NXP Semiconductors
Release Notes

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ZigBee® 3.0 Software for the Kinetis MKW41Z Dual Mode Wireless Microcontroller, Version 6.0.6

Release Notes

1 Overview

These release notes pertain to the ZigBee 3.0 software that was developed for the MKW41Z Kinetis-based dual mode microcontrollers platforms, and the associated development board, FRDM-KW41Z. These notes pertain to the Kinetis ZigBee 3.0 Software version 6.0.6.

Contents

2 Release Contents

The NXP Kinetis MKW41Z ZigBee 3.0 Software version 6.0.6 release main wireless connectivity components are listed in the table below.

Table 1. Release Contents

(File | Folder) Name	Description
boards/[**board**]/wireless_examples/zigbee_3.0	
middleware/wireless/zigbee_3.0_6.0.6	ZigBee 3.0 Stack
middleware/wireless/bluetooth_1.2.5/host	Bluetooth® LE v4.2 host stack
middleware/wireless/bluetooth_1.2.5/controller	Bluetooth® LE v4.2 controller
middleware/wireless/bluetooth_1.2.5/profiles	Bluetooth® LE GATT profiles
middleware/wireless/ieee_802_15_4_5.3.5/mac	Kinetis IEEE 802.15.4 upper MAC
middleware/wireless/ieee_802_15_4_5.3.5/phy	Kinetis IEEE 802.15.4 lower MAC
doc/wireless	Wireless connectivity documentation
middleware/wireless/framework_5.3.5/Common	Connectivity Framework common files
middleware/wireless/framework_5.3.5/DSP	Signal processing and bit manipulation helper functions
middleware/wireless/framework_5.3.5/FSCI	Freescale Serial Connectivity Interface
middleware/wireless/framework_5.3.5/LowPower	Low Power Module
middleware/wireless/framework_5.3.5/MemManager	Memory Manager
middleware/wireless/framework_5.3.5/Messaging	Messaging API
middleware/wireless/framework_5.3.5/NVM	Non Volatile Memory support
middleware/wireless/framework_5.3.5/Panic	Panic module
middleware/wireless/framework_5.3.5/RNG	Random Number Generator wrapper
middleware/wireless/framework_5.3.5/SerialManager	Serial Manager for various interface
middleware/wireless/framework_5.3.5/Shell	Shell/Console module
middleware/wireless/framework_5.3.5/TimersManager	Timers Manager module
middleware/wireless/framework_5.3.5/SecLib	Security Library
tools/wireless/binaries	Example applications binaries
tools/wireless/host_sdk	Host SDK

2.1 List of Pre-compiled Binaries

The *tools/wireless/binaries* folder contains the following pre-compiled binaries, which are referenced and used in the application notes included in this package:

- *bdb_coordinator_frdmkw41z.bin*
- *bdb_end_device_frdmkw41z.bin*
- *bdb_router_frdmkw41z.bin*
- *ble_control_bridge_frdmkw41z.bin*
- *ble_coordinator_frdmkw41z.bin*
- *ble_end_device_frdmkw41z.bin*
- *ble_router_frdmkw41z.bin*
- *bootloader_fsci_frdmkw41z.bin*
- *bootloader_otap_frdmkw41z.bin*
- *color_scene_controller_frdmkw41z.bin*
- *color_temperature_light_frdmkw41z.bin*
- *control_bridge_frdmkw41z.bin*
- *dimmable_light_frdmkw41z.bin*
- *dimmer_switch_frdmkw41z.bin*
- *eh_switch_frdmkw41z.bin*
- *extended_color_light_frdmkw41z.bin*
- *light_sensor_frdmkw41z.bin*
- *occupancy_sensor_frdmkw41z.bin*
- *lto_sensor_frdmkw41z.bin*
- *zb_fsci_black_box_frdmkw41z.bin*

Please refer to http://www.nxp.com/connectivity for more information on NXP wireless connectivity platforms.

