

Generic FSK Link Layer Software for the Kinetis MKW41Z Dual Mode Wireless Microcontroller, Version 1.0.6

Release Notes

1 Overview

These release notes pertain to the Generic FSK Link Layer software that was developed for the Kinetis MKW41Z wireless microcontrollers, and the associated development boards FRDM-KW41Z, USB-KW41Z. These notes pertain to the Generic FSK Link Layer Software version 1.0.6.

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2 Release Contents

The Freescale Kinetis MKW41Z Generic FSK Link Layer Software version 1.0.6 main wireless connectivity components are listed in the table below.

Table 1. Release Contents

(File Folder) Name	Description
boards/[board]/wireless_examples/genfsk/connectivity_test	GENFSK Connectivity Test example application
middleware/wireless/genfsk_1.0.6	Generic FSK Link Layer code
doc/wireless	Wireless connectivity documentation
middleware/wireless/framework_5.3.6/Common	Connectivity Framework common files
middleware/wireless/framework_5.3.6/FSCI	Freescale Serial Connectivity Interface
middleware/wireless/framework_5.3.6/LowPower	Low Power Module
middleware/wireless/framework_5.3.6/MemManager	Memory Manager
middleware/wireless/framework_5.3.6/Messaging	Messaging API
middleware/wireless/framework_5.3.6/NVM	Non Volatile Memory support
middleware/wireless/framework_5.3.6/OtaSupport	Over-The-Air Programming support files
middleware/wireless/framework_5.3.6/Panic	Panic module
middleware/wireless/framework_5.3.6/RNG	Random Number Generator wrapper
middleware/wireless/framework_5.3.6/SerialManager	Serial Manager for various interface
middleware/wireless/framework_5.3.6/Shell	Shell/Console module
middleware/wireless/framework_5.3.6/TimersManager	Timers Manager module
middleware/wireless/framework_5.3.6/SecLib	Security Library
tools/wireless/binaries	Demo applications binaries

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 Generic FSK Link Layer software releases:

3.1 MKW41Z Generic FSK Link Layer Software v1.0.6 Changes

- This version corresponds to a maintenance release of build of the MKW41Z GENFSK LL Software. Some of its major new features, compared to the previous GENFSK release on Kinetis MKW41Z wireless microcontrollers, include:
 - Updated transceiver driver for better RF performance

3.2 MKW41Z Generic FSK Link Layer Software v1.0.5 Changes

- This version corresponds to a maintenance release of build of the MKW41Z GENFSK LL Software. Some of its major new features, compared to the previous GENFSK release on Kinetis MKW41Z wireless microcontrollers, include:
 - Added new functionalities in the Wireless Framework modules

3.3 MKW41Z Generic FSK Link Layer Software v1.0.4 Changes

- This version corresponds to a maintenance release of build of the MKW41Z GENFSK LL Software. Some of its major new features, compared to the previous GENFSK release on Kinetis MKW41Z wireless microcontrollers, include:
 - Updated transceiver driver for better RF performance
 - General bug fixing

3.4 MKW41Z Generic FSK Link Layer Software v1.0.3 Changes

- This version corresponds to a maintenance release of build of the MKW41Z GENFSK LL Software. Some of its major new features, compared to the previous GENFSK release on Kinetis MKW41Z wireless microcontrollers, include:
 - Low power support in the Generic FSK enablement
 - MCUXpresso IDE support
 - FreeRTOS v9.0.0 support
 - Updated transceiver driver for better RF performance
 - Updated DCDC converter driver with new voltage ranges
 - General bug fixing

- Discontinued uC/OS-II RTOS support
- Discontinued Kinetis Design Studio support

3.5 MKW41Z Generic FSK Link Layer Software v1.0.2 Changes

- This version corresponds to the general availability (GA) build of the MKW41Z GENFSK LL Software. Some of its major new features compared to the Beta build are listed below:
 - Instantiable Generic FSK modes to allow the application to switch between them
 - Forward Error Correction (FEC) support for the bit stream
 - Better alignment of connectivity folder structure with the Kinetis SDK.
 - Optional packaging in .tar.gz format for Linux host machines
 - uC/OS-II support

3.6 MKW41Z Generic FSK Link Layer Software v1.0.1 Changes

- This version corresponds to the Beta build of the MKW41Z GENFSK LL Software. Some of its major new features compared to the Alpha build are listed below:
 - Support for the Kinetis Design Studio IDE and the GNU Toolchain

3.7 MKW41Z Generic FSK Link Layer Software v1.0.0 Changes

- This version corresponds to the Alpha build of the MKW41Z GENFSK LL Software. This is the first release for this enablement software. Some of its major new features are listed below:
 - Bluetooth® LE v4.1 packet format
 - Single modulation configuration: 1 Mbps, BT=0.5, mod index = 0.5 FSK modulation
 - Flexible 1 MHz-wide channeling: $f_c = (2360 + \text{channel number}) \text{ MHz}$, where the channel number is between 0 and 127
 - Configurable 8-, 16-, 24- and 32-bit CRC polynomial, processing in hardware or software
 - Configurable scrambling (data whitening) polynomial
 - Address matching support
 - Connectivity Test application with the following functionality:
 - Packet error rate Test (Rx/Tx)
 - Continuous modulated (zeros, ones, PRBS9) Tx signals
 - Continuous un-modulated carrier wave signal
 - Random payload packet Tx burst
 - Continuous Rx

4 Software Deployment Considerations

- The Generic FSK Link Layer applications in this package have been built in a Kinetis SDK version 2.0 environment, making use of the FreeRTOS and microcontroller peripheral drivers included in this SDK. This package includes a full build of the Kinetis SDK v2.0 for Kinetis MKW41Z/31Z/21Z.
- IAR Embedded Workbench for ARM® **v8.22.2** was used to build and test the Generic FSK Link Layer example IDE projects included in this release.
- MCUXpresso IDE **v10.2.1** was used to build the Bluetooth low energy associated example applications IDE projects.
- The pre-compiled binaries for FRDM-KW41Z are optimized for the DCDC buck mode configuration of the board.

5 Embedded System Considerations

- The FRDM-KW41Z and USB-KW41Z boards feature 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/>
- If your FRDM-KW41Z board is configured for the buck or boost modes of the DCDC converter inside the KW41Z microcontroller, the firmware too needs to be configured for these modes of the DCDC, by setting the following defines: `gDCDC_Enabled_d` to 1 and `APP_DCDC_MODE` to `gDCDC_Mode_Buck_c` or `gDCDC_Mode_Boost_c` respectively, in the `app_preinclude.h` header file.

6 Known Limitations

- This release supports only the IAR Embedded Workbench and MCUXpresso IDEs and toolchains, the FreeRTOS kernel and a bare-metal non-preemptive task scheduler. 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."
- 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.

7 Documentation Included in this Package

The following connectivity-supporting documentation is included in this package:

- *Generic FSK Link Layer Quick Start Guide.pdf*

For detailed reference documentation on this software package, please visit

<https://nxp.com/infocenter>

For detailed reference of the public API exposed by the software libraries provided in this software package, please visit: <http://mcuxpresso.nxp.com/apidoc>

8 GENFSK LL Applications Memory Footprints

The following table lists the memory footprint of a typical GENFSK-based application:

Application – Connectivity Test		
Configuration - FreeRTOS, IAR Embedded Workbench, FRDM-KW41Z		
	RAM [bytes]	Flash [bytes]
Application code	1028	7,921
Kinetis base SDK	176	4,913
Connectivity Framework	4,646	21,714
RTOS	6,672	5,523
GENFSK	213	6,774
Total	12,820	48,701

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