BSP Porting Guide for SMDK6410
(Windows Embedded CE 6.0)

S3C6410
Sep 1, 2008
(Preliminary) REV 0.6
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S3C6410 RISC Microprocessor
BSP Porting Guide

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Preliminary product information describe products that are in development, for which full characterization data and associated errata are not yet available. Specifications and information herein are subject to change without notice.
## Revision History

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<tr>
<th>Revision No</th>
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1 Boot Media Configuration

It is available to boot through both NAND Flash and AMD Flash (NOR Flash) in the SMDK6410 Board. This information is applied to SMDK6410 CPU Board revision(0.0, 0.1) and Base Board revision(0.0, 0.1, 0.2)

1.1 NOR Flash Boot

In CPU Board

<table>
<thead>
<tr>
<th>Description</th>
<th>CFG3[6:1]</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NOR Boot (8bit Data Width)</td>
<td>Don't Care</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>NOR Boot (16bit Data Width)</td>
<td>Don't Care</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
</tr>
</tbody>
</table>

1.2 NAND Flash Boot

In CPU Board

<table>
<thead>
<tr>
<th>Description</th>
<th>CFG3[6:1]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal NAND, 512-byte page, 3 addr. Cycle</td>
<td>ON</td>
</tr>
<tr>
<td>Normal NAND, 512-byte page, 4 addr. Cycle</td>
<td>ON</td>
</tr>
<tr>
<td>Advanced NAND, 2K-byte page, 4 addr. Cycle</td>
<td>ON</td>
</tr>
<tr>
<td>Advanced NAND, 2K-byte page, 5 addr. Cycle</td>
<td>ON</td>
</tr>
</tbody>
</table>

In Base Board

<table>
<thead>
<tr>
<th>Description</th>
<th>CFGB3[4:1]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[4]</td>
</tr>
<tr>
<td>Connected NandFlash to Xmc0CSn2</td>
<td>OFF</td>
</tr>
<tr>
<td>Connected XD Picture Card to Xmc0CSn2</td>
<td>OFF</td>
</tr>
</tbody>
</table>
2 BSP Directory Layout

Windows CE 6.0 BSP Directory Layout is as follows. This is changed from Beta Release BSP. The main change is OAL common parts. Please Refer to “Appendix I. Directory Layout Change list”. This Change list will be updated up to Final Release. If you have used old BSP, Appendix will help you to understand what is changed. and Release Notes also help you.

Windows CE 6.0 SOC Directory Layout

![Windows CE 6.0 SOC Directory Layout](Image)

Figure 2-1 WinCE 6.0 SOC Directory Layout
Windows CE 6.0 BSP Directory Layout

Figure 2-2 WinCE 6.0 BSP Directory Layout
3 OAL option configuration

3.1 CPU Selection

This is obsolete. This BSP only support SMDK6410.
3.2 System Clock Configuration

- You can change System Clock Speed (including CPU Clock)
- There are three pre-defined values for control system clock speed in two files (PLATFORM\COMMON\SRC\SOC\S3C6410_SEC_V1\OAL\INC\soc_cfg.h and PLATFORM\COMMON\SRC\SOC\S3C6410_SEC_V1\OAL\INC\s3c6410.inc)
- Default setting is 532Mhz/133Mhz/33.25Mhz. (ARM/HCLK/PCLK)

In \PLATFORM\COMMON\SRC\SOC\S3C6410_SEC_V1\OAL\INC\soc_cfg.h file

// Change This Definition to change SOC Clock !!! (and "s3c6410.inc")

//define S3C6410_FCLK FCLK_400MHz
#define S3C6410_FCLK FCLK_532MHz
//define S3C6410_FCLK FCLK_634MHz

In PLATFORM\COMMON\SRC\SOC\S3C6410_SEC_V1\OAL\INC\s3c6410.inc file

;----------------------------------------
; Change S3C6410_FCLK definition for StartUp code
;----------------------------------------
;S3C6410_FCLK SETA FCLK_400MHZ
S3C6410_FCLK SETA FCLK_532MHZ
;S3C6410_FCLK SETA FCLK_634MHZ
FIN EQU 12000000
;----------------------------------------;

- SDRAM parameter and System Timer parameter will be recalculated properly as clock speed
- If you want use any other value than pre-defined clock speed, you should define several definitions related to clock speed configuration as sample code in soc_cfg.h and s3c6410.inc file
3.3 LCD Display Module Configuration

