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Rockchip_CameraHAL3_FAQ

（技术部，第二系统产品部）

(Technical Department, R & D Dept. II）

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V1.0.1	王潘祯撰 Randy Wang	2020-07-31	1、新增 MCLK 异常说明 2、新增马达及闪光灯配置注意事项 3、新增调试案例分析	
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V1.1.2	王潘祯撰 Randy Wang	2021-05-6	1、新增 rk356x 平台 camera CTS 测试失败案例分析及说明	
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V1.1.5	王潘祯撰 Randy Wang	2023-04-11	新增 rk3588 平台 dts 配置及部分案例分析说明	

目 录 Contents

前言 Preface

概述 Overview

本文档主要介绍 Rockchip Camera 模块的常见问题分析。

This document mainly introduces FAQ of Rockchip Camera modules.

读者对象 Applicable object

本文档（本指南）主要适用于以下工程师：

This document (the guide) is mainly suitable for the following engineers:

- 技术支持工程师

  Field application engineers

- 软件开发工程师

  Software development engineers

1 目的 Purpose

本文介绍 RK 平台上已有的调试文档，总结以往处理 Camera 中相关问题的步骤和方法，作为后续分析和处理 Camera 调试过程中遇到问题的参考。

This document introduces the debugging documents which are already available on RK platform, and summarize the methods and steps for debugging camera related issues based on previous experience, as reference for customers to analyze and deal with the issues during camera debugging.

2 适用范围 Applicable scope

目前 RK 产品的各 Android 平台中使用的 Camera Hal，分为 2 两个大版本：

The Camera Hals currently used on various Android platforms of RK products are divided into two big versions:

- Camera Hal1 在 Android8.1 及以下版本中使用
  Camera Hal1 is used for Android8.1 and lower versions
- Camera Hal3 在 Android9.0 及以上版本中使用
  Camera Hal3 is used on Android9.0 and later versions

本文档仅适用于 Android 平台上，Camera Hal3 及对应新框架的 Camera Sensor 驱动常见问题分析排查和处理方法。

This document is only suitable for debugging and dealing with FAQ related with Camera Hal3 and the Camera Sensor driver with the corresponding new framework on Android platform.

3 SDK 已有 Camera 文档说明 Camera documents available in SDK

文档目录：

Document directory:

- SDK/RKDocs/common/camera/HAL3
- https://redmine.rock-chips.com/documents/53

3.1 camera_hal3_user_manual_vx.x.pdf

文档介绍 RK CameraHal3 框架、camera3_profiles.xml 文件配置、HAL 层数据 DUMP 及部分调试案例。对应代码目录：SDK/ hardware/rockchip/camera

This document introduces RK CameraHal3 framework, camera3_profiles.xml file configuration, HAL layer data DUMP and some debugging examples. The corresponding code directory is: SDK/ hardware/rockchip/camera

3.2 camera_engine_rkisp_user_manual_vx.x.pdf

文档介绍 RK CameraHal3 Engine 框架、API 简要说明及 IQ 效果文件相关的规则等。

This document introduces RK CameraHal3 Engine framework, API brief introduction and IQ effect file related rules.

对应代码目录：SDK/ hardware/rockchip/camera_engine_rkisp

The corresponding code directory is: SDK/ hardware/rockchip/camera_engine_rkisp

3.3 Rockchip_Development_Guide_ISP2x_CN_v1.x.x.pdf

文档介绍 RKISP2 版本，RKAIQ 架构，所处软件框架位置、软件流程、API 调用详细说明等。

对应代码目录：SDK/external/camera_engine_rkaiq

The corresponding code directory is: SDK/ external/camera_engine_rkaiq

文档位置：https://redmine.rock-chips.com/documents/53

3.4 RKCIF_Driver_User_Manual_v1.xx.pdf

文档介绍 RKCIF 驱动框架、DTS 配置、驱动中部分数据类型及 API 简介。

This document introduces RKCIF driver framework, DTS configuration, some data type and API brief introduction in the driver.

对应代码目录：SDK/kernel/drivers/media/platform/rockchip/cif

The corresponding code directory is: SDK/kernel/drivers/media/platform/rockchip/cif

3.5 RKISP_Driver_User_Manual_v1.xx.pdf

文档介绍 RKISP1 驱动框架、CIS(CMOS IMAGE SENSOR)驱动、马达驱动、闪光灯驱动、RK1608 AP 驱动的 DTS 配置、部分数据类型及 API 简要说明和 FAQ。

This document introduces RKISP1 driver framework, CIS(CMOS IMAGE SENSOR) driver, motor driver, flash led driver, DTS configuration of RK1608 AP driver, some data type and API brief introduction and FAQ.

RKISP1 驱动对应代码目录：SDK/kernel/drivers/media/platform/rockchip/isp1

The corresponding code directory of RKISP1 driver is: SDK/kernel/drivers/media/platform/rockchip/isp1

3.6 Rockchip_Driver_Guide_ISP2x_CN_v1.x.x.pdf

文档介绍 RKISP2 驱动框架、CIS(CMOS IMAGE SENSOR)驱动、马达驱动、闪光灯驱动的 DTS 配置、关键数据类型及关键 API 说明、驱动移植步骤和 FAQ。

This document introduces RKISP2 driver framework, CIS(CMOS IMAGE SENSOR) driver, motor driver, flash led driver, DTS configuration of RK1608 AP driver, some data type and API brief introduction and FAQ.

RKISP2 驱动对应代码目录：SDK/kernel/drivers/media/platform/rockchip/isp

The corresponding code directory of RKISP2 driver is: SDK/kernel/drivers/media/platform/rockchip/isp

3.7 Rockchip_Developer_Guide_Android_Camera_Of_Multichannel_CN.pdf

文档介绍 RK356X 多路摄像头框架逻辑及常用 AHD 转多路芯片配置。

多路摄像头文档位置如下：

https://redmine.rockchip.com.cn/documents/53 中

Rockchip_Developer_Guide_Android_Camera_Of_Multichannel_CN.pdf

3.8 Rockchip_Driver_Guide_VI_CN_v1.1.1.pdf

VI 驱动开发文档 ，本文旨在描述 RKISP（Rockchip Image Signal Processing）模块的作用，整体工作流程，及相关的 API 接口。主要给驱动工程师调试 Camera 提供帮助 。该文档是 RKCIF_Driver_User_Manual_v1.0.pdf 和 RKISP_Driver_User_Manual_v1.3.pdf 文档的升级版，同时介绍 RK356x 及 RK3588 相关 dts 配置及驱动调试说明。

文档位置：

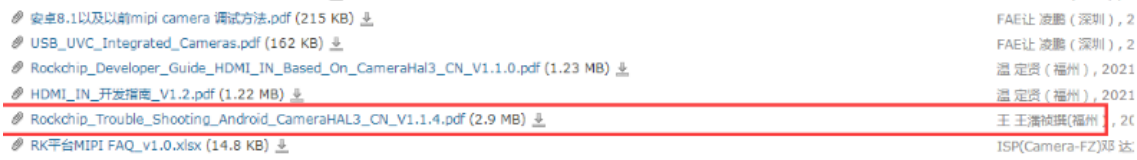
SDK\RKDocs\common\camera\HAL3\Rockchip_Driver_Guide_VI\CN\

Rockchip_Driver_Guide_VI_CN_v1.1.1.pdf

3.9 本文档位置：

https://redmine.rockchip.com.cn/documents/53

中会不定时更新 Rockchip_Trouble_Shooting_Android_CameraHal3_CN-Vxxx.pdf 文档。



4 FAQ

4.1 各平台芯片 ISP 版本区分

目前 SOC 平台各 ISP 版本区分如下：

表 1

rkisp1x	rkisp2x	rkisp3x
RK3288	RK3566/68	RK3588
RK3368/PX5		
RK3326/PX30		

RK3399		
RK3399pro		

4.2 如何查看 camera 相关版本号？ How to check camera related version?

4.2.1 查看 rkisp1/rkcif 驱动的版本号 Check the version number of rkisp1/rkcif driver

rkisp1 驱动获取版本号命令：cat /sys/module/video_rkisp1/parameters/version

The command to acquire the version number of rkisp1 driver: cat /sys/module/video_rkisp1/parameters/version

图 1 rkisp1 驱动版本号

Picture 1 version number of rkisp1 driver

rkcif 驱动获取版本号命令：cat /sys/module/video_rkcif/parameters/version

The command to acquire the version number of rkcif driver: cat /sys/module/video_rkcif/parameters/version

4.2.2 查看 Camera Hal3 版本号 Check the version number of Camera Hal3

获取版本号命令：getprop | grep cam.hal3.ver

The command to acquire the version number: getprop | grep cam.hal3.ver

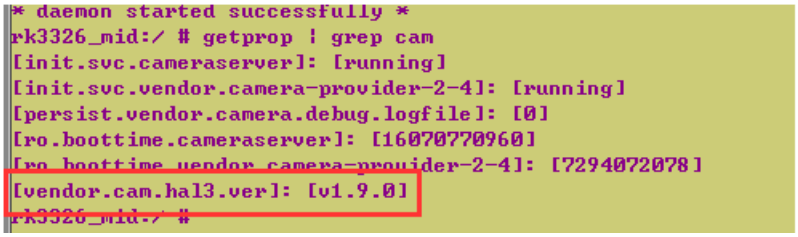


图 2 Camera Hal3 版本号

Picture 2 version number of Camera Hal3

4.2.3 查看 Camera_engine_rkisp 版本号 Check the version number of Camera_engine_rkisp

获取版本号命令：strings /vendor/lib/librkisp.so | grep v1. 或 grep v2.

The command to acquire the version number: strings /vendor/lib/librkisp.so | grep v1. or grep v2.

```
rk3368:/ #
trings /vendor/lib/librkisp.so | grep v1
_ZTVN10__cxxabiv117__class_type_infoE
_ZTVN10__cxxabiv120__si_class_type_infoE
_ZTVN10__cxxabiv121__vmi_class_type_infoE
v1.9.0
```

图 3 librkisp 版本号

Picture 3 version number of librkisp

4.2.4 查看 3A 库版本号 Check the version number of 3A library

获取版本号命令：

The command to acquire the version number:

strings /vendor/lib/rkisp/ae/librkisp_aec.so | grep v0

strings /vendor/lib/rkisp/af/librkisp_af.so | grep v0

strings /vendor/lib/rkisp/awb/librkisp_awb.so | grep v0

```
generic_arm64:/ # strings /vendor/lib/rkisp/ae/librkisp_aec.so | grep v0
v0.0.9
generic_arm64:/ #
generic_arm64:/ # strings /vendor/lib/rkisp/af/librkisp_af.so | grep v0
v0.2.10
generic_arm64:/ # strings /vendor/lib/rkisp/awb/librkisp_awb.so | grep v0
v0.0.9
```

图 4 3A 库版本号

Picture 4 version number of 3A lib

4.2.5 Android10.0 后查看上述版本号方法 The way to check above version number after Android10.0

首先确保：SDK/hardware/rockchip/camera_engine_rkisp 目录包含如下提交：

Firstly make sure the following commit is included in the directory of SDK/hardware/rockchip/camera_engine_rkisp:

commit 41670de2aa53f72d00eae837ecd1275e93fd7182

Author: Wang Panzhenzhuan <randy.wang@rock-chips.com>

Date: Tue Sep 3 10:32:03 2019 +0800

add properties to show rkisp & 3A lib version

Change-Id: Iccfe8a0fc773489eb9a327d1ba192dc572c4c89f

Signed-off-by: Wang Panzhenzhuan randy.wang@rock-chips.com

需要使用 su 权限，获取版本命令：getprop | grep cam，结果如图：

Need to use su authority, the command to acquire the version number: getprop | grep cam, the result is shown as below:

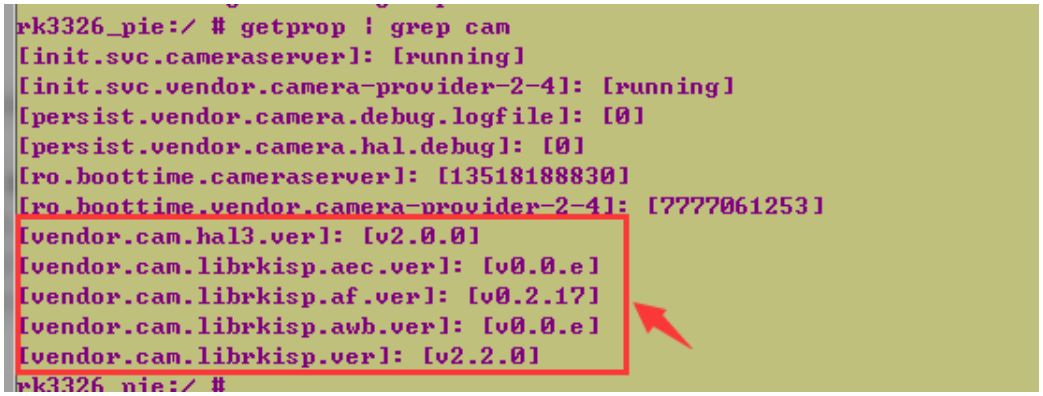


图 5 Hal3、ISP 和 3A 库版本号

Picture 5 version number of Hal3, ISP and 3A lib

4.2.6 查看 camera_engine_rkaiq 相关版本号 Check the version number of camera_engine_rkaiq

需要使用 su 权限，获取版本命令：getprop | grep rkaiq，结果如图：

Need to use su authority, the command to acquire the version number: getprop | grep rkaiq, the result is shown as below:

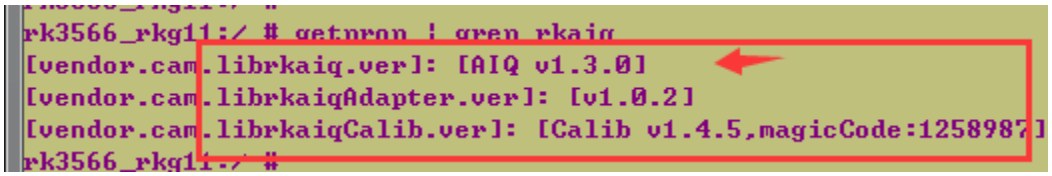


图 6 RKAIQ 相关版本号

Picture 6 version number of RKAIQ

4.3 如何打开 debug 开关抓取 LOG？ How to enable debug switch to capture LOG?

4.3.1 camera hal3 的 LOG 抓取 Capture LOG of camera hal3

打开 camerahal 的 debug 命令；

The command to enable debug of camerahal:

setprop persist.vendor.camera.hal.debug 5

关闭命令

Disable command:

setprop persist.vendor.camera.hal.debug 0

具体参考 SDK 下文档：

For details, refer to the following document in SDK:

RKDocs\common\camera\HAL3\camera_hal3_user_manual_vx.x.pdf

4.3.2 camera_engine_rkisp 的 LOG 抓取 Capture LOG of camera_engine_rkisp

打开 camera_engine_rkisp 的 debug 命令

The command to enable debug of camera_engine_rkisp

setprop persist.vendor.rkisp.log 4

关闭命令

Disable command

setprop persist.vendor.rkisp.log 0

如果 SDK/hardware/rockchip/camera_engine_rkisp 目录包含如下提交：

If there is the following commit in the directory of SDK/hardware/rockchip/camera_engine_rkisp:

commit 050834ce2614f8533cdd774fbdf920fbbe910395

Author: ZhongYichong <zyc@rock-chips.com>

Date: Tue Jun 11 15:35:28 2019 +0800

use new log system, support module logs

…

set debug level example:

eg. set module afc log level to debug, and others to error:

Android:

setprop persist.vendor.rkisp.log 0x4000

Linux:

export persist_camera_engine_log=0x4000

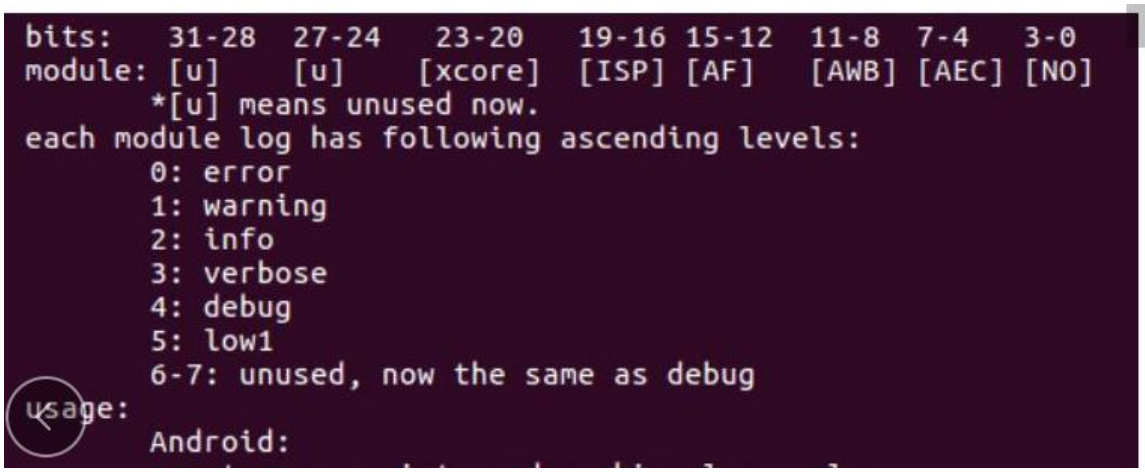
Change-Id: I702bc8de878bef021f58de42b5ceb0d71d1a3439

Signed-off-by: ZhongYichong <zyc@rock-chips.com>

则 debug 开关打开命令如下：

Then the command to enable debug is as below:

setprop persist.vendor.rkisp.log 0x444444



具体参考 SDK 下文档：

For details, refer to the document in SDK:

RKDocs\common\camera\HAL3\ camera_engine_rkisp_user_manual_vx.x.pdf

4.3.3 camera_engine_rkaiq 的 LOG 抓取 Capture LOG of camera_engine_rkaiq

打开 camera_engine_rkaiq 中所有模块的 debug 命令

The command to enable all modules debug of camera_engine_rkaiq

`setprop persist.vendor.rkisp.log 0x7fffffffff6`

```
bit: [63-39]   38      37       36    35   34     33    32    31
mean:  [U]   [CAMHW][ANALYZER][XCORE][ASD][AFEC][ACGC][AORB][ASHARP]

bit:  30   29   28     27     26       25      24   23       22
mean:[AIE][ACP][AR2Y][ALDCH][A3DLUT][ADEHAZE][AWDR][AGAMMA][ACCM]

bit:      21     20    19   18    17    16     15   14  13   12
mean:[ADEBAYER][AGIC][ALSC][ANR][AHDR][ADPCC][ABLC][AF][AWB][AEC]

bit:    11-4        3-0
mean:[sub modules][level]

    [U] means unused now.
    [level] : use 4 bits to define log levels.
    each module log has following ascending levels:
    0: error
    1: warning
    2: info
    3: debug
    4: verbose
    5: low1
    6-7: unused, now the same as debug
```

关闭命令

Disable command

`setprop persist.vendor.rkisp.log 0x00`

只开 librkisp 库的 log 命令：

`setprop persist.vendor.rkisp.log 0x1000000ff6`

具体参考文档：

For details, refer to the document

https://redmine.rock-chips.com/documents/53

Rockchip_Development_Guide_ISP2x_CN_v1.x.x.pdf

代码目录：

SDK/external/camera_engine_rkaiq

4.3.4 rkcif 控制器驱动 LOG 抓取 Capture LOG of rkcif controller driver

通过如下命令打开 debug 开关：

Use the following command to enable debug:

`echo 8 > /proc/sys/kernel/printk`

`echo 1 > /sys/module/video_rkcif/parameters/debug`

`echo 1 > /sys/module/video_rkcif/parameters/debug_csi2`

或者修改 SDK/kernel/drivers/media/platform/rockchip/cif/dev.c 中 `int rkcif_debug = 1;`

Or change int rkcif_debug = 1; in SDK/kernel/drivers/media/platform/rockchip/cif/dev.c

具体参考 SKD 下文档：

For details, refer to the document in SDK:

SDK\RKDocs\common\camera\HAL3\RKCIF_Driver_User_Manual_v1.xx.pdf

4.3.5 rkisp 控制器驱动的 LOG 抓取 Capture LOG of rkisp controller driver

通过如下命令打开 debug 开关：

Use the following command to enable debug:

echo 1 > /sys/module/video_rkisp1/parameters/debug

或者修改 SDK/kernel/drivers/media/platform/rockchip/isp1/dev.c 中 int rkisp1_debug = 1;

Or change int rkisp1_debug = 1; in SDK/kernel/drivers/media/platform/rockchip/isp1/dev.c

具体参考 SKD 下文档：

For details, refer to the document in SDK:

SDK\RKDocs\common\camera\HAL3\RKISP_Driver_User_Manual_v1.xx.pdf

RK3566 打开 debug 开关如下：

echo 8 > /proc/sys/kernel/printk

echo 3 > /sys/module/video_rkisp/parameters/debug

echo 0 > /sys/module/video_rkisp/parameters/debug

4.3.6 rkisp2.x 控制器驱动的 LOG 抓取 Capture LOG of rkisp2.x controller driver

通过如下命令打开 debug 开关：

Use the following command to enable debug:

echo 1 > /sys/module/video_rkisp/parameters/debug

或者修改 SDK/kernel/drivers/media/platform/rockchip/isp/dev.c 中 int rkisp_debug = 1;

Or change int rkisp_debug = 1; in SDK/kernel/drivers/media/platform/rockchip/isp/dev.c

还可以通过如下命令查看当前 rkisp 的状态：原理是添加了 proc 节点；

cat /proc/rkisp*

示例输出如下：

```
rkisp-vir0 Version:v01.06.00
clk_isp       500000000
aclk_isp      396000000
hclk_isp      198000000
Interrupt    Cnt:1719 ErrCnt:0
Input          rockchip-csi2-dphy0 Format:SBGGR10_1X10 Size:3264x2448@30fps Offset(0,0)
Isp online frame:610 working time:32ms
Output         rkisp_mainpath Format:NV12 Size:3264x2448 (frame:331 rate:2166ms delay:33ms)
Output         rkisp_selfpath Format:NV12 Size:1280x960 (frame:610 rate:33ms delay:33ms)
```

```
DPCC0          ON(0x40000005)
DPCC1          ON(0x40000005)
BLS            ON(0x1)
SDG            OFF(0x6197)
LSC            ON(0x1)
AWBGAIN        ON(0x6197) (gain: 0x01040104, 0x018c01af)
DEBAYER        ON(0xf000111)
CCM            ON(0xc0000003)
GAMMA_OUT    ON(0xc0000001)
CPROC          ON(0xf)
IE             OFF(0x0) (effect: BLACKWHITE)
HDRTMO         OFF(0x0)
HDRMGE         OFF(0x0)
BAYNR          ON(0xc0000101)
BAY3D          ON(0x78010011)
YNR            ON(0x801001)
CNR            ON(0xc0000003)
SHARP          ON(0x60000001)
GIC            OFF(0x0)
DHAZ           ON(0xc0111011)
3DLUT          OFF(0x0)
LDCH           OFF(0x0)
CSM            FULL(0x6197)
SIAF           OFF(0x0)
SIAWB          OFF(0x0)
YUVAE          OFF(0x0)
SIHST          OFF(0x0)
RAWAF          ON(0x7)
RAWAWB         ON(0x7740d1f)
RAWAE0         ON(0x3)
RAWAE1         ON(0xf5)
RAWAE2         OFF(0x0)
RAWAE3         ON(0xf5)
RAWHIST0       ON(0x501)
RAWHIST1       ON(0x20000501)
RAWHIST2       OFF(0x0)
RAWHIST3       ON(0x20000501)
Monitor        OFF Cnt:0
```

4.3.7 v4l2 框架的 LOG 抓取 Capture LOG of v4l2 framework

通过如下命令打开 debug 开关：

Use the following command to enable debug:

echo 7 > /sys/module/videobuf2_core/parameters/debug

echo 7 > /sys/module/videobuf2_common/parameters/debug

对应代码位置：SDK/kernel/drivers/media/ v4l2-core/videobuf2-core.c

及 echo 0x1f > /sys/class/video4linux/video0/dev_debug

对应代码位置：SDK/kernel/drivers/media/v4l2-core/v4l2-dev.c

4.4 如何配置 camera3_profiles.xml 文件？ How to configure camera3_profiles.xml file?

