**NXP Semiconductors**
Release Notes

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# Kinetis Thread Stack v.1.2.8 Release Notes

# Supporting KW41Z

## 1 Overview

These are the release notes for the Kinetis Thread Stack software version 1.2.8 implementing a wireless IPv6 mesh network protocol for Internet of Things devices. The release notes are included in the software package for which they apply.

See nxp.com/thread and www.threadgroup.org for more information about the Thread wireless network technology.

See nxp.com/wireless for more information about NXP Thread supported platforms.

Contents

# 2 Release Contents

The release contents are listed in the table below.

**Table 1. Release Contents**

| Folder | Description |
|---|---|
| \middleware\wireless\nwk_ip_1.2.8\examples | Application source code, initialization and configuration files |
| \boards | Demo applications, driver examples, rtos examples and wireless application examples |
| \docs | Documents applying to the release |
| \boards\<board_type>\wireless_examples\thread\ | Sample/demo projects for router eligible devices, end devices and host controlled device applications |
| \boards\<board_type>\wireless_examples\hybrid\ | Sample/demo projects for Bluetooth Thread Router wireless UART, Bluetooth Thread Host Controlled Devices and Bluetooth 802.15.4 FSCI black box hybrid applications |
| \boards\<board_type>\wireless_examples\framework | Platform framework components |
| \tools\wireless\host_sdk | Thread Linux® OS Host Software (Python and C demos) |
| \boards\<board_type>\wireless_examples\ieee_802_15_4 | IEEE® 802.15.4 MAC and PHY |
| \middleware\wireless\nwk_ip_1.2.8 | Thread and network stack files |
| \devices | Platform linker configuration files for Thread applications |
| \tools\wireless | HostSDK, MyStarNetwork demo application, binary images, MAC/BLE/THREAD xml configuration files. |
| \rtos | Supported operating systems for the features included in the MKW41Z Connectivity Software package |

# 3 Features Included

Kinetis Thread Stack 1.2.8 Release is a maintenance release for the KW41 platform.

The main features of this release are listed below.

- The stack provides Thread networking components over IEEE-802.15.4 MAC 2006 layer running on Kinetis MCUs which are enabled to use IEEE 802.15.4.
- The stack implements version 1.1.1 of the Thread Group core specification. The Thread stack has been certified by Thread Group.
- The stack comes with application examples for implementing Thread Router Eligible Device, Thread End Device (including Low Power/Sleepy End Devices) and Thread Border Router, with application examples for implementing the Over-The-Air Updates in a Thread Large Network, with support for MCUXpresso IDE and IAR® Embedded Workbench. It contains also application examples for multimode Bluetooth (BLE) and Thread.
- The stack comes with application examples and a Host API to implement the host MCU scenario where the Kinetis wireless MCU running the Thread stack is hosted by an application processor running a high-level operating system such as Linux OS, Android™ platform, or Windows® OS.

# 4 What's New and Change Log

This section describes the major changes and new features implemented in the KW41Z Thread software releases:

## 4.1 MKW41Z Thread Software v1.2.8 (Thread lib v1.1.1.35)

- This version corresponds to a maintenance release of the MKW41Z Thread Software. Some of its major new features, compared to the previous Thread release on Kinetis MKW41Z wireless microcontrollers, include:
    - Thread Large Network stability improvements for Over-The-Air Updates
    - Thread bug fixes

## 4.2 MKW41Z Thread Software v1.2.8 (Thread lib v1.1.1.31)

- This version corresponds to a maintenance release of the MKW41Z Thread Software. Some of its major new features, compared to the previous Thread release on Kinetis MKW41Z wireless microcontrollers, include:
    - Thread bug fixes for Thread v1.1 certification
    - Stability improvements for long time running Thread large networks
    - Thread Sockets API updates

# 5 Software Deployment Considerations

- IAR Embedded Workbench for ARM® **v8.40.1** or MCUXpresso IDE **v11.0.0** are required to build the example projects included in this release and deploy the protocol stack libraries.
- Folder paths for projects must be kept short to account for a nested directory path limit. Otherwise, compilation errors referring to header files which cannot be found can arise.
- This release is compatible with the Test Tool for Connectivity Products **v12.8.6** or later. It is recommended to use the *ThreadIP_1.2.8.xml* file found in the *tools/wireless/xml_fsci* folder of this package or the Test Tool installation, with the Test Tool Command Console functionality to interact with the FSCI black box applications provided in this package. For more information, please refer *TTUG.pdf* included in the Test Tool installation.

# 6 Platform Considerations

The current release of Thread stack includes EWARM and MCUXpresso projects for the following platforms.

- FRDM-KW41Z
- USB-KW41Z

The Thread stack architecture is RTOS-agnostic. Sample applications in the current release use the FreeRTOS OS configurations.