- You can change LCD module type for SMDK6410 board
- There are four pre-defined LCD module configuration in BSP

  LTS222 : Portrait 2.2” QVGA
  LTV350 : Landscape 3.5” QVGA (SMDK6410 Base Board Rev0.0)
  LTE480 : Landscape 4.8” WVGA (SMDK6410 Base Board Rev0.1)
  EMUL48_D1 : Landscape 4.8” WVGA works as D1 (720x480)
  EMUL48_QV : Landscape 4.8” WVGA works as QVGA (320x240)
  EMUL48_PQV : Landscape 4.8” WVGA works as PQVGA (240x320) Rev0.1)
  LTP700 : Landscape 7” WVGA

In smdk6410\SRC\Inc\bsp_cfg.h

```
//------------------------------------------------------------------------------
// SMDK6410 Display Dimension
//------------------------------------------------------------------------------
#define LCD_MODULE_LTS222 (0) // Portrait 2.2” QVGA RGB16
#define LCD_MODULE_LTV350 (1) // Landscape 3.5” QVGA RGB16
#define LCD_MODULE_LTE480 (2) // Landscape 4.8” WVGA RGB16
#define LCD_MODULE_EMUL48_D1 (3) // Landscape 4.8” WVGA as D1 (720x480)
#define LCD_MODULE_EMUL48_QV (4) // Landscape 4.8” WVGA as QVGA (320x240)
#define LCD_MODULE_EMUL48_PQV (5) // Landscape 4.8” WVGA as PQVGA (240x320)
#define LCD_MODULE_LTP700 (6) // Landscape 7” WVGA RGB24
#define SMDK6410_LCD_MODULE (LCD_MODULE_LTE480)
//------------------------------------------------------------------------------
```

- If you want use any other module than pre-defined in BSP, you should define several definitions related to LCD module dimensions as sample code in bsp_cfg.h, and implement LDI_fill_output_device_information() function and module control functions (LDI_XXX()) in \smdk6410\SRC\drivers\Display\s3c6410_disp_ldi.c file
3.4 UART Debug Port Configuration

- There are two UART port available for debug. You can use one port at a time.
- If you set BSP_DEBUGPORT as following code, Debug port will use UART0
- Default setting is UART0

In smdk6410\smdk6410.bat file

   set BSP_DEBUGPORT=SERIAL_UART0  
   @REM set BSP_DEBUGPORT=SERIAL_UART1  
   @REM set BSP_DEBUGPORT=SERIAL_UART2  
   @REM set BSP_DEBUGPORT=SERIAL_UART3

- You can change Baudrate for debug port also
- Default setting is 115200 bps

In smdk6410\SRC\Inc\bsp_cfg.h

   //----------------------------------------------------------------------------------
   // SMDK6410 UART Debug Port Baudrate
   //----------------------------------------------------------------------------------
   #define DEBUG_UART0    (0)
   #define DEBUG_UART1    (1)
   #define DEBUG_UART2    (2)
   #define DEBUG_UART3    (3)
   #define DEBUG_BAUDRATE (115200)

- You should configure the baudrate of terminal program in your host PC same as SMDK6410 board
3.5 NAND Flash

- For using NAND Flash, timing parameter should be set appropriately
- The default setting leaves a margin. (TACLS: 7, TWRPH0: 7, TWRPH1: 7)
- Please set optimal timing parameter for NAND Flash your platform uses

```c
In smdk6410\SRC\Inc\bsp_cfg.h file
//---------------------------------------------------------------------------------
// SMDK6410 NAND Flash Timing Parameter
//---------------------------------------------------------------------------------
#if (S3C6410_HCLK == FCLK_100MHz)
#define NAND_TACLS (7)
#define NAND_TWRPH0 (7)
#define NAND_TWRPH1 (7)
#elif (S3C6410_HCLK == FCLK_133MHz)
#define NAND_TACLS (7)
#define NAND_TWRPH0 (7)
#define NAND_TWRPH1 (7)
#endif
```
4 Display Driver Configuration

- Display device can be disabled. (set BSP_NODISPLAY=1)
- If you clear BSP_NODISPLAY as following code, Display driver will be included in OS image
- Default setting is enabled.

```
In smdk6410\smdk6410.bat file
set BSP_NODISPLAY=
```

- Setting BSP_NODISPLAY=1 means that display driver is removed from OS image.

