

TI81XX PSP MMC SD Support



Linux PSP MMC/SD Driver Guide

Linux PSP

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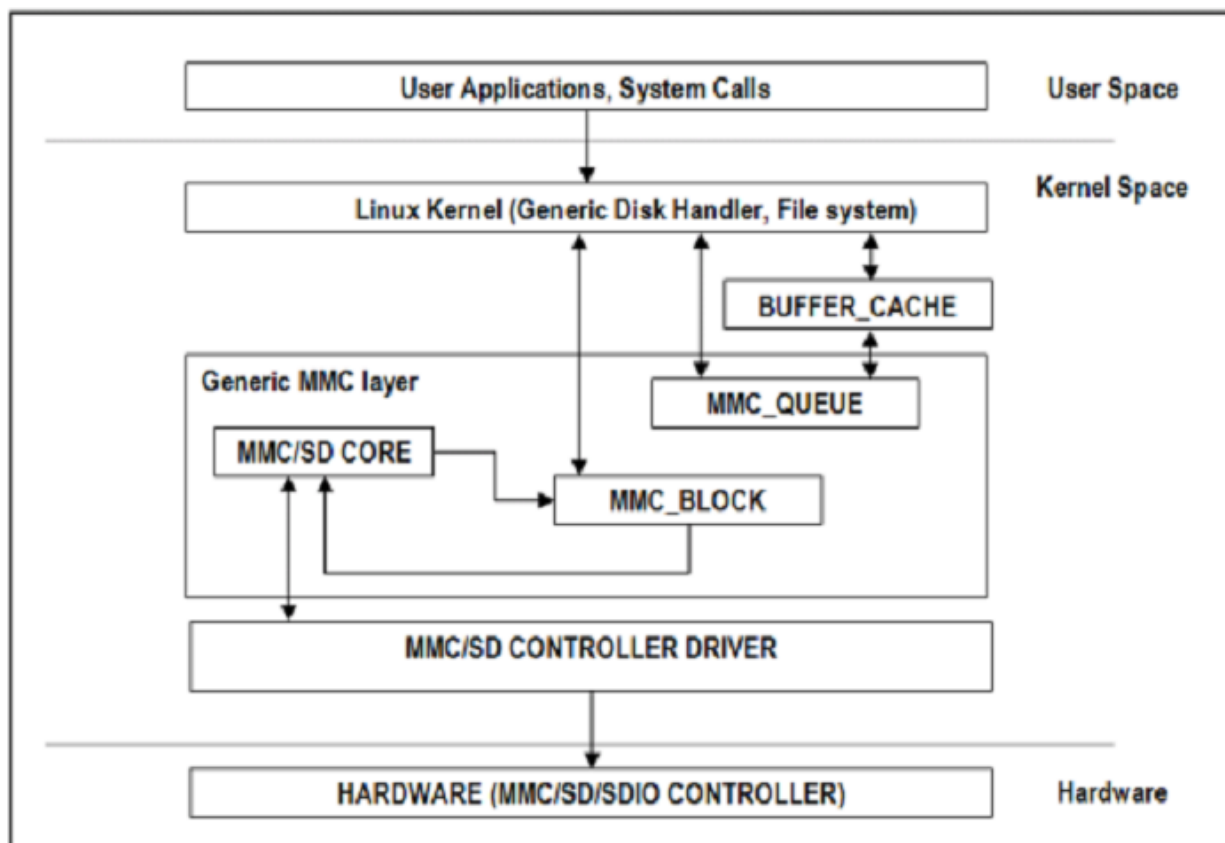
IMPORTANT

TI81xx refers to DM816x, DM814x and DM813X.

Introduction

DM81xx devices have multimedia card high-speed/secure data/secure digital I/O (MMC/SD/SDIO) host controller, which provides an interface between microprocessor and either MMC, SD memory cards, or SDIO cards. The current version of the user guide talks about the SD controller. The SD driver is implemented on top of host controller as a HS-MMC controller driver and supports SD, SD High Speed and SDHC cards. The salient features of the aforementioned HS-MMC host controller are:

- Full compliance with MMC/SD command/response sets as defined in the Specification.
- Support:
 - 4-bit transfer mode specifications for SD and SDIO cards
 - Built-in 1024-byte buffer for read or write
 - 32-bit-wide access bus to maximize bus throughput
 - Single interrupt line for multiple interrupt source events
 - Two slave DMA channels (1 for TX, 1 for RX)
 - Designed for low power and Programmable clock generation
 - Maximum operating frequency of 48MHz
 - MMC/SD card hot insertion and removal



