

UNISOC Android 10 Camera多摄像头方 案配置指引

修改历史



版本号	日期	注释
V1.0	2020/4/3	初稿

Unisoc Confidential For hiar

适用产品信息	适用版本信息	关键字
SC9863A,UMS512(T)	Android 10.0	双摄/三摄/四摄方案配置方案

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展锐手机开发平台支持多种多摄方案，本文档主要介绍展锐推荐的参考多摄设计方案，每种方案配置方法的说明。客户可以根据实际多摄像头方案搭配配置使用。

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Camera 宏所在的文件位置

platformname: 实际使用平台名称

boardname: 实际使用board名称

1. BoardConfig.mk

例如：device/sprd/platformname/boardname/BoardConfig.mk

2. system.prop

例如：device/sprd/platformname/boardname/system.prop

3. boardname.mk

例如：device/sprd/platformname/boardname/boardname.mk

4. DeviceCommon.mk

例如：device/sprd/platformname/common/DeviceCommon.mk

5. sensor_config.xml

例如：platformname/boardname/camera/sensor_config.xml

单摄像头配置及具体详细方式可以参考Sensor配置文档: 附录

Sensor的配置主
要包括四个部分：

1.1 硬件配置

1.2 驱动配置

1.3 xml配置

1.4 Tunning参
数配置

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●双摄功能配置

主要介绍双摄方案支持的AI人像模式单摄、AI人像模式双摄、大光圈、光学Zoom四种功能配置方法。

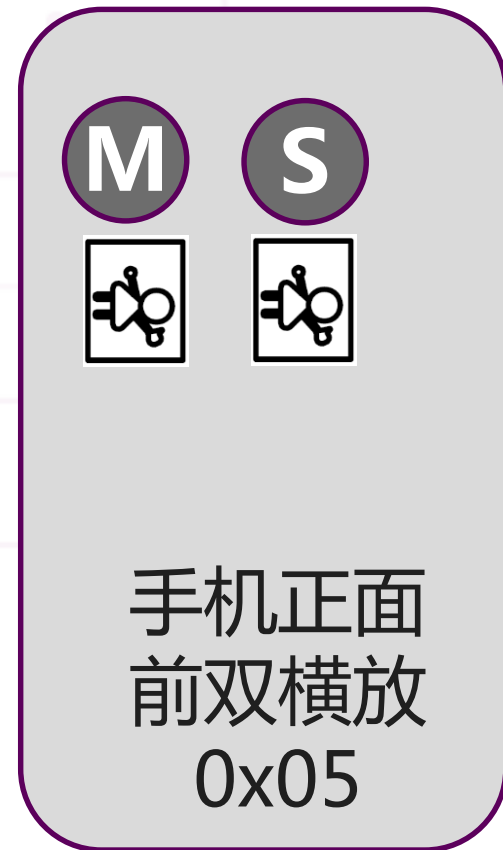
功能的支持场景:

	前双摄	前单摄	后双摄
AI人像模式单摄	不支持	支持	不支持
AI人像模式双摄	支持	不支持	支持
大光圈	支持	不支持	支持
光学zoom	支持	不支持	支持

功能配置List:

	功能	配置编号
前摄	AI人像模式单摄	配置1
	AI人像模式双摄	配置2
	大光圈	配置3
	光学Zoom	配置4
后摄	AI人像模式双摄	配置5
	大光圈	配置6
	光学Zoom	配置7

