ALLWIMER®

V316 GPADC 接口使用说明书

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概述

### 1.1 编写目的

介绍按键 GPADC 模块的基本实现原理。

### 适用范围

### 1.3 相关人员

デンンリス 需要采集模拟输入相关模块驱动的开发/维护人员

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# 2 模

## 模块介绍

#### 2.1 模块功能介绍

GPADC 是 12bit 采样精度的魔术转换模块,支持 4 路通道,模拟输入范围具体由平台而定 (1721 平台为 1.8v),最高采样率 1MHZ,并且支持数据比较,自检验功能,同时工作于可配置的四种模式:

- 1. Single mode: 在指定的通道完成一次转换并将数据放在相应的数据寄存器中;
- 2. Single-cycle mode: 在指定的通道完成一次周期的转换并将数据放在相应的寄存器中;
- 3.Continue mode: 在指定的通道持续转换并将数据放在相应的数据寄存器中;
- 4.Burst mode: 边采样边转化并将数据放入 32 字节的 FIFO, 支持中断控制。

#### 2.2 相关术语介绍

术语 解释说明

sunxi 指 Allwinner 的一系列 soc 硬件平台

GPADC 高精度模数转换

### 2.3 模块配置介绍

#### 2.3.0.1 sys\_config.fex 配置说明

[gpadc]
gpadc\_used = 1
channel\_num = 4
channel\_select = 0x50
channel\_data\_select = 0x0
channel\_compare\_select = 0x01
channel\_cld\_select = 0x01
channel\_chd\_select = 0x00

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```
channel0_compare_lowdata = 460000
channel1_compare_higdata = 1200000
channel1_compare_lowdata = 460000
channel2_compare_higdata = 1200000
channel2_compare_lowdata = 460000
channel2_compare_higdata = 1200000
channel3_compare_lowdata = 460000
channel3_compare_higdata = 1200000
```

#### 其中

gpadc used:表示 gpadc 是否使用, 1:使用; 0:不使用

channel num: 表示平台支持的最大 gpadc 通道数;

channel\_select: 表示通道使能选择, channel0:0x01; channel1:0x02; channel2:0x04; channel3:0x08。channel\_data\_select: 表示数据使能通道选择, channel0:0x01; channel1:0x02; channel2:0x04; channel3:0x08。

channel\_compare\_select: 表示比较功能使能通道选择; channel0:0x01; channel1:0x02; channel2:0x04; channel3:0x08。

channel\_cld\_select: 表示比较功能的低数据通道使能选择; channel0:0x01; channel1:0x02; channel2:0x04; channel3:0x08。

channel\_chd\_select: 表示比较功能的高数据通道使能选择; channel0:0x01; channel1:0x02; channel2:0x04; channel3:0x08。

channel0\_compare\_lowdata: 表示通道 0 低于设定值时产生中断并采集数据,单位为 uv。channel0\_compare\_higdata: 表示通道 0 高于设定值时产生中断并采集数据,单位为 uv。

例如:设置通道 0 的比较功能小于 1.7V 时采集数据

channel select = 0x01

channel compare select = 0x01

channel cld select = 0x01

channel0 compare lowdata = 1700000

如果设置通道1的数据采集功能:

channel select = 0x02

channel data select = 0x02

#### 2.3.1 devices tree 配置说明

gpade:gpade{

compatible = "allwinner,sunxi-gpade",



```
reg = <0x0 \ 0x05070000 \ 0x0 \ 0x400>;
interrupts = <GIC_SPI 0 IRQ TYPE NONE>;
clocks = <&clk gpadc>;
key cnt = <5>;
key0 = <115 115>;
key1 = <235 114>;
kev2 = <360 \ 139>:
key3 = <480 \ 28>;
key4 = <590\ 102>;
status = "disabled";
```

#### 其中:

- 1. compatible: 表征具体的设备,用于驱动和设备的绑
- 2. reg: 设备使用的地址;
- 3. status: 表示设备是否使能;
- 4. key cnt: 表示支持按键数;
- 5. key0:表示按键输出电压值和对应的键值;

#### 2.3.2 menuconfig 配置说明

在命令行中进入内核根目录,执行 make ARCH=arm menuconfig 《64 位平台执行 make ARCH=arm64 menuconfig) 进入配置主界面,并按以下步骤操作: 首先,选择 Device Drivers 选项进入下一级配置,如下图所示:

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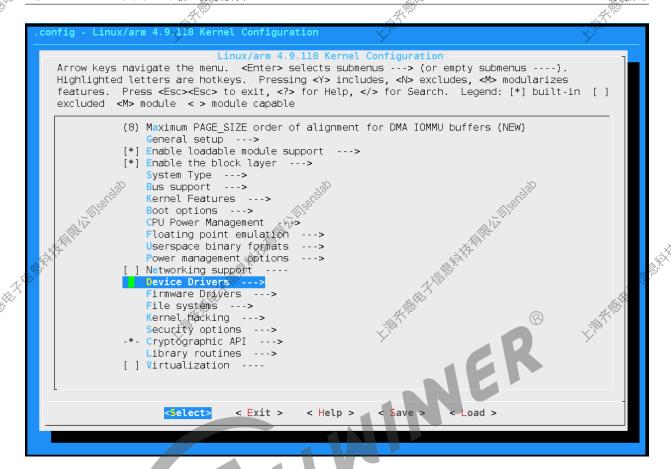


图 2-1: Device Drivers 选项配置

然后,选择 Input device support 选项,进入下一级配置,如下图所示:

%

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```
Arrow keys navigate the menu. \, <Enter> selects submenus ---> (or empty submenus ----).
Highlighted letters are hotkeys. Pressing <Y> includes, <N> excludes, <M> modularizes
features. Press <Esc> to exit, <?> for Help, </> for Search. Legend: [*] built-in []
excluded <M> module < > module capable
               Generic Driver Options --->
               Bus devices --->
           < > Memory Technology Device (MTD) support ----
           [*] Device Tree and Open Firmware support --->
           < > Parallel port support

[*] Block devices --->
           < > NVMe Target support
               Misc devices --->
               SCSI device support
           < > Serial ATA and Parallel ATA drivers (libata)
           [ ] Multiple devices driver support (RAID and LVM)
               Open-Channel SSD target support
               Input device support --
               Character devices
               I2C support
           [ ] SPI support
           < > SPMI support ----
           < > HSI support ----
PPS support --->
               PPS support
               PTP clock support --->
               Pin controllers --->
           [*] GPIO Support
           <sup>⊥</sup>(+)-
                               < <u>E</u>xit >
                  <Select>
                                           < Help >
                                                       < Save
```