- If you want to enable or disable 2D Hardware accelerator, you may modify this.

```
In smdk6410\src\drivers\display\s3c6410_disp_drv\precomp.h file
#define G2D_ACCELERATE (TRUE)   //< If you want to use 2D HW for GDI, set this to "TRUE", if not, set to "FALSE"
#define G2D_TRY_CBLT    (TRUE)  //< Try to bitblt from cached source surface to non cached destinatino surface, this do cache flush
#define G2D_MSG (FALSE)
/// For using Physically Linear Surface on System Memory to wide 2D HW usage.
/// 2D HW need physically contiguous memory, and its address.
/// This will consume System Memory and allocate Physically and Virtually contiguous memory.
/// So if system has small memory, allocation may fail.
/// Then 2D HW will not work for that memory.
/// BUGBUG: in Media Player, Occasionally PACSurf object cannot be bitblted correctly.
#define USE_PACSURF (TRUE)
```

- There are some optimization options provided for 2D Hardware
In smdk6410\src\drivers\display\s3c6410_disp_drv\precomp.h file

#define PAC_ALLOCATION_BOUNDARY (160*120*2) // (320*240*2)  //< PACSurf creation request is processed only for the surface has over QVGA 16bpp size

#define G2D_BLT_OPTIMIZE (FALSE)    //< This option will enable above two optimization method. This can increase 2D processing overhead.
#define G2D_COMPROMISE_LIMIT (28800)  //< Transferring below this size(byte) using HW will be poor than using SW, so we will use software 2D flow under this size transfer request.
#define G2D_BYPASS_HW_STRETCHBLT (FALSE)  //< HW Stretchblt algorithm differs from MS'SW Stretching BLT algorithms,
   //< So, CETK 218, 219 can fails.
5 Touch Screen Driver Configuration

- Touch screen device can be disabled. (set BSP_NOTOUCH=1)
- If you clear BSP_NOTOUCH as following code, Touch screen driver will be included in OS image
- Default setting is enabled.

In smdk6410\smdk6410.bat file
set BSP_NOTOUCH=

- Setting BSP_NOTOUCH=1 means that touch screen driver is removed from OS image.
- After Changing, Build display driver and make image.

- Default calibration data is defined in registry. Set proper value for the touch panel you have.

In smdk6410\files\platform.reg file

;------------ Touch Driver -------------------------------------------------
; @CESYSGEN IF CE_MODULES_POINTER
IF BSP_NOTOUCH !

[HKEY_LOCAL_MACHINE\HARDWARE\DEVICEMAP\TOUCH]
 "DriverName"="s3c6410_touch.dll"
 "MaxCalError"=dword:7

[HKEY_LOCAL_MACHINE\HARDWARE\DEVICEMAP\TOUCH]
 "DriverName"="s3c6410_touch.dll"
 "MaxCalError"=dword:7

; 3.5" QVGA Landscape
; "CalibrationData"="504,508 233,236 231,788 785,792 790,227"

; 4.8" WVGA Landscape
; for S3C6410 SMRP 12bit
; "CalibrationData"="2108,1981 1131,2643 1133,1343 3079,1339 3078,2616"
; for S3C6410 10bit
; "CalibrationData"="2098,1998 1013,2663 997,1339 3187,1312 3195,2665"
; for S3C6410 10bit
; "CalibrationData"="519,501 253,671 246,335 794,331 794,663"
; for S3C6400
; "CalibrationData"="508,490 200,735 204,246 820,824 823,731"
; 4.8" WVGA Landscape as D1 (720x480)
;   "CalibrationData"="473,492 189,747 188,244 751,238 748,748"
; 4.8" WVGA Landscape as QVGA Landscape
;   "CalibrationData"="278,642 158,766 159,517 404,520 405,757"
; 4.8" WVGA Landscape as QVGA Portrait
;   "CalibrationData"="244,586 152,754 152,426 332,425 334,747"
; 4.8" WVGA Landscape as 480x320
;   "CalibrationData"="362,592 171,761 173,431 547,427 543,755"
; 4.8" WVGA Landscape as 320x480
;   "CalibrationData"="276,489 156,740 156,240 402,238 396,732"ENDIF BSP_NOTOUCH !
; @CESYSGEN ENDIF CE_MODULES_POINTER
;---------------------------------------------------------------
6 Keypad Driver Configuration

- Keypad/Keyboard device can be disabled. (set BSP_NOKEYBD=1)
- If you clear BSP_NOKEYBD as following code, Keypad/Keyboard driver will be included in OS image
- Default setting is enabled.