3 What's New and Change Log

This section describes the major changes and new features implemented in the ZigBee 3.0 software releases:

3.1 MKW41Z ZigBee 3.0 Software v6.0.6 Changes

This version corresponds to the sixth release of the MKW41Z ZigBee 3.0 Software. Some of the key features included in this release are listed below:

- ZigBee 3.0 core stack R21 has undergone the official certification testing process
- Support for ZigBee Large Network up to 75 nodes.
- Over-The-Air Updates support for the Sensors and BDB Application Notes.
- Documentation Updates

3.2 MKW41Z ZigBee 3.0 Software v6.0.5 Changes

This version corresponds to the fifth release of the MKW41Z ZigBee 3.0 Software. Some of the key features included in this release are listed below:

- Green Power support
- Sensors applications and application notes
- OTA Cluster support in Dimmable Light, Extended Color Light and Color Temperature Light applications

3.3 MKW41Z ZigBee 3.0 Software v6.0.4 Changes

- This version corresponds to the forth release of the MKW41Z ZigBee 3.0 Software. Some of the key features included in this release are listed below:
  - BLE dual mode BDB applications
  - OTA Cluster support in Dimmable Light applications
  - Sensors applications and application notes
  - Controller/Switches applications and application notes

3.4 MKW41Z ZigBee 3.0 Software v6.0.3 Changes

- This version corresponds to the third release of the MKW41Z ZigBee 3.0 Software. Some of the key features included in this release are listed below:
  - Shell/console support for BDB applications
  - NTAG install codes sharing for BDB applications

3.5 MKW41Z ZigBee 3.0 Software v6.0.2 Changes

- This version corresponds to the second release of the MKW41Z ZigBee 3.0 Software. Some of the key features included in this release are listed below:
    - FSCI black-box support with control bridge commands
    - ZigBee PRO child aging feature
    - Host SDK support for the FSCI host
    - Test Tool for Connectivity Products integration of the ZigBee Gateway UI and Color Scene Controler Remote Control UI
    - MCUXpresso IDE support
    - Example applications re-architecture for better integration with other stacks in dual mode setups (BLE or Thread)

3.6 MKW41Z ZigBee 3.0 Software v6.0.1 Changes

- This version corresponds to the first release of the MKW41Z ZigBee 3.0 Software. Some of the key features included in this release are listed below:
    - ZigBee 3.0 compliant solution ported from NXP JN517x devices
    - ZigBee PRO R21 compliant core stack (certification pending on the KW41Z platform)
    - Base Device Behavior implementation and associated application templates
    - ZigBee Cluster Library (ZCL)
    - ZigBee Lighting & Occupancy Devices and associated applications
    - Control Bridge application with an optional BLE dual mode configuration
    - ZigBee Gateway UI tool to use with the Control Bridge application
    - FreeRTOS v9.0.0 support
    - Kinetis SDK v2.2 integration

4 Software Deployment Considerations

- The ZigBee 3.0 energy applications in this package have been built in a Kinetis SDK version 2 environment, making use of the FreeRTOS kernel and microcontroller peripheral drivers included in this SDK. This package includes a full build of the Kinetis SDK v2 for Kinetis MKW41Z/31Z/21Z.
- IAR Embedded Workbench for ARM® **v7.80.4** was used to build and test the ZigBee example IDE projects included in this release.
- MCUXpresso IDE **v10.1.1** was used to build the ZigBee associated example applications IDE projects.
- The Color Scene Controller Remote Control User Interface desktop applications can be found in the *tools/wireless* folder. For more information about its usage, please consult the AN12063-MKW41Z-AN-ZigBee-3-0-ControlBridge application note.
- This release is compatible with the Test Tool for Connectivity Products **v12.7.6** or later. It is recommended to use the *ZigBee3_0.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.
- Please refer to each Application Note for information related to code sizes. The Application Notes are available in the *\docs\wireless\ZigBee\Application Notes* folder.

5 Embedded System Considerations

- This release supports the FRDM-KW41Z evaluation board
- The FRDM-KW41Z board features a composite USB device called OpenSDA which serves as debugger interface and as USB to serial converter via a virtual COM port application. Several firmware images can be programmed on the FRDM-KW41Z OpenSDA device, among which:

  https://github.com/mbedmicro/CMSIS-DAP

  https://www.segger.com/opensda.html

  http://www.pemicro.com/opensda/

6 Known Limitations

- This software has been certified as a Zigbee Compliant Platform, however, Zigbee 3.0 Certification has not been completed and the user may experience issues during Zigbee 3.0 testing.
- BDB Touchlink functionality is not implemented.
- Large or long-running networks may display unexpected behavior and stability issues and is not intended for final products.
- If the OTA process is interrupted either by a power cycle or a soft reset on the low power end devices (Sensors or Zigbee End Devices), the OTA process must be re-initiated. The low power end devices will not resume the OTA process automatically.
- The FSCI black-box using control bridge commands currently supports configuring only coordinator and router configurations.
- This release supports only the IAR Embedded Workbench IDE, the MCUXpresso IDE and toolchains and the FreeRTOS kernel. Other RTOSes and toolchains supported in the KSDK have not been tested with this release.
- Maximum file path length in Windows® 7 Operating System: Windows OS 7 imposes a 260-character maximum length for file paths. The same limitation influences the command line for build tools in various toolchains, which cannot exceed 8191 characters. When deploying this package, it is recommended to place it in a directory close to the root of the disk drive to prevent the limitations described above. The recommended location is the C:\NXP folder."

