

New USB Unified stack in MQX™ RTOS

User's Guide

1 Read Me First

This document provides the detailed difference between old USB stack in MQX™ RTOS and new USB Unified stack, so that the audience is able to understand the unified USB stack better.

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2 Overview

New USB Unified stack is designed to replace the legacy USB stack in MQX RTOS, it has an OSA layer so that it can support different operating systems, like MQX RTOS, bare metal or other RTOS (like, FreeRTOS or μ Cos in KPSDK). Some new features are included and the architecture is improved to fix some issues which are hard to fix in the old stack.

New added features:

- Device:
 - Support multiple languages
 - Support multiple configuration descriptors
 - Composite Device support
- Host:
 - Support multiple configuration descriptors
 - Composite Device support
 - Unsupported device notification
- OTG:
 - Session Request Protocol (SRP)
 - Host Negotiation Protocol (HNP)

3 Architecture

MQX RTOS USB device stack architecture:

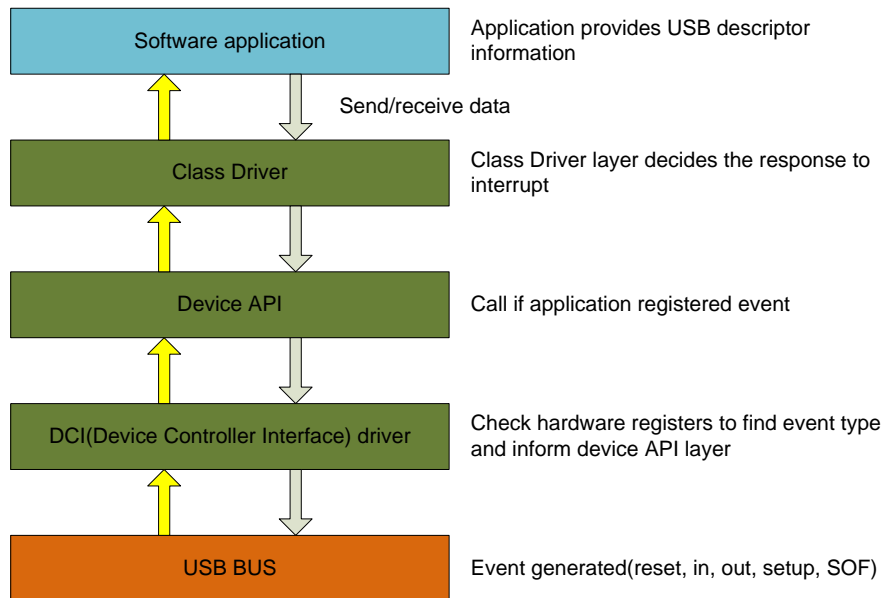


Figure 1 Stack architecture

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- OSA (OS adapter): Includes the adapter files which allow the USB stack to run on different RTOS with the same USB core code.
It abstracts common services of specific OS such as task, event, mutex, semaphore....
 - HAL (Hardware abstract layer): Provide software interface to access the hardware register

4 Folder structure

Figure below shows the default directory structure of new USB unified stack.