<table>
<thead>
<tr>
<th>In smdk6410\smdk6410.bat file</th>
</tr>
</thead>
<tbody>
<tr>
<td>set BSP_NOKEYBD=</td>
</tr>
</tbody>
</table>

- Setting BSP_NOKEYBD=1 means that keypad/keyboard driver is removed from OS image.
- After Changing, Build keypad/keyboard driver and make image.
- If you want to use Keypad on SMDK6410 Board, set CFG to the following CFG4 (all OFF)
- To use the Keypad, Set the CFG4 in the base board as below.

```
1 2 3 4

CFG4 : OFF OFF OFF OFF
```
7 Power Button Driver Configuration

- You can enter sleep mode and trigger S/W reset with power button driver
- Power Button is switch 68 (SW68 in bottom of base board)
- Reset Button is switch 66 (SW66 in bottom of base board)
- Power Button driver can be disabled. (set BSP_NOPWRBTN=1)
- If you clear BSP_NOPWRBTN as following code, Power Button driver will be included in OS image
- Default setting is enabled.

In smdk6410\smdk6410.bat file
set BSP_NOPWRBTN=

- Setting BSP_NOPWRBTN=1 means that Power Button driver is removed from OS image.
- After Changing, Build Power driver and make image
8 Audio Driver Configuration

SMDK6410 supports two audio interfaces AC97 and IIS.

- Audio driver can be disabled (set BSP_NOAUDIO=1)
- Default setting is enabled and AC97 interface

8.1 AC97 interface

- For including AC97 driver in OS image, change as follow

```
In smdk6410\smdk6410.bat file
    set BSP_NOAUDIO=
    set BSP_AUDIO_AC97=1
```

- Rebuild audio driver and make image
- To use the AC97 interface as audio device Set the CFG1 and CFG2 in the base board as below.

```
    1  2  3  4
CFG1 : ON ON ON ON
CFG2 : OFF OFF OFF OFF
```

- If you want to change the Key layout, set like the following.

```
In smdk6410\SRC\Inc\bsp_cfg.h file
    // SMDK6410 Keypad Layout
    #define LAYOUT0    (0)  // 8*8 Keypad board
    #define LAYOUT1    (1)  // On-Board Key
    #define LAYOUT2    (2)  // Qwerty Key board
    #define MATRIX_LAYOUT  (LAYOUT1)
```
8.2 IIS interface

- For including IIS driver in OS image, change as follow

In smdk6410\smdk6410.bat file
set BSP_NOAUDIO=
set BSP_AUDIO_AC97=
set BSP_NOI2C=

- Rebuild audio driver and make image
- Because IIS driver use I2C interface to control external audio codec chip. You have to include I2C driver in the OS image

- To use the IIS interface as audio device Set the CFG1 and CFG2 in the base board as below.

  1  2  3  4
  CFG1 : OFF OFF OFF OFF

8.3 Board Revision

- In SMDK6410 Base Board Rev 0.0, AC97 does not work properly, so, you should remove the register, R48. IIS 5.1 channel path is able to use. But, IIS 2 channel does not work properly.
- In the SMDK6410 Base Board Rev 0.1, AC97, IIS 5.1 channel path and IIS 2 channel path work properly. If the resister R48 is connected, you should remove the R48.
- In AC97, delay value is configurable. Sometimes you need to adjust the delay value.
9 Camera Driver Configuration

- Camera driver can be disabled. (set BSP\_NOCAMERA=1)
- Default setting is disabled.
- If you clear BSP\_NOCAMERA as following code, Camera driver will be included in OS image

```shell
In smdk6410\smdk6410.bat file
    set BSP\_NOCAMERA=
    set BSP\_NOI2C=
```

- Setting BSP\_NOCAMERA=1 means that Camera driver is removed from OS image.
- After Changing, Build Camera driver and make image
- Because Camera driver use I2C interface to control external camera module. You have to include I2C driver in OS image
10 I2C Driver Configuration

- I2C driver can be disabled. (set BSP_NOI2C=1)
- Default setting is disabled.
- If you clear BSP_NOI2C as following code, I2C driver will be included in OS image

```
In smdk6410\smdk6410.bat file
set BSP_NOI2C=
```

