



## SIM8905 Series Camera Driver Development Guide

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# 1. About Document

## 1.1. Document Information

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Revision	Date	Owner	Status / Comments
1.00	April 18, 2018	Cheng.Li	First Release.

## 1.3. Related Documents

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# 1 Purpose of this document

In general, camera sensors have two data formats, RAW and YUV. The drivers for these two kinds of formats are different, therefore, it'd better to confirm which format the sensor under developing can support.

## 2 Add a new Camera Sensor Driver

### 2.1 RAW format camera sensor

#### 2.1.1 Path to Configure Files

e.g. ov5648\_q5v22e sensor:

[dts file](#) :

- 1) kernel/arch/arm/boot/dts/qcom/msm8909-camera-sensor-skue.dtsi

[sensor\\_lib path](#):

- 1) vendor/qcom/proprietary/mm-camera/mm-camera2/media-controller/modules/sensors/sensor\_libs\

[chromatix file path](#):

vendor/qcom/proprietary/mm-camera/mm-camera2/media-controller/modules/sensors/chromatix\0301\libchromatix\

[AF driver path](#):

vendor/qcom/proprietary/mm-camera/mm-camera2/media-controller/modules/sensors/actuator\_libs\

vendor/qcom/proprietary/mm-camera/mm-camera2/media-controller/modules/sensors/actuators\0301

[build config \(e.g. ov5648\\_q5v22e\)](#):

vendor/qcom/proprietary/common/config/device-vendor.mk

## 2.1.2 Modifications to Configure files

### dts file

- 1) flashlight node config:

```
flash_SY7803:flashlight {
    ....
    qcom,flash-en = <&msm_gpio 31 0>;
    qcom,flash-now = <&msm_gpio 32 0>;
    qcom,op-seq = "flash_en", "flash_now";
    qcom,torch-seq-val = <0 1>;
    qcom,flash-seq-val = <1 0>;
    ...
};

led_flash0: qcom,camera-led-flash {
    cell-index = <0>;
    compatible = "qcom,camera-led-flash";
    qcom,flash-type = <3>;
    qcom,flash-source = <&flash_SY7803>;
    qcom,torch-source = <&flash_SY7803>;
};
```

- 2) AF node:

```
actuator0: qcom,actuator@0 {
    cell-index = <0>;
    reg = <0x3>;
    compatible = "qcom,actuator";
    qcom,cci-master = <0>;
    cam_vaf-supply = <&pm8909_l8>;
    qcom,cam-vreg-name = "cam_vaf";
    qcom,cam-vreg-type = <0>;
    qcom,cam-vreg-min-voltage = <2850000>;
    qcom,cam-vreg-max-voltage = <2900000>;
    qcom,cam-vreg-op-mode = <80000>;
};
```

- 3) camera sensor node config:

qcom,camera@0 is back camera, qcom,camera@1 is front camera.

```
qcom,camera@0 {
    ...
    qcom,actuator-src = <&actuator0>;
    qcom,led-flash-src = <&led_flash0>;
};
```

```

....
cam_vdig-supply = <&pm8909_l6>;
cam_vaf-supply = <&pm8909_l17>;
cam_vio-supply = <&pm8909_l6>;
cam_vana-supply = <&pm8909_l8>;

qcom,cam-vreg-name = "cam_vdig", "cam_vio", "cam_vana";
qcom,cam-custom-vreg-name = "cam_vdig", "cam_vio", "cam_vana";

qcom,cam-vreg-type = <0 1 0>;
qcom,cam-vreg-min-voltage = <1800000 0 2800000>;
qcom,cam-vreg-max-voltage = <1800000 0 2850000>;
qcom,cam-vreg-op-mode = <200000 0 80000>;
...
gpios = <&msm_gpio 26 0>,
        <&msm_gpio 35 0>,
        <&msm_gpio 34 0>;
qcom,gpio-reset = <1>;
qcom,gpio-standby = <2>;
qcom,gpio-req-tbl-num = <0 1 2>;
qcom,gpio-req-tbl-flags = <1 0 0>;
qcom,gpio-req-tbl-label = "CAMIF_MCLK",
                          "CAM_RESET1",
                          "CAM_STANDBY";
...
}

```

The above is a configuration example of the power-on portion of the back camera. AVDD, DVDD, and IOVDD must be configured. If any one of them is not used, please configure to an empty power supply. The AF power supply configuration is not necessary.

Please note that the configuration of AVDD, DVDD, IOVDD, and GPIO must be configured to corresponding pins according to schematics.

### 2.1.3 Power Timing Configure

e.g.

```

vendor\qcom\proprietary\mm-camera\mm-camera2\media-controller\modules\sensors\sensor
_libs\ov5648_q5v22e_lib.c

```

```

static struct msm_sensor_power_setting ov5648_q5v22e_power_setting[] = {
    ...
}

```

The above structure is the configuration structure of power-up sequence. The power-down

configuration is not necessary.