[配置1] 前摄:AI人像模式单摄



BoardConfig.mk

#camera dual sensor

TARGET_BOARD_CAMERA_DUAL_SENSOR_MODULE := true

#BOKEH feature

TARGET_BOARD_BOKEH_MODE_SUPPORT := true

#portrait_single

TARGET_BOARD_PORTRAIT_SINGLE_SUPPORT := true

boardname.mk

persist.vendor.cam.ba.blur.version=6

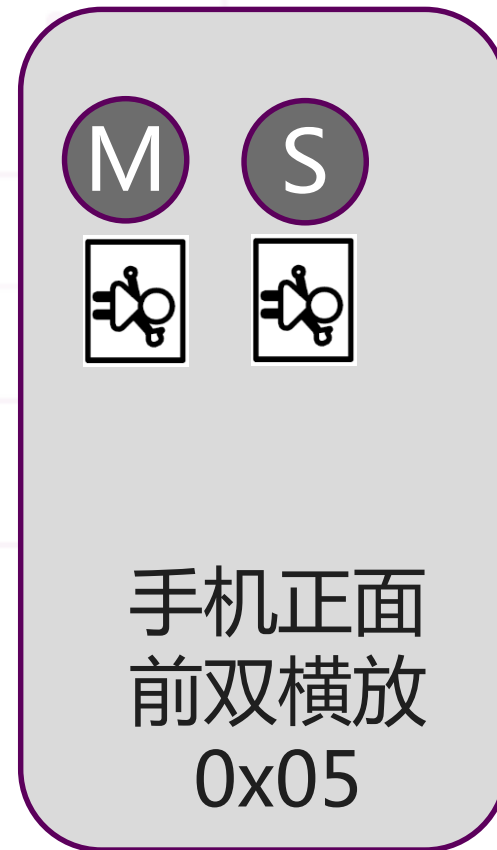
persist.vendor.cam.fr.blur.version=1

#ip feature list

#enable front portrait mode

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.fr.portrait.enable=1

[配置2] 前摄:AI人像模式双摄



BoardConfig.mk

#camera dual sensor

TARGET_BOARD_CAMERA_DUAL_SENSOR_MODULE := true

#BOKEH feature

TARGET_BOARD_BOKEH_MODE_SUPPORT := true

#portrait_single

TARGET_BOARD_PORTRAIT_SINGLE_SUPPORT := true

boardname.mk

persist.vendor.cam.ba.blur.version=6

persist.vendor.cam.fr.blur.version=1

#ip feature list

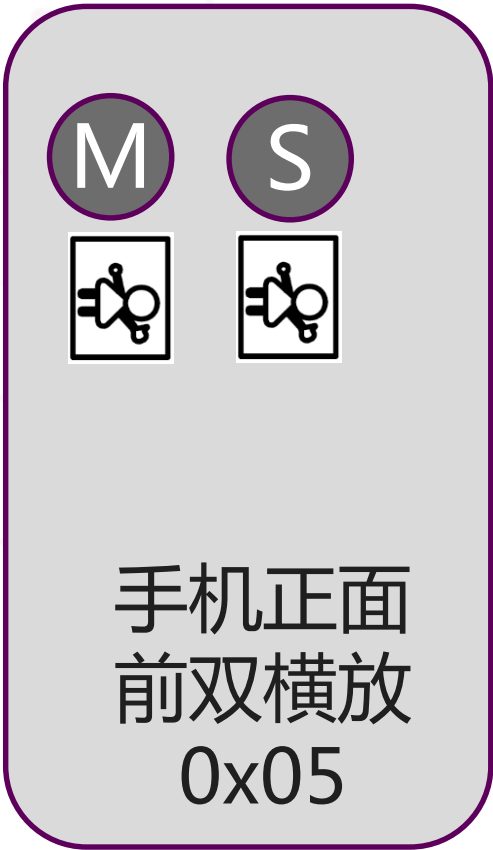
#enable back portrait mode

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.ba.portrait.enable=1

#enable front portrait mode

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.fr.portrait.enable=0

[配置2] 前摄:AI人像模式双摄



vendor/sprd/modules/libcamera/sensor/sensor_cfg.c

在支持Bokeh的情况下，是需要在这个数组里面配置用于做bokeh的这两颗sensor的。

```
const SNS_MULTII_CAMERA_INFO_T multi_camera_sensor_group[] = {
#ifdef CONFIG_BOKEH_SUPPORT
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"imx351", "0", "ov8856_shine", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863a1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"imx351", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863a1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"s5k3p9sx04", "0", "ov8856_shine", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863a1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov32a1q", "0", "ov16885_normal", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark15pro ums512_1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov8856", "0", "ov2680", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863a1h10_go_32b
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"s5k3l6xx03", "0", "gc5035", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 9863a3c10 sprocomm
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"s5k3p9sx04", "0", "s5k5e9yu05", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863a1h10 3-camera demo module
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov13855", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for sharkle sp9832e_1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov12a10", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark15 ums312_1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"imx363", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for roci ud710_3h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"hi1336_m0", "0", "gc2375_js_2", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 9863a_1c10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"hi1336_m0", "0", "gc02m1b_js_1", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 9863a_1c10
#endif
};
```

参数说明：

SPRD_BLUR_ID：逻辑Cam ID,不需要改动

MODE_BOKEH：对应功能Type,不需要改动

2：模组数量

{ "imx351", "0", "ov8856_shine", "0", "0", "0" }：模组信息对应其物理ID填入

SNS_FACE_BACK：模组位置，前摄对应SNS_FACE_FRONT

90: 图像软件旋转角度，支持 90、180、270 (通常后摄配置90，前摄配置270)

[配置3] 前摄:大光圈



BoardConfig.mk

#camera dual sensor

TARGET_BOARD_CAMERA_DUAL_SENSOR_MODULE := true

#BOKEH feature

TARGET_BOARD_BOKEH_MODE_SUPPORT := true

#portrait_single

TARGET_BOARD_PORTRAIT_SINGLE_SUPPORT := false

boardname.mk

persist.vendor.cam.ba.blur.version=6

persist.vendor.cam.fr.blur.version=1

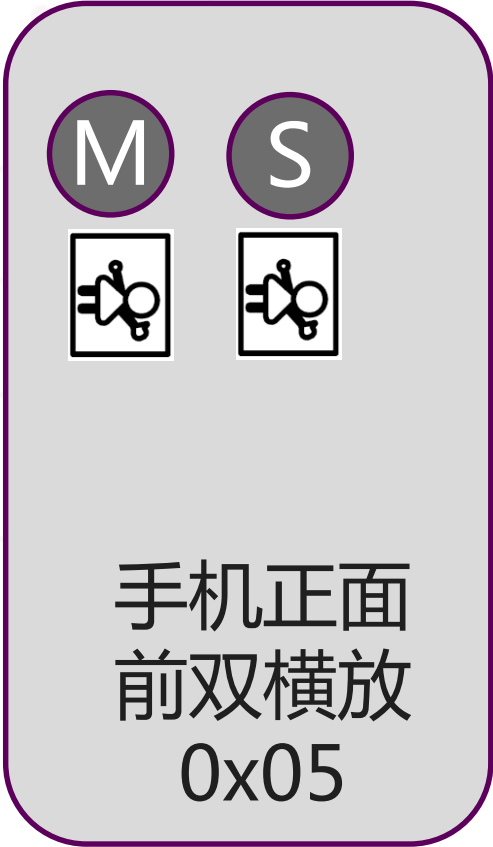
#ip feature list

#enable back portrait mode

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.ba.portrait.enable=0

#enable front portrait mode

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.fr.portrait.enable=0



vendor/sprd/modules/libcamera/sensor/sensor_cfg.c

在支持Bokeh的情况下，是需要在这个数组里面配置用于做bokeh的这两颗sensor的。

```
const SNS_MULTII_CAMERA_INFO_T multi_camera_sensor_group[] = {
#ifdef CONFIG_BOKEH_SUPPORT
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"imx351", "0", "ov8856_shine", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863a1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"imx351", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863a1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"s5k3p9sx04", "0", "ov8856_shine", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863a1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov32a1q", "0", "ov16885_normal", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark15pro ums512_1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov8856", "0", "ov2680", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863a1h10_go_32b
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"s5k3l6xx03", "0", "gc5035", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 9863a3c10 sprocomm
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"s5k3p9sx04", "0", "s5k5e9yu05", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863a1h10 3-camera demo module
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov13855", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for sharkle sp9832e_1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov12a10", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark15 ums312_1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"imx363", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for roci ud710_3h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"hi1336_m0", "0", "gc2375_js_2", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 9863a_1c10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"hi1336_m0", "0", "gc02m1b_js_1", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 9863a_1c10
#endif
};
```

参数说明：

SPRD_BLUR_ID：逻辑Cam ID,不需要改动

MODE_BOKEH：对应功能Type,不需要改动

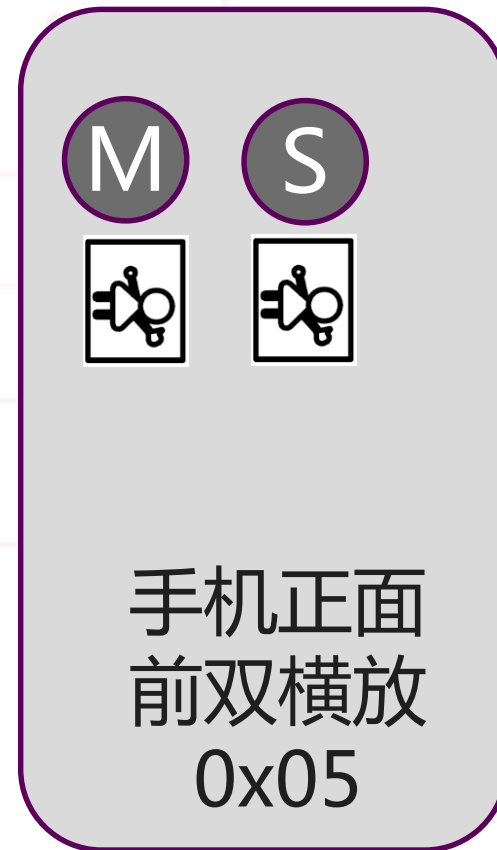
2：模组数量

{ "imx351", "0", "ov8856_shine", "0", "0", "0" }：模组信息对应其物理ID填入

SNS_FACE_BACK：模组位置，前摄对应SNS_FACE_FRONT

90: 图像软件旋转角度，支持 90、180、270 (通常后摄配置90，前摄配置270)

[配置4] 前摄:光学Zoom



BoardConfig.mk

```
#Multi Camera
TARGET_BOARD_MULTICAMERA_SUPPORT := true
#support wide superwide
TARGET_BOARD_WIDE_ULTRAWIDE_SUPPORT := true
```

