Freescale Semiconductor
Release Notes

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Freescale SMAC Software for the KW01 Wireless Microcontroller, Version 3.1.3

Release Notes

1 Overview

These release notes pertain to the software that was developed for the Kinetis KW01wireless microcontroller. These notes pertain to the KW01 SMAC Software version 3.1.3.

Contents

2 Release Contents

The Freescale KW01 SMAC software version 3.1.3 release contents are listed in the table below.

Table 1. Release Contents

(File | Folder) Name	Description
app\ieee_802_15_4\Wireless_UART	Wireless UART
app\ieee_802_15_4\Connectivity_Test	Connectivity Test application
app\ieee_802_15_4\Wireless_Messenger	Wireless Messenger application
app\ieee_802_15_4\Low_Power_Demo	KW01 SMAC Low Power Demo
ieee_802_15_4\Source\SMAC	KW01 SMAC
ieee_802_15_4\Source\Phy	KW01 IEEE 802.15.4g sub-Gigahertz MR-FSK SUN PHY with five distinct operating band plans: • 863-870 MHz – Europe, 50 kbps and 100 kbps • 865-867 MHz – India, 1.2 kbps, 20 kbps and 100 kbps • 902-928 MHz – US, 50 kbps and 150 kbps • 920-928 MHz – Japan, 50 kbps and 100 kbps plus 3 custom modes defined by ARIB std108, page 92 • 470-510 MHz – China, 50 kbps1
doc	Connectivity documentation
framework\Common	Connectivity Framework common files
framework\LPM	Low Power Module
framework\MemManager	Memory Manager
framework\Messaging	Messaging API
framework\NVM	Non Volatile Memory support
framework\Panic	Panic module
framework\RNG	Random Number Generator wrapper
framework\SerialManager	Serial Manager for various interface
framework\Shell	Shell/Console module
framework\TimersManager	Timers Manager module
framework\Utils\SecLib	Security Library
drv\Portable	Abstractions for peripheral drivers

2.1 List of Pre-compiled Binaries

The *tools\binaries* folder contains the following pre-compiled binaries:

frdmkw01_connectivity_test_eu.bin – Connectivity Test for FRDM-KW019032, EU band
frdmkw01_connectivity_test_jp.bin – Connectivity Test for FRDM-KW019032, JP band
frdmkw01_connectivity_test_us.bin – Connectivity Test for FRDM-KW019032, US band
frdmkw01_wireless_uart_eu.bin – Wireless UART for FRDM-KW019032, EU band
frdmkw01_wireless_uart_jp.bin – Wireless UART for FRDM-KW019032, JP band
frdmkw01_wireless_uart_us.bin – Wireless UART for FRDM-KW019032, US band

Detailed information about the release contents can be found in the *connsw_manifest.xml* file included in this package.

Please refer to www.freescale.com/connectivity for more information on Freescale 802.15.4 platforms.

3 Features Added Since Last Release

The features added since the last internal SMAC release for KW01 are listed below:

- FRDM-KW019032 and USB-KW019032 board support
- Kinetis SDK v1.3 integration
- Compatibility with the legacy BeeKit™ SMAC API

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4 Software Deployment Considerations

- IAR Embedded Workbench for ARM® v7.40.2 was used to build and test the IDE projects included in this release.
- This release contains Freescale Kinetis SDK v1.3 sources. The SDK is required for the MQX and FreeRTOS kernels and the peripheral drivers configured for the supported boards.
- The SMAC applications have some source and include paths relative to the Kinetis SDK v1.3 folder, through the *KSDK130_FWK513_PATH* environment variable. This variable is automatically set by the installer of this package.
- The *ConnSw\tools\binaries* folder contains pre-compiled binaries, ready to flash for example applications. It also contains a set of USB-KW019032 binaries for protocol sniffing functionality for the various supported bands.
- The package contains a project cloner Windows® executable in the *ConnSw\tools\project_cloner* folder, which allows copying to a chosen location the example applications files that are likely to be modified by the user, such as IDE projects and configuration headers. It is recommended to use this cloner instead of opening directly the IDE projects from the installation folder, so as to preserve the original installation files for future use

