

# **Freescale MQX™ RTOS for Kinetis SDK Release Notes for the Freescale KL43Z Platforms**

## **1 Overview**

These are the Release Notes for Freescale MQX™ RTOS for Kinetis SDK 1.0.0 for KL43Z Freescale platforms using MKL43Z256VLH4 microcontroller supporting the FRDM-KL43Z Freescale Freedom development board platform and the TWR-KL43Z Freescale Tower System development board platform. The MKL43Z256VLH4 microcontroller belongs to the Kinetis L series processor family of 32-bit microcontrollers. The software is built based on Freescale SDK version 1.0.0. It includes the full set of RTOS services and a standard set of peripheral drivers.

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## 1.1 Development tools

The KL43Z release was tested with following software development tools:

- IAR Embedded Workbench for ARM® Version 7.20
  - Support available for Kinetis ARM Cortex®-M0+ devices
  - See build projects in the IAR subdirectories
- ARM-MDK - Keil µVision Version 5.11
  - Support available for Kinetis ARM Cortex-M0+ devices
  - See build projects in uv4 subdirectories
- Kinetis Design Studio IDE 2.0
  - Support available for Kinetis ARM Cortex-M0+ devices
  - See build projects in KDS IDE subdirectories

## 1.2 System requirements

The system requirements are defined by the development tool requirements. There are no special host system requirements for the Kinetis SDK distribution itself.

The minimum PC configuration is determined by the development tools.

The recommended PC configuration is a 2 GHz processor, 2 GB RAM, and 2 GB free disk space.

## 1.3 Target requirements

The Freescale MQX™ RTOS package for Kinetis SDK 1.0.0 was tested with these hardware configurations:

- FRDM-KL43Z Freescale Freedom development board platform with Rev. B board with a MKL43Z256VLH4 microcontroller
- TWR-KL43Z48M Freescale Tower System development board platform with Rev. B board with a MKL43Z256VLH4 microcontroller

## 2 Features

### 2.1 Key features

This package provides support for the Freescale KL43Z platforms with a MKL43Z256VLH4 microcontroller and a standard set of features and example applications.

This section describes the major changes and new features implemented in this release.

- BSP Timer: SysTick
- Default console: LPUART0 (CDC virtual COM) for Freescale Freedom FRDM-KL43Z platform
- Default console: UART2 (CDC virtual COM) for Freescale Tower TWR-KL43Z48M platform

The alpha package supports these features:

- PSP support for the MKL43Z256VLH4 microcontroller
- BSP for the Freescale Freedom FRDM-KL43Z platform with a MKL43Z256VLH4 microcontroller.
- BSP for the Freescale Tower TWR-KL43Z48M platform with a MKL43Z256VLH4 microcontroller.
- MQX RTOS STDLIB
- nShell
- KSDK support for the MKL43Z256VLH4 microcontroller
- MFS file system

### 2.2 Limitations

This release does not support these features:

- CodeWarrior v10
- GNU Tools for ARM Embedded Processors

### 2.3 Example applications

This package contains applications demonstrating MQX RTOS kernel and peripheral drivers on the FRDM-KL43Z Freescale Freedom development board platform and the TWR-KL43Z48M Freescale Tower System development board platform. The applications can be found at this location:

- `<install_dir>/rtos/mqx/mqx/examples` – The standard set of examples for MQX kernel features.

## 2.4 Release contents

This section provides an overview of the release contents.