- Setting BSP_NOI2C=1 means that I2C driver is removed from OS image.
- After Changing, Build I2C driver and make image
- IIS Audio Driver and Camera Driver use I2C driver to control external device. You should include I2C driver for that kind of drivers
11 SPI Driver Configuration

- SPI driver can be disabled. (set BSP_NOSPI=1)
- Default setting is disabled.
- If you clear BSP_NOSPI as following code, SPI driver will be included in OS image

In smdk6410\smdk6410.bat file
set BSP_NOSPI=

- Setting BSP_NOSPI=1 means that SPI driver is removed from OS image.
- After Changing, Build SPI driver and make image
12 USB Driver Configuration

12.1 USB Device

- USB device can be disabled. (set BSP_NOUSBFN=1)
- Default setting is enabled and Serial function.
- If you clear BSP_NOUSBFN as following code, USB device driver will be included in OS image

In smdk6410\smdk6410.bat file
set BSP_NOUSBFN=

- Setting BSP_NOUSBFN=1 means that USB device driver is removed from OS image.
- After Changing, Build display driver and make image.
- You can not use USB function device and USB KITL at a time.

12.1.1 Serial Function Driver

- You can use USB Serial Function driver by setting as follows.
- Default setting is serial function driver

In smdk6410\smdk6410.bat file
set BSP_NOUSBFN=
set BSP_USBFNCLASS=SERIAL
@REM set BSP_USBFNCLASS=MASS_STORAGE

- After changing, Build USB function driver and make image.

12.1.2 Mass Storage Function Driver

- You can use USB Mass Storage Function driver by setting as follows.

In smdk6410\smdk6410.bat file
set BSP_NOUSBFN=
@REM set BSP_USBFNCLASS=SERIAL
set BSP_USBFNCLASS=MASS_STORAGE

- After changing, Build USB function driver and make image.
12.2 Host

- USB device can be disabled. (set BSP_NOUSBHCD=1)
- Default setting is enabled.
- If you clear BSP_NOUSBHCD as following code, USB Host driver will be included in OS image

In smdk6410\smdk6410.bat file
set BSP_NOUSBHCD=

- Setting BSP_NOUSBHCD=1 means that USB Host driver is removed from OS image.
- After Changing, Build USB Host driver and make image.
13 Serial Driver Configuration

- All serial drivers can be disabled. *(set BSP_NOSERIAL=1)*
- Default setting is disabled.
- So if you want to enable serial driver, clear BSP_NOSERIAL

```
In smdk6410\smdk6410.bat file
set BSP_NOSERIAL=
```

- Setting BSP_NOSERIAL =1 means that Serial driver is removed from OS image.

### 13.1 UART

- UART0, UART1, UART2 and UART3 can be disabled by each setting in BSP.
- Default BSP setting is disabled.
- The following codes means enable UART1

```
In smdk6410\smdk6410.bat file
set BSP_NOUART0=1
set BSP_NOUART1=
set BSP_NOUART2=1
set BSP_NOUART3=1
```

- After Changing, Build driver and make image.

- The following codes means enable UART0

```
In smdk6410\smdk6410.bat file
set BSP_NOUART0=
set BSP_NOUART1=1
set BSP_NOUART2=1
set BSP_NOUART3=1
```

- Be careful when using UART0 as general purpose COM port. UART0 is default debug port.
  You must change debug port to UART1.
- You can change debug port to UART1 like the following. Then you can use UART0 as COM port without conflict

```
In smdk6410\smdk6410.bat file
set BSP_NOUART0=
```
set BSP_DEBUGPORT=SERIAL_UART1
- After Changing, Build driver and make image.
- In SMDK6410 board, UART1, UART2 and UART3 share same COM2 port.
- If you want to use UART1 on COM2 port, set CFG3 in the base board to the following.
  \[
  \begin{array}{c|c|c|c}
  1 & 2 & 3 & 4 \\
  \end{array}
  \]
  CFG3 : OFF DC DC DC  *DC means don’t care
- If you want to use UART2 on COM2 port, set CFG3 in the base board to the following.
  \[
  \begin{array}{c|c|c|c}
  1 & 2 & 3 & 4 \\
  \end{array}
  \]
  CFG3 : ON OFF OFF OFF
- If you want to use UART3 on COM2 port, set CFG3 in the base board to the following.
  \[
  \begin{array}{c|c|c|c}
  1 & 2 & 3 & 4 \\
  \end{array}
  \]
  CFG3 : ON ON ON OFF

13.2 IrDA
- IrDA uses UART2, UART3
- Default BSP setting is disabled.
- If you want to use IrDA on UART channel2, set like the following.
- Be careful When using UART Channel 2 as IrDA, you cannot use UART channel 2 as UART.
  So, Do not Enable IrDA2 and UART2 at the same time.
- If you clear BSP_NOIRDA2 like following code, you can use IrDA device.

