

MCUXSDKJN518XRN

MCUXpresso SDK Release Notes for JN518x

Rev. 0 — 08/2020

Release Notes

1 Overview

The MCUXpresso Software Development Kit (SDK) is a collection of software enablement for microcontrollers that includes peripheral drivers, high-level stacks including integrated RTOS support for FreeRTOS™ OS. In addition to the base enablement, the MCUXpresso SDK is augmented with demo applications, driver example projects, and API documentation to help the customers quickly leverage the support of the MCUXpresso SDK.

For more details about MCUXpresso SDK, see the MCUXpresso SDK homepage [MCUXpresso-SDK: Software Development Kit](#).

NOTE

See the attached Change Logs section at the end of this document to reference the device-specific driver logs, middleware logs, and RTOS log.

2 MCUXpresso SDK

As part of the MCUXpresso software and tools, MCUXpresso SDK is the evolution of Kinetis SDK, includes support for both LPC and i.MX System-on-Chips (SoC). The same drivers, APIs, and middleware are still available with support for Kinetis, LPC, and i.MX silicon. The MCUXpresso SDK adds support for the MCUXpresso IDE, an Eclipse-based toolchain that works with all MCUXpresso SDKs. Easily import your SDK into the new toolchain to access to all of the available components, examples, and demos for your target silicon. In addition to the MCUXpresso IDE, support for the MCUXpresso Config Tools allows easy cloning of existing SDK examples and demos, allowing users to leverage the existing software examples provided by the SDK for their own projects.

NOTE

In order to maintain compatibility with legacy Freescale code, the filenames and the source code in MCUXpresso SDK containing the legacy Freescale prefix **FSL** has been left as is. The **FSL** prefix has been redefined as the NXP Foundation Software Library. It is suggested to keep the downloaded SDK archive in the root directory of your drive to avoid any unexpected build issues caused by deep path of files.

3 Development tools

The MCUXpresso SDK was compiled and tested with these development tools:

- IAR Embedded Workbench for Arm version 8.40.2
- MCUXpresso IDE v11.2.0
- Python 3 (Used by IAR and MCUXpresso IDE post build script, and the version should be newer than 3.2)
- GNU Tools for Arm Embedded Processors 8-2018-q4-major

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4 Supported development systems

This release supports boards and devices listed in [Table 1](#). The boards and devices in bold were tested in this release.

Table 1. Supported MCU devices and development boards

Development boards	MCU devices
OM15076-V3 (DK006) Carrier Board + JN518x module	JN5189, JN5189T, JN5188, JN5188T
JN5189-USB Dongle	JN5189

5 What is new

MCUXpresso SDK JN5189 MR1

This new release package for the JN5189 platform corresponds to the Maintenance Release 1 of the program. Compared to previous SDK Release RFP, this package provides several fixes and performance improvements, detailed as below.

Here are the changes since the RFP release:

- **Framework:**
 - Add support for wake timer in Timers Manager module
 - Add support for the Secondary Stage Bootloader (SSBL) which is delivered in the SDK package
 - Add support for encrypted OTA upgrade storage in external flash
 - Add support for new external QSPI flash XT25F08B-S base
 - Add support for OTA_AlignOnReset function. This function is called by the Zigbee OTA cluster to align any internal OTA support parameters used for the type of download enabled
 - Fix `OTA_CommitImage` which could lead to a stack issue depending of the OTA file size
 - Fix Zigbee OTA in external flash when the board reset during the download
 - PDM Overwrite and Append functions are deprecated and have been removed from the PDM library
 - The `NV_flash` framework component is now deprecated, instead PDM APIs should be used to store non-volatile data
 - Low Power: Fix interrupts should be unmasked before going to sleep
 - Fix problem that DCO calibration data were not read correctly from the flash. Even if the radio measurements did not show a big improvement after solving, this is an important fix that could explain poor radio RX. This fix also force any previous existing radio calibration data stored in flash to be cleared and new calibrations to be performed. External impact because of that. Radio driver v2089 delivery
 - Fix address range in RAZ function used by a radio driver test function (one table element was not cleared. No external impact). Radio driver v2089 delivery
- **Openthread:**
 - Updated LPED linker name and copyright
 - Reworked LED and buttons behavior
 - Updated Python version and path to image signing script for OT enablement
 - Added PDM support to OT
 - Add connectivity framework support for the 4th button
 - Add GPIO pins support in OT REED SDK project
 - Move RNG initialization from OT to SDK