一般是在各平台默认的 camera3_profiles.xml 基础上进行修改，修改参考 CameraHal 文档：

Generally it is modified based on the default camera3_profiles.xml of each platform. Modify referring to CameraHal document:

SDK\RKDocs\common\camera\HAL3\camera_hal3_user_manual_vx.x.pdf

或 https://redmine.rockchip.com.cn/documents/53 上的 camera_hal3_user_manual_vx.x.pdf 文档

or camera_hal3_user_manual_vx.x.pdf document in https://redmine.rockchip.com.cn/documents/53

camera3_profiles.xml 里面<Android_metadata>中的参数详细含义及配置说明，

For the parameter definition and configuration instruction of <Android_metadata> in camera3_profiles.xml, you can refer to Google official document in SDK: SDK/system/media/camera/docs/docs.html

可参考 SDK 中 Google 官方文档：SDK/system/media/camera/docs/docs.html

4.5 各平台 Camera 示例 dts 配置 dts configuration reference for Camera driver on each platform

RK Android9.0 中各平台样机对应 dts 及所配置 Sensor 情况如下：

The corresponding dts and Sensor configuration of RK Android9.0 platforms device are as below:

4.5.1 rk3126c 平台 platform

可参考 rk3126-bnd-d708.dtsi，默认配置前置 GC0329+后置 GC2145

rk3126c platform can refer to rk3126-bnd-d708.dtsi, with the default sensor configuration front GC0329 + back GC2145

4.5.2 rk3288w 平台 platform

可参考 rk3288-th804-avb.dts，默认配置前置 GC2145+后置 OV8858

rk3288w platform can refer to rk3288-th804-avb.dts, with the default sensor configuration front GC2145 + back OV8858

4.5.3 rk3326 平台 platform

可参考 rk3326-863-lp3-v10-avb.dts，默认配置前置 GC0312+后置 GC2145

rk3326 platform can refer to rk3326-863-lp3-v10-avb.dts, with the default sensor configuration front GC0312 + back GC2145

4.5.4 rk3368 平台 platform

可参考 rk3368-xikp-avb.dts，默认配置前置 GC2145+后置 OV8858

rk3368 platform can refer to rk3368-xikp-avb.dts, with the default sensor configuration front GC2145 + OV8858

4.5.5 rk3399 平台 platform

可参考 rk3399-tve1030g-avb.dts，默认只配置前置 GC2355

rk3399 platform can refer to rk3399-tve1030g-avb.dts, with the default sensor configuration only front GC2355

4.5.6 rk356x 平台摄像头 DTS 注册 camera dts configuration for rk356x platform

4.5.6.1 单目摄像头使用 MIPI-4lane 情况 case of one camera use mipi-4lane

链接关系必须为： ***sensor->csi2_dphy0->isp； 向下兼容 1/2lane；***

示例参考：arch/arm64/boot/dts/rockchip/rk3566-rk817-tablet.dts 中 OV8858 链路配置

```
&csi2_dphy0 {
        status = "okay";

        ports {
                #address-cells = <1>;
                #size-cells = <0>;
                port@0 {
                        reg = <0>;
                        #address-cells = <1>;
                        #size-cells = <0>;

                        mipi_in_ucam0: endpoint@0 {
                                reg = <0>;
                                remote-endpoint = <&gc2385_out>;
                                data-lanes = <1>;
                        };
                        mipi_in_ucam1: endpoint@1 {
                                reg = <1>;
                                remote-endpoint = <&ov8858_out>;
                                data-lanes = <1 2 3 4>;
                        };
                };
```

4lane

4.5.6.2 单目摄像头使用 MIPI 1/2lane 情况 case of one camera use mipi-1/2lane

链接关系 1： ***sensor->csi2_dphy1->isp***

链接关系 2： ***sensor->csi2_dphy2->isp***

示例参考：arch/arm64/boot/dts/rk3566-evb1-ddr4-v10.dtsi

```
&csi2_dphy1 {
	status = "okay";

	/*
	 * dphy1 only used for split mode,
	 * can be used  concurrently  with dphy2
	 * full mode and split mode are mutually exclusive
	 */
	ports {
		#address-cells = <1>;
		#size-cells = <0>;

		port@0 {
			reg = <0>;
			#address-cells = <1>;
			#size-cells = <0>;

			dphy1_in: endpoint@1 {
				reg = <1>;
				remote-endpoint = <&ov5695_out>;
				data-lanes = <1 2>;
			};
```

```
		port {
			ov5695_out: endpoint {
				remote-endpoint = <&dphy1_in>;
				data-lanes = <1 2>;
			};
		};
```

```
&csi2_dphy2 {
	status = "okay";

	/*
	 * dphy2 only used for split mode,
	 * can be used  concurrently  with dphy1
	 * full mode and split mode are mutually exclusive
	 */
	ports {
		#address-cells = <1>;
		#size-cells = <0>;

		port@0 {
			reg = <0>;
			#address-cells = <1>;
			#size-cells = <0>;

			dphy2_in: endpoint@1 {
				reg = <1>;
				remote-endpoint = <&ov02k10_out>;
				data-lanes = <1 2>;
			};
		};
```

```
        port {
                ov02k10_out: endpoint {
                        remote-endpoint = <&dphy2_in>;
                        data-lanes = <1 2>;
                };
        };
```

4.5.6.3 双目使用 MIPI-RAW+DVP-SOC 情况 case of dual camera use MIPI-RAW+DVP-SOC

链接关系 1： ***sensor1->csi2_dphy0->isp_vir0***

链接关系 2： ***sensor2->vicap***

示例参考：arch/arm64/boot/dts/rockchip/rk3566-evb3-ddr3-v10.dtsi

里面包含 ov5695-mipi camera+ gc2145-dvp camera 配置

```
&rkcif {
        status = "okay";
};

&rkcif_dvp {
        status = "okay";

        port {
                /* Parallel bus endpoint */
                dvp_in_bcam: endpoint {
                        remote-endpoint = <&gc2145_out>;
                        bus-width = <8>;
                        vsync-active = <0>;
                        hsync-active = <1>;
                };
        };
};
```

```
&rkisp {
        status = "okay";
};

&rkisp_mmu {
        status = "okay";
};

&rkisp_vir0 {
        status = "okay";

        port {
                #address-cells = <1>;
                #size-cells = <0>;

                isp0_in: endpoint@0 {
                        reg = <0>;
                        remote-endpoint = <&csidphy_out>;
                };
        };
};
```

4.5.6.4 双目使用 MIPI-RAW+MIPI-RAW 情况（即 2lane+2lane）case of dual camera use MIPI-RAW+MIPI-RAW

这时单个硬件 isp 通过虚拟多个设备，分时复用处理多路 sensor 数据。

链接关系 1： ***sensor1->csi2_dphy1->isp_vir0***

链接关系 2： ***sensor2->csi2_dphy2->mipi_csi2->vicap->isp_vir1***

示例参考：arch/arm64/boot/dts/rockchip/rk3566-evb2-lp4x-v10.dtsi

里面包含 ov5695-mipi camera+ gc5025-mipi camera 配置，但 vicap->isp_vir1 还未连接，

需要添加如下配置：

```
521  &rkcif_mipi_lvds_sditf {
522      status = "okay";
523
524      port {
525          mipi_lvds_sditf: endpoint {
526              remote-endpoint = <&isp1_in>;
527              data-lanes = <1 2>;
528          };
529      };
530  };
531
```

```
&rkisp_vir1 {
    status = "okay";
    /* gc2093->dphy2->csi2->vicap */
    /* vicap sditf->isp_vir1 */
    port {
        #address-cells = <1>;
        #size-cells = <0>;

        isp1_in: endpoint@0 {
            reg = <0>;
            remote-endpoint = <&mipi_lvds_sditf>;
        };
    };
};
```

4.5.6.5 RK356x-MIPI-CSI-DPHY 配置注意事项 RK356x-mipi-csi-dphy configuration notes

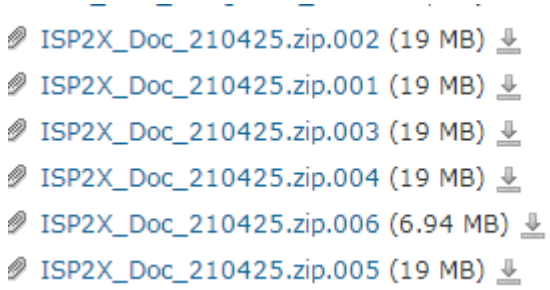
MIPI-CSI-DPHY 支持两种配置模式，即 full mode 和 split mode

Option1	Sensor1 x4Lane	MIPI_CSI_RX_D0-3 MIPI_CSI_RX_CLK0
Option2	Sensor1 x2Lane + Sensor2 x2Lane	MIPI_CSI_RX_D0-1 MIPI_CSI_RX_CLK0 MIPI_CSI_RX_D2-3 MIPI_CSI_RX_CLK1

full mode 和 split mode 不能同时使用，反应在 dts 配置上即
csi2_dphy0 不能和 csi2_dphy1、csi2_dphy2 同时使能；
csi2_dphy0 使能的时候，csi2_dphy1 和 csi2_dphy2 需要 disabled；
同理：csi2_dphy1 和 csi2_dphy2 使能的时候，csi2_dphy0 需要 disabled

4.5.6.6 上面 dts 具体配置参考文档 The dts configurations refer to the documents:

从 https://redmine.rock-chips.com/documents/53 中下载如下文档解压：
参考里面的 Rockchip_Driver_Guide_VI_CN_v1.0.5.pdf 文档排查



4.5.6.7 RK356x-CIS 时钟配置注意事项 RK356x CIS clock configuration notes

RK356x 有四个输出时钟，可作为给 CIS 模组的 MCLK：
1、REFCLK_OUT（GPIO0_A0）
示例 dts：arch/arm64/boot/dts/rockchip/rk3566-evb2-lp4x-v10.dtsi 中的 gc5025 时钟配置

```
gc5025: gc5025@37 {
        ……
    clocks = <&pmucru CLK_WIFI>;
    clock-names = "xvclk";
    pinctrl-names = "default";
    pinctrl-0 = <&refclk_pins>;
};
```

2、CAM_CLKOUT0（GPIO4_A7）

示例 dts：arch/arm64/boot/dts/rockchip/rk3566-rk817-tablet.dts 中的 ov8858 时钟配置

```
ov8858: ov8858@36 {
        ……
    clocks = <&cru CLK_CAM0_OUT>;
    clock-names = "xvclk";
    pinctrl-names = "default";
    pinctrl-0 = <&cam_clkout0 >;
};
```

