	Interface		
		SPI	I <sup>2</sup> C	ADC
<b>FXAS21002</b>	Gyroscope	✓	✓	—
<b>FXLC95000</b>	Intelligent accelerometer	✓	✓	—
<b>FXLS8471</b>	Digital accelerometer	✓	✓	—
<b>FXOS8700</b>	Digital accelerometer and magnetometer	✓	✓	—
<b>MAG3110</b>	Digital magnetometer	—	✓	—
<b>MMA845X</b>	Digital accelerometer	—	✓	—
<b>MMA8491</b>	Digital accelerometer	—	✓	—
<b>MMA865X</b>	Digital accelerometer	—	✓	—

Sensor part number	Sensor type	Interface		
		SPI	I <sup>2</sup> C	ADC
MMA9553	Intelligent accelerometer	—	✓	—
MPL3115	Digital pressure	—	✓	—
FXPQ3115	Pressure/Bio-Compatible	—	✓	—
MPXV5004DP	Differential and gauge, integrated analog pressure sensor	—	—	✓

## 2.6 Algorithm support

ISSDK v1.6 supports Sensor Fusion V7.2.0 algorithm deployed as example applications and source code libraries.

ISSDK v1.6 supports a pedometer algorithm deployed as example applications, interface files and a binary library.

## 3 Development tools

The ISSDK v1.6 is supported with the following development toolchains:

- MCUXpresso IDE (RedEye) v10.0.0 [Build 344]
- Kinetis Design Studio IDE v3.2
- IAR Embedded Workbench for ARM version 7.70.1
- MDK-ARM Microcontroller Development Kit (Keil)<sup>®</sup> 5.23.0
- Somnium DRT
- Makefiles support with GCC revision v4.9-2015-q3 from ARM Embedded

## 4 PC configurations

The system configurations required to use ISSDK v1.6 supported development toolchains are as follows:

**Table 2. PC configurations**

Parameter	Minimum configuration	Recommended configuration
Operating system	Windows 7	
Communications to target hardware	USB port	
Processor speed in GHz	1.8	2.6
RAM in GB	4	8
Free disk space in GB	20	400

## 5 Supported development systems

ISSDK v1.6 is designed to be distributed as codebases created by MCUXpresso SDK Builder targeting a particular sensor demonstration kit. A sensor demonstration kit is defined as a known combination of Freedom Development Board and Arduino

compatible Sensor Shield board. MCUXpresso SDK Builder allows selection of these kits as input configurations to the SDK Builder.

The following standard ([Table 3](#)) and custom ([Table 4](#)) Sensor Kits are supported by ISSDK 1.6:

- Standard Sensor Kits are Official MCU Board- Sensor Shield kits which are available for end user to order from NXP Sensor Evaluation Boards webpage.
- Custom Sensor Kits are Board Shield pairs which will not be available for end user to order as Official MCU Board- Sensor Shield kits (MCU Board and Sensor Shield must be ordered separately).

**Table 3. Standard sensor kits supported by ISSDK v1.6**

Sensor Kit	MCU Board	Sensor Shield Board
FRDM-K22F-AGM01	FRDM-K22F	FRDM-STBC-AGM01
FRDM-K22F-SA9500	FRDM-K22F	FRDM-STBC-SA9500
FRDM-K64F-AGM01	FRDM-K64F	FRDM-STBC-AGM01
FRDM-K64F-AGM04	FRDM-K64F	FRDM-STBC-AGM04
FRDMKE15-DP5004	FRDM-KE15Z	FRDMSTBCDP5004
FRDMKL25-A8471	FRDM-KL25Z	FRDMSTBC-A8471
FRDMKL25-A8491	FRDM-KL25Z	FRDMSTBC-A8491
FRDMKL25-P3115	FRDM-KL25Z	FRDMSTBC-P3115
FRDM-KL25Z	FRDM-KL25Z	Using on-board MMA8451
FRDMKL27-B3115	FRDM-KL27Z	FRDMSTBI-B3115
FRDMKL27-B3115	FRDM-KL27Z	FRDMSTBI-B3115
FRDM-KL27Z	FRDM-KL27Z	Using on-board MMA8451 & MAG3110

**Table 4. Custom sensor kits supported by ISSDK v1.6**

Sensor Kit	MCU Board	Sensor Shield Board
FRDM-K64F with MULT2B	FRDM-K64F	FRDM-FXS-MULT2-B
LPCXpresso54114 with AGM01	LPXCpresso54114	FRDM-STBC-AGM01

## 6 Release contents

**Table 5. Release contents**

Deliverable	Location	Status
Kits	<install_dir>/boards/<kit_name>	Added board kits definitions for LPC54114 with AGM01 and AGMP03. Added board kit definitions for FRDM-KE15Z and DP5004.