- Updated NWKU GetTimestamp function to use OT platform alarm function for timestamps
- Moved to connectivity framework boards files by updating them with necessary code for OT
- Added Serial Manager to OT enablement in order to have unified serial interface for hybrid apps
- SCR updates

- **Zigbee:**

- Fix frame counter restoration after wakeup (generic build of zpsnwk library)
- API function to enable/disable PAN ID conflict resolution:

```
ZPS_vNwkSetOverrideConflictBehaviour()
```

- Fix bug in zigbee_ed_rx_off that prevented rejoin after reset
- Fix issue in discovery neighbour table update
- Fix depth setup in mgmt lqi and base device
- Fix possible loss of deferred confirm when transmissions are aggressive
- Fix report of destination address in route request deferred confirm for broadcast transmission
- Add support at the application level to get/set OOB commissioning data
- Add support of BDB_OOB events in zigbee_router example
- MCPS handles management improvement
- Add support for ZED to leave network without RESET and join network again
- Fix search for an empty slot in APS key table
- Add support for beacon sorting based on LQI in the discovery table
- Add mechanism to continue rejoin attempts without doing discovery post successful rejoin and after the device has a security failure due to joining the wrong network
- Fix the alignment of data so that recovery from PDM does not cause a problem over an OTA update.

6 Release contents

Table 2 provides an overview of the MCUXpresso SDK release package contents and locations.

Table 2. Release contents

Deliverable	Location
Boards	<install_dir>/boards
CMSIS Arm Cortex®-M header files, DSP library source	<install_dir>/CMSIS
Demo applications	<install_dir>/boards/<board_name>/demo_apps
Documentation	<install_dir>/docs
Driver examples	<install_dir>/boards/<board_name>/driver_examples
Driver, SoC header files, extension header files and feature header files, utilities	<install_dir>/devices/<device_name>
Middleware	<install_dir>/middleware

Table continues on the next page...

Table 2. Release contents (continued)

Deliverable	Location
Peripheral Drivers	<install_dir>/devices/<device_name>/drivers
RTOS examples	<install_dir>/boards/<board_name>/rtos_examples
RTOS Kernel Code	<install_dir>/rtos
Tools	<install_dir>/tools
USB Dongle Examples	<install_dir>/boards/<board_name>/usb_dongle_examples
Utilities such as debug console	<install_dir>/devices/<device_name>/utilities
Wireless examples	<install_dir>/boards/<board_name>/wireless_examples

7 MCUXpresso SDK release package

The MCUXpresso SDK release package content is aligned with the silicon subfamily it supports. This includes the boards, CMSIS, devices, documentation, middleware, and RTOS support.

7.1 Device support

The device folder contains the whole software enablement available for the specific System-on-Chip (SoC) subfamily. This folder includes clock-specific implementation, device register header files, device register feature header files, CMSIS derived device SVD, and the system configuration source files. Included with the standard SoC support are folders containing peripheral drivers, toolchain support, and a standard debug console.

The device-specific header files provide a direct access to the microcontroller peripheral registers. The device header file provides an overall SoC memory mapped register definition. The folder also includes the feature header file for each peripheral on the microcontroller.

The toolchain folder contains the startup code and linker files for each supported toolchain. The startup code is a CMSIS compliant startup code that efficiently transfers the code execution to the main() function.

7.1.1 Board support

The boards folder provides the board-specific demo applications, driver examples, and RTOS examples.

7.1.2 Demo applications and other examples

The demo applications demonstrate the usage of the peripheral drivers to achieve a system level solution. Each demo application contains a readme file that describes the operation of the demo and required setup steps.

The driver examples demonstrate the capabilities of the peripheral drivers. Each example implements a common use case to help demonstrate the driver functionality.

7.2 Middleware

7.2.1 RTOS

The MCUXpresso SDK is integrated with FreeRTOS OS.

7.2.2 OpenThread

This version corresponds to the Maintenance Release build of the JN5189DK6 Software.

The main features of this release are listed below.

- The OpenThread stack implements version 1.1.1 of the Thread Group core specification.
- The OpenThread stack comes with application examples for implementing Thread Router Eligible Device, Thread End Device (including Low Power/Sleepy End Devices), and Thread Border Router, including application examples for implementing the Over-The-Air Updates in a Thread Large Network.