3、 CAM_CLKOUT1（GPIO4_A8）

示例 dts：arch/arm64/boot/dts/rockchip/rk3566-evb1-ddr4-v10.dtsi 中的 ov02k10 时钟配置

```
ov02k10: ov02k10@36 {
        ……
    clocks = <&cru CLK_CAM1_OUT>;
    clock-names = "xvclk";
    pinctrl-names = "default";
    pinctrl-0 = <& cam_clkout1>;
};
```

4、 CLK_CIF_OUT （GPIO4_C0）

示例 dts：arch/arm64/boot/dts/rockchip/rk3566-rk817-tablet.dts 中的 gc2385 时钟配置

```
gc2385: gc2385@37 {
        ……
    clocks = <&cru CLK_CIF_OUT >;
    clock-names = "xvclk";
    pinctrl-names = "default";
    pinctrl-0 = <& cif_clk >;
};
```

4.5.6.8 RK356x-CIS 各个时钟支持的输出频率 Output frequency supported by each clock of RK356x CIS

RK356X	CLK_WIFI	GPIO0_A0	24M
RK356X	CLK_MAC0_OUT	GPIO2_C1	24M、25M、50M、125M
RK356X	CLK_MAC1_OUT	GPIO3_B0	24M、25M、50M、125M
RK356X	CLK_MAC1_OUT	GPIO4_B3	24M、25M、50M、125M
RK356X	CLK_CIF_OUT	GPIO4_C0	24M、27M、37.125M
RK356X	CLK_CAM0_OUT	GPIO4_A7	24M、27M、37.125M
RK356X	CLK_CAM1_OUT	GPIO4_B0	24M、27M、37.125M

图 7 RK356x-CIS-CLOCKS

Figure 7 RK356x-CIS-CLOCKS

4.5.7 rk3588 平台摄像头 DTS 注册 camera dts configuration for rk3588 platform

4.5.7.1 dchpy0-单 ISP-8M 摄像头配置参考 case of one camera use 8M-single ISP

可参考 rk3588-evb1-imx415.dtsi，默认配置 8M 摄像头 imx415 连接 RK3588-dcphy0；

4.5.7.2 dhpy0-单 ISP-8M 摄像头配置参考 case of one camera use 8M-single ISP

可参考 rk3588-evb2-imx415.dtsi，默认配置 8M 摄像头 imx415 连接 RK3588-dphy0；

4.5.7.3 48M-摄像头使用 ISP 联合模式配置参考 case of 48M camera use unite isp

可参考：rk3588s-tablet.dtsi：默认配置后置 48M 摄像头 OV50C40，前置 13M 摄像头 ov13855;
也可参考：rk3588s-evb1-lp4x-v10-camera.dtsi ，默认 dcphy0/1 均连接 OV50c40，切换使用；

4.6 马达常见问题调试/分析 Motor FAQ debugging/analyzing

可以参考驱动调试文档：

You can refer to the driver debugging document:

“SDK\RKDocs\common\camera\HAL3\RKISP_Driver_User_Manual_v1.xx.pdf”，

文档中对马达驱动做了一些说明；调试方法/步骤总结如下三点：

There is some introduction about motor driver in the document. Summarize the debugging method/steps as below three points:

4.6.1 如何查看马达驱动是否注册？ How to check if the motor driver is registered or not?

以马达 vm149c 为例，使用命令：media-ctl -p，查看是否包含如图的 entity

Take motor vm149c as example, use the command: media-ctl -p, to check if entity in the following picture is included or not

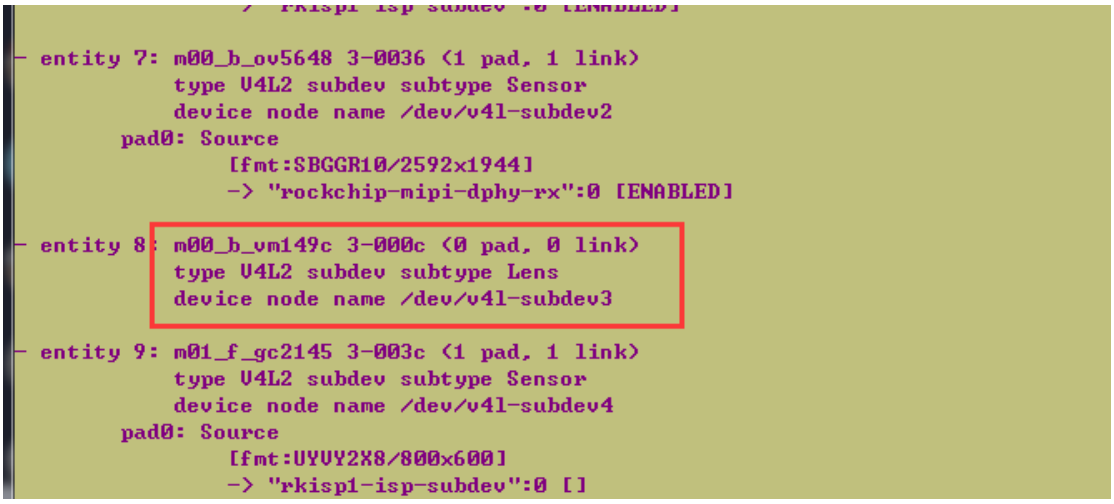


图 8 vm149c 马达注册上示例图

Picture 6 example of vm149c motor is registered successfully

如果有，说明调用到马达驱动注册成功；

If yes, it means the motor driver is registered successfully.

如果没有请参考 SDK\RKDocs\common\camera\HAL3\RKISP_Driver_User_Manual_v1.xx.pdf 文档正确配置 dts，及移植对应的马达驱动。

If no, please refer to SDK\RKDocs\common\camera\HAL3\RKISP_Driver_User_Manual_v1.xx.pdf file to configure dts correctly, and port the corresponding motor driver.

4.6.2 如何使用 V4l2 工具控制马达移动？ How to use V4l2 tool to control the movement of the motor?

打开包含马达的摄像头，使用如下命令：控制马达移动

Enable the camera with the motor, use the following command to control the movement of the motor:

```
v4l2-ctl -d dev/video5 --set-ctrl 'focus_absolute=32' (0~64)
```

如果会移动，说明底层马达控制 OK；

If it can move, that means the bottom layer motor control is OK.

如果马达不移动说明马达底层驱动调用有问题； 需要在马达驱动的 static int xxxx_set_ctrl()和 static int xxxx_set_pos()这两个函数中加打印信息调试；

If the motor cannot move, it means the call of the motor’s bottom layer driver has something wrong. Need to add print information in static int xxxx_set_ctrl() and static int xxxx_set_pos() functions of the motor driver for debugging.

以 vm149c 为例：控制命令肯定会调到如下函数中

Take vm149c as example: control command will definitely be called into the following function

```
static int vm149c_set_ctrl(struct v4l2_ctrl *ctrl)
{
    struct vm149c_device *dev_vcm = to_vm149c_vcm(ctrl);
    struct i2c_client *client = v4l2_get_subdevdata(&dev_vcm->sd);
    unsigned int dest_pos = ctrl->val;
    int move_pos;
    long int mv_us;
    int ret = 0;

    if (ctrl->id == V4L2_CID_FOCUS_ABSOLUTE) {
        if (dest_pos > VCMDRV_MAX_LOG) {
            dev_info(&client->dev,
                "%s dest_pos is error. %d > %d\n",
                __func__, dest_pos, VCMDRV_MAX_LOG);
            return -EINVAL;
        } else {
            /* calculate move time */
            move_pos = dev_vcm->current_related_pos - dest_pos;
            if (move_pos < 0)
                move_pos = -move_pos;

            ret = vm149c_set_pos(dev_vcm, dest_pos);
```

图 9 马达移动调用函数

Picture 7 motor movement call function

4.6.3 camera3_profiles.xml 如何配置？ How to configure camera3_profiles.xml?

只有 RAW Sensor 才支持马达控制，如果支持马达，camera3_profiles.xml 中需要如下配置：

Only RAW Sensor supports motor control. If the motor does support, the following configuration is required in camera3_profiles.xml:

<control.afAvailableModes value="OFF,AUTO,MACRO,CONTINUOUS_VIDEO,CONTINUOUS_PICTURE,EDOF"/>

<control.maxRegions value="1,0,1"/>

<lens.info.minimumFocusDistance value="0.1"/> <!-- HAL may override this value from CMC for RAW sensors -->

如果录像中不需要马达对焦，可以尝试将 CONTINUOUS_VIDEO 关键字去掉；

If the motor focus is not required for video recording, you can try to remove the key word CONTINUOUS_VIDEO.

<request.availableRequestKeys 中需要包含：control.afRegions 字段

<request.availableRequestKeys should include: control.afRegions field

<request.availableResultKeys 中需要包含： control.afRegions 字段

<request.availableResultKeys should include: control.afRegions field

<sensorType value="SENSOR_TYPE_RAW"/> // SENSOR_TYPE 需要是 RAW 的而不是 SOC；

<sensorType value="SENSOR_TYPE_RAW"/> // SENSOR_TYPE should be RAW but not SOC.

不然调用不到 3A 库，从而不会调到底层马达进行自动对焦；

Otherwise it cannot invoke 3A lib, therefore cannot invoke the bottom layer motor to do the auto focus.

4.6.4 效果文件中马达对焦如何配置？

如果需要支持马达对焦，效果文件中 contrast_af 中 enable 设置为：1；

```
<contrast_af index="1" type="struct" size="[1 1]">
<enable index="1" type="double" size="[1 1]">
[1]
</enable>
```

如果不需要支持马达对焦，则将 enable 设置为：0

```
<contrast_af index="1" type="struct" size="[1 1]">
<enable index="1" type="double" size="[1 1]">
[0]
</enable>
```

4.6.5 示例案例：无马达 OV2680 模组配置错误导致切换到录像卡住问题 Example: Device halt issue when switch to video recording caused by the configuration error of OV2680 module without motor

4.6.5.1 问题描述 Issue description

RK3326-9.0 机器，使用不带马达的 OV2680 模组，切换到录像界面出现卡住问题。

RK3326-9.0 device, using OV2680 module which doesn’t have motor, halts when it is switched to video recording interface.

卡住打印的关键 log 如下：

The key log are as below:

```
W CAM2PORT_CamCapabs: Focus mode not supported:AUTO
W CAM2PORT_CamCapabs: Focus mode not supported:AUTO
W CAM2PORT_CamAgnt: Unsupported settings in applySettings()
```

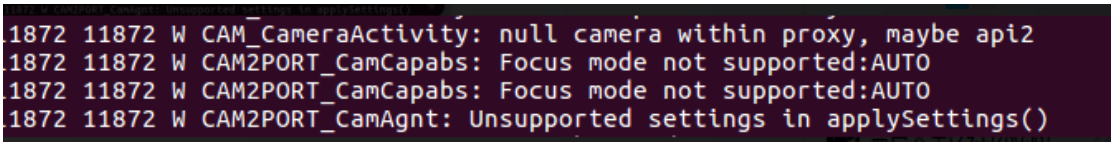


图 10 关键 LOG 截图

Picture 8 key LOG screenshot

4.6.5.2 问题分析 Issue analysis

因为客户机器不带 VCM 马达，所以修改 camera3_profiles.xml 配置

Customer device doesn’t have VCM motor, so they modified the configuration of camera3_profiles.xml

```
<control.afAvailableModes
value="OFF,AUTO,MACRO,CONTINUOUS_VIDEO,CONTINUOUS_PICTURE,EDOF"/>
```

改成了：

to be:

<control.afAvailableModes value="OFF"/>

但还漏了其他地方没有修改；

But missed some other modifications.