In smdk6410\smdk6410.bat file
set BSP_NOIRDA2
- After Changing, Build driver and make image.
- And you need SMDK base board setting.
- Set CFG3 to the following for IrDA2 test.
If you want to use IrDA on UART channel3, set like the following.
- Be careful When using UART Channel 3 as IrDA, you cannot use UART channel 3 as UART.
  So, Do not Enable IrDA3 and UART3 at the same time.
- If you clear BSP_NOIRDA3 like following code, you can use IrDA device.

**In smdk6410\smdk6410.bat file**

```bash
set BSP_NOIRDA3
```

- After Changing, Build driver and make image.
- And you need SMDK base board setting.
- Set CFG3 to the following for IrDA3 test.

```
  1  2  3  4
CFG3 : DC  DC  OFF  OFF  *
```

---

### 13.3 Active Sync

- If you want to use Active Sync with UART Serial, You should use UART0 in SMDK6410
- The following codes means enable UART0
- You cannot use same UART and serial KITL at once.

**In smdk6410\smdk6410.bat file**

```bash
set BSP_NOUART0=
set BSP_NOUART1=1
set BSP_NOUART2=1
set BSP_NOUART3=1
```

- Be careful when using UART0 as general purpose COM port. UART0 is default debug port.
  You must change debug port to UART1.
- Short jumper J2 on SMDK base board.
- And configure WinCE and ActiveSync to use COM port.
14 SD / HSMMC Driver Configuration

14.1 Channel Configuration

- The driver supporting 4 bit DAT bus width on SD/HSMMC Channel 0 can be disabled, Default setting is enabled.
  - set BSP_NOHSMMC_CH0=1
- The drivers supporting 4 bit DAT bus width on SD/HSMMC Channel 1 can be disabled, Default setting is enabled.
  - set BSP_NOHSMMC_CH1=1
- Driver Supporting 8 bit DAT bus width on Channel 1 can be enabled, Default setting is disabled.
  - set BSP_HSMMC_CH1_8BIT=
- If you clear BSP_NOHSMMC_CHx as following code, SD/HSMMC drivers will be included in OS image. (Channel 0 is 4 bit, Channel 1 is 8 bit.)

  In smdk6410\smdk6410.bat file
  
  set BSP_NOHSMMC_CH0=
  set BSP_NOHSMMC_CH1=
  set BSP_HSMMC_CH1_8BIT=1

- In this time, SD/HSMMC Drivers are under developing. Some kind of HS-MMC does not work with Driver.

- Open jumper J7 and J8, and Short pin 2 and 3 of jumper J6 on SMDK base board.

- Short pin MMCD and PVDD of jumper JP25 on SMDK CPU board.
14.2 Fast-Path

“Fast-Path operations improve transfer performance on high speed SDIO and SD cards by utilizing polling in the host controller driver.” In MSDN. And Fast-Path is enabled basically. But CPU utilization can be increased as result of Fast-Path. So, you can disable Fast-Path with comment out _FASTPATH_ENABLE_ on CDEFINES in sources file. **But, you are responsible for the result on Fast-Path disability.**

In SMDK6410\Src\Drivers\HSMMC\SDBus\sources file

CDEFINES=$(CDEFINES) ... ... #_FASTPATH_ENABLE_

14.3 Using the Channel 0

- Board modification is needed for using HSMMC channel 0 to work correctly according to the SMDK board revision number Except for REV 0.0. If you have the later board than REV 0.0, it is needed to modify the CPU Board in the board level.
- Connect R158 with a resistor less than 100K Ohm for using external interrupt as card detection signal.
15 CF Driver Configuration

- TRUE-IDE mode on S3C6410 CF Controller does not support HOT-PLUG. CF device must be in the slot before booting OS up.
- CF ATAPI driver can be disabled. (set BSP_NOCFATAPI=1)
- Default setting is disabled.
- Default value in registry is Direct Mode.
- If you clear BSP_NOCFATAPI as following code, CF ATAPI driver will be included in OS image

In smdk6410\smdk6410.bat file
set BSP_NOCFATAPI=

- Setting BSP_NOCFATAPI=1 means that CF ATAPI driver is removed from OS image.
- After Changing, Build CF ATAPI driver and make image
- To set the operating mode, direct mode or indirect mode, set the CFGB7 as below.