**Table 1: Release Contents**

| Deliverable                                                                | Location                                                                                              |
|----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| Specific content for the evaluation boards                                 | <install_dir>/rtos/mqx/...                                                                            |
| MQX RTOS PSP source code for Kinetis                                       | .../mqx/source/psp/cortex_m                                                                           |
| MQX RTOS PSP build projects                                                | .../mqx/build/<compiler>/psp_frdmkl43z48m /...<br>.../mqx/build/<compiler>/psp_twrkl43z48m /...       |
| MQX RTOS example applications                                              | .../mqx/examples/...                                                                                  |
| MQX RTOS BSP Source Code                                                   | <install_dir>/rtos/mqx/...                                                                            |
| MQX RTOS BSP source code for FRDM-KL43Z platform and TWR-KL43Z48M platform | .../mqx/source/bsp/KL43Z4<br><install_dir>/board/frdmkl43z48m<br><install_dir>/boards/twrkl43z48m     |
| MQX RTOS BSP build projects                                                | .../mqx/build/<compiler>/bsp_frdmkl43z48m /...<br>.../mqx/build/<compiler>/bsp_twrkl43z48m /...       |
| MQX RTOS STDLIB Source Code                                                | <install_dir>/rtos/mqx/mqx_stdlib/...                                                                 |
| MQX RTOS STDLIB build projects                                             | .../mqx_stdlib/build/<compiler>/mqx_stdlib_frdmkl43z48m<br>.../mqx_stdlib/build/<compiler>/mqx_stdlib |
| MQX RTOS STDLIB Source Code                                                | .../mqx_stdlib/source                                                                                 |
| KSDK MQX Source Code                                                       | <install_dir>/lib/ksdk_mqx_lib                                                                        |
| KSDK build projects                                                        | .../ksdk_mqx_lib/<compiler>/KL43Z4/                                                                   |
| KSDK source                                                                | <install_dir>/platform                                                                                |
| Shell Library Source Code                                                  | <install_dir>/rtos/mqx/nshell/...                                                                     |
| Shell source code                                                          | .../nshell/source                                                                                     |
| Shell build projects                                                       | .../nshell/build/<compiler>/nshell_frdmkl43z48m<br>.../nshell/build/<compiler>/nshell_twrkl43z48m     |
| PC Host Tools                                                              | <install_dir>/tools                                                                                   |
| Documentation                                                              | <install_dir>/rtos/mqx/doc                                                                            |

## 3 Installation Instructions

### 3.1 Installation guide

Run the installer for the Freescale MQX™ RTOS package for Kinetis SDK 1.0.0 for the KL43Z release package for both the FRDM-KL43Z Freescale Freedom development board platform and the TWR-KL43Z48M Freescale Tower System development board platform and install into the folder

`<SDK_install_dir>/rtos/mqx/.`

#### 3.1.1 Build procedure

For build procedures, see *Getting Started with Freescale MQX™ RTOS*.

#### 3.1.2 Jumper settings

For the FRDM-KL43Z Freescale Freedom development board platform standalone operation, the jumper settings are:

- J12 on
- J7 on

For the TWR-KL43Z48M Freescale Tower System development board platform standalone operation, the jumper settings are:

- J25, J38, J36, J11, J19, J24, J33, J30, J27, J26, J29, J32, J34, J37: Open
- J28, J12, J1, J31, J35, J17, J10, J16, J23, J18, J13, J7, J26, J29, J32, J2: 1-2
- J3, J5: 2-3.

#### 3.1.3 Board-specific build targets

Internal Flash (Debug and Release): These targets enable building applications suitable for booting the system from the internal Flash memory. After reset, the code is executed from the internal Flash.

## 4 Patch Description

This provides the patch description.

**Table 2: Patch Description**

| Patch Name                       | Description                                   |
|----------------------------------|-----------------------------------------------|
| Keil.Kinetis_KLxx_DFP.1.2.2.pack | Patch KL43Z256xxx4 for Keil $\mu$ Vision 5.11 |

The pack can be downloaded from Keil pages at [www.keil.com/dd2/Pack/](http://www.keil.com/dd2/Pack/).

## 5 Applying Patches

Install Patch KL43Z256xxx4 to apply a patch for Keil  $\mu$ Vision 5.11.

## 6 Known Issues

### 6.1 The LPUART driver: (experienced with FRDM-KL43Z4 Freescale Freedom development board platform using default console)

The current “printf” function does not work correctly in interrupt mode with long string input. The demo ram\_disk test fails at print output data on the console. However, it does not have mechanism to lock the device when the input parameter is a string. Therefore, some demos (hello, lwsem, sem, etc.) may have the wrong output console. To work around this issue, implement a mutex lock before “printf” processing, or change from interrupt mode to polled mode. See the “msg” demo as an example.

### 6.2 The ramdisk application example with Kinetis Design Studio IDE 1.1:

The KL43 chip has small RAM. The project was compiled on the Debug target, where the application code has low optimization. The memory is not large enough to allocate the amount of memory used in mfs functions. Because of this, reduce the RAM disk size to 0x1400 in the shell\_task.c of project mfs\_ramdisk as described.

#warning Modify the RAM\_DISK\_SIZE if you need more or less ramdisk space.

#define RAM\_DISK\_SIZE 0x1400

# 7 Revision History

This table summarizes the revisions made to this document.

| Revision History |        |                              |
|------------------|--------|------------------------------|
| Revision number  | Date   | Substantive changes          |
| 1.0.0            | 9/2015 | Initial release              |
| 1.0.1            | 1/2015 | General availability release |

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