图 2-2: Device Drivers 选项配置

接着,选择 Sensors 选项, 级配置,如下图:

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```
Input device support
Arrow keys navigate the menu. <Enter> selects submenus ---> (or empty submenus ----).
Highlighted letters are hotkeys. Pressing <Y> includes, <N> excludes, <M> modularizes
features. Press <Esc><Esc> to exit, <?> for Help, </> for Search. Legend: [*] built-in []
excluded <M> module < > module capable
           < >
                 Sparse keymap support library
                 Matrix keymap support library
                 *** Userland interfaces ***
                 Mouse interface
                 Joystick interface
                 Event interface
                 Event debugging
                 Reset key
                 Key combo
                 sunxi sensor init
                 *** Input Device Drivers ***
                 Keyboards --->
                 Mice ----
                 Joysticks/Gamepads
                 Tablets
                 Touchscreens ----
                 Miscellaneous devices
                 Synaptics RMI4 bus support
                 Sensors
                 BMA2x2 acceleration sensor support
                 EMA2X2 acceleration sensor interrupt INT1 support
           < >
                   BMA2X2 acceleration sensor interrupt INT2 support
                              < <u>E</u>xit >
                                          < Help >
                                                                   < Load >
                                                       < Save >
```

图 2-3: Device Drivers 选项配置

选择 SUNXI GPADC 选项,可选择直接编译进内核。如下图:

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```
Arrow keys navigate the menu. <Enter> selects submenus ---> (or empty submenus ----).
Highlighted letters are hotkeys. Pressing <Y> includes, <N> excludes, <M> modularizes
features. Press <Esc><Esc> to exit, <?> for Help, </> for Search. Legend: [*] built-in []
excluded <M> module < > module capable
           --- Sensors
           <M>
                 BMA250 acceleration sensor support (NEW)
                 SC7A30 3-Axis Orientation/Motion Detection Sensor Support (NEW)
           <M>
           <M>
                 MMA7660 3-Axis Orientation/Motion Detection Sensor Support (NEW)
                 MIR3DA 2-Axis Orientation/Motion Detection Sensor Support (NEW)
                 MXC622X 2-Axis Orientation/Motion Detection Sensor Support (NEW)
           ≥M>
                 MMA8452 3-Axis Orientation/Motion Detection Sensor Support (NEW)
           <M>
           <M>
                 MMA865X 3-Axis Orientation/Motion Detection Sensor Support (NEW)
                 MC32X0 Orientation/Motion Detection Sensor Support (NEW)
           <M>
                 SUNXI GPADO
                 SUNXI TPADC (NEW)
SUNXI GPADC test (NEW)
allwinnner KEY GPIO support (NEW)
                   <Select>
                               < Exit >
                                            < Help >
                                                          Save >
```

图 2-4: Device Drivers 选项配置

## 源码结构介绍

大·指表的。

```
drivers/input/
sensor
      - sunxi_gpadc.c // 平台的驱动代码SunxiGPADC |
      ·sunxi gpadc.h // 为平台的驱动定义了一些宏、数据结构SunxiGPADC
```

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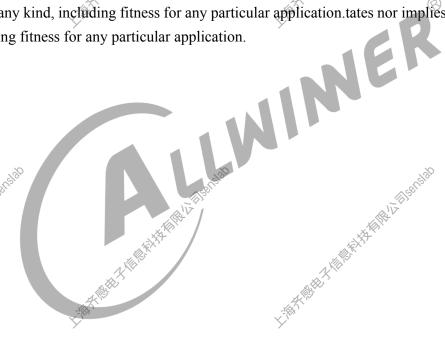


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