Freescale Semiconductor

Release Notes

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Freescale Bare Metal USB Stack v5.0 Beta Release Notes

1 Read Me First

These release notes describe the Freescale USB Stack v5.0 Beta released for Freescale Kinetis ARM® CortexM0+ and Cortex M4 microcontroller families.

Contents

1.1 Requirements

1.1.1 Development tools

This Freescale USB Stack Beta Release was compiled and tested only with the following development tools:

- IAR Embedded Workbench for ARM Version 6.70.3, available for Kinetis devices
    - Patch for K64F120M
- Keil uVision4 Integrated Development Environment Version 5.0.5.15, available for Kinetis devices
    - Patch for K64F120M
- GNU Tools for ARM Embedded Processors 4.7 2013Q3
- MinGW v3.82.90 or later with the **mingw32-base** and **msys-base** packages installed

1.1.2 Desktop system requirements

The system requirements are defined by the development tools requirements. There are no special host system requirements for hosting the Freescale USB Stack distribution itself.

- Minimum PC configuration

  As required by Development and Build Tools

- Recommended PC configuration:

  GHz processor – 2 GB RAM – 2 GB free disk space.

- Software requirements:

  OS: As required by Development and Build tools (Windows 7 or later)

1.1.3 Embedded target platforms requirements

The Freescale USB Stack in this Beta release supports the evaluation boards mentioned below. There are no special requirements for the target hardware that would be out of scope of what each board requires for its operation (power supply, cabling, jumper settings, etc).

The following evaluation boards are supported:

- Kinetis ARM® Cortex M0+
    - FRDM-KL25
    - FRDM-KL26
- Kinetis ARM® Cortex M4

- o   TWR-K22F120M with the MK22F51212 chip

- o   TWR-K64F120M

- o   FRDM-K64F120M

- o   TWR-K70FN1M

2   Known Issues and Limitations

- The installation folder of the GCC Tool Chain needs to be modified to the correct path manually by the customer. Otherwise, the GCC tool chain cannot work.

- The GCC Tool Chain is only verified on the Windows 7 system, not verified on any other systems.

- All the examples on Keil only have the Flash target version, no RAM target version provided.

- External power supply of HUB must be provided before it can be used.

- The full folder path of the USB stack source code cannot contain blank spaces. Otherwise, the compilation will fail. Due to this issue, if the install path assigned by the user contains one or more spaces, the installation will fail.

- Because of poor clock accuracy of CSTCE8M00G55-R0 on TWR-K22F120M, there is noise when USB audio example is running.

- There is a post build for USB library generation, which intends to copy the header files and binary library file to the OUTPUT folder. If the USB stack is installed to a deep folder, this copy operation may fail because of the 260 characters limitation of command line on Windows, and then you get a build error. Please keep the root folder name of USB stack as short as possible to avoid this issue.

- Parsing HID report descriptor is not implemented in all the HID examples of USB Host, the key mapping of some HID devices may not be correct and the key mapping for Audio volume control of some Audio devices may not be correct.

- Due to the pin conflict between USB HS controller and JTAG debugger module on TWR-K70F120M, the HS USB controller and JLink cannot work at the same time. Therefore, the JLink can be used to flash the target binary, but cannot be used as the debugger for the HS USB controller. The PE Micro can be used as the debugger in such case (the USB Multilink option should be selected) for IAR and KEIL tool chain. For ARM GCC, currently no debugger can be supported.

- Due to the USB controller/ULPI PHY issue (K70 HS controller only), the full speed device cannot work well together with the low speed device through the full speed HUB.

- Due to the HW endpoint number limitation, the composite msd_cdc example cannot work on the HS USB controller.

- Due to the HW design limitation on TWR-K70F120M, the OTG SRP on this board cannot work.

3 Documents Included in This Release

The following documents are included in this release:

- *Freescale Bare Metal USB Stack v5.0 Beta User's Guide* (USBBMV50UG)

- *Freescale Bare Metal USB Stack v5.0 Beta Release Notes* (USBBMV50RN)

- *Freescale BM USB Stack Developing New Application User's Guide V1.0* (USBSDNAUG)

- *Freescale BM USB Stack Porting New Platform User's Guide V1.0* (USBSPNPUG)

- *USB Stack Device Reference Manual* (USBSDRM)

- *USB Stack Host Reference Manual* (USBSHRM)

- *USB Host Stack Supported Peripheral List* (USBHSSPL)

4 Changes

This section describes the major changes and new features implemented in this USB Stack Beta releases

- More stable optimized architecture

- Better expandability to support other RTOSs

- Better expandability to support different SoCs

- PEx components/examples not supported in this release

5 Other Notes

5.1 IAR patch

Because IAR EW version 6.70.3 does not support K64F120M, a patch is needed for this device.

