

# Porting LTC3589 to a SMDK64xx-family board

List of items that have to be changed when porting to a mx5x board:

- [I2C Communications bus registration](#)
- [Included headers](#) in pmic board file
- [Kernel configuration files](#) to properly compile board file and include LTC3589 driver
- [Board specific resistor values](#) in the driver.

## Assumptions

The descriptions in this section refer to the task of porting the LTC3589 to the Samsung SMDK6410 board.

Please read the next section on [Board File Naming](#) for further information.

The **SMDK6410** board was picked as an example board to port the LTC3589 PMIC to a non-freescale based architecture. Since the LTC3589 PMIC is not actually on the SMDK6410 it is assumed that the LTC3589 PMIC would be connected in a similar manner as the currently used WM8350 PMIC. Thus:

- SMDK6410\_VDDARM -> SW1
- DCDC1 -> SW4
- DCDC3 -> SW2
- DCDC4 -> SW3
- SMDK6410\_VDDALIVE -> LD01\_STBY
- SMDK6410\_VDDLCD -> LD02
- SMDK6410\_VDDOTG -> LD03
- LD04 -> LD04

## Board File Naming

There is only 1 board file that represents the smdk64xx family boards.

In this following examples **mach-smdk6410.c** is the main board file. This file already exists and just has to be modified to describe the Regulator Constraints, the Consumers who may use the regulator, and it must reference the LTC3589 device driver.

## Included Headers

The following headers were added to the board file:

- mach-smdk6410.c:

```
#include <linux/regulator/ltc3589.h>
```

```
#include <linux/regulator/machine.h>
#include <linux/mfd/ltc3589/core.h>
```

## Kernel Configuration

1. Select the LTC3589 driver:

- The LTC3589 driver is included in two parts in the Kconfig file under **drivers/mfd/Kconfig**. It can be selected from menuconfig by searching for and selecting the following:
  - **MFD\_LTC3589\_I2C**
  - **REGULATOR**
  - **REGULATOR\_LTC3589** (this depends on the first two)

2. Select the SMDK6410 board:

- Since the PMIC-board file is compiled along with the main board file, simply selecting the correct smdk64xx board from the menuconfig is all that is necessary. For the SMDK6410 board the parameter to search for is: **CONFIG\_MACH\_SMDK6410**

## I2C Bus Registration

The pmic board file contains initialization code needed by the PMIC driver. This code must be run before consumer drivers begin to make requests of the regulator during their initialization. Information on how this is accomplished is in [Appendix B](#).

The I2C bus instance that the PMIC is located on physically (i2c-0/i2c-1/etc.) has to be specified. This is done in the call to `i2c_register_board_info()`.

On the SMDK6410 board the PMIC is on i2c bus 0.

- `mach-smdk6410.c`:

```
static struct i2c_board_info i2c_devs0[] __initdata = {
    { I2C_BOARD_INFO("24c08", 0x50), },
    { I2C_BOARD_INFO("wm8580", 0x1b), },
    { I2C_BOARD_INFO("ltc3589", 0x34),
      .platform_data = &smdk6410_ltc3589_pdata,
      .irq = S3C_EINT(12),
    },
};
```

The registration is performed later in the board file during the initialization:

```
i2c_register_board_info(0, i2c_devs0, ARRAY_SIZE(i2c_devs0));
```

## Board-Specific Resistor Values

If the board is ported to a non-mx53 based design, there are modifications to the driver that are required.

In **ltc3589-regulator.c**:

- A `#ifdef` has to be added to turn off these MX53-specific functions or the code will not compile properly.
- the resistor values need to be specified according to what is located on the board.

```
static int ltc3589_regulator_probe(struct platform_device *pdev)
{
    ...
    ...
    ...

    #ifdef CONFIG_ARCH_MX53
        if (cpu_is_mx53_rev(CHIP_REV_2_0) >= 1) {
            ltc3589_ldo2_r2 = LTC3589_LDO2_R2_TO2;
            ltc3589_sw2_r2 = LTC3589_SW2_R2_TO2;
        } else {
            ltc3589_ldo2_r2 = LTC3589_LDO2_R2_TO1;
            ltc3589_sw2_r2 = LTC3589_SW2_R2_TO1;
        }
    #endif

    ...
    ...
    ...

    return 0;
}
```

## Appendix A

**Referenced files for porting LTC3589 to the smdk6410 board.**

### Modified

- arch/arm/mach-s3c64xx/
  - mach-smdk6410.c
- drivers/regulator/
  - ltc3589-regulator.c

### Important

- arch/arm/mach-s3c64xx/
  - cpufreq.c
- drivers/regulator/
  - wm8350-regulator.c

- drivers/mfd/
  - ltc3589-i2c.c