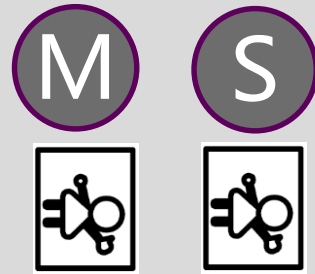
boardname.mk

```
#MMI main menu camera calibration & verification entry: 0-not display, 1-display
PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.multicam.cali.veri=1
#MMI opticszoom calibration mode: 1-SW+W, 2-W+T, 3-SW+W+T
PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.opticszoom.cali.mode=1
#multi camera superwide & wide
PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.multi.camera.enable=1
#multi camera
PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.res.multi.camera=RES_MULTI
#mutli camera section
PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.multi.section=2
```

DeviceCommon.mk

```
PRODUCT_PACKAGES += libmulticam
```


[配置4] 前摄:光学Zoom



手机正面
前双横放
0x05

vendor/sprd/modules/libcamera/sensor/sensor_cfg.c

同bokeh，光学变焦也需要在multi_camera_sensor_group中配置

```
#ifdef CONFIG_MULTICAMERA_SUPPORT
{SPRD_MULTI_CAMERA_ID, MODE_MULTI_CAMERA, 3, {"ov32a1q", "0", "ov16885_normal", "ov8856_shine", "0", "0"}, SNS_FACE_BACK, 90},
#ifdef CONFIG_WIDE_ULTRAWIDE_SUPPORT
{SPRD_MULTI_CAMERA_ID, MODE_MULTI_CAMERA, 2, {"s5k3l6", "0", "0", "hi846_wide", "0", "0"}, SNS_FACE_BACK, 90},
{SPRD_MULTI_CAMERA_ID, MODE_MULTI_CAMERA, 2, {"hi1336_m0", "0", "0", "hi846_gj_1", "0", "0"}, SNS_FACE_BACK, 90},
#endif
#endif
```

参数说明：

SPRD_MULTI_CAMERA_ID：逻辑ID,不需要改动

MODE_MULTI_CAMERA：对应功能Type,不需要改动

3：模组数量

{ "ov32a1q", "0", "ov16885_normal", "ov8856_shine", "0", "0" }：6颗模组信息对应其物理ID填入

SNS_FACE_BACK：模组位置，前摄对应SNS_FACE_FRONT

90：图像软件旋转角度，支持 90、180、270 (通常后摄配置90，前摄配置270)

[配置5] 后摄: AI人像模式双摄



手机背面
后双竖放
0x03

BoardConfig.mk

#camera dual sensor

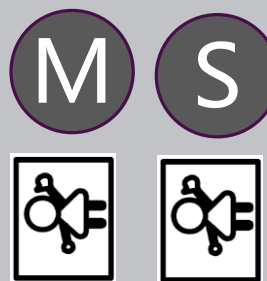
TARGET_BOARD_CAMERA_DUAL_SENSOR_MODULE := true

#BOKEH feature

TARGET_BOARD_BOKEH_MODE_SUPPORT := true

#portrait_single

TARGET_BOARD_PORTRAIT_SINGLE_SUPPORT := true



手机背面
后双横放
0x04

boardname.mk

persist.vendor.cam.ba.blur.version=6

persist.vendor.cam.fr.blur.version=1

#ip feature list

#enable back portrait mode

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.ba.portrait.enable=1

#enable front portrait mode

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.fr.portrait.enable=0

[配置5] 后摄: AI人像模式双摄



vendor/sprd/modules/libcamera/sensor/sensor_cfg.c

在支持Bokeh的情况下，是需要在这个数组里面配置用于做bokeh的这两颗sensor的。

```
const SNS_MULTII_CAMERA_INFO_T multi_camera_sensor_group[] = {
#ifdef CONFIG_BOKEH_SUPPORT
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"imx351", "0", "ov8856_shine", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863a1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"imx351", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863a1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"s5k3p9sx04", "0", "ov8856_shine", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863a1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov32a1q", "0", "ov16885_normal", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark15pro ums512_1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov8856", "0", "ov2680", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863a1h10_go_32b
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"s5k3l6xx03", "0", "gc5035", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 9863a3c10 sprocomm
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"s5k3p9sx04", "0", "s5k5e9yu05", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863a1h10 3-camera demo module
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov13855", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for sharkle sp9832e_1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov12a10", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark15 ums312_1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"imx363", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for roci ud710_3h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"hi1336_m0", "0", "gc2375_js_2", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 9863a_1c10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"hi1336_m0", "0", "gc02m1b_js_1", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 9863a_1c10
#endif
};
```

参数说明：

SPRD_BLUR_ID：逻辑Cam ID,不需要改动

MODE_BOKEH：对应功能Type,不需要改动

2：模组数量

{ "imx351", "0", "ov8856_shine", "0", "0", "0" }：模组信息对应其物理ID填入

SNS_FACE_BACK：模组位置，前摄对应SNS_FACE_FRONT

90: 图像软件旋转角度，支持 90、180、270 (通常后摄配置90，前摄配置270)

[配置6] 后摄:大光圈



手机背面
后双竖放
0x03

BoardConfig.mk

#camera dual sensor

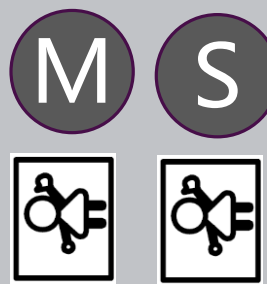
TARGET_BOARD_CAMERA_DUAL_SENSOR_MODULE := true