7.2.3 Zigbee 3.0

ZigBee Pro stack, Base Device Behavior, and ZigBee cluster library are implemented in line with the ZigBee 3.0 version of the standards.

ZigBee Compliant Platform is certified to the ZigBee Pro R22 specifications.

The SDK is supplied with ZigBee 3.0 with wireless demo examples for implementing a ZigBee Coordinator, ZigBee Router, Zigbee sleepy (Rx OFF when Idle) End Device and Zigbee non-sleeping (Rx ON) End Device, with the option for Over-the-Air updates.

Additional reference ZigBee Application Notes for ZigBee ZLO devices such as Bulbs, Controller & Switches, Sensors and Control Bridge are distributed outside of the SDK on the NXP website.

7.2.4 Other middleware

Optional middleware packages can be included in the release based on the user selection. See `<install_dir>/SW-Content-Register.txt` for a list of components and associated licenses.

8 Known issues

8.1 Maximum file path length in Windows 7[®] operating system

The Windows 7 operating system imposes a 260-character maximum length for file paths. When installing the MCUXpresso SDK, place it in a directory close to the root to prevent file paths from exceeding the maximum character length specified by the Windows operating system. The recommended location is the `C:\nxp` folder.

8.2 New Project Wizard compile failure

The following components request the user to manually select other components that they depend upon in order to compile. These components depend on several other components and the New Project Wizard (NPW) is not able to decide which one is needed by the user.

NOTE

xxx means core variants, such as, `cm0plus`, `cm33`, `cm4`, `cm33_nodsp`.

Also for low-level adapter components, currently the different types of the same adapter cannot be selected at the same time. For example, if there are two types of timer adapters, `gpt_adapter` and `pit_adapter`, only one can be selected as timer adapter in one project at a time. Duplicate implementation of the function results in an error.

8.3 Need to use QN9090 as the part number in IAR project file

IAR does not officially support the JN5189 yet. Please use QN9090 as the part number in IAR project file. All SDK examples are using the QN9090 part number in IAR project file.

8.4 ZB Pro Configuration Editor

Some of the parameters can't be changed (such as the table size under Network Layer Configuration: Active Neighbor Table Size, Address Map Table Size, Child table size etc).