# 7 Known Limitations

- This release supports only the IAR Embedded Workbench, the MCUXpresso toolchains and the FreeRTOS kernel. A bare metal (task scheduler only) system is not supported.
- Maximum file path length in Windows® 7 Operating System: "Windows OS 7 imposes a 260-character maximum length for file paths. When installing the release, please place it in a

directory close to the root, to prevent file paths from exceeding the maximum character length specified by Windows OS. The recommended location is the C:\NXP folder."

- The Thread Border Router application is available only for the usbkw41z_kw41z board type.
- One may experience a warning for “cmsis_iar.h” with IAR EWARM 8.22.x. The patch can be found on the IAR’s My Pages.
- One may experience a warning for “Warning[Pa182]: bitwise operation drops significant bits from a constant” with IAR EWARM 8.30.1. This is a false warning and will be fixed in new IAR release.
- One may experience problems with MCUXpresso IDE v10.3.0 when importing more than one project from SDK. Workaround is to import just one project. The issue will be fixed in the future version.

# 8 Recommended Memory Configurations

The following are default memory configurations for the different Thread projects available in this release. The memory footprints provided below have been computed using Release project configurations and the IAR Embedded Workbench IDE.

- Thread border router (BR) default configurations:

| MODULE | RAM [bytes] | Flash [bytes] |
|---|---|---|
| Application | 6669 | 12543 |
| Framework | 34770 | 35018 |
| Freertos | 18080 | 5599 |
| KSDK | 208 | 8816 |
| MAC/PHY | 230 | 23358 |
| Thread | 16893 | 229242 |
| TOTAL | 76850 | 314576 |

- Thread router eligible end device (REED) default configurations:

| MODULE | RAM [bytes] | Flash [bytes] |
|---|---|---|
| Application | 6141 | 11587 |
| Framework | 22761 | 35641 |

| | | |
|---|---|---|
| Freertos | 17056 | 5556 |
| KSDK | 208 | 8555 |
| MAC/PHY | 230 | 23370 |
| Thread | 12978 | 206080 |
| TOTAL | 59374 | 290789 |

- Thread end device (ED) default configurations:

| MODULE | RAM [bytes] | Flash [bytes] |
|---|---|---|
| Application | 2289 | 10410 |
| Framework | 12861 | 35588 |
| Freertos | 11424 | 5556 |
| KSDK | 208 | 8554 |
| MAC/PHY | 226 | 19716 |
| Thread | 4978 | 148278 |
| TOTAL | 31986 | 228102 |

- Thread low power end device (LPED) default configurations:

| MODULE | RAM [bytes] | Flash [bytes] |
|---|---|---|
| Application | 2162 | 8632 |
| Framework | 12628 | 31533 |
| Freertos | 11424 | 5556 |
| KSDK | 208 | 7019 |
| MAC/PHY | 226 | 19716 |

| | | |
|---|---|---|
| Thread | 5253 | 128990 |
| TOTAL | 31901 | 201446 |

- BLE Thread Host Controlled Device default configurations:

| | | |
|---|---|---|
| Application | 8527 | 11713 |
| BLE Controller | 1850 | 43373 |
| BLE Host | 3924 | 92011 |
| Framework | 37754 | 38643 |
| Freertos | 11424 | 5556 |
| KSDK | 208 | 8554 |
| MAC/PHY | 231 | 23915 |
| Thread | 14124 | 216059 |
| TOTAL | 78042 | 439824 |

- BLE Thread Router Wireless UART default configurations:

| MODULE | RAM [bytes] | Flash [bytes] |
|---|---|---|
| Application | 8927 | 18203 |
| BLE Controller | 1850 | 43376 |
| BLE Host | 3755 | 68771 |
| Framework | 31965 | 41480 |
| Freertos | 18080 | 5556 |
| KSDK | 208 | 8554 |
| MAC/PHY | 231 | 23917 |
| Thread | 12978 | 206152 |

| | | |
|---|---|---|
| TOTAL | 77994 | 416009 |

# 9 Revision History

This table summarizes revisions to this document.

| Table 2 Revision history | | |
|---|---|---|
| **Revision number** | **Date** | **Substantive changes** |
| 0 | 09/2016 | Initial release |
| 1 | 04/2017 | Updates for the KW41 MCUX GA release |
| 2 | 01/2018 | Updates for KW41 Maintenance Release |
| 3 | 08/2018 | Updates for KW41 Maintenance Release1 |
| 4 | 01/2019 | Updates for KW41 Maintenance Release2 |
| 5 | 03/2019 | Updates for KW41 Maintenance Release3 |
| 6 | 08/2019 | Updates for KW41 MR3.1 |

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