#BOKEH feature

TARGET_BOARD_BOKEH_MODE_SUPPORT := true

#portrait_single

TARGET_BOARD_PORTRAIT_SINGLE_SUPPORT := false



手机背面
后双横放
0x04

boardname.mk

persist.vendor.cam.ba.blur.version=6

persist.vendor.cam.fr.blur.version=1

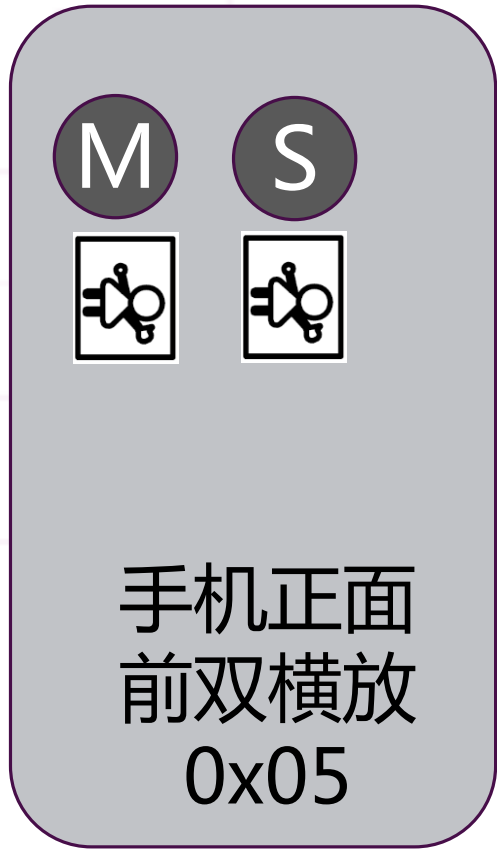
#ip feature list

#enable back portrait mode

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.ba.portrait.enable=0

#enable front portrait mode

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.fr.portrait.enable=0



vendor/sprd/modules/libcamera/sensor/sensor_cfg.c

在支持Bokeh的情况下，是需要在这个数组里面配置用于做bokeh的这两颗sensor的。

```
const SNS_MULTII_CAMERA_INFO_T multi_camera_sensor_group[] = {
#ifdef CONFIG_BOKEH_SUPPORT
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"imx351", "0", "ov8856_shine", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863alh10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"imx351", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863alh10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"s5k3p9sx04", "0", "ov8856_shine", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863alh10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov32a1q", "0", "ov16885_normal", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark15pro ums512_1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov8856", "0", "ov2680", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863alh10_go_32b
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"s5k3l6xx03", "0", "gc5035", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 9863a3c10 sprocomm
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"s5k3p9sx04", "0", "s5k5e9yu05", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863alh10 3-camera demo module
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov13855", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for sharkle sp9832e_1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov12a10", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark15 ums312_1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"imx363", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for roci ud710_3h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"hi1336_m0", "0", "gc2375_js_2", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 9863a_1c10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"hi1336_m0", "0", "gc02m1b_js_1", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 9863a_1c10
#endif
};
```

参数说明：

SPRD_BLUR_ID：逻辑Cam ID,不需要改动

MODE_BOKEH：对应功能Type,不需要改动

2：模组数量

{ "imx351", "0", "ov8856_shine", "0", "0", "0" }：模组信息对应其物理ID填入

SNS_FACE_BACK：模组位置，前摄对应SNS_FACE_FRONT

90: 图像软件旋转角度，支持 90、180、270 (通常后摄配置90，前摄配置270)

[配置7] 后摄:光学Zoom



手机背面
后双竖放
0x03

BoardConfig.mk

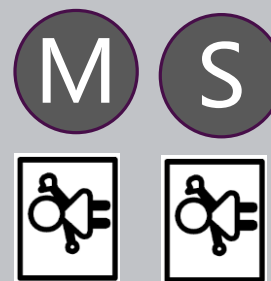
```
#Multi Camera
TARGET_BOARD_MULTICAMERA_SUPPORT := true
#support wide superwide
TARGET_BOARD_WIDE_ULTRAWIDE_SUPPORT := true
```

boardname.mk

```
#MMI main menu camera calibration & verification entry: 0-not display, 1-display
PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.multicam.cali.veri=1
#MMI opticszoom calibration mode: 1-SW+W, 2-W+T, 3-SW+W+T
PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.opticszoom.cali.mode=1
#multi camera superwide & wide
PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.multi.camera.enable=1
#multi camera
PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.res.multi.camera=RES_MULTI
#mutli camera section
PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.multi.section=2
```

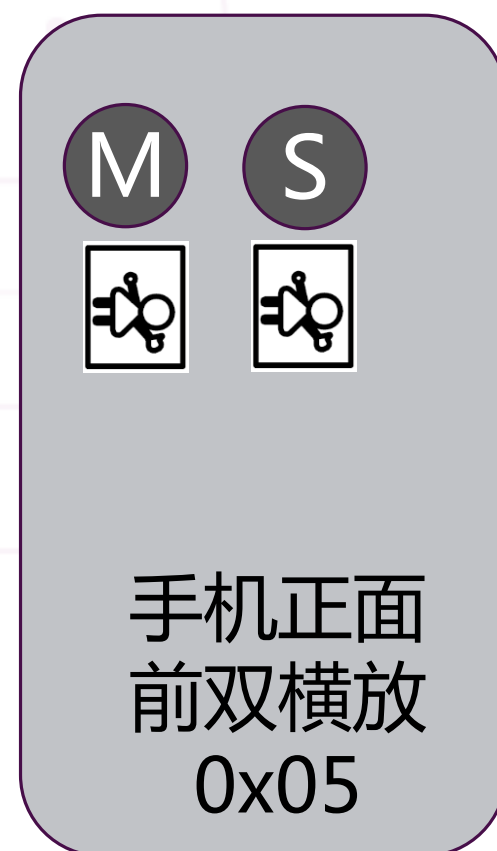
DeviceCommon.mk

```
PRODUCT_PACKAGES += libmulticam
```



手机背面
后双横放
0x04

[配置7] 后摄:光学Zoom



vendor/sprd/modules/libcamera/sensor/sensor_cfg.c

同bokeh，光学变焦也需要在multi_camera_sensor_group中配置

```
#ifdef CONFIG_MULTICAMERA_SUPPORT
{SPRD_MULTI_CAMERA_ID, MODE_MULTI_CAMERA, 3, {"ov32a1q", "0", "ov16885_normal", "ov8856_shine", "0", "0"}, SNS_FACE_BACK, 90},
#ifdef CONFIG_WIDE_ULTRAWIDE_SUPPORT
{SPRD_MULTI_CAMERA_ID, MODE_MULTI_CAMERA, 2, {"s5k3l6", "0", "0", "hi846_wide", "0", "0"}, SNS_FACE_BACK, 90},
{SPRD_MULTI_CAMERA_ID, MODE_MULTI_CAMERA, 2, {"hi1336_m0", "0", "0", "hi846_gj_1", "0", "0"}, SNS_FACE_BACK, 90},
#endif
#endif
```

参数说明：

SPRD_MULTI_CAMERA_ID：逻辑ID,不需要改动

MODE_MULTI_CAMERA：对应功能Type,不需要改动

3：模组数量

{ "ov32a1q", "0", "ov16885_normal", "ov8856_shine", "0", "0" }：6颗模组信息对应其物理ID填入

SNS_FACE_BACK：模组位置，前摄对应SNS_FACE_FRONT

90：图像软件旋转角度，支持 90、180、270 (通常后摄配置90，前摄配置270)

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●三摄功能配置

主要介绍三摄方案支持的超广角、人像模式、大光圈、光学Zoom四种功能配置方法。

功能的支持场景:

	超广角	光学变焦	人像模式	大光圈
后三摄方案一	√	√	√	X
后三摄方案二	X	√	√	X
后三摄方案三	√	√	X	√
后三摄方案四	X	√	X	√

功能配置List:

	功能	配置编号
后三摄方案一	超广角+人像模式+光学变焦	配置3-1
后三摄方案二	光学变焦+人像模式	配置3-2
后三摄方案三	超广角+光学变焦+大光圈	配置3-3
后三摄方案四	光学变焦+大光圈	配置3-4