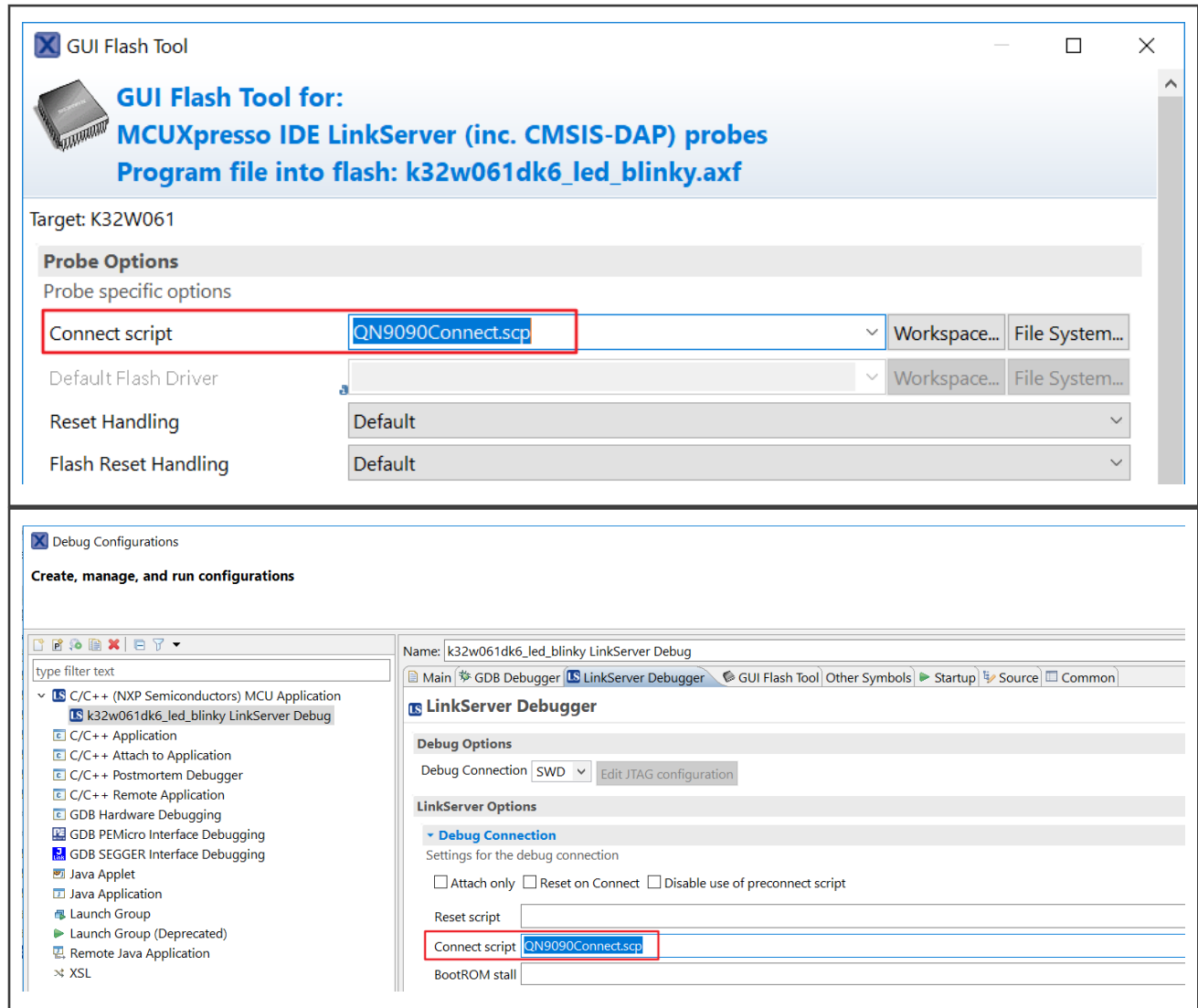
8.5 Other limitations

- The OpenThread Large Network has been tested for 110 nodes.
- The OpenThread Border Router application is natively available for RCP configuration and demonstrated in this release. NCP configuration is not demonstrated in current release.
- There are times when the Thread Commissioning App cannot discover/connect to the mDNS services exposed by the Border Router. In this case, please connect to the UDOO shell and restart the web agent service by running the `restart_br_agent.sh` bash script (`sudo ./restart_br_agent.sh`). The role of this script is to connect to the running Docker container and restart the `otbr-agent` service.
- After an OTA upgrade, a reflash of the board from IAR is possible only if the NVM is erased.
- If a JN518x device is erased and left without an image in flash, the MCUXpresso IDE will be unable to access it for programming or debug. The workaround is to program any image into the device using either the IAR IDE or the DK6 CLI Flash Programmer. An erase-program performed as a single operation from within the MCUXpresso IDE works correctly.
- The OpenThread and ZigBee wireless demo applications contained within this release are designed to operate as bare metal implementations only. There is currently no RTOS support for these wireless applications in this release.
- SW4/DIO4 on OM15082 should not be used as mask for Wake.
- The PSECT (protected sectors of flash) is not in the normal application flash use domain. It is used to store certain chip related configurations. It is possible to write to these pages through the flash programmer. Lack of FreeRTOS support is restricted to the Wireless Demo examples for both OpenThread & Zigbee

NOTE

DO NOT write to these locations. Writing to these sectors outside their intended use will cause the device to not function correctly.

- IAR toolchain is not currently supported for all the Zigbee Wireless applications and dual mode BLE/Zigbee examples. MAC OS and Linux are not supported with Zigbee.
- The binary generated by the IAR Output Converter should not be run on the chip since it does not contain the signature information. The correct one is `xxxx.out.bin` in the debug or release directory of the project.
- The flash programmer provided in this release is a command line variant. There is no MCUXpresso plugin for the JN518X. The command line flash programmer when used with multiple boards connected can fail to recognise COM ports.
- Serial Manager is only supported on UART (not I²C nor SPI).
- All peripherals working except the DMIC.
- Zigbee sleeping end device (ZED rx off) doesn't go into power saving after receiving leave request.
- Zigbee sleeping end device (ZED rx off) doesn't send periodic reports after wake up.
- FreeRTOS tickless mode configuration may exhibit stability issues. An update will be available in an upcoming maintenance release.
- If the chip can not be connected after mass erase by the flash programmer or the MCUXpresso IDE, please upgrade the MCUXpresso IDE to 11.2.0 then set the **Connect script** to **QN9090Connect.scp** in the GUI Flash Tool and in the CMSIS-DAP launch configure.



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For sales office addresses, please send an email to: salesaddresses@nxp.com

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