4.6.5.3 解决办法 Solution

camera3_profiles.xml 配置还需要如下修改：

camera3_profiles.xml configuration also needs the following modifications:

<control.afAvailableModes value="OFF"/>

<lens.info.minimumFocusDistance value="0.0"/>

不支持 af 时，afAvailableModes 必须为 OFF，minimumFocusDistance 必须为 0.0

When af is not supported, minimumFocusDistance must be 0.0

<control.maxRegions value="1,0,1"/>

改成

Change to:

<control.maxRegions value="1,0,0"/>

4.6.6 注意事项 note

dts 中马达节点中配置的 module index 需要和对应 camera sensor 的 module index 一样；

例如：dts 中 OV13850 节点配置 module index 如下

```
ov13850: ov13850@10 {
        compatible = "ovti,ov13850";
        ……
        rockchip,camera-module-index = <0>;
        ….
};
```

则 dts 中对应马达节点配置 module index 如下：

```
vm149c: vm149c@0c {
        compatible = "silicon touch,vm149c";
        ……
        rockchip,camera-module-index = <0>;
        ……
};
```

4.7 闪光灯常见问题调试/分析 Flash led FAQ debugging/analyzing

首先参考驱动调试文档：“SDK\RKDocs\common\camera\HAL3\RKISP_Driver_User_Manual_v1.xx.pdf”文档中对闪光灯驱动做了一些说明。根据实际使用的 led_flash 类型定义 flash 节点；

First refer to the driver debugging document: SDK\RKDocs\common\camera\HAL3\RKISP_Driver_User_Manual_v1.xx.pdf which includes some introduce on the flash led driver. Define flash node according to the actually used led_flash type.

- 如果是 i2c 控制的 led_flash 设备，定义在 i2c 节点中；

  If it is led_flash device controlled by i2c, define in i2c node.

- 如果是简单 gpio 设备，定义在根节点中；

  If it is simple gpio device, define in root node.

目前支持的 2 种 led_flash 驱动

Currently support two kinds of led_flash drivers.

1、sgm3784（i2c 控制类型，双色温）；

sgm3784 (i2c control type, dual color temperature)

I2C 控制的 LED FLASH 示例参考文档为：

The reference document of LED FLASH example controlled by I2C is:

SDK/kenrel/Documentation/devicetree/bindings/media/i2c/sgm3784.txt

2、flash_rgb13h (gpio 控制类型，简单 led)；

flash_rgb13h (gpio control type, simple led)

GPIO 控制的 LED FLASH 示例参考文档为：

The reference document of LED FLASH example controlled by GPIO is:

SDK/kernel/Documentation/devicetree/bindings/leds/leds-rgb13h.txt

调试方法/步骤总结如下三点：

Summarize the debugging method/steps as below three points:

4.7.1 如何查看闪光灯驱动是否注册？ How to check if the flash led is registered or not?

使用命令：media-ctl -p 查看是否包含如图的 entity：

Use the command: media-ctl -p to check if entity in the following picture is included or not.

I2C 控制的 sgm3784 注册后如下：

sgm3784 controlled by I2C after registered is as below:

```
- entity 10: m00_b_sgm3784_led1 1-0030 (0 pad, 0 link)
        type V4L2 subdev subtype Flash
        device node name /dev/v4l-subdev4

- entity 11: m00_b_sgm3784_led0 1-0030 (0 pad, 0 link)
        type V4L2 subdev subtype Flash
        device node name /dev/v4l-subdev5
```

图 11 sgm3784 注册上示例图

Picture 9 example of sgm3784 is registered successfully

GPIO 控制的 flash_rgb13h 注册后如下：

flash_rgb13h controlled by GPIO after registered is as below:

```
- entity 10: m00_b_ov8858 2-0036 (1 pad, 1 link)
             type V4L2 subdev subtype Sensor
             device node name /dev/v4l-subdev3
        pad0: Source
                [fmt:SBGGR10/3264x2448]
                -> "rockchip-mipi-dphy-rx":0 [ENABLED]

- entity 11: m00_b_gpio-flash flash-rgb13h (0 pad, 0 link)
             type V4L2 subdev subtype Flash
             device node name /dev/v4l-subdev4
```

图 12 rgb13h 注册上示例图

Picture 10 example of flash_rgb13h is registered successfully

4.7.2 如何使用 V4l2 工具控制闪光灯模式？ How to use V4l2 tool to control the flash led mode?

使用 V4l2 工具控制闪光灯模式

Use V4l2 tool to control the flash led mode

闪光灯驱动添加后，可以使用如下命令查看闪光灯是否变化；

After adding the driver of the flash led, you can use the following command to check if the flash led changes or not.

Flash off 模式：

Flash off mode:

```
v4l2-ctl -d dev/video0 --set-ctrl 'led_mode=0'
```

Flash 模式：会闪一下

Flash mode: it will flash once

```
v4l2-ctl -d dev/video0 --set-ctrl 'led_mode=1'
v4l2-ctl -d dev/video0 --set-ctrl 'strobe=1'
```

Torch 模式：常亮

Torch mode: always on

```
v4l2-ctl -d dev/video0 --set-ctrl 'led_mode=2'  或者
v4l2-ctl -d /dev/v4l-subdev6 --set-ctrl ‘led_mode =2’
```

如果没有，自己先添加打印信息，排查调试闪光灯驱动；

If no change, add print information by yourself to debug the flash led driver.

4.7.3 camera3_profiles.xml 如何配置？ How to configure camera3_profiles.xml?

如果需要支持 flash，camera3_profiles.xml 需要修改如下配置项：

If need to support flash, need to modify the following configuration items in camera3_profiles.xml:

```
<control.aeAvailableModes value="ON,OFF,ON_AUTO_FLASH,ON_ALWAYS_FLASH"/>
<flash.info.available value="TRUE"/>
```

然后清理 camera APK，重启；

Then clean camera APK, restart.

配置好后：抓取关键 log：例如：闪光灯挂载在 OV8858 上时候的 log 如下：

After configuration, capture the key log, for example, the log when the flash led is loaded to OV8858 is as below:

开启 Camera Hal3 的 log 开关：

Enable log of Camera Hal3:

抓取 LOG：

Capture LOG:

```
logcat -c;pkill provider;logcat | grep flash
```

或者：

Or:

```
logcat -c;pkill provider;logcat | grep    -i attach
```

抓取的关键 LOG 如下：

The key LOG captured is as below:

D RkCamera: <HAL> PlatformData: findAttachedSubdevs:827,found **flashlight m00_b_gpio-flash flash-rgb13h** attatched to sensor ov8858

4.7.4 示例案例：camera flash 如何配置默认关闭？ Example: How to disable camera flash by default?

4.7.4.1 问题描述 Issue description

相机 APK 默认闪光灯是开启的，要求默认关闭。

Camera APK enabled the flash led by default. The requirement is to disable it by default.

4.7.4.2 问题分析 Issue analysis

查看 camera3_profiles.xml 中支持闪光灯的配置如下：

The configuration to check the flash led supported in camera3_profiles.xml is as below:

```
<control.aeAvailableModes value="ON,ON_AUTO_FLASH,ON_ALWAYS_FLASH "/> <!--
remove ON_AUTO_FLASH,ON_ALWAYS_FLASH if flash is not available-->
```

按照 SDK/system/media/camera/docs/docs.html 配置正确

Configure correctly according to SDK/system/media/camera/docs/docs.html

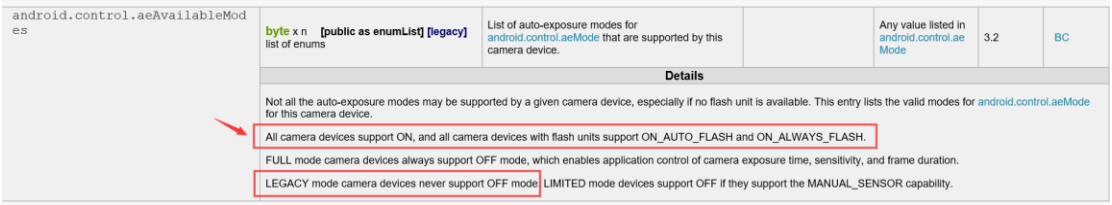


图 13 aeAvailableModes 配置说明

Picture 11 aeAvailableModes configuration instruction

需要清除 APK 缓存再确认下，其他带闪光灯的客户应该都是这么配置的； 需要排查看下 APK 默认的 flash 选项是在哪里配置的。

Need to clean APK buffer and check again. Other customers with flash led are supposed to configure like this. Need to check where APK default flash option is configured.

4.7.4.3 解决办法 Solution

SDK/packages/apps/Camera2/res/values/strings.xml 需要默认配置成 false；

Need to configure SDK/packages/apps/Camera2/res/values/strings.xml as false by default.

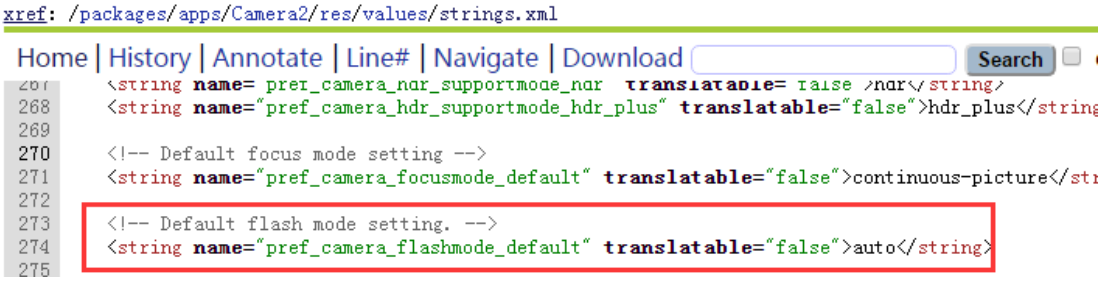


图 14 默认配置位置

Picture 12 Default location of the configuration

4.7.5 注意事项 note

dts 中闪光灯节点中配置的 module index 需要和对应 camera sensor 的 module index 一样；

例如：dts 中 OV13850 节点配置 module index 如下

```
ov13850: ov13850@10 {
    compatible = "ovti,ov13850";
    ……
    rockchip,camera-module-index = <0>;
    ….
};
```

则 dts 中对应闪光灯节点配置 module index 如下：

```
sgm3784: sgm3784@30 {
        compatible = "sgmicro,gsm3784";
        ……
        rockchip,camera-module-index = <0>;
        ……
};
```

4.8 I2C 不通，如何确认相关信号？ I2C doesn’t work, how to confirm relative signals?

Camera Sensor 的 I2C 不通，则需要测量确认如下信号：Power/PowerDown/Reset/Mclk/I2cBus，以 OV5648 正常调试为例进行说明。

If I2C of Camera Sensor doesn’t work, need to measure and confirm the following signals: Power/PowerDown/Reset/Mclk/I2cBus. Take OV5648 normal debugging as example to introduce.

