# TI81XX PSP NOR Driver User Guide

## TI81XX PSP NOR Driver User Guide

**Linux PSP**

**IMPORTANT**

TI81XX refers to TI816X, TI814X and TI813X.

**NOTE**

*The TI8168 and TI8148 base board does not have NOR flash, it is present only in the application specific daughter card. Hence for validating NOR support you need to have respective application daughter card.

- Refer "EVM Switch Settings" section in u-boot user guide[[1]] for the base_board and daughter card (if any) switching settings.

## Linux NOR flash support

- As the same GPMC chip select (CS0) is used for NAND and NOR flash in TI8168 and TI8148 EVM, their support is mutually exclusive. Hence, disable NAND support in kernel configuration to get NOR working.. During 'make menuconfig' NAND could be disabled by deselecting "**NAND Device Support**" from the following location

```
Device Drivers  --->
  <*> Memory Technology Device (MTD) support  --->
       < >   NAND Device Support  --->
```

- NOR support is not added by default to EVM defconfig. Hence please add NOR support from the following location during make menuconfig. De-selecting the menu item should disable NOR support and selecting it should enable NOR support.

```
Device Drivers  --->
  <*> Memory Technology Device (MTD) support  --->
          <*>   MTD concatenating support
          [*]   MTD partitioning support
          [*]     Command line partition table parsing
          RAM/ROM/Flash chip drivers  --->
                  <*> Detect flash chips by Common Flash Interface (CFI) probe
                  <*> Detect non-CFI AMD/JEDEC-compatible flash chips
                  <*> Support for AMD/Fujitsu/Spansion flash chips
          Mapping drivers for chip access  --->
                  <*> Flash device in physical memory map
```

## Linux NOR Loadable Module support

- Skip this section if NOR support is built with the kernel
- To build NOR as module select **[M]** while enabling (as shown below)

```
Device Drivers  --->
   <*> Memory Technology Device (MTD) support  --->
           <*>   MTD concatenating support
           [*]   MTD partitioning support
           [*]     Command line partition table parsing
           RAM/ROM/Flash chip drivers  --->
                   <M> Detect flash chips by Common Flash Interface (CFI) probe
                   <M> Detect non-CFI AMD/JEDEC-compatible flash chips
                   <M> Support for AMD/Fujitsu/Spansion flash chips
           Mapping drivers for chip access  --->
                   <M> Flash device in physical memory map
```

- Do 'make modules' from Linux shell prompt and check if following .ko modules are generated

```
drivers/mtd/chips/cfi_cmdset_0002.ko
drivers/mtd/chips/cfi_probe.ko
drivers/mtd/chips/cfi_util.ko
drivers/mtd/chips/gen_probe.ko
drivers/mtd/chips/jedec_probe.ko
drivers/mtd/maps/physmap.ko
```

- Copy all .ko file to the target file system.
- Load these modules using 'insmod <module_name.ko>' from the target's shell prompt

**Module insertion Sequence**

```
insmod cfi_util.ko
insmod cfi_cmdset_0002.ko
insmod gen_probe.ko
insmod cfi_probe.ko
insmod jedec_probe.ko
insmod physmap.ko
```

**Module removal Sequence**

```
rmmod physmap.ko
rmmod jedec_probe.ko
rmmod cfi_probe.ko
rmmod gen_probe.ko
rmmod cfi_cmdset_0002.ko
rmmod cfi_util.ko
```

## NOR Device Information

- For TI8148, the partition layout is defined in the file arch/arm/mach-omap2/board-ti8148evm.c
- For TI813X, the partition layout is defined in the file arch/arm/mach-omap2/board-dm385evm.c
- Also, the partition structure variable would be ti814x_evm_norflash_partitions instead of ti816x_evm_norflash_partitions in case of TI8148
- To modify partition layout on NOR flash following structure has to be modified in **arch/arm/mach-omap2/board-ti8168evm.c**

```
static struct mtd_partition ti816x_evm_norflash_partitions[] = {
    /* bootloader (U-Boot, etc) in first 5 sectors */
    {
        .name       = "bootloader",
        .offset     = 0,
        .size       = 2 * SZ_128K,
        .mask_flags = MTD_WRITEABLE, /* force read-only */
    },
    /* bootloader params in the next 1 sectors */
    {
        .name       = "params",
        .offset     = MTDPART_OFS_APPEND,
        .size       = SZ_128K,
        .mask_flags = 0,
    },
    /* kernel */
    {
        .name       = "kernel",
        .offset     = MTDPART_OFS_APPEND,
        .size       = 2 * SZ_2M,
        .mask_flags = 0
    },
    /* file system */
    {
        .name       = "filesystem",
        .offset     = MTDPART_OFS_APPEND,
        .size       = 25 * SZ_2M,
        .mask_flags = 0
    }
    /* file system */
    {
        .name       = "reserved",
        .offset     = MTDPART_OFS_APPEND,
        .size       = MTDPART_SIZ_FULL,
        .mask_flags = 0
    }
};
```

- **board_nor_init**(): The mach-omap2 folder provides this API to register a NOR device. It is available in file **arch/arm/mach-omap2/board-flash.c**
- This API takes care of reserving a memory region in GPMC and also registering NOR platform device.
- The board file **arch/arm/mach-omap2/board-ti8168evm.c** should register a NOR device by passing partition table to this API (as shown below).

```
board_nor_init(ti816x_evm_norflash_partitions,
                ARRAY_SIZE(ti816x_evm_norflash_partitions), 0);
```

## References

[1]  http://processors.wiki.ti.com/index.php/TI81XX_PSP_U-Boot

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