Deliverable	Location	Status
Sensor Driver Examples	<install_dir>/boards/<kit_name>/issdk_examples/sensors	Added custom kits examples for LPCXpresso 54114 with AGM01 and AGMP03. Added standard kit example for FRDMKE15-DP5004.
Algorithm Examples	<install_dir>/boards/<kit_name>/issdk_examples/algorithms	Unchanged
Board-Kit Specific Configuration	<install_dir>/middleware/issdk_1.6/boardkit	Added boardkit definition files for LPCXpresso54114 and FRDM-KE15Z kits
CMSIS Driver Implementations	<install_dir>/middleware/issdk_1.6/drivers	Unchanged
Documentation	<install_dir>/docs/ISSDK	Updated for ISSDK v1.6
Middleware	<install_dir>/middleware/issdk_1.6	Updated
Sensor Algorithms	<install_dir>/middleware/issdk_1.6/algorithms	Added sensor fusion examples for LPCXpresso 54114 with AGM01 and AGMP03.
Driver Examples	<install_dir>/middleware/issdk_1.6/driverexamples	Added MPXV5004DP sensor example
Sensor Drivers	<install_dir>/middleware/issdk_1.6/sensors	Unchanged
ISSDK Specific Drivers	<install_dir>/middleware/issdk_1.6/drivers	Added LPC GPIO drivers
CMSIS Driver API Includes	<install_dir>/CMSIS/Driver/Include	Unchanged
Host protocol compliant demo sources	<install_dir>/middleware/issdk_1.6/driverexamples/demos	Updated

## 7 Open/Closed defects

### 7.1 ISSDK v1.6 open defects

There are no open defects in ISSDK 1.6.

### 7.2 ISSDK v1.6 closed defects

There are no closed defects in ISSDK v1.6 (no open defects reported in ISSDK v1.5).

### 7.3 ISSDK v1.5 closed defects

Table 6. ISSDK v1.5 closed defects

Ticket Number	Description	Closed Date
KPSDK-14392	ISSDK generated MCUX example definition XML file has the incorrect CMSIS target path	02/14/2017
KEX-2111	Multiple Compilation Issues with the MCUX IDE imported ISSDK projects using the generated external manifest xml files	02/16/2017

Ticket Number	Description	Closed Date
SSDSW-509	Spurious NMI Interrupt occurs in RD KL25Z Board.	01/24/2017
SSDSW-516	Baremetal Sensor Fusion example missing from the release.	01/30/2017
SSDSW-520	ISSDK application stalls when characters sent to the FRDM-K22F board at baud rates that do not match the configured baud rate in the firmware running on the board.	02/10/2017
SSDSW-521	UART device unable to keep up with transmit requests for data rates exceeding 400 Hz.	02/10/2017
SSDSW-522	While UART transmit packet streaming is active at high data rates exceeding 100 Hz, random UART receive packet corruption or loss of characters is observed	02/16/2017
SSDSW-523	SysTick framework updated to support data rates less than 5 Hz.	02/10/2017

## 7.4 ISSDK 1.1 closed defects

Table 7. ISSDK 1.1 closed defects

Ticket Number	Description	Closed Date
KPSDK-13269	[ISSDK 1.1 EB1]: PG tool clone feature not identifying ISSDK examples for on-board sensor MMA8451 on FRDM-KL25Z and FRDM-KL27Z boards.	11/28/2016
KPSDK-13270	[ISSDK 1.1 EB1]: PG tool cloning feature not identifying FXPQ3115 example projects of FRDMKL25-B3115 kit.	11/28/2016
KEX-1731	[ISSDK 1.1 EB1]: PG tool not identifying kits and corresponding ISSDK projects in the SDK builder package generated for board configuration with ISSDK optional middleware selected	11/24/2016
SSDSW-422	The ISSDK example application files should be part of the respective generated example projects like KSDK driver examples	11/30/16
SSDSW-435	Links to some of the APIs in APIRM are broken and some data structures do not have brief descriptions	11/22/2016
SSDSW-458	ISSDK middleware driver files name uppercase and lowercase are not aligned	11/18/2016

## 7.5 ISSDK 1.0 closed defects

Table 8. ISSDK 1.0 closed defects

Ticket Number	Description	Closed Date
KEX-1348	If existing configuration on KEx-Stage not removed before creating new configuration with the same name, the KDS/ATL toolchain project files are corrupted in the generated SDK package.	08/12/16
KEX-1323	The default package name shown in kit configuration should match with kit name	08/18/16

Ticket Number	Description	Closed Date
SSDSW-423	KL25Z generated projects have different behaviors from the K22F and K64F generated projects. For the KL25Z, during the initial download, it asks the user to select a valid device to connect.	08/05/16

## 8 Known issues

### 8.1 Pedometer project IDE limited to IAR

Due to the inclusion of a binary library and problems with KDS support, the pedometer projects are currently only supported with the IAR IDE.

## 9 Revision history

Table 9. Revision history

Revision number	Date	Description
1.0	20170525	Initial release for ISSDK v1.6



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Date of release: 25 May 2017