The information of sensor is stored in the following structure. The i2c address and the sensor id register must be configured according to the datasheet of the sensor.

```
static struct msm_camera_sensor_slave_info sensor_slave_info = {
    /* Camera slot where this camera is mounted */
    .camera_id = CAMERA_0,
    /* sensor slave address */
    .slave_addr = 0x6c,
    /* sensor i2c frequency*/
    .i2c_freq_mode = I2C_FAST_MODE,
    /* sensor address type */
    .addr_type = MSM_CAMERA_I2C_WORD_ADDR,
    /* sensor id info*/
    .sensor_id_info = {
        /* sensor id register address */
        .sensor_id_reg_addr = 0x300a,
        /* sensor id */
        .sensor_id = 0x5648,
    },
    /* power up / down setting */
    .power_setting_array = {
        .power_setting = ov5648_q5v22e_power_setting,
        .size = ARRAY_SIZE(ov5648_q5v22e_power_setting),
    },
    .is_flash_supported = SENSOR_FLASH_SUPPORTED,
};
```

### 2.1.4 Load sensor configuration file

vendor\qcom\proprietary\mm-camera\mm-camera2\media-controller\modules\sensors\module\sensor\_init.c

Please note that the modifications must be added under the macro BOARD\_SENSORS.

## 2.2 YUV format camera sensor



## 2.2.1 Path to Configure Files

e.g. gc0310

dts config file:

kernel/arch/arm/boot/dts/qcom/msm8909-camera-sensor-skue.dtsi

driver file:

kernel/drivers/media/platform/msm/camera\_v2/sensor/gc0310.c

vendor driver:

vendor/qcom/proprietary/common/config/device-vendor.mk

vendor/qcom/proprietary/mm-camera/mm-camera2/media-controller/modules/sensors/sensor\_libs/gc0310

For YUV format, Chromatix file is needless.

## 2.2.2 Modifications of Configure files

YUV camera needs independent node:

```
qcom,camera@42 {
    compatible = "shinotech,gc0310";
    reg = <0x42 0x0>;
    qcom,slave-id = <0x42 0xf0 0xa310>;
    qcom,csiphy-sd-index = <0>;
    qcom,csid-sd-index = <1>;
    qcom,mount-angle = <270>;
    qcom,sensor-name = "gc0310";
    cam_vana-supply = <&pm8909_l17>;
    cam_vio-supply = <&pm8909_l6>;
    qcom,cam-vreg-name = "cam_vio", "cam_vana";
    qcom,cam-custom-vreg-name = "cam_vio", "cam_vana";
    qcom,cam-vreg-type = <1 0>;
    qcom,cam-vreg-min-voltage = <0 2800000>;
    qcom,cam-vreg-max-voltage = <0 2850000>;
    qcom,cam-vreg-op-mode = <0 80000>;
    pinctrl-names = "cam_default", "cam_suspend";
    pinctrl-0 = <&cam_sensor_mclk1_default
        &cam_sensor_front_default>;
    pinctrl-1 = <&cam_sensor_mclk1_sleep &cam_sensor_front_sleep>;
    gpios = <&msm_gpio 27 0>,
        <&msm_gpio 28 0>,
```



```

    <&msm_gpio 33 0>;
    qcom,gpio-reset = <1>;
    qcom,gpio-standby = <1>;
    qcom,gpio-req-tbl-num = <0 1 2>;
    qcom,gpio-req-tbl-flags = <1 0 0>;
    qcom,gpio-req-tbl-label = "CAMIF_MCLK",
        "CAM_RESET",
        "CAM_STANDBY";
    qcom,gpio-set-tbl-num = <1 1>;
    qcom,gpio-set-tbl-flags = <0 2>;
    qcom,gpio-set-tbl-delay = <1000 4000>;
    qcom,csi-lane-assign = <0x0004>;
    qcom,csi-lane-mask = <0x18>;
    qcom,sensor-position = <1>;
    qcom,sensor-mode = <1>;
    qcom,cci-master = <0>;
    clocks = <&clock_gcc clk_mclk1_clk_src>,
        <&clock_gcc clk_gcc_camss_mclk1_clk>;
    clock-names = "cam_src_clk", "cam_clk";
};

```

qcom,slave-id = <0x42 0xf0 0xa310>;0x42 refers to i2c address ,0xf0 refers to register address and 0xa310 refers to sensor ID.

### 2.2.3 Power Timing Configure

kernel\drivers\media\platform\msm\camera\_v2\sensor\ gc0310.c

```

static struct msm_sensor_power_setting gc0310_power_setting[] = {
    .....
}

```

The structure of the above power-up sequence is similar to the RAW format configuration.

## 3. Contact

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