- Decompress the patch "Patch_for_IAR_to_include_K24,_K63,_and_K64.zip" located at `<install_dir>/tools/iar_extensions` to a temporary folder.
- Copy the three overwritten folders inside the patch "config", "inc", "src" to the "arm" folder of the IAR default installation.
  For example: `C:/Program Files/IAR Systems/Embedded Workbench 6.70/arm`
- If required, create a backup copy of the current files.

CMSIS-DAP is set as the default debugger for all the IAR projects. This release has been tested with the CMSIS-DAP firmware version 2.1 (build date: Feb 25, 2014).

5.2 Keil (Uv4) patch

Because the Keil version 5.05 does not support the K64F120M device, a patch is required for this device. Install the patch by following the installer instructions.

The Patch for Keil can be found at:

```
<install_dir>/tools/keil_extensions/uVision4/
```

The file name is: MDK-MRM_AddOn_K24F_K63F_K64F.exe.

CMSIS-DAP is set as the default debugger in the Keil projects. Before debugging an application, verify that the Single Wire option is set and the correct flash algorithm is selected. This release has been tested with the CMSIS-DAP firmware version 2.1 (build date: Feb 25, 2014).

6 Feature Overview

This release supports the USB stack and example applications for USB classes for Kinetis microcontrollers. The following table provides the matrices of supported demo applications on devices and IDEs.

6.1 Device

Device	FRDM-KL25	FRDM-KL26	FRDM-K64	TWR-K64	TWR-K22F512	TWR-K70
HID	IAR, KEIL	IAR, KEIL	IAR, KEIL	IAR, KEIL, ARM_GCC	IAR, KEIL, ARM_GCC	IAR, KEIL, ARM_GCC
CDC	IAR, KEIL	IAR, KEIL	IAR, KEIL	IAR, KEIL, ARM_GCC	IAR, KEIL, ARM_GCC	IAR, KEIL, ARM_GCC
MSC	N/A	N/A	IAR, KEIL	IAR, KEIL, ARM_GCC	IAR, KEIL, ARM_GCC	IAR, KEIL, ARM_GCC
PHDC	IAR, KEIL	IAR, KEIL	IAR, KEIL	IAR, KEIL, ARM_GCC	IAR, KEIL, ARM_GCC	IAR, KEIL, ARM_GCC
AUDIO	N/A	N/A	N/A	IAR, KEIL, ARM_GCC	IAR, KEIL, ARM_GCC	IAR, KEIL, ARM_GCC
Composite	N/A	N/A	IAR, KEIL	IAR, KEIL, ARM_GCC	IAR, KEIL, ARM_GCC	IAR, KEIL, ARM_GCC

6.2 Host

Host	FRDM-KL25	FRDM-KL26	FRDM-K64	TWR-K64	TWR-K22F512	TWR-K70
HID	N/A	N/A	IAR, KEIL	IAR, KEIL, ARM_GCC	IAR, KEIL, ARM_GCC	IAR, KEIL, ARM_GCC
CDC	N/A	N/A	IAR, KEIL	IAR, KEIL,	IAR, KEIL,	IAR, KEIL,

				ARM_GCC	ARM_GCC	ARM_GCC
MSC	N/A	N/A	IAR, KEIL	IAR, KEIL, ARM_GCC	IAR, KEIL, ARM_GCC	IAR, KEIL, ARM_GCC
PHDC	N/A	N/A	IAR, KEIL	IAR, KEIL, ARM_GCC	IAR, KEIL, ARM_GCC	IAR, KEIL, ARM_GCC
AUDIO	N/A	N/A	IAR, KEIL	IAR, KEIL, ARM_GCC	IAR, KEIL, ARM_GCC	IAR, KEIL, ARM_GCC
HUB	N/A	N/A	IAR, KEIL	IAR, KEIL, ARM_GCC	IAR, KEIL, ARM_GCC	IAR, KEIL, ARM_GCC

6.3 OTG

OTG	FRDM-KL25	FRDM-KL26	FRDM-K64	TWR-K64	TWR-K22F512	TWR-K70 KHCI
HID	N/A	N/A	N/A	IAR, KEIL, ARM_GCC	IAR, KEIL, ARM_GCC	IAR, KEIL, ARM_GCC