需要将__ov5648_power_off()函数中相关下电操作屏蔽如下：

Need to comment out power off related operations in __ov5648_power_off() function as below:

```
1024:
1025: static void __ov5648_power_off(struct ov5648 *ov5648)
1026: {
1027: #if 0
1028:     if (!IS_ERR(ov5648->pwdn_gpio))
1029:         gpiod_set_value_cansleep(ov5648->pwdn_gpio, 0);
1030:     clk_disable_unprepare(ov5648->xvclk);
1031:     if (!IS_ERR(ov5648->reset_gpio))
1032:         gpiod_set_value_cansleep(ov5648->reset_gpio, 1);
1033:     regulator_bulk_disable(OV5648_NUM_SUPPLIES, ov5648->supplies);
1034: #endif
1035: }
1036:
```

图 15 代码下电位置屏蔽示例图

Picture 13 example of comment out power off code

4.8.1 测量 Power 情况 Measure Power status

查看 OV5648 的 Datasheet：AVDD、DVDD、DOVDD 的供电要求分别如下：

Check OV5648 Datasheet: the power supply requirements of AVDD, DVDD, DOVDD are as below:

01	DVDD	power	digital circuit power	1.5V
02	AGND	ground	analog ground	
03	AVDD	power	analog power	2.8V
04	DOGND	ground	I/O ground	
05	SIOD	I/O	SCCB interface data	
06	SIOC	input	SCCB interface input clock	
07	DVDD	power	digital circuit power	1.5V
08	SCK	I/O	SPI interface input clock	
09	SDI0	I/O	SPI interface data input 0	
10	SDI1	I/O	SPI interface data input 1	
11	DOVDD	power	I/O power	1.8/2.8V

图 16 OV5648 供电要求

Picture 14 OV5648 power supply requirement

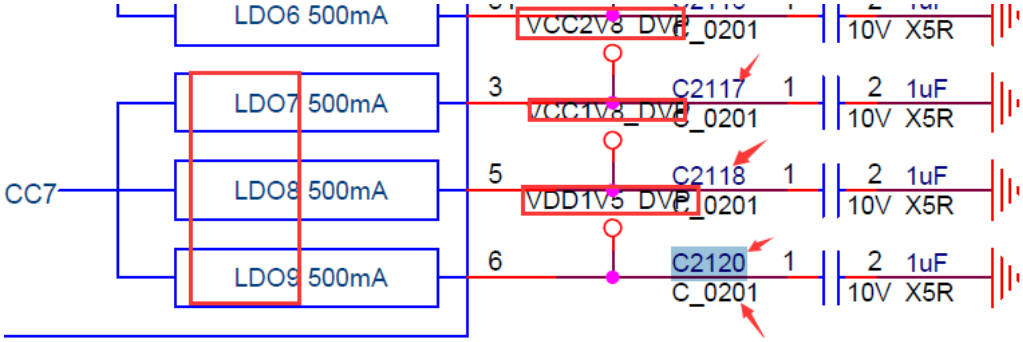


图 17 原理图供电电源

Picture 15 Power in the schematic

依次测量结果如下：

The measure results are as below:

VCC2V8_DVP：2.8V，对应 OV5648 的 AVDD； corresponding to AVDD of OV5648

VCC1V8_DVP：1.8V，对应 OV5648 的 DOVDD； corresponding to DOVDD of OV5648

VDD1V5_DVP：1.5V，对应 OV5648 的 DVDD； corresponding to DVDD of OV5648

和 Datasheet 的供电要求一致，正常。

The results are consistent with the power supply requirement of Datasheet, which is normal.

4.8.1.1 异常分析

如果测量的电压和实际的不符，需要硬件工程师检查各个供电分压是否正常；

4.8.2 PowerDown

查看 OV5648 的 Datasheet：有效时候为低电平：

Check Datasheet of OV5648: low effective

图 18 PWDNB

那说明 Sensor 工作的时候需要为：高电平

That means it should be high level while Sensor is working.

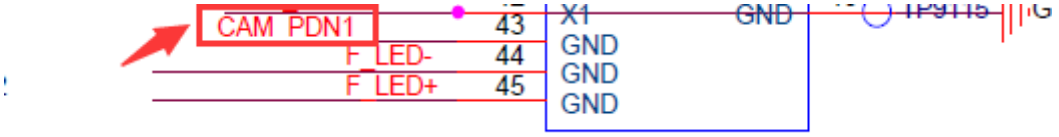


图 19 原理图 PWD 引脚

Picture 17 PWD pin in the schematic

测量结果为：1.8V；正常

The measure result is 1.8V, which is normal.

4.8.2.1 异常分析

如果测量的 PowerDown 电平和实际配置的 GPIO 输出电压不一致，那需要查看如下两个方面原因:

1、查看对应 GPIO 是否是被其他模块占用，是否配置为 GPIO 功能

2、检查硬件电路，查看中间是否有电阻虚焊或者漏焊问题；

4.8.3 Reset

查看 OV5648 的 Datasheet：有效时候为低电平

Check Datasheet of OV5648: low effective

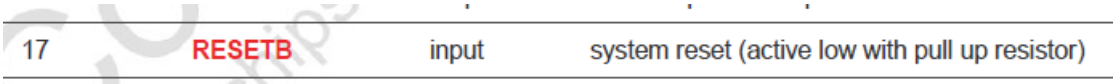


图 20 RESET

那说明 Sensor 工作的时候需要为：高电平

That means it should be high level while Sensor is working.

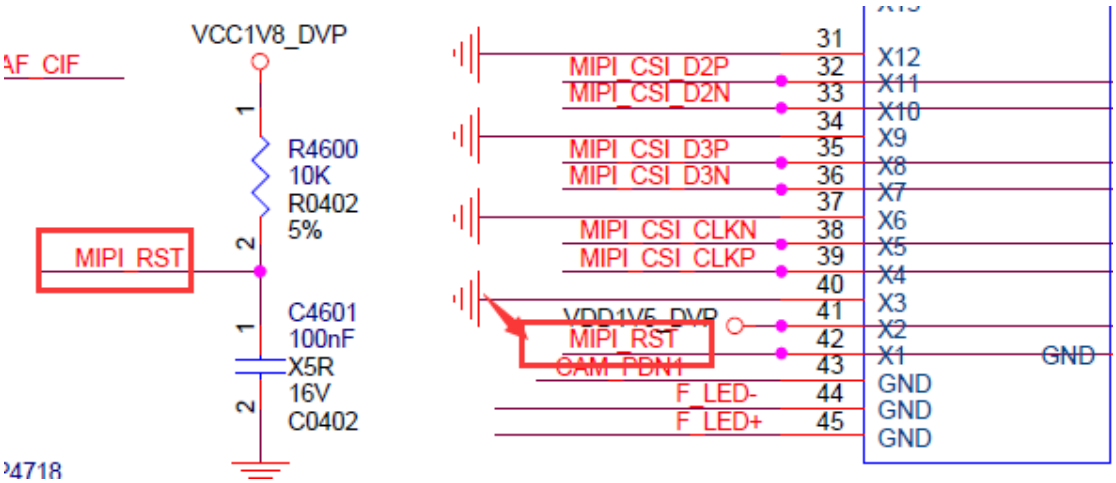


图 21 原理图 RESET 引脚

Picture 19 RESET pin in the schematic

测量结果为：1.8V，被固定拉成 1.8V 了；正常。

The measure result is 1.8V which is pulled up to 1.8V constantly. It is normal.

4.8.3.1 异常分析

如果测量的 Reset 电平和实际配置的 GPIO 输出电压不一致，那需要查看如下两个方面原因:

1、查看对应 GPIO 是否是被其他模块占用，是否配置为 GPIO 功能

2、检查硬件电路，查看中间是否有电阻虚焊或者漏焊问题；

4.8.4 Mclk

测量结果如图：

The measure result is shown as below:

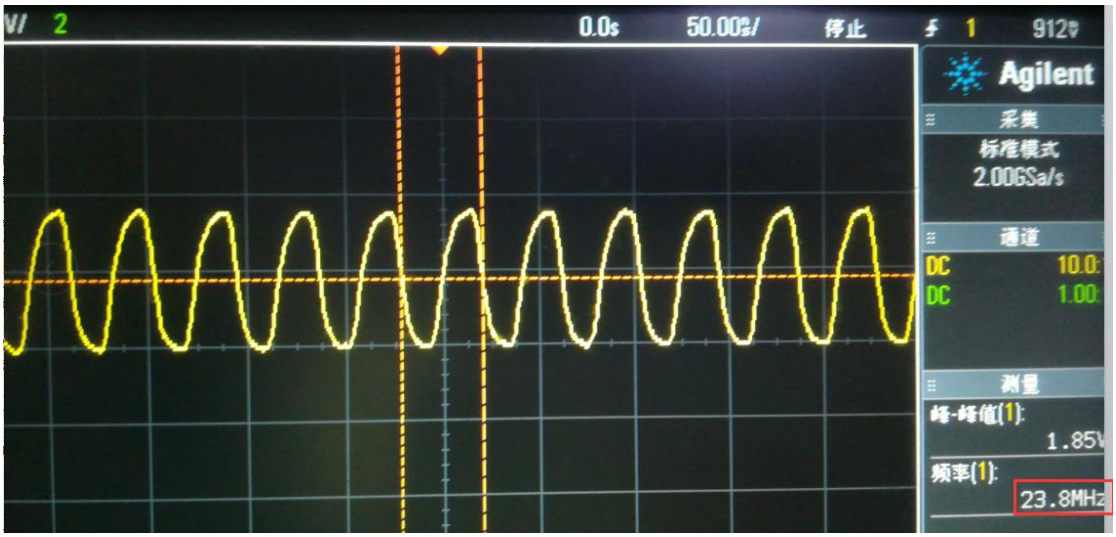


图 22 正常 MCLK 示例

Picture 20 Example of normal MCLK

24MHZ，1.8V 左右，正常。

24MHz, around 1.8V, normal.

4.8.4.1 MCLK 异常分析

测量到 MCLK 输出如图： 结果只有 200mv 左右，或者有时直接没有

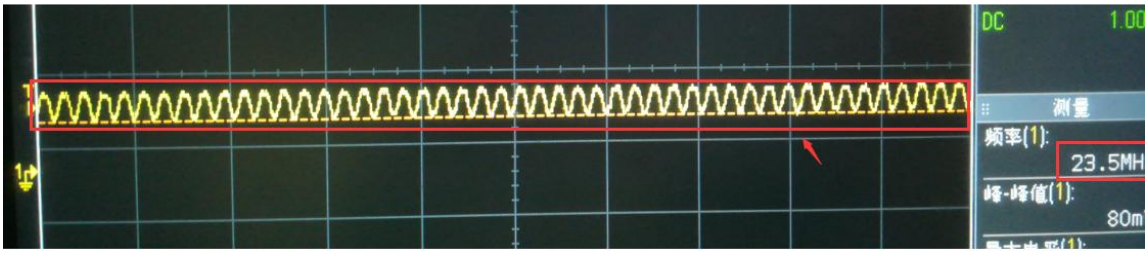


图 23 异常 MCLK 示例

MCLK 异常的可能原因：

1、查看 CIF_CLKOUT 引脚复用没有配置正确

cat /sys/kernel/debug/pinctrl/pinctrl/pinmux-pins

```
pin 65 (gpio2-9): ff950000.cif-new (GPIO UNCLAIMED) function isp_pin group isp-d2d9
pin 66 (gpio2-10): ff950000.cif-new (GPIO UNCLAIMED) function isp_pin group isp-d2d9
pin 67 (gpio2-11): ff950000.cif-new (GPIO UNCLAIMED) function isp_pin group isp-mipi
pin 68 (gpio2-12): (MUX UNCLAIMED) (GPIO UNCLAIMED)
```

图 24 rk3288 cif_ckout 引脚复用查看示例

Picture 21 Example of rk3288 cif_ckout iomux

2、硬件上 CIF_CLKOUT 对应的 IO 电源域未供电；

直接测量硬件上 CIF_CLKOUT 的 IO 电源供电情况；

3. 硬件上 CIF_CLKOUT 对应的 IO 电源域与软件配置 IO-domain 不匹配；

在：kernel/drivers/power/avs/rockchip-io-domain.c 中可以查看原理图上电源域名称和 dts 中配置的电源域名称对应关系；以下以 RK3326 为例说明如何正确配置 MCLK 的 IO-domain。