[配置3-1]：超广角+人像模式+光学变焦

Super
Wide
Camera

Main
(Wide)
Camera

Sub
Camera

BoardConfig.mk

#Multi Camera

TARGET_BOARD_MULTICAMERA_SUPPORT := true

boardname.mk

#multi camera

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.res.multi.camera=RES_MULTI

#mutli camera section

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.multi.section=3

#MMI main menu camera calibration & verification entry: 0-not display, 1-display

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.multicam.cali.veri=1

#MMI opticszoom calibration mode: 1-SW+W, 2-W+T, 3-SW+W+T

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.opticszoom.cali.mode=3

#enable back portrait mode

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.ba.portrait.enable=1

#multi camera superwide & wide & tele

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.multi.camera.enable=1

#enable ultra wide

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.ultra.wide.enable=1

DeviceCommon.mk

PRODUCT_PACKAGES += libmulticam

[配置3-1]：超广角+人像模式+光学变焦

Super
Wide
Camera

Main
(Wide)
Camera

Sub
Camera

vendor/sprd/modules/libcamera/sensor/sensor_cfg.c

在支持Bokeh的情况下，是需要在这个数组里面配置用于做bokeh的这两颗sensor的。

```
const SNS_MULTII_CAMERA_INFO_T multi_camera_sensor_group[] = {
#ifdef CONFIG_BOKEH_SUPPORT
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"imx351", "0", "ov8856_shine", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863alh10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"imx351", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863alh10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"s5k3p9sx04", "0", "ov8856_shine", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863alh10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov32a1q", "0", "ov16885_normal", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark15pro ums512_1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov8856", "0", "ov2680", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863alh10_go_32b
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"s5k3l6xx03", "0", "gc5035", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 9863a3c10 sprocomm
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"s5k3p9sx04", "0", "s5k5e9yu05", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863alh10 3-camera demo module
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov13855", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for sharkle sp9832e_1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov12a10", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark15 ums312_1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"imx363", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for roci ud710_3h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"hi1336_m0", "0", "gc2375_js_2", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 9863a_1c10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"hi1336_m0", "0", "gc02m1b_js_1", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 9863a_1c10
#endif
}
```

参数说明：

SPRD_BLUR_ID：逻辑Cam ID,不需要改动

MODE_BOKEH：对应功能Type,不需要改动

2：模组数量

{ "imx351", "0", "ov8856_shine", "0", "0", "0" }：模组信息对应其物理ID填入

SNS_FACE_BACK：模组位置，前摄对应SNS_FACE_FRONT

90: 图像软件旋转角度，支持 90、180、270 (通常后摄配置90，前摄配置270)

[配置3-1]：超广角+人像模式+光学变焦

Super
Wide
Camera

Main
(Wide)
Camera

Sub
Camera

vendor/sprd/modules/libcamera/sensor/sensor_cfg.c

同bokeh，光学变焦也需要在multi_camera_sensor_group中配置

```
#ifdef CONFIG_MULTICAMERA_SUPPORT
{SPRD_MULTI_CAMERA_ID, MODE_MULTI_CAMERA, 3, {"ov32a1q", "0", "ov16885_normal", "ov8856_shine", "0", "0"}, SNS_FACE_BACK, 90},
#ifdef CONFIG_WIDE_ULTRAWIDE_SUPPORT
{SPRD_MULTI_CAMERA_ID, MODE_MULTI_CAMERA, 2, {"s5k316", "0", "0", "hi846_wide", "0", "0"}, SNS_FACE_BACK, 90},
{SPRD_MULTI_CAMERA_ID, MODE_MULTI_CAMERA, 2, {"hi1336_m0", "0", "0", "hi846_gj_1", "0", "0"}, SNS_FACE_BACK, 90},
#endif
#endif
```

参数说明：

SPRD_MULTI_CAMERA_ID：逻辑ID,不需要改动

MODE_MULTI_CAMERA：对应功能Type,不需要改动

3：模组数量

{"ov32a1q", "0", "ov16885_normal", "ov8856_shine", "0", "0"}：6颗模组信息对应其物理ID填入

SNS_FACE_BACK：模组位置，前摄对应SNS_FACE_FRONT

90：图像软件旋转角度，支持 90、180、270 (通常后摄配置90，前摄配置270)

[配置3-1]：超广角+人像模式+光学变焦

Super
Wide
Camera

Main
(Wide)
Camera

Sub
Camera

vendor/sprd/modules/libcamera/sensor/sensor_drv/classic/Hynix/hi846_gj_1/sensor_hi846_wide_mipi_raw_4lane.h

由于在开机过程中，get_camera_info函数会获取超广角sensor的id，而超广角id的获得是通过读取sensor驱动文件中的module_id获得，因此还需要配置超广角的module_id为MODULE_SPW_NONE_BACK。

```
static SENSOR_TRIM_T s_hi846_wide_resolution_trim_tab[VENDOR_NUM] = {
    {.module_id = MODULE_SPW_NONE_BACK,
     .trim_info =
        {
            {0, 0, 0, 0, 0, 0, 0, {0, 0, 0, 0}},

            {.trim_start_x = VIDEO_TRIM_X,
             .trim_start_y = VIDEO_TRIM_Y,
             .trim_width = VIDEO_TRIM_W,
             .trim_height = VIDEO_TRIM_H,
             .line_time = VIDEO_LINE_TIME,
```

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[配置3-2]：光学变焦+人像模式

Tele
Camera

Main
(Wide)
Camera

Sub
Camera

BoardConfig.mk

#Multi Camera

TARGET_BOARD_MULTICAMERA_SUPPORT := true

boardname.mk

#multi camera

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.res.multi.camera=RES_MULTI_FULLSIZE

#mutli camera section

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.multi.section=2

#MMI main menu camera calibration & verification entry: 0-not display, 1-display

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.multicam.cali.veri=1

#MMI opticszoom calibration mode: 1-SW+W, 2-W+T, 3-SW+W+T

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.opticszoom.cali.mode=2

#enable back portrait mode

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.ba.portrait.enable=1

#multi camera superwide & wide & tele

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.multi.camera.enable=1

#enable ultra wide

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.ultra.wide.enable=0

DeviceCommon.mk

PRODUCT_PACKAGES += libmulticam

[配置3-2]：光学变焦+人像模式



vendor/sprd/modules/libcamera/sensor/sensor_cfg.c

在支持Bokeh的情况下，是需要在这个数组里面配置用于做bokeh的这两颗sensor的。

```
const SNS_MULTII_CAMERA_INFO_T multi_camera_sensor_group[] = {
#ifdef CONFIG_BOKEH_SUPPORT
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"imx351", "0", "ov8856_shine", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863a1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"imx351", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863a1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"s5k3p9sx04", "0", "ov8856_shine", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863a1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov32a1q", "0", "ov16885_normal", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark15pro ums512_1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov8856", "0", "ov2680", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863a1h10_go_32b
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"s5k3l6xx03", "0", "gc5035", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 9863a3c10 sprocomm
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"s5k3p9sx04", "0", "s5k5e9yu05", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863a1h10 3-camera demo module
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov13855", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for sharkle sp9832e_1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov12a10", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark15 ums312_1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"imx363", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for roci ud710_3h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"hi1336_m0", "0", "gc2375_js_2", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 9863a_1c10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"hi1336_m0", "0", "gc02m1b_js_1", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 9863a_1c10
#endif
};
```