7 Documentation Included in this Package

The following connectivity-supporting documentation is included in this package, in the *docs/wireless* folder:

- ZigBee 3.0 user guides
  - *ZigBee 3.0 Devices User Guide.pdf*
  - *ZigBee Cluster Library User Guide.pdf*
  - *ZigBee Green Power User Guide.pdf*
  - *ZigBee Stack User Guide.pdf*

- ZigBee 3.0 application notes
  - *AN12061-MKW41Z-AN-Zigbee-3-0-Base-Device.pfd*
  - *AN12062-MKW41Z-AN-Zigbee-3-0-Base-Device-BLE-Dual-Mode.pdf*
  - *AN12063-MKW41Z-AN-ZigBee-3-0-ControlBridge.pdf*
  - *AN12064-MKW41Z-AN-ZigBee-3-0-Controller-and-Switch.pdf*
  - *AN12065-MKW41Z-AN-ZigBee-3-0-Light-Bulbs.pdf*
  - *AN12066-MKW41Z-AN-ZigBee-3-0-Sensors.pdf*

- IEEE 802.15.4 MAC documentation
  - *IEEE 802.15.4 MACPHY Application Developer's Guide.pdf*
  - *IEEE 802.15.4 MACPHY API Reference Manual*

- Bluetooth low energy v4.2 host stack documentation
  - *BLE Host Stack API Reference Manual*
  - *BLE Application Developer's Guide*

- Kinetis Connectivity Framework supporting documentation
  - *Connectivity Framework Reference Manual.pdf*

- Host SDK supporting documentation
  - *Kinetis FSCI Host Application Programming Interface.pdf*

This release also contains extensive Kinetis SDK v2 documentation in the *docs* folder.

8 Recommended Memory Configurations

The following are some of the default memory configurations for the different ZigBee projects available in this release. For a complete list of code sizes corresponding to each demo project available in this release, please consult the information provided in each Application Note. The Application Notes are placed in the *\docs\wireless\ZigBee\Application Notes* folder.

- BLE ZigBee Control Bridge default configuration:

	Memory Footprint (KB)	
	Flash	RAM
Default Apps	25	6
SDK, Tools, Framework	52	46
MAC/PHY	22	1
Bluetooth	87	6
ZigBee	187	14
Total	373	73

- BLE ZigBee Coordinator default configuration:

	Memory Footprint (KB)	
	Flash	RAM
Default Apps	15	5
SDK, Tools, Framework	56	29
MAC/PHY	22	1
Bluetooth	107	7
ZigBee	163	12
Total	363	54

- BLE ZigBee Router default configuration:

	Memory Footprint (KB)	
	Flash	RAM
Default Apps	15	5
SDK, Tools, Framework	56	29
MAC/PHY	22	1
Bluetooth	107	7
ZigBee	156	10
Total	356	52

- BLE End Device default configuration:

	Memory Footprint (KB)	
	Flash	RAM
Default Apps	15	5
SDK, Tools, Framework	56	30
MAC/PHY	21	1
Bluetooth	107	7
ZigBee	126	8
Total	325	51

- ZigBee Control Bridge default configuration:

	Memory Footprint (KB)	
	Flash	RAM
Default Apps	26	5
SDK, Tools, Framework	47	24
MAC/PHY	21	1
ZigBee	192	14
Total	286	44

- ZigBee Coordinator default configuration:

	Memory Footprint (KB)	
	Flash	RAM
Default Apps	12	2
SDK, Tools, Framework	49	24
MAC/PHY	21	1
ZigBee	163	12
Total	245	39

- ZigBee Router default configuration:

	Memory Footprint (KB)	
	Flash	RAM
Default Apps	10	2
SDK, Tools, Framework	48	24
MAC/PHY	21	1
ZigBee	156	10
Total	235	37

- ZigBee End Device default configuration:

	Memory Footprint (KB)	
	Flash	RAM
Default Apps	9	2
SDK, Tools, Framework	45	24
MAC/PHY	21	1
ZigBee	126	8
Total	201	35

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