RK3326：

CIF_CLKO_MO 对应的电源域如图：为 VCCIO3；

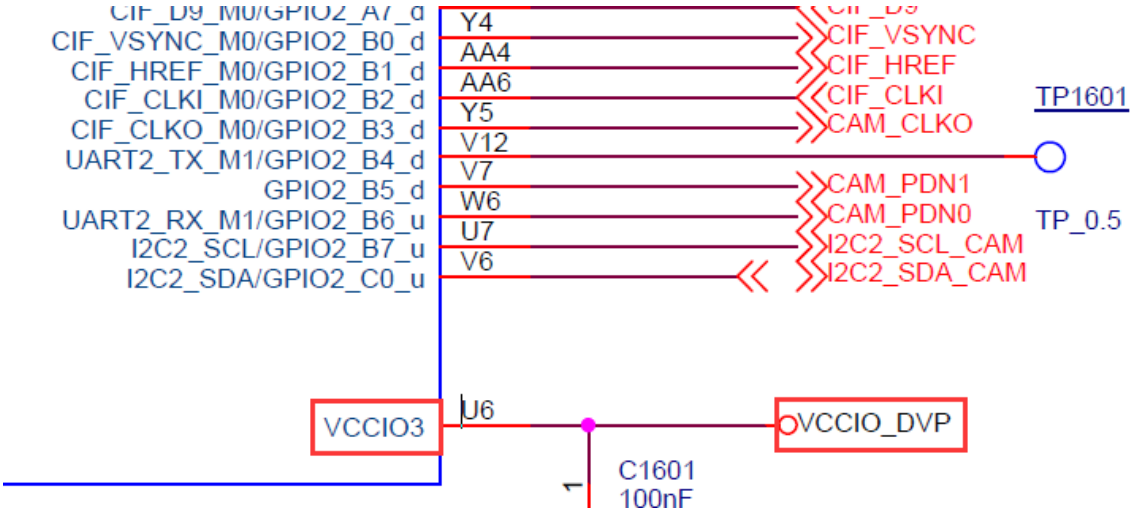


图 25 RK3326 MCLK 对应电源域示例图

a.硬件 VCCIO_DVP 连接 1.8V 供电如图：

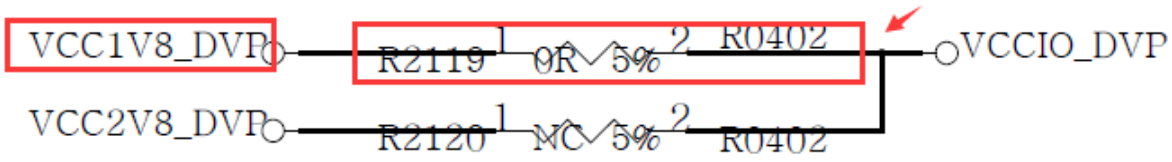


图 26 VCCIO_DVP 连接 1.8V 供电

此时需要将 vccio3-supply 配置成 1.8v 电源域如下：

```
55
56 &io_domains {
57         status = "okay";
58
59         vccio1-supply = <&vcc_3v0>;
60         vccio2-supply = <&vccio_sd>;
61         vccio3-supply = <&vcc1v8_dvp>;
62         vccio4-supply = <&vcc_3v0>;
63         vccio5-supply = <&vcc_3v0>;
64 };
```

b.硬件 VCCIO_DVP 连接 2.8V 供电如图：

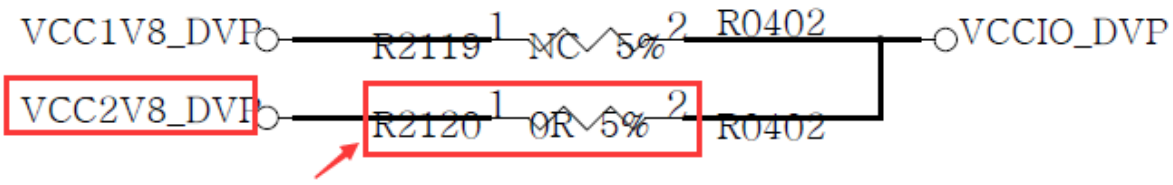


图 27 VCCIO_DVP 连接 2.8V 供电

此时需要配置成 2.8V 电源域如下：

```
539 &io_domains {
540         status = "okay";
541
542         vccio1-supply = <&vcc_3v0>;
543         vccio2-supply = <&vccio_sd>;
544         vccio3-supply = <&vcc2v8_dvp>;
545         vccio4-supply = <&vcc_3v0>;
546         vccio5-supply = <&vcc_3v0>;
547 };
```

4.8.4.2 RK3566 –Android11.0-MCLK 测量没有

很大原因是没有添加 power-domain，需要添加，示例如下：

```
&i2c4 {
        status = "okay";
        gc2145: gc2145@3c {
                status = "okay";
                compatible = "galaxycore,gc2145";
                reg = <0x3c>;
                clocks = <&cru CLK_CIF_OUT>;
                clock-names = "xvclk";
+                 power-domains = <&power RK3568_PD_VI>;
                pinctrl-names = "default";
                pinctrl-0 = <&cif_dvp_8bit>;
            ……
}
```

4.8.5 I2cBus

根据原理图确认是 I2C2。

It is I2C2 confirmed according to the schematic.

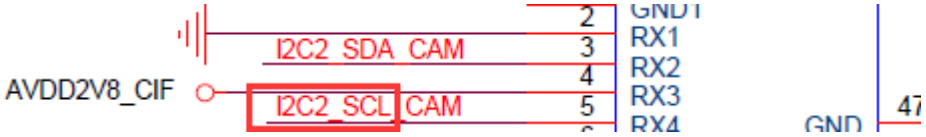


图 28 原理图 I2C 编号示例

Picture 21 I2C number example in the schematic

查看 DTS 中 OV5648 确实配置在 I2C2 结点下，配置正确。

Check OV5648 is actually configured to I2C2 node in DTS. The configuration is correct.

```
32
33  &i2c2 {
34      status = "okay";
35
36      ov5648: ov5648@36 {
37          status = "okay";
38          compatible = "ovti,ov5648";
39          reg = <0x36>;
40          clocks = <&cru SCLK_CIF_OUT>;
41          clock-names = "xvclk";
42
```

图 29 I2CBus 正确示例图

Picture 22 Example of correct I2CBus

4.8.5.1 异常分析

如果测量的 I2C 电平不对，需要检查 I2C 的供电是否正常，在无信号传输的情况下，I2C 的两条总线是处于高电平状态；

4.9 如何使用 v4l2 获取底层数据流？ How to use v4l2 to acquire the bottom layer data flow?

4.9.1 首先配置链路 First configure the link

目前 RK 的 Camera 驱动使用的 media-ctl 框架，有以下四种常见链路：

Currently RK camera driver uses media-ctl framework, and there are the following four common chain links:

1、 MIPI-RAW-Sensor -> MIPI 接口->ISP

MIPI-RAW-Sensor -> MIPI interface->ISP

2、 MIPI-YUV-Sensor -> MIPI 接口->ISP

MIPI-YUV-Sensor -> MIPI interface->ISP

3、 Parallel-Sensor ->ISP

4、 Parallel-Sensor ->CIF

4.9.1.1 MIPI-RAW-Sensor -> MIPI interface->ISP

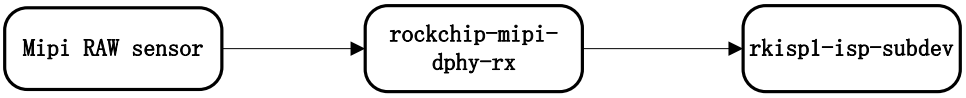


图 30 示例拓扑图 1

Picture 23 example of topological graph 1

以 ov5648 为例：配置链路命令如下：

Take ov5648 as example, the command to configure the link is as below:

media-ctl -l '"ov5648 2-0036":0->"rockchip-mipi-dphy-rx":0[1]'

配置好后，使用 media-ctl -p 命令查看如下：会显示 ENABLED（下同），说明链路配置连接成功。

After configuring, use media-ctl -p command to check as below: it will display ENABLED (same hereinafter), which means the link is configured successfully.

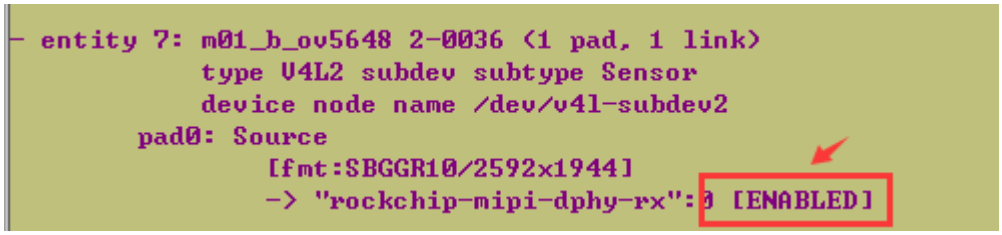


图 31 链路配置 OK 示例图

Picture 24 example of link is configured OK

其他所需链路配置的命令：

Other commands required for the link configuration:

```
media-ctl -l '"rockchip-mipi-dphy-rx":1->"rkisp1-isp-subdev":0[1]'
media-ctl -l '"rkisp1-input-params":0->"rkisp1-isp-subdev":1[1]'
media-ctl -l '"rkisp1-isp-subdev":2->"rkisp1_selfpath":0[1]'
media-ctl -l '"rkisp1-isp-subdev":2->"rkisp1_mainpath":0[1]'
media-ctl -l '"rkisp1-isp-subdev":3->"rkisp1-statistics":0[1]'
```

4.9.1.2 MIPI-YUV-Sensor -> MIPI interface->ISP

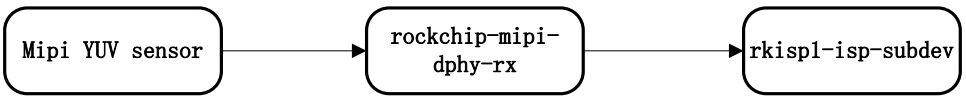


图 32 示例拓扑图 2

Picture 25 example of topological graph 2

以 GC2145-MIPI-YUV 为例：配置链路命令如下：

Take GC2145-MIPI-YUV as example, the command to configure the link is as below:

```
media-ctl -l '"gc2145 2-003c":0->"rockchip-mipi-dphy-rx":0[1]'
media-ctl -l '"rockchip-mipi-dphy-rx":1->"rkisp1-isp-subdev":0[1]'
```

其他同 1

Others are same as 1.