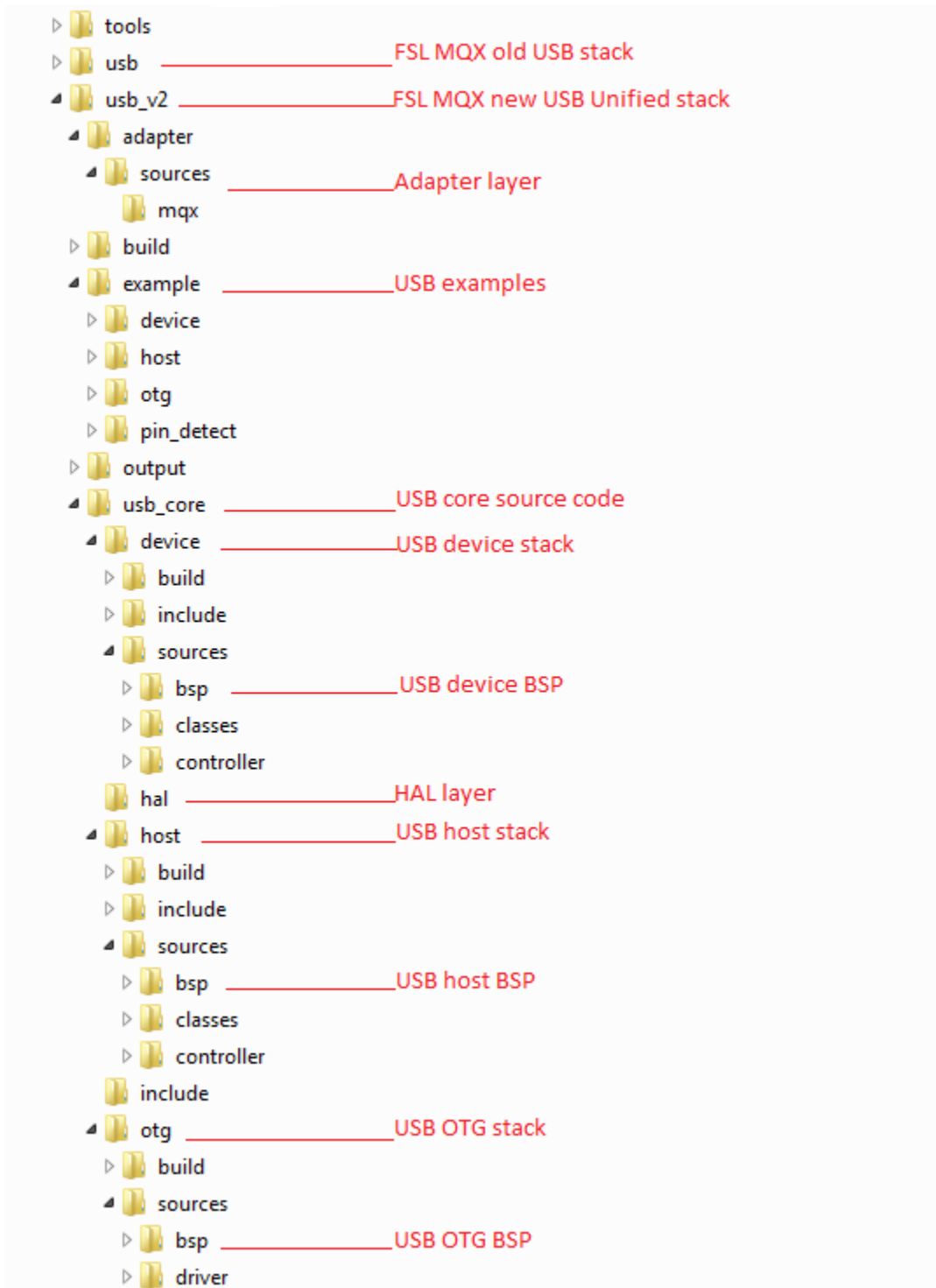


Figure 4 Folder structure

New USB stack is located in the **usb_v2** folder and it contains some subfolders as below:

- adapter

Includes the adapter files which allow the USB stack to run on different RTOS with the same USB core code.

- example

Includes all the source code and project files of the USB examples.

- output

The USB library binary file is generated into this folder and all the USB related public header files are copied to this folder. The examples need to include one folder as the including path in the example project settings.

- usb_core

Includes the USB source files, such as HAL, controller driver, and class drivers. It also includes the USB library projects.

- In original MQX RTOS USB stack, the USB BSP part is in the MQX RTOS BSP lib, but in the new USB unified stack, this part is inside of USB.
- Includes USB OTG stack which supports max3353 interface to implement OTG Host Negotiation and Session Request Protocols (HNP and SRP).

5 APIs and work flow

5.1 Device APIs

Refer to “*USB_Stack_Device_Reference_Manual.docx*” document chapter 5, 6, and 7 for more information.

5.2 Device work flow

Refer to “*USB_Stack_Device_Reference_Manual.docx*” document chapter 4.5 for more information.

5.3 Host APIs

Refer to “*USB_Stack_Host_Reference_Manual.docx*” document chapter 5 for more information.

5.4 Host work flow

Refer to “*USB_Stack_Host_Reference_Manual.docx*” document chapter 5 for more information.

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