GlobalMems Accelerometer Sensor -Proting Guides

Platform: AllWinner A33

Rev: V1.0

Date: 6/22/2015

目錄

目錄 2

1. REVISION HISTORY 2

2. PREFACE 3

3. RELEASE FOLDERS 3

4. SOFTWARE CONFIGURATION DETAIL 4

5. 自動檢測功能的使用步驟 5

6. HALSUPPORT 6

7. GLEVEL.APK SUPPORT 7

1. Revision History

Version	Revision Date	Descriptions
0.1	12/18/2014	First release of document applicable to gma302 products.
1.0	06/22/2015	移植流程補充

2. Preface

This document highlights the fundamental porting procedures to comply with gma302 driver to AllWinner platform.

3. Release folders

The software release packages contain the following gma302 device specific folders.

3.1 Kernel Driver

src\kernel\gma30x.c

src\kernel\gma30x.h

3.2 HAL

src\libsensors

3.3 Java Application

\APK-LEVEL\GLevel_D.apk

\APK-LEVEL\GLevel_L.apk

\APK-LEVEL\LevelCalibrationManual.pdf

3.4 SellScript

src\gss.sh

src\GlobalmemsShellScriptManual.pdf

4. Software configuration detail

4.1 sys_config.fex

配置文件在:/lichee/tools/pack/chips/sun8iw5/configs/android/astar-xxx目錄下.

Sys_config.fex文件中關係到gsensor自動檢測功能為”gsensor_para”以及”gsensor_list_para”兩部分參數.如下所示

```
;----------------------------------------------------------------------------------------------------
; G sensor configuration
; gs_twi_id --- TWI ID for controlling Gsensor (0: TWI0, 1: TWI1, 2: TWI2)
;----------------------------------------------------------------------------------------------------
[gsensor_para]
gsensor_used      = 1 //標示使用gsensor
gsensor_twi_id    = 1 //標示使用哪組i2c通道
gsensor_twi_addr = 0x18 //標示gsensor i2c slave address
gsensor_int1        = port:PB06<4><1><default><default>
gsensor_int2        =
; ----------------------------------------------------------------------------------------------------
```

如果gsensor_used 設置為0,表示gsensor不使用自動檢測.

```
;----------------------------------------------------------------------------------------------------
; G sensor automatic detection configuration
; gsensor_detect_used --- Whether startup automatic inspection function.
; 1:used, 0:unused
;Module name postpostion 1 said detection, 0 means no detection.
;----------------------------------------------------------------------------------------------------
[gsensor_list_para]
gsensor_det_used      = 1 //設置為1時,啟用自動檢測,設置為0時不檢測
gma30x    = 1 //設置為1,添加該型號gsensor到自動掃描列表
bma250    = 0 //
mma8452 = 1
mma7660 = 1
mma865x = 1
afa750      = 1
lis3de_acc = 1
```

當gsensor_det_used設置為1時,啟用自動檢測,為0時,痛出自動檢測.模組的名稱寫1表示添加到自動檢測掃描列表,寫0表示剔除自動檢測掃描列表.

Gsensor_list_para列表中的名稱順序必須與sw-device.c中sensors的名稱順序一一對應.

4.2 驅動模組

自動檢測源馬目錄: /lichee/linux-3.4/drivers/input/sw-device.c

模組	Slave Address	Who am I Register	Who am I value	KO文件
gma30x	0x18	0x04	0x55	gma30x.ko

4.3 device.info 文件的介紹

device.info 文件將會位於/data/device.info, 它的作用是記錄下當前使用的設備,自動檢測模組將讀取其中的設備驅動名稱,進行檢測,如果檢測失敗將會去掃描支持列表,查找使用的設備,也就是只有當更換設備時才會去掃描設備支持列表.否則將指檢測使用的設備.上層應用中根據其中的驅動名稱進行相應設備驅動的加載.

```
;-------------------------
;name:Gma30xAccelerometer
;-------------------------
gsensor_name = gma30x
gsensor_direct_x = true
gsensor_direct_y = false
gsensor_direct_z = true
gsensor_xy_revert = false
```

5. 自動檢測功能的使用步驟

5.1 驅動文件目錄存放在/lichee/linux3.4/drivers/hwmon

5.2 驅動的拷貝:編譯後的目錄: out/target/product/…/system/vendor/modules,省略部份為 lunch 時選擇的配置文件夾名稱.

機器中對應的目錄為:/system/vendor/modules

5.3 sys_config.fex 文件的修改

5.4 驅動的加載:

使用自動檢測功能時,只需加載 sw-device.ko 即可.

在 android/device/softwinner/Polaris-xxx/init.xxx.rc 中添加驅動加載的模組.

```
On fs
…….
#csi module
   insmod /system/vendor/modules/videobuf-core.ko
   insmod /system/vendor/modules/videobuf-dma-contig.ko
#insmod tp and keyboard gsensor
   insmod /system/vendor/modules/sw-device.ko
   //insmod  /system/vendor/modules/gma30x.ko  //手動加載模組確認驅動是否被帶起來,並確認與gsensor 硬件溝通狀況時使用
```

5.5 Device Driver Debug

gma30x.c use switch #define DEBUG

#define DEBUG : Enable gma->client->dev debug data .