MMC/SD Driver Architecture

References

1. MMCA Homepage [<http://www.mmca.org/home> ^[2]]
2. SD ORG Homepage [<http://www.sdcard.org/home> ^[3]]

Acronyms & Definitions

Audio Driver: Acronyms

Acronym	Definition
MMC	Multimedia Card
HS-MMC	High Speed MMC
SD	Secure Digital
SDHC	SD High Capacity
SDIO	SD Input/Output

Features

The SD driver supports following features

- The driver is built in-kernel (part of vmlinux)
- SD cards including SD High Speed and SDHC cards
- Uses block bounce buffer to aggregate scattered blocks

Features NOT supported

Following features are not supported currently:

- PIO mode

Driver Configuration

The default kernel configuration enables support for MMC/SD(built-in to kernel). OMAP MMC/SD driver is reused for DM81xx.

The selection of MMC/SD/SDIO driver can be modified as follows: start Linux Kernel Configuration tool.

```
$ make menuconfig ARCH=arm
```

- Select Device Drivers from the main menu.

```
...
...
Kernel Features --->
Boot options --->
CPU Power Management --->
Floating point emulation --->
Userspace binary formats --->
Power management options --->
[*] Networking support --->
Device Drivers --->
...
...
```

Building into Kernel

- Select MMC/SD/SDIO card support from the menu.

```
...
...
[*] USB support --->
< > Ultra Wideband devices (EXPERIMENTAL) --->
<*> MMC/SD/SDIO card support --->
< > Sony MemoryStick card support (EXPERIMENTAL) --->
...
...
```

- Select OMAP HS MMC driver

```
...
[ ] MMC debugging
```

```
[ ] Assume MMC/SD cards are non-removable (DANGEROUS)
    *** MMC/SD/SDIO Card Drivers ***
<*> MMC block device driver
[*] Use bounce buffer for simple hosts
...
<*> TI OMAP High Speed Multimedia Card Interface support
...
```

Building as Loadable Kernel Module

- To build the above components as modules, press 'M' key after navigating to config entries preceded with '< >' as shown below:

```
...
...
[*] USB support --->
< > Ultra Wideband devices (EXPERIMENTAL) --->
<M> MMC/SD/SDIO card support --->
< > Sony MemoryStick card support (EXPERIMENTAL) --->
...
```

- Select OMAP HS MMC driver to be built as module

```
...
[ ] MMC debugging
[ ] Assume MMC/SD cards are non-removable (DANGEROUS)
    *** MMC/SD/SDIO Card Drivers ***
<*> MMC block device driver
[*] Use bounce buffer for simple hosts
...
<*> TI OMAP High Speed Multimedia Card Interface support
...
```

- After doing module selection, exit and save the kernel configuration when prompted.
- Now build the kernel and modules from Linux build host as

```
$ make uImage
$ make modules
```

- Following modules will be built

```
mmc_core.ko
mmc_block.ko
omap_hsmmc.ko
```

- Boot the newly built kernel and transfer the above mentioned .ko files to the filesystem
- Navigate to the directory containing these modules and insert them from type the following commands in console to insert the modules in specified order:

```
# insmod mmc_core.ko
# insmod mmc_block.ko
# insmod omap_hsmmc.ko
```

- If 'udev' is running and the SD card is already inserted, the devices nodes will be created and filesystem will be automatically mounted if exists on the card.

Suspend to Memory support

This driver supports suspend to memory functionality. To use the same, the following steps need to be followed.

Note that these are not enabled in the configuration by default. If this change is not made, suspend to memory might fail if I/O is happening on MMC/SD simultaneously.

- Select Device Drivers from the main menu.

```
...
...
Kernel Features  --->
Boot options  --->
CPU Power Management  --->
Floating point emulation  --->
Userspace binary formats  --->
Power management options  --->
[*] Networking support  --->
Device Drivers  --->
...
...
```

- Select MMC/SD/SDIO card support from the menu.

```
...
...
[*] USB support  --->
< > Ultra Wideband devices (EXPERIMENTAL)  ---->
<*> MMC/SD/SDIO card support  --->
< > Sony MemoryStick card support (EXPERIMENTAL)  ---->
...
...
```

- Select Assume MMC/SD cards are non-removable option.

```
...
[ ] MMC debugging
[*] Assume MMC/SD cards are non-removable (DANGEROUS)
*** MMC/SD/SDIO Card Drivers ***
<*> MMC block device driver
[*] Use bounce buffer for simple hosts
...
<*> TI OMAP High Speed Multimedia Card Interface support
...
...
```

References

- [1] <http://creativecommons.org/licenses/by-sa/3.0/>
 - [2] <http://www.mmca.org/home>
 - [3] <http://www.sdcard.org/home>
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