AM335x USB Driver's Guide

AM335x USB Driver's Guide   Translate this page to   cs - Česky   Translate

Google™ Custom Search   Search

AM33XX USB User Guide

Linux PSP

Quick Start Guide

This section is a quick guide on how to start using usb ports on TI platform with supplied pre-built binaries. Please refer to USB Quick Start

Introduction

The USB User's Guide provides information about

- Overview of USB hardware and software
- Supported linux driver features for USB host and device mode of operation
- The Linux USB configuration through menuconfig. Please refer to USB configuration

Hardware Overview

USBSS Overview

- The USB subsystem includes
  - Two instances of USB (Mentor Graphic's USB2.0 OTG) controllers. Each MUSB controller supports USB 1.1 and USB 2.0 standard.
  - CPPI 4.1 compliant DMA controller sub-module with 30 RX and 30 TX simultaneous DMA channels
  - CPPI 4.1 DMA scheduler
  - CPPI Queue Manager module with 92 queues for queuing/dequeuing packets
- Interfaces to the CPU via 3 OCP interfaces
  - Master OCP HP interface for the DMA (for data transfers)
  - Master OCP HP interface for the Queue manager (to manage CPPI descriptors)
  - Slave OCP MMR interface (for CPU to access USBSS/MUSB registers)
- Signals the standard Charge Pump (part of EVM BOM) for VBUS 5V generation

MUSB Controller Overview

The salient features of the MUSB USB2.0 OTG controller are:

- High/full speed operation as USB peripheral.
- High/full/low speed operation as Host controller.
- Compliant with OTG spec.
- 15 Transmit and 15 Receive Endpoints other than the mandatory Control Endpoint 0.
- Double buffering support in FIFO.

- Support for high bandwidth Isochronous transfer
- 32 Kilobytes of Endpoint FIFO RAM for USB packet buffering.
- Interfaced with CPPI4.1 DMA controller with 15 Rx and 15 Tx channels (for each usb controller).
- Defer interrupt enable feature is supported for each packet descriptor of cppi-dma.
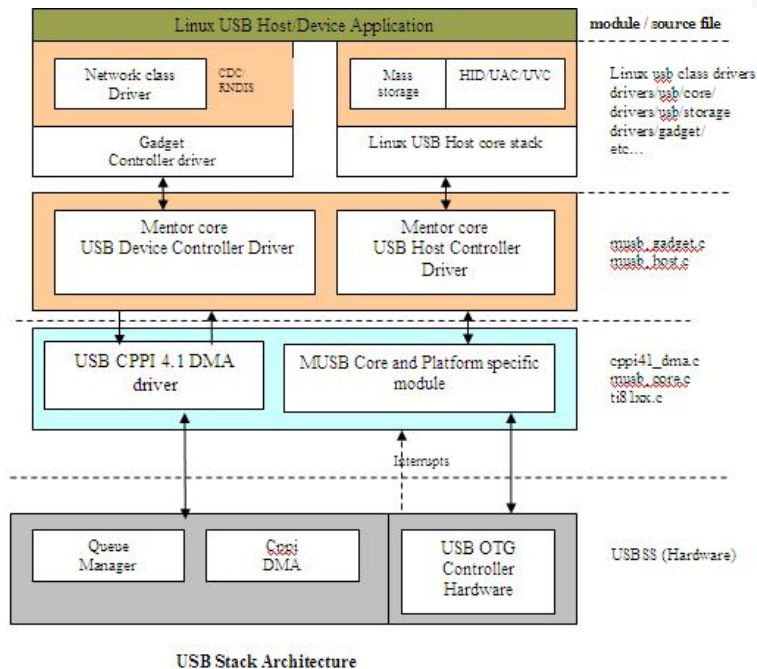
Software Overview

Mentor graphics controller driver (or MUSB driver)

The MUSB driver is implemented on top of Mentor controller IP which supports all the speeds (High, Full and Low). AM33XX USBOTG subsytem uses CPPI 4.1 DMA for all the transfers. The musb driver conforms to linux usb framework and supports both PIO and DMA mode of operation. The musb host controller driver (HCD) binds the controller hardware to linux usb core stack. The musb device or gadget controller driver binds the controller hardware and specific gadget driver (filestorage, cdc/rndis etc).

Linux USB Stack Architecture

As shown in the figure, linux usb stack is a layered architecture, with musb controller at the lowest layer, the musb host/device controller driver binds the musb controller hardware to linux usb stack framework. The CPPI4.1 DMA controller driver is responsible for transmit/receive of packets over the musb endpoints.

USB Stack Architecture

Driver Features List

- The Mentor USB driver can be built as module or built-in to kernel
- Support both PIO and DMA mode (The DMA mode not applicable for control endpoint)
- Support two instances musb controller in otg mode (both usb0 and usb1 controller in otg mode. This will allow host or device operation on each port simultaneously.

The driver supports the following features for USB Host (AM33XX)

Host Mode Feature	AM33xx
HUB class support	Yes
Human Interface Class (HID)	Yes
Mass Storage Class (MSC)	Yes

The driver supports the following features for USB Gadget (AM33XX)

Gadget Mode Feature	AM33xx
Mass Storage Class (MSC)	Yes
USB Networking - RNDIS	Yes
USB Networking - CDC	Yes

The driver supports the following features for Dual host/gadget (AM33xx)

Dual Mode Feature	AM33x
USB0 as OTG, USB1 as OTG	Yes

Not verified features of AM33xx

Not verified features	am33x
Wifi support	Not verified
Serial device	Not verified

References

- For more details about EVM, please refer to EVM reference manual ⧉.

USB Configuration through menuconfig

- The Mentor USB driver can be built as module or built into kernel. For more information refer to USB Configuration

	For technical support please post your questions at *http://e2e.ti.com* ⧉. *Please post only comments about the article* **AM335x USB Driver's Guide** *here.*

Links

ARM Microcontroller MCU ⧉	ARM Processor ⧉	Digital Media Processor ⧉	Digital Signal Processing ⧉	Microcontroller MCU ⧉	Multi Core Processor ⧉
	Ultra Low Power DSP ⧉	8 bit Microcontroller MCU ⧉	16 bit Microcontroller MCU ⧉	32 bit Microcontroller MCU ⧉	

Categories: AM335x | Linux | PSP | USB

Leave a Comment