//#define DEBUG : Disable gma->client->dev debug data

6. HALsupport

Gsensor's HAL source Path

"android/device/softwinner/fiber-common/hardware/libhardware/libsensors/"

Input->name : gma30x

1g = 1024 LSB

6.1.1 Modify libsensor/sensorDetect.cpp , add follow line

```
{
        {
            "gma30x", LSG_GMA302,
        }, {
            "GMA302 3-axis Accelerometer",
                "GlobalMems Inc.",
                1, 0,
                SENSOR_TYPE_ACCELEROMETER,
                (GRAVITY_EARTH * 16.0f),
                GRAVITY_EARTH/1024.0f,
                0.145f, 0,
                0, 0,
                { },
        },
    },
```

6.1.2 Modify libsensor/sensors.h , add follow line

```
#define LSG_GMA301                  (1024.0f)
#define LSG_GMA302                  (1024.0f)
#define LSG_GMA303                  (1024.0f)
```

6.1.3 方向的配置

在android/device/softwinner/wingr-xxx目錄下有個gsensor.cfg

這部分無法在pandaboard上模擬驗證,

請參考" A20平台CTP與SENSOR自動檢測使用文檔.pdf" CH6.1

6.1.4 驅動的加載

請參考" A20平台CTP與SENSOR自動檢測使用文檔.pdf" CH6.2,

在android上移植Gsensor還必須將驅動複製到android打包目錄的對應文件夾中並在init.sun7i.rc中將其加載.

對應目錄為 $PRODUCT_ROOT/system/vendor/modules/

6.1.5 權限開放與自動化腳本

a) Copy gss.sh to $ANDROID/libhardware/modules/libsensors/

```
$cp src/gss.sh $ANDROID/libhardware/modules/libsensors/
```

Modification of device.mk

For example, add the following descriptions (Red part) to “PRODUCT_COPY_FILES” section in “$ANDROID/device/ti/panda/device.mk” as shown below.

```
# Kernel
 ##########################################################
 PRODUCT_COPY_FILES += \
     $(TARGET_PREBUILT_KERNEL):kernel \
     hardware/libhardware/modules/libsensors/gss.sh:/system/bin/gss.sh
```

b) Modification of init.sun7i.rc

add: insmod /vendor/modules/gma30x.ko

c) Modification of init.rc

In “$ANDROID/system/core/rootdir/init.rc” of Android source code tree,

Modify the permission of sysfs interface. Sensor HAL should be allowed to access to sysfs interface of the acceleration sensor. Add the following descriptions to “on boot” section in init.rc.

```
on post-fs-data
……
      # create basic filesystem structure
      mkdir /data/misc 01771 system misc
# for gma302/gma303 setup
      mkdir /data/misc 01777 system shell
      chmod 755 /system/bin/gss.sh
      chown system system /sys/class/input/input0/enable
      chown system system /sys/class/input/input0/delay
…..
```

On the above, input2, input3, input4, input5, and input6 correspond to sysfs interface numbers of each acceleration sensor driver, geomagnetic sensor driver, geomagnetic raw sensor driver, orientation sensor driver, gyro sensor driver. In order to find sysfs interface number, use “getevent” check /sys/class/input/inputX/name (X indicates a number) after embedding each driver to the kernel and starting-up.

7. GLevel.apk support

Gsensor出廠時一般都有校準，但由於安裝外力等因素，到整機還是會有少數有較大的偏差，為了達到一致翻轉反應效果，所以少數有較大的偏差需要手動校準。

在水平狀態時點選校準的apk如下,請選擇合適的來安裝

詳細設置請參考\LEVEL APK\Calibration_Bubble_Level_2015_0621.pdf

7.1 讀寫sysfs文件

/sys/class/input/inputX/

7.2 補充

gss.sh 是apk跟driver溝通的shellscript，gss.sh將溝通介面固定，所以Level apk不需要經常更動

a) **先將gss.sh置入平台**

adb push gss.sh /system/bin

adb shell chmod 755 /system/bin/gss.sh

b) **Use getevent 得到 name : "accelerometer"註冊inputX**

Case : /dev/input/event0 表示gsensor註冊位置為input0

getevent

c) **如何使用gss.sh**

Example **usage 等同下右列command**

cd /sys/class/input/input0

Implement interface	Apk Example Usage	Command
calib	sh /system/bin/gss.sh calib 1	echo 1 > calibration
Clear_offset	sh /system/bin/gss.sh clear_offset	echo 1 > clear_offset
Read_reg	sh /system/bin/gss.sh read_reg 0x12 讀出register的值	echo 0x12 > reg_rx cat reg_rx
Write_reg	sh /system/bin/gss.sh write_reg 0x0f 0x20 將register 0x0f 的值改為0x20	echo 0x0f > reg_rx echo 0x20 > reg_tx cat reg_rx

```
$ adb shell
root@android:/ # cd /system/bin
cd /system/bin
root@android:/system/bin # ls -l ./gss.sh
ls -l ./gss.sh
-rw-rw-rw- root     root         6989 2014-07-21 09:38 gss.sh
root@android:/system/bin # sh ./gss.sh calib 1
sh ./gss.sh calib 1
start calibration....  ( Fri Jan  2 00:06:14 GMT 1970)
49 107 201
root@android:/system/bin # sh ./gss.sh clear_offset
sh ./gss.sh clear_offset
0 0 0
root@android:/system/bin # cat /sys/class/input/input0/calibration_value
cat /sys/class/input/input0/calibration_value
0 0 0
```