CFGB7

<p>| | | |</p>
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Direct

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<tr>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Indirect

- To use Ultra-DMA mode of ATA-Device, You should set it as Direct mode.
  Ultra-DMA mode is only supported on Direct mode
- To use the CF ATAPI, Set the CFGB5 and CFGB6 as below.

CFGB5

<p>| | | | |</p>
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CFGB6

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</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
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</table>

- CF ATAPI Interface is conflict with Keypad H/W in SMDK6410 board. Do not Enable CF ATAPI Driver and Keypad Driver at the same time
In some version of SMDK board, you will be able to be faced with some trouble. If encounters a trouble in the direct mode, it is recommended to set the CFG4 in the base board as below.

![CFG4 Diagram]

- If you want to change PIO, PDMA, UDMA and In/Direct Mode, change registry as follows,

```
[HKEY_LOCAL_MACHINE\Drivers\BuiltIn\6410_CF\Device0]
"Prefix"="DSK"
"Dll"="S3C6410_CF_atapi.dll"
"Order"=dword:31
"IClass"=multi_sz: "{A4E7EDDA-E575-4252-9D68-4195D48B8865}"
"{8DD679CE-8AB4-43c8-A14A-EA4963FAA715}"
"InterruptDriven"=dword:00 ; en(1) dis(0)able interrupt driven I/O
"DMA"=dword:00 ; disable DMA. DMA is not supported
"DoubleBufferSize"=dword:10000 ; 128 sector (65536 byte) double buffer
"DrqDataBlockSize"=dword:200 ; 1 sector (512 byte) DRQ data block
"WriteCache"=dword:01 ; enable on-disk write cache
"LookAhead"=dword:1 ; enable on-disk look-ahead
"DeviceId"=dword:00 ; device 0, i.e., primary master
"TransferMode"=dword:ff ; use mode 0;
"EnablePDMA"=dword:1 ; 0 = PIO, 1 = PDMA. We recommend PDMA mode.
"EnableUDMA"=dword:1 ; 0 = PIO, 1 = UDMA. We recommend UDMA mode.
"IndirectMode"=dword:0 ; 0 = Direct, 1 = Indirect.
; To use UDMA, it should be '0'
; UDMA is only working on DIRECT MODE.
```
# 16 APPENDIX I. DIRECTORY LAYOUT CHANGE LIST

Changes of file & folder will be listed up here for each file & folder, only for rename, move, delete case, not including add. You can use diff tool to find the changes in file content. Content changes are not listed here. Moving file can cause changing including path, so you must diff each ‘sources’, ‘dir’ files