5 Embedded System Considerations

- This package supports the following board setups: FRDM-KW019032, USB-KW01Z9032 and MRB-KW01
- The demo applications included in this package configure the MRB-KW01 to be connected as a daughter card for the TWR-RF motherboard.
- The FRDM-KW019032 and USB-KW9032 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 OpenSDA device, among which:

  http://developer.mbed.org/handbook/CMSIS-DAP

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

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

6 Known Limitations

- This release supports only the IAR Embedded Workbench toolchain and the MQX and FreeRTOS kernels and a bare metal scheduler. Other RTOSes and toolchains supported in the KSDK have not been tested with this release.
- The IEEE 802.15.4g PHY Service Data Unit (PSDU) is limited to 254 bytes
- For the Japanese 920-928 MHz PHY band, it is recommended to use the MRB-KW01 board with a 30 MHz crystal resonating element, due to the frequency synthesis with a 32 MHz crystal generates some spurious emissions towards the upper end of the band.
- The Indian band (865-867 MHz) with 3 distinct PHY modes (1.2 kbps, 20 kbps and 100 kbps) has undergone limited testing and is provided without any warranty, as an example of how to configure custom PHY modes.

7 Documentation Included in this Package

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

CONNFWKRM.pdf	– Connectivity Framework API Reference Manual
MKW01SMACDAUG.pdf	– KW01 SMAC Demo Applications User's Guide
MKW01SMACRM.pdf	– KW01 SMAC Reference Manual
SMAC_Quick_Start_Guide.pdf	– Quick Start Guide for this package

The package also includes extensive Kinetis SDK v1.3 documentation in the "*KSDK_1.3.0/doc*" folder.

8 Memory Footprints of SMAC Applications

8.1 Application Sizes on FRDM-KW019032

Target Board/Platform: FRDM-KW019032 (IAR Embedded Workbench compiler)				
Component/ Application	Code Size (bytes)	Data Size (bytes)		Comments
	READ ONLY	READ ONLY	READ/WRITE	
Connectivity Test	42417	7600	11684	MQX RTOS
Wireless UART	30969	565	11320	MQX RTOS
Wireless Messenger	36637	2756	11624	MQX RTOS
Low Power Demo	37253	3318	11360	MQX RTOS
Connectivity Test	41828	7466	12672	FreeRTOS
Wireless UART	30388	431	12304	FreeRTOS
Wireless Messenger	36048	2623	12608	FreeRTOS
Low Power Demo	36680	3184	12348	FreeRTOS
Connectivity Test	36796	7456	6064	Bare-metal
Wireless UART	25416	423	5696	Bare-metal
Wireless Messenger	31016	2613	6000	Bare-metal
Low Power Demo	31552	3174	5740	Bare-metal

8.2 Application Sizes on MRB-KW01

Target Board/Platform: MRB-KW01 (IAR Embedded Workbench compiler)				
Component/ Application	Code Size (bytes)	Data Size (bytes)		Comments
	READ ONLY	READ ONLY	READ/WRITE	
Connectivity Test	42401	7599	11680	MQX RTOS
Wireless UART	30953	564	11316	MQX RTOS
Wireless Messenger	36621	2755	11620	MQX RTOS
Low Power Demo	37253	3317	11360	MQX RTOS
Connectivity Test	41824	7468	12668	FreeRTOS
Wireless UART	30380	433	12300	FreeRTOS
Wireless Messenger	36040	2622	12604	FreeRTOS
Low Power Demo	36668	3186	12348	FreeRTOS
Connectivity Test	36792	7455	6060	Bare-metal
Wireless UART	25408	422	5692	Bare-metal
Wireless Messenger	31008	2612	5996	Bare-metal
Low Power Demo	31540	3173	5740	Bare-metal

8.3 Application Sizes on USB-KW019032

Target Board/Platform: USB-KW019032 (IAR Embedded Workbench compiler)				
Component/ Application	Code Size (bytes)	Data Size (bytes)		Comments
	READ ONLY	READ ONLY	READ/WRITE	
Connectivity Test	42165	7575	11680	MQX RTOS
Wireless UART	30589	504	11316	MQX RTOS
Wireless Messenger	36397	2719	11620	MQX RTOS
Connectivity Test	41600	7444	12668	FreeRTOS
Wireless UART	30004	373	12300	FreeRTOS
Wireless Messenger	35816	2586	12604	FreeRTOS
Connectivity Test	36568	7431	6060	Bare-metal
Wireless UART	25032	362	5692	Bare-metal
Wireless Messenger	30780	2576	5996	Bare-metal

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