参数说明：

SPRD_BLUR_ID：逻辑Cam ID,不需要改动

MODE_BOKEH：对应功能Type,不需要改动

2：模组数量

{ "imx351", "0", "ov8856_shine", "0", "0", "0" }：模组信息对应其物理ID填入

SNS_FACE_BACK：模组位置，前摄对应SNS_FACE_FRONT

90: 图像软件旋转角度，支持 90、180、270 (通常后摄配置90，前摄配置270)

[配置3-2]：光学变焦+人像模式

Tele
Camera

Main
(Wide)
Camera

Sub
Camera

vendor/sprd/modules/libcamera/sensor/sensor_cfg.c

同bokeh，光学变焦也需要在multi_camera_sensor_group中配置

```
#ifdef CONFIG_MULTICAMERA_SUPPORT
{SPRD_MULTI_CAMERA_ID, MODE_MULTI_CAMERA, 3, {"ov32a1q", "0", "ov16885_normal", "ov8856_shine", "0", "0"}, SNS_FACE_BACK, 90},
#ifdef CONFIG_WIDE_ULTRAWIDE_SUPPORT
{SPRD_MULTI_CAMERA_ID, MODE_MULTI_CAMERA, 2, {"s5k3l6", "0", "0", "hi846_wide", "0", "0"}, SNS_FACE_BACK, 90},
{SPRD_MULTI_CAMERA_ID, MODE_MULTI_CAMERA, 2, {"hi1336_m0", "0", "0", "hi846_gj_1", "0", "0"}, SNS_FACE_BACK, 90},
#endif
#endif
```

参数说明：

SPRD_MULTI_CAMERA_ID：逻辑ID,不需要改动

MODE_MULTI_CAMERA：对应功能Type,不需要改动

3：模组数量

{ "ov32a1q", "0", "ov16885_normal", "ov8856_shine", "0", "0" }：6颗模组信息对应其物理ID填入

SNS_FACE_BACK：模组位置，前摄对应SNS_FACE_FRONT

90：图像软件旋转角度，支持 90、180、270 (通常后摄配置90，前摄配置270)

[配置3-3]：超广角+大光圈+光学变焦

Super
Wide
Camera

Main
(Wide)
Camera

Sub
Camera

BoardConfig.mk

#Multi Camera

TARGET_BOARD_MULTICAMERA_SUPPORT := true

boardname.mk

#multi camera

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.res.multi.camera=RES_MULTI

#mutli camera section

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.multi.section=3

#MMI main menu camera calibration & verification entry: 0-not display, 1-display

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.multicam.cali.veri=1

#MMI opticszoom calibration mode: 1-SW+W, 2-W+T, 3-SW+W+T

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.opticszoom.cali.mode=3

#enable back portrait mode

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.ba.portrait.enable=0

#multi camera superwide & wide & tele

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.multi.camera.enable=1

#enable ultra wide

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.ultra.wide.enable=1

DeviceCommon.mk

PRODUCT_PACKAGES += libmulticam

[配置3-3]：超广角+大光圈+光学变焦

vendor/sprd/modules/libcamera/sensor/sensor_cfg.c

在支持Bokeh的情况下，是需要在这个数组里面配置用于做bokeh的这两颗sensor的。

```
const SNS_MULTII_CAMERA_INFO_T multi_camera_sensor_group[] = {
#ifdef CONFIG_BOKEH_SUPPORT
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"imx351", "0", "ov8856_shine", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863alh10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"imx351", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863alh10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"s5k3p9sx04", "0", "ov8856_shine", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863alh10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov32alq", "0", "ov16885_normal", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark15pro ums512_1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov8856", "0", "ov2680", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863alh10_go_32b
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"s5k3l6xx03", "0", "gc5035", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 9863a3c10 sprocomm
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"s5k3p9sx04", "0", "s5k5e9yu05", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863alh10 3-camera demo module
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov13855", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for sharkle sp9832e_1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov12a10", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark15 ums312_1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"imx363", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for roci ud710_3h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"hi1336_m0", "0", "gc2375_js_2", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 9863a_1c10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"hi1336_m0", "0", "gc02mlb_js_1", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 9863a_1c10
#endif
};
```

参数说明：

SPRD_BLUR_ID：逻辑Cam ID,不需要改动

MODE_BOKEH：对应功能Type,不需要改动

2：模组数量

{ "imx351", "0", "ov8856_shine", "0", "0", "0" }：模组信息对应其物理ID填入

SNS_FACE_BACK：模组位置，前摄对应SNS_FACE_FRONT

90: 图像软件旋转角度，支持 90、180、270 (通常后摄配置90，前摄配置270)

Super
Wide
Camera

Main
(Wide)
Camera

Sub
Camera

[配置3-3]：超广角+大光圈+光学变焦

Super
Wide
Camera

Main
(Wide)
Camera

Sub
Camera

vendor/sprd/modules/libcamera/sensor/sensor_cfg.c

同bokeh，光学变焦也需要在multi_camera_sensor_group中配置

```
#ifdef CONFIG_MULTICAMERA_SUPPORT
{SPRD_MULTI_CAMERA_ID, MODE_MULTI_CAMERA, 3, {"ov32a1q", "0", "ov16885_normal", "ov8856_shine", "0", "0"}, SNS_FACE_BACK, 90},
#ifdef CONFIG_WIDE_ULTRAWIDE_SUPPORT
{SPRD_MULTI_CAMERA_ID, MODE_MULTI_CAMERA, 2, {"s5k3l6", "0", "0", "hi846_wide", "0", "0"}, SNS_FACE_BACK, 90},
{SPRD_MULTI_CAMERA_ID, MODE_MULTI_CAMERA, 2, {"hi1336_m0", "0", "0", "hi846_gj_1", "0", "0"}, SNS_FACE_BACK, 90},
#endif
#endif
#endif
```

参数说明：

SPRD_MULTI_CAMERA_ID：逻辑ID,不需要改动

MODE_MULTI_CAMERA：对应功能Type,不需要改动

3：模组数量

{"ov32a1q", "0", "ov16885_normal", "ov8856_shine", "0", "0"}：6颗模组信息对应其物理ID填入

SNS_FACE_BACK：模组位置，前摄对应SNS_FACE_FRONT

90：图像软件旋转角度，支持 90、180、270 (通常后摄配置90，前摄配置270)

[配置3-3]：超广角+大光圈+光学变焦

Super
Wide
Camera

Main
(Wide)
Camera

Sub
Camera

vendor/sprd/modules/libcamera/sensor/sensor_drv/classic/Hynix/hi846_gj_1/sensor_hi846_wide_mipi_raw_4lane.h

由于在开机过程中，get_camera_info函数会获取超广角sensor的id，而超广角id的获得是通过读取sensor驱动文件中的module_id获得，因此还需要配置超广角的module_id为MODULE_SPW_NONE_BACK。

```
static SENSOR_TRIM_T s_hi846_wide_resolution_trim_tab[VENDOR_NUM] = {
    {.module_id = MODULE_SPW_NONE_BACK,
     .trim_info =
        {
            {0, 0, 0, 0, 0, 0, 0, {0, 0, 0, 0}},

            {.trim_start_x = VIDEO_TRIM_X,
             .trim_start_y = VIDEO_TRIM_Y,
             .trim_width = VIDEO_TRIM_W,
             .trim_height = VIDEO_TRIM_H,
             .line_time = VIDEO_LINE_TIME,
```