## From BSP 0.28 version to BSP 0.29 version

<table>
<thead>
<tr>
<th>From 0.28 Non-SOC folder Layout</th>
<th>To 0.29 SOC Folder Layout</th>
<th>Type</th>
<th>Operation</th>
</tr>
</thead>
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<td>PLATFORM\SMDK6410\SRC\COMMON\Cache</td>
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<td>Move</td>
</tr>
<tr>
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<td>PLATFORM\COMMON\SRC\SOC\S3C6410_SEC_V1\OAL\INTR</td>
<td>Folder</td>
<td>Move</td>
</tr>
<tr>
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<td>Folder</td>
<td>Move</td>
</tr>
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<td>PLATFORM\COMMON\SRC\SOC\S3C6410_SEC_V1\OAL\MISC</td>
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<td>Folder</td>
<td>Move</td>
</tr>
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<td>PLATFORM\COMMON\SRC\SOC\S3C6410\SEC_V1\OAL\INC\s3c6410_uart.h</td>
<td>File Move d</td>
<td></td>
</tr>
<tr>
<td>PLATFORM\SMDK6410\SRC\INC\s3c6410_usbottg.h</td>
<td>PLATFORM\COMMON\SRC\SOC\S3C6410\SEC_V1\OAL\INC\s3c6410_usbottg.h</td>
<td>File Move d</td>
<td></td>
</tr>
<tr>
<td>PLATFORM\SMDK6410\SRC\INC\s3c6410_wdog.h</td>
<td>PLATFORM\COMMON\SRC\SOC\S3C6410\SEC_V1\OAL\INC\s3c6410_wdog.h</td>
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</tr>
<tr>
<td>PLATFORM\SMDK6410\SRC\INC\s3c6410_intr.h</td>
<td>PLATFORM\COMMON\SRC\SOC\S3C6410\SEC_V1\OAL\INC\s3c6410_intr.h</td>
<td>File Move d</td>
<td></td>
</tr>
<tr>
<td>PLATFORM\SMDK6410\SRC\INC\oal_system.h</td>
<td>PLATFORM\COMMON\SRC\SOC\S3C6410\SEC_V1\OAL\INC\s3c6410_system.h</td>
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<td></td>
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<tr>
<td>PLATFORM\SMDK6410\SRC\INC\pmplatform.h</td>
<td>PLATFORM\COMMON\SRC\SOC\S3C6410\SEC_V1\OAL\INC\pmplatform.h</td>
<td>File Move d</td>
<td></td>
</tr>
<tr>
<td>PLATFORM\SMDK6410\SRC\INC\oal_intr.h</td>
<td>PLATFORM\COMMON\SRC\SOC\S3C6410\SEC_V1\OAL\INC\oal_intr.h</td>
<td>File Split</td>
<td></td>
</tr>
<tr>
<td>PLATFORM\SMDK6410\SRC\INC\bsp_cfg.h</td>
<td>PLATFORM\COMMON\SRC\SOC\S3C6410\SEC_V1\OAL\INC\soc_cfg.h</td>
<td>File Split</td>
<td></td>
</tr>
<tr>
<td>PLATFORM\SMDK6410\SRC\Drivers\Drvlib\s3c6410_stall.s</td>
<td></td>
<td>File Delet ed</td>
<td></td>
</tr>
</tbody>
</table>

**Affected sources&dir file**

<table>
<thead>
<tr>
<th>file PATH</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLATFORM\SMDK6410\SRC\BOOTLOADER\EBOOT\sources</td>
<td>Cache &amp; System Library</td>
</tr>
<tr>
<td>PLATFORM\SMDK6410\SRC\COMMON\dirs</td>
<td>OAL module code is moved</td>
</tr>
<tr>
<td>PLATFORM\SMDK6410\SRC\DRIVERS\DRVLIB\sources</td>
<td>s3c6410_stall.s is deleted</td>
</tr>
</tbody>
</table>
From BSP 0.30 version to BSP 0.31 version

<table>
<thead>
<tr>
<th>From 0.30</th>
<th>To 0.31</th>
<th>Type</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLATFORM\COMMON\SRC\SOC\S3C6410_SEC_V1\OAL\INC\TIMER\dvs.c</td>
<td>PLATFORM\COMMON\PM\dvs.c</td>
<td>File</td>
<td>Moved</td>
</tr>
<tr>
<td>PLATFORM\SMDK6410\SRC\COMMON\NANDFLASH\DLL</td>
<td>PLATFORM\COMMON\SRC\DRIVERS\NANDFLASH</td>
<td>Folder</td>
<td>Moved</td>
</tr>
<tr>
<td>PLATFORM\SMDK6410\SRC\COMMON\ioctl</td>
<td>PLATFORM\COMMON\SRC\SOC\S3C6410_SEC_V1\OAL\ioctl</td>
<td>Folder</td>
<td>Moved</td>
</tr>
</tbody>
</table>

Affected sources&dir file

<table>
<thead>
<tr>
<th>file PATH</th>
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</tr>
</thead>
<tbody>
<tr>
<td>PLATFORM\COMMON\SRC\SOC\S3C6410_SEC_V1\TIMER\sources</td>
<td>DVS module is moved</td>
</tr>
<tr>
<td>PLATFORM\SMDK6410\SRC\COMMON\dirs</td>
<td>PM(DVS) Module is added</td>
</tr>
<tr>
<td>PLATFORM\SMDK6410\SRC\DRIVERS\dirs</td>
<td>NANDFLASH driver is moved</td>
</tr>
</tbody>
</table>