

USB LLD

Release Notes

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USB LLD version 01.00.00.03

Overview

This document provides the release information for the latest USB Low Level Driver which should be used by drivers and application that interface with USB and USB IPs.

USB LLD module includes:

- Compiled library (Big and Little) Endian of USB LLD.
- Source code.

LLD Dependencies

LLD is dependent on following external components delivered in PDK package:

- CSL
- Starterware (needed for AM437, AM335x)
- OSAL
- Board

New/Updated Features and Quality

Release 1.0.0.3

- Add USB MSC support for AM571x and AM572x. BIOS/RTOS examples provided. No USB MSC host support for AM572x EVM (Beagle X15).

Release 1.0.0.2

- Initial release for USB driver. Release includes bare metal / RTOS USB MSC Host and Device Examples and support.
- The following IRs have been raised:
 - SDOCM00118998 : USB device MSC re-enumeration failed
 - SDOCM00119010 : USB host MSC fails to re-enumerate
 - SDOCM00119111: USB examples need to run with cache enabled

- SDOCM00120579: USB LLD fails if both USB hardware instances are configured as both USB host or both USB device

Resolved Incident Reports (IR)

Table 1 provides information on IR resolutions incorporated into this release.

Table 1 Resolved IRs for this Release

IR Parent/ Child Number	Severity Level	IR Description

Known Issues/Limitations

IR Parent/ Child Number	Severity Level	IR Description
SDOCM00118998	Major	USB device MSC re-enumeration failed
SDOCM00119010	Major	USB host MSC fails to re-enumerate
SDOCM00119111	Major	USB examples need to run with cache enabled
SDOCM00120579	Major	USB LLD fails if both USB hardware instances configured as both host or device

Licensing

Please refer to the software Manifest document for the details.

Delivery Package

There is no separate delivery package. The USB LLD is being delivered as part of PDK.

Installation Instructions

The LLD is currently bundled as part of Platform Development Kit (PDK). Refer installation instruction to the release notes provided for PDK.

Directory structure

The following table explains each individual directory:

Directory Name	Description
ti/drv/usb	<p>The top level directory contains the following:-</p> <ol style="list-style-type: none"> 1. <u>Environment configuration batch file</u> The file “setupenv.bat” is used to configure the build environment for the USB low level driver. 2. <u>XDC Build and Package files</u> These files (config.bld, package.xdc etc) are the XDC build files which are used to create the USB package. 3. <u>Exported Driver header file</u> Header files which are provided by the USB low level driver and should be used by the application developers for driver customization and usage.
ti/drv/usb/build	The directory contains internal XDC build related files which are used to create the USB low level driver package.
ti/drv/usb/device	The directory contains the device specific files for the USB low level driver.
ti/drv/usb/docs	The directory contains the USB low level driver documentation.
ti/drv/usb/example	The “example” directory in the USB low level driver has the infrastructure mode example.
ti/drv/usb/include	The “include” directory has private USB low level driver header files. These files should not be used by application developers.
ti/drv/usb/lib	The “lib” folder has pre-built Big and Little Endian libraries for the USB low level driver along with their <u>code/data size information</u> .
ti/drv/usb/package	Internal USB low level driver package files.
ti/drv/usb/src	Source code for the USB low level driver.

Customer Documentation List

Table 2 lists the documents that are accessible through the /docs folder on the product installation CD or in the delivery package.

Table 2 Product Documentation included with this Release

Document #	Document Title	File Name
1	API documentation (generated by Doxygen)	docs/usblldDocs.chm
3	Software Manifest	docs/USB_LLD_SoftwareManifest.pdf

Steps To rebuild USB Library

- Set following environment variables with appropriate tool path. Below is shown for Windows environment. Linux build support is not verified in this release.

```
set C6X_GEN_INSTALL_PATH=C:\ti\ccsv6\tools\compiler\c6000_7.4.14
set
TOOLCHAIN_PATH_A15=C:\ti\ccsv6\tools\compiler\gcc-arm-none-eabi-4_7-2013q3\
set TOOLCHAIN_PATH_A9=%TOOLCHAIN_PATH_A15%
set TOOLCHAIN_PATH_A8=%TOOLCHAIN_PATH_A15%
set TOOLCHAIN_PATH_M4=%TOOLCHAIN_PATH_A15%
set CROSS_TOOL_PRFX=arm-none-eabi-
@REM XDC Tools location: Optional only needed for gmake. For msys or cygwin
build not needed
REM set XDC_INSTALL_PATH=t:/gen/xdc/xdctools_3_22_04_46
set XDC_INSTALL_PATH=C:/ti/xdctools_3_25_04_88
set PATH=%PATH%;%XDC_INSTALL_PATH%;%XDC_INSTALL_PATH%\bin
```
- Note: XDC is only shown for gmake/make dependency. Modify to appropriate tool for gmake support in case if XDC is not used
- Command to build

```
gmake all
```

Steps to rebuild USB MSC Examples

Bellow is example to build various USB examples. Please replace the pdk_am437x_1_0_0 directory mentioned with your actual directory name (which matches with your current PDK)

Bare metal examples:

- Host and Device MSC example currently are built as two simple makefile projects. They are at
ti/drv/usb/examples/usb_host/msc/build/am437x and
ti/drv/usb/examples/usb_dev/msc/build/am437x respectively
- Build these examples (assuming the PDK is installed at c:\ti\pdk_am437x_1_0_0)

```
cd c:\ti\pdk_am437x_1_0_0\packages
pdksetupenv.bat
```

 - USB Host MSC example:

```
cd c:\ti\pdk_am437x_1_0_0\packages\ti\drv\usb\example\usb_host\msc\build\am437x
gmake
```
 - USB Device MSC example:

```
cd c:\ti\pdk_am437x_1_0_0\packages\ti\drv\usb\example\usb_dev\msc\build\am437x
```

gmake

From here we have .out files that can be loaded to the EVM by CCS

RTOS examples:

Use the following commands to create CCS USB RTOS examples

```
cd c:\ti\pdk_am437x_1_0_0\packages  
pdksetupenv.bat
```

run pdkProjectCreate.bat to create the example RTOS projects. Please refer to PDK document for command syntax.

Examples CCS projects will be created under MyExampleProjects under pdk_am437x_1_0_0\packages

Import these CCS projects to build the examples

Example demos:

USB Host MSC:

- Load the .out built from step mentioned above by CCS. The program counter should be now at main().
- The AM437 USB host MSC demo is built to use the USB port 1 as a host port (customer can configure the example code to use the OTG port #0 as host if needed).
- Connect a USB Memory stick to the USB host port of the AM437x EVM.
- Connect a serial cable between your PC and the COM port on the AM437 EVM. This serial port is used as a shell in which the example code showing the content of the file system in the said USB memory stick. Run a terminal program of your choice and connected to the serial port of the EVM. The baud-rate should be 115200 with 8 bit, No parity, 1 stop bit, no flow control.
- Run the USB host demo program from CCS.
- The UART console should print the demo message and a command prompt. The supported commands are: "ls", "cat", "cd", "help". Cat with direction operation can be used to copy files in the memory stick. Run "help" for more command options.

USB Device MSC:

- Load the .out built from step mentioned above with CCS.
- Run the program.
- The Device mode MSC demo is using AM437EVM / AM335EVM USB port #0 for device mode. Connect this USB#0 port with a PC's USB port
- The PC connected to this USB device will notify a USB drive plugged in, and it will ask user to format the drive. Just need to format it before files can be copied and read out.