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[配置3-4]：光学变焦+大光圈

Tele
Camera

Main
(Wide)
Camera

Sub
Camera

BoardConfig.mk

#Multi Camera

TARGET_BOARD_MULTICAMERA_SUPPORT := true

boardname.mk

#multi camera

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.res.multi.camera=RES_MULTI_FULLSIZE

#mutli camera section

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.multi.section=2

#MMI main menu camera calibration & verification entry: 0-not display, 1-display

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.multicam.cali.veri=1

#MMI opticszoom calibration mode: 1-SW+W, 2-W+T, 3-SW+W+T

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.opticszoom.cali.mode=2

#enable back portrait mode

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.ba.portrait.enable=0

#multi camera superwide & wide & tele

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.multi.camera.enable=1

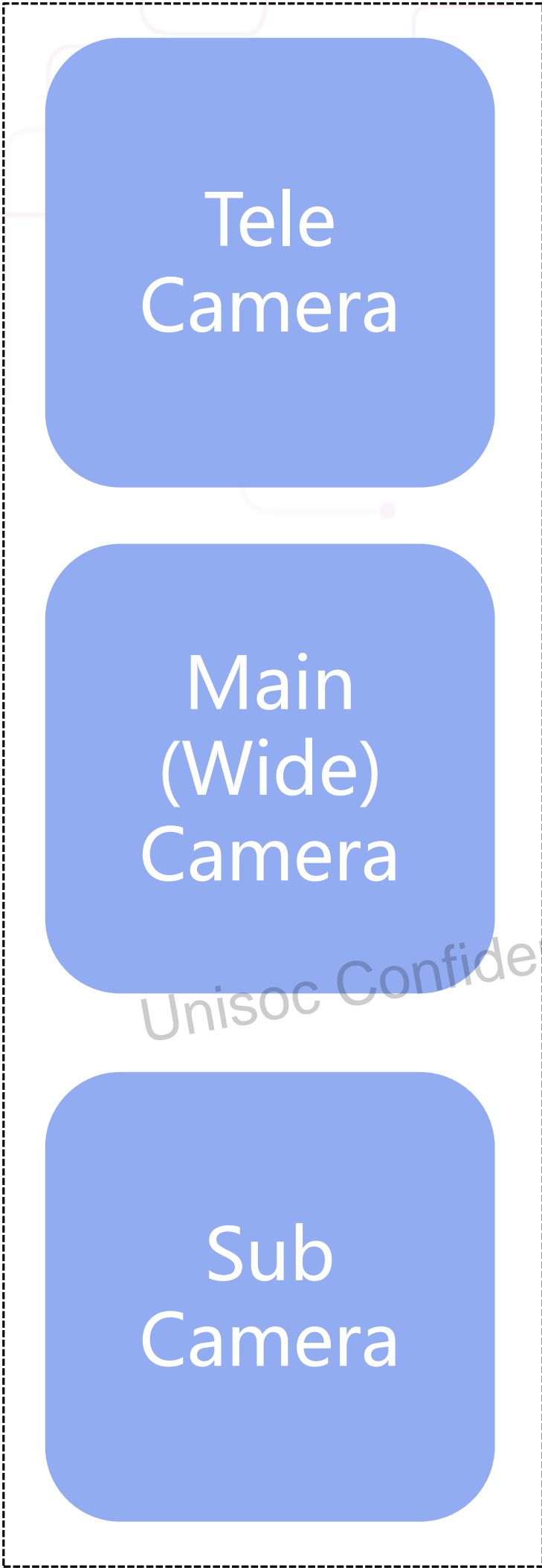
#enable ultra wide

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.ultra.wide.enable=0

DeviceCommon.mk

PRODUCT_PACKAGES += libmulticam

[配置3-4]：光学变焦+大光圈



vendor/sprd/modules/libcamera/sensor/sensor_cfg.c

在支持Bokeh的情况下，是需要在这个数组里面配置用于做bokeh的这两颗sensor的。

```
const SNS_MULTII_CAMERA_INFO_T multi_camera_sensor_group[] = {
#ifdef CONFIG_BOKEH_SUPPORT
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"imx351", "0", "ov8856_shine", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863a1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"imx351", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863a1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"s5k3p9sx04", "0", "ov8856_shine", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863a1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov32a1q", "0", "ov16885_normal", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark15pro ums512_1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov8856", "0", "ov2680", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863a1h10_go_32b
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"s5k3l6xx03", "0", "gc5035", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 9863a3c10 sprocomm
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"s5k3p9sx04", "0", "s5k5e9yu05", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863a1h10 3-camera demo module
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov13855", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for sharkle sp9832e_1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov12a10", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark15 ums312_1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"imx363", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for roci ud710_3h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"hi1336_m0", "0", "gc2375_js_2", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 9863a_1c10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"hi1336_m0", "0", "gc02m1b_js_1", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 9863a_1c10
#endif
};
```

参数说明：

SPRD_BLUR_ID：逻辑Cam ID,不需要改动

MODE_BOKEH：对应功能Type,不需要改动

2：模组数量

{ "imx351", "0", "ov8856_shine", "0", "0", "0" }：模组信息对应其物理ID填入

SNS_FACE_BACK：模组位置，前摄对应SNS_FACE_FRONT

90: 图像软件旋转角度，支持 90、180、270 (通常后摄配置90，前摄配置270)

[配置3-4]：光学变焦+大光圈

Tele
Camera

Main
(Wide)
Camera

Sub
Camera

vendor/sprd/modules/libcamera/sensor/sensor_cfg.c

同bokeh，光学变焦也需要在multi_camera_sensor_group中配置

```
#ifndef CONFIG_MULTICAMERA_SUPPORT
{SPRD_MULTI_CAMERA_ID, MODE_MULTI_CAMERA, 3, {"ov32a1q", "0", "ov16885_normal", "ov8856_shine", "0", "0"}, SNS_FACE_BACK, 90},
#endif
#ifdef CONFIG_WIDE_ULTRAWIDE_SUPPORT
{SPRD_MULTI_CAMERA_ID, MODE_MULTI_CAMERA, 2, {"s5k3l6", "0", "0", "hi846_wide", "0", "0"}, SNS_FACE_BACK, 90},
{SPRD_MULTI_CAMERA_ID, MODE_MULTI_CAMERA, 2, {"hi1336_m0", "0", "0", "hi846_gj_1", "0", "0"}, SNS_FACE_BACK, 90},
#endif
#endif
```

参数说明：

SPRD_MULTI_CAMERA_ID：逻辑ID,不需要改动

MODE_MULTI_CAMERA：对应功能Type,不需要改动

3：模组数量

{ "ov32a1q", "0", "ov16885_normal", "ov8856_shine", "0", "0" }：6颗模组信息对应其物理ID填入

SNS_FACE_BACK：模组位置，前摄对应SNS_FACE_FRONT

90：图像软件旋转角度，支持 90、180、270 (通常后摄配置90，前摄配置270)

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●四摄功能配置

主要介绍四摄方案支持的微距、人像模式、大光圈、光学Zoom四种功能配置方法。

功能的支持场景:

	超广角	光学变焦	人像模式	微距
后四摄方案一	√	√	√	√

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功能配置List:

	功能	配置编号
后三摄方案一	超广角+人像模式+光学变焦+微距	配置4-1

[配置4-1] : 超广角+人像模式+光学变焦+微距

Tele
Camera

Main
(Wide)
Camera

Super
Wide
Camera

Macro
Lens
Camera

BoardConfig.mk

#Multi Camera

TARGET_BOARD_MULTICAMERA_SUPPORT := true

boardname.mk

#multi camera

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.res.multi.camera=RES_MULTI

#mutli camera section

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.multi.section=3

#MMI main menu camera calibration & verification entry: 0-not display, 1-display

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.multicam.cali.veri=1

#MMI opticszoom calibration mode: 1-SW+W, 2-W+T, 3-SW+W+T

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.opticszoom.cali.mode=3

[配置4-1] : 超广角+人像模式+光学变焦+微距

Tele
Camera

Main
(Wide)
Camera

Super
Wide
Camera

Macro
Lens
Camera

boardname.mk

#enable back portrait mode

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.ba.portrait.enable=1

#multi camera superwide & wide & tele

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.multi.camera.enable=1

#enable ultra wide

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.ultra.wide.enable=1

#camera macrophoto

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.macrophoto.enable=1

#camera macrovideo

PRODUCT_PROPERTY_OVERRIDES += persist.vendor.cam.macrovideo.enable=1

DeviceCommon.mk

PRODUCT_PACKAGES += libmulticam

[配置4-1] : 超广角+人像模式+光学变焦+微距

Tele
Camera

Main
(Wide)
Camera

Super
Wide
Camera

Macro
Lens
Camera

vendor/sprd/modules/libcamera/sensor/sensor_drv/classic/Hynix/hi846_gj_1/sensor_hi846_wide_mipi_raw_4lane.h

由于在开机过程中，get_camera_info函数会获取超广角sensor的id，而超广角id的获得是通过读取sensor驱动文件中的module_id获得，因此还需要配置超广角的module_id为MODULE_SPW_NONE_BACK。

```
static SENSOR_TRIM_T s_hi846_wide_resolution_trim_tab[VENDOR_NUM] = {
    {.module_id = MODULE_SPW_NONE_BACK,
     .trim_info =
        {
            {0, 0, 0, 0, 0, 0, 0, {0, 0, 0, 0}},

            {.trim_start_x = VIDEO_TRIM_X,
             .trim_start_y = VIDEO_TRIM_Y,
             .trim_width = VIDEO_TRIM_W,
             .trim_height = VIDEO_TRIM_H,
             .line_time = VIDEO_LINE_TIME,
```


[配置4-1] : 超广角+人像模式+光学变焦+微距

Tele
Camera

Main
(Wide)
Camera

Super
Wide
Camera

Macro
Lens
Camera

vendor/sprd/modules/libcamera/sensor/sensor_cfg.c

在支持Bokeh的情况下，是需要在这个数组里面配置用于做bokeh的这两颗sensor的。

```
const SNS_MULTII_CAMERA_INFO_T multi_camera_sensor_group[] = {
#ifdef CONFIG_BOKEH_SUPPORT
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"imx351", "0", "ov8856_shine", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863a1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"imx351", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863a1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"s5k3p9sx04", "0", "ov8856_shine", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863a1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov32a1q", "0", "ov16885_normal", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark15pro ums512_1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov8856", "0", "ov2680", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863a1h10_go_32b
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"s5k3l6xx03", "0", "gc5035", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 9863a3c10 sprocomm
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"s5k3p9sx04", "0", "s5k5e9yu05", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 s9863a1h10 3-camera demo module
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov13855", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for sharkle sp9832e_1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"ov12a10", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark15 ums312_1h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"imx363", "0", "ov5675_dual", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for roci ud710_3h10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"hi1336_m0", "0", "gc2375_js_2", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 9863a_1c10
    {SPRD_BLUR_ID, MODE_BOKEH, 2, {"hi1336_m0", "0", "gc02m1b_js_1", "0", "0", "0"}, SNS_FACE_BACK, 90}, // for shark13 9863a_1c10
#endif
}
```

参数说明：

SPRD_BLUR_ID：逻辑Cam ID,不需要改动

MODE_BOKEH：对应功能Type,不需要改动

2：模组数量

{ "imx351", "0", "ov8856_shine", "0", "0", "0" }：模组信息对应其物理ID填入

SNS_FACE_BACK：模组位置，前摄对应SNS_FACE_FRONT

90: 图像软件旋转角度，支持 90、180、270 (通常后摄配置90，前摄配置270)

[配置4-1] : 超广角+人像模式+光学变焦+微距

Tele
Camera

Main
(Wide)
Camera

Super
Wide
Camera

Macro
Lens
Camera

vendor/sprd/modules/libcamera/sensor/sensor_cfg.c

同bokeh，光学变焦也需要在multi_camera_sensor_group中配置

```
#ifdef CONFIG_MULTICAMERA_SUPPORT
{SPRD_MULTI_CAMERA_ID, MODE_MULTI_CAMERA, 3, {"ov32a1q", "0", "ov16885_normal", "ov8856_shine", "0", "0"}, SNS_FACE_BACK, 90},
#ifdef CONFIG_WIDE_ULTRAWIDE_SUPPORT
{SPRD_MULTI_CAMERA_ID, MODE_MULTI_CAMERA, 2, {"s5k3l6", "0", "0", "hi846_wide", "0", "0"}, SNS_FACE_BACK, 90},
{SPRD_MULTI_CAMERA_ID, MODE_MULTI_CAMERA, 2, {"hi1336_m0", "0", "0", "hi846_gj_1", "0", "0"}, SNS_FACE_BACK, 90},
#endif
#endif
```

参数说明：

SPRD_MULTI_CAMERA_ID：逻辑ID,不需要改动

MODE_MULTI_CAMERA：对应功能Type,不需要改动

3：模组数量

{"ov32a1q", "0", "ov16885_normal", "ov8856_shine", "0", "0"}：6颗模组信息对应其物理ID填入

SNS_FACE_BACK：模组位置，前摄对应SNS_FACE_FRONT

90：图像软件旋转角度，支持 90、180、270 (通常后摄配置90，前摄配置270)

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序号	平台	硬件文档	说明
1	SC9863A	SC9863A Camera Design Guide V2.1.pdf	主要针对SC9863A 平台的Camera的硬件方案介绍和设计指导
2	UMS312	UMS312 Camera Hardware Design Guide V1.0.pdf	CAMERA方案设计，硬件设计要求，以及针对双，摄模组的要求，并对无支架方案进行了一定的介绍
3	UMS512	UMS512 Camera Hardware Design Guide V1.0.pdf	平台方案配置介绍、设计要点和注意事项等
4	UMS512T	UMS512T Camera Hardware Design Guide V1.0.pdf	摄像头设计指导文档
5	UMS512T SC9863A	UNISOC Android10 Camera Driver Customization Guide V1.0 CN.pdf	摄像头Porting文档

THANKS



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