4.9.1.3 Parallel-Sensor ->ISP

图 33 示例拓扑图 3

Picture 26 example of topological graph 3

以 GC2145-DVP 为例：

Take GC2145-DVP as example:

```
media-ctl -l '"gc2145 2-003c":0->"rkisp1-isp-subdev":0[1]'
media-ctl -l '"rkisp1-input-params":0->"rkisp1-isp-subdev":1[1]'
media-ctl -l '"rkisp1-isp-subdev":2->"rkisp1_selfpath":0[1]'
media-ctl -l '"rkisp1-isp-subdev":2->"rkisp1_mainpath":0[1]'
media-ctl -l '"rkisp1-isp-subdev":3->"rkisp1-statistics":0[1]'
```

4.9.1.4 Parallel-Sensor ->CIF

图 34 示例拓扑图 4

Picture 27 example of topological graph 4

以 GC0329 为例：

Take GC0329 as example:

```
media-ctl -l '"gc0329 0-0031":0->"stream_cif":0[1]'
```

4.9.2 配置各 entity 格式 Configure each entity format

4.9.2.1 MIPI-RAW-Sensor -> MIPI interface->ISP

以 ov5648 为例：全分辨率 2592x1944 输出，配置各 entity 和 pad 的格式如下：

Take ov5648 as example: output with full resolution 2592x1944, configure each entity and pad format as below:

```
media-ctl --set-v4l2 '"ov5648 2-0036":0[fmt:SBGGR10/2592x1944]'
media-ctl --set-v4l2 '"rkisp1-isp-subdev":0[fmt:SBGGR10/2592x1944]'
media-ctl --set-v4l2 '"rkisp1-isp-subdev":0[fmt:SBGGR10/2592x1944]' --set-v4l2
'"rkisp1-isp-subdev":0[crop:(0,0)/2592x1944]'
media-ctl --set-v4l2 '"rkisp1-isp-subdev":2[fmt:YUYV2X8/2592x1944]'
```

media-ctl --set-v4l2 "'rkisp1-isp-subdev":2[fmt:YUYV2X8/2592x1944]' --set-v4l2 "'rkisp1-isp-subdev":2[crop:(0,0)/2592x1944]'

使用命令：media-ctl --get-v4l2 "'rkisp1-isp-subdev":0’ 或 media-ctl -p

Use the command: media-ctl --get-v4l2 "'rkisp1-isp-subdev":0’ 或 media-ctl -p

查看设置的格式是否正确

to check if the format set is correct or not

```
127|r8638_mid:/ # media-ctl --get-v4l2 '"rkisp1-isp-subdev":0'
                [fmt:SBGGR10/2592x1944
                 crop.bounds:(0,0)/2592x1944
                 crop:(0,0)/2592x1944]
r8638_mid:/ #
```

图 35 分辨率配置正确示例图

Picture 28 example of resolution is configured correctly

4.9.2.2 MIPI-YUV-Sensor -> MIPI interface->ISP

以 GC2145-MIPI-YUV 为例：800x600 输出

Take GC2145-MIPI-YUV as example: output with 800x600

media-ctl --set-v4l2 "'gc2145 3-003c":0[fmt:UYVY2X8/800x600]'

media-ctl --set-v4l2 "'rkisp1-isp-subdev":0[fmt:UYVY2X8/800x600]'

media-ctl --set-v4l2 "'rkisp1-isp-subdev":0[fmt:UYVY2X8/800x600]' --set-v4l2 "'rkisp1-isp-subdev":0[crop:(0,0)/800x600]'

media-ctl --set-v4l2 "'rkisp1-isp-subdev":2[fmt:YUYV2X8/800x600]'

media-ctl --set-v4l2 "'rkisp1-isp-subdev":2[fmt:YUYV2X8/800x600]' --set-v4l2 "'rkisp1-isp-subdev":2[crop:(0,0)/800x600]'

4.9.2.3 MParallel-Sensor ->ISP

以 GC2145-DVP 为例：同 2

Take GC2145-DVP as example: same as 2

4.9.2.4 MParallel-Sensor ->CIF

media-ctl --set-v4l2 "'gc0329 0-0031":0[fmt:YUYV2X8/640x480]'

4.9.3 使用 V4l2 命令获取数据流 Use V4l2 command to acquire the data flow

以上四种通路最后获取数据流的命令基本一致：使用命令：v4l2-ctl -h，查看使用方法，以 ov5648 为例：

The command for above four links to acquire the data flow are basically consistent: use the command: v4l2-ctl -h, check the usage, take ov5648 as example:

v4l2-ctl --verbose -d /dev/video0 --set-fmt-video=width=2592,height=1944,pixelformat='NV12' --stream-mmap=4 --set-selection=target=crop,flags=0,top=0,left=0,width=2592,height=1944

如果是其他分辨率，需要修改下 width 和 height；

If for other resolutions, need to modify width and height.

如果数据流正常，打印如下：会打印出帧率。

If the data flow is normal, it will print as below: will print out the frame rate.

```
idx: 1 seq:    997 bytesused: 11985408 ts: 471.372915 delta: 66.655 ms fps: 15.00
idx: 2 seq:    998 bytesused: 11985408 ts: 471.439573 delta: 66.658 ms fps: 15.00
idx: 3 seq:    999 bytesused: 11985408 ts: 471.506243 delta: 66.670 ms fps: 15.00
idx: 0 seq:   1000 bytesused: 11985408 ts: 471.572785 delta: 66.542 ms fps: 15.00
VIDIOC_STREAMOFF: ok
```

图 36 正常数据流输出示例图

Picture 29 example of normal data flow output

4.9.4 v4l2-ctl 及 media-ctl 工具说明 v4l2-ctl and media-ctl tool introduction

media-ctl 以及 v4l2-ctl 是 v4l-utils 中包含的两个命令行工具。

media-ctl and v4l2-ctl are the command line tools involved in v4l-utils.

- media-ctl，用以查看、配置拓扑结构

  media-ctl, used to check and configure topological structure

- v4l2-ctl， 用以配置 v4l2 controls， 可抓帧， 设置 cif， isp， sensor 参数

  v4l2-ctl, used to configure v4l2 controls, can capture the frame, set cif, isp, sensor parameter

v4l-utils 工具是由 Linuxtv 维护的一个 V4L2 开发套件， 它提供一系列 V4L2 及 media framework 相关的工具，用来配置 V4L2 子设备的属性，测试 V4L2 设备，并提供如 libv4l2.so 开发库等等。代码下载地址：https://www.linuxtv.org/downloads/v4l-utils/

v4l-utils tool is V4L2 development kit maintained by Linuxtv. It provides a series of tools related with V4L2 and media framework, which are used to configure the sub-device property of V4L2, test V4L2 device, and provide development libraries such as libv4l2.so. The download link of the code is: https://w ww.linuxtv.org/downloads/v4l-utils/

media-ctl 以及 v4l2-ctl 两个命令工具可以通过上述地址自己下载编译或找 FAE 获取 RK 平台编译好的可执行文件。

You can download and compile media-ctl and v4l2-ctl command tools through the above link by yourself or acquire the executable file compiled on RK platform from FAE.

4.10 v4l2 命令获取数据流失败问题常见原因及调试方法 The common reason of failing to use v4l2 command to acquire the data flow and debugging method

4.10.1 可能原因 1：DVP 接口相关的 IOMUX 未进行配置 Possible reason 1: DVP interface related IOMUX is not configured

以 RK3368 上调试 GC2145-DVP 为例进行说明。

Take GC2145-DVP debugging on RK3368 as example to introduce.

4.10.1.1 问题现象 Issue phenomenon

使用如下命令进行数据流获取：

Use the following command to acquire the data flow:

```
v4l2-ctl --verbose -d /dev/video0 --set-fmt-video=width=800,height=600,pixelformat='NV12'
--stream-mmap=4 --set-selection=target=crop,flags=0,top=0,left=0,width=800,height=600
```

但是结果如下：

But the result is as below:

```
VIDIOC_QUERYCAP: ok
VIDIOC_G_FMT: ok
VIDIOC_S_FMT: ok
Format Video Capture Multiplanar:
        Width/Height      : 800/600
        Pixel Format      : 'NV12'
        Field             : None
        Number of planes  : 1
        Flags             :
        Colorspace        : Default
        Transfer Function : Default
        YCbCr Encoding    : Default
        Quantization      : Full Range
        Plane 0           :
           Bytes per Line : 800
           Size Image     : 720000
VIDIOC_REQBUFS: ok
VIDIOC_QUERYBUF: ok
VIDIOC_QUERYBUF: ok
VIDIOC_QBUF: ok
VIDIOC_QUERYBUF: ok
VIDIOC_QBUF: ok
VIDIOC_QUERYBUF: ok
VIDIOC_QBUF: ok
VIDIOC_QUERYBUF: ok
VIDIOC_QBUF: ok
VIDIOC_STREAMON: ok
select timeout
```

就是没有数据流抓出来；

There is no data flow output.

测量 GC2145 输出及输入的信号： CIF_CLKIN = 61MHZ

Measure GC2145 output and input signals: CIF_CLKIN = 61MHZ

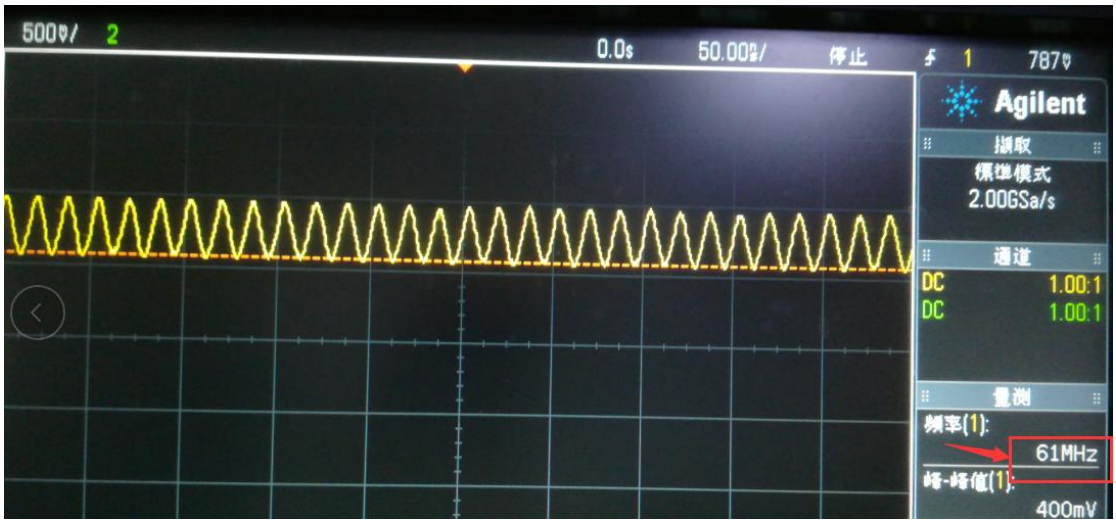


图 37 PCLK 信号

Picture 42 PCLK signal

输入给 GC2145 的 CIF_CLKOUT = 24MHZ 正常，CIF_DATA 引脚均有数据输出。

CIF_CLKOUT = 24MHZ input to GC2145 is normal. CIF_DATA pin has data output.

4.10.1.2 调试方法 Debugging method

使用 IO 命令查看当前 DVP 相关的 GPIO 的 IOMMU 是否正确

Use IO command to check if IOMMU of current DVP related GPIO is correct or not.

```
isp_dvp_d2d9: isp-dvp-d2d9 {
    rockchip,pins =
        <1 0 RK_FUNC_1 &pcfg_pull_none>,//cif_data2
        <1 1 RK_FUNC_1 &pcfg_pull_none>,//cif_data3
        <1 2 RK_FUNC_1 &pcfg_pull_none>,//cif_data4
        <1 3 RK_FUNC_1 &pcfg_pull_none>,//cif_data5
        <1 4 RK_FUNC_1 &pcfg_pull_none>,//cif_data6
```

图 38 DVP 接口部分 GPIO 示例

Picture 43 example of DVP related GPIO

查看 RK3368 的 Datasheet 找到对应 GPIO 口 IOMUX 的寄存器地址：

Check RK3368 Datasheet to find the register address of IOMUX of the corresponding GPIO port:

GRF 基地址：

GRF basic address

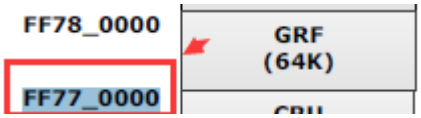


图 39 GRF 基地址

Picture 44 GRF basic address

对应 GPIO_IOMUX 地址:

Corresponding GPIO_IOMUX address:

GRF_GPIO1A_IOMUX	0x00000	W	0x00000000	GPIO1A iomux control
GRF_GPIO1B_IOMUX	0x00004	W	0x00000000	GPIO1B iomux control

图 40 GPIO_IOMUX 地址

Picture 45 GPIO_IOMUX address

0xFF770000 + 0x00000= 0xff770000

3:2	RW	0x0	gpio1a1_sel GPIO1A[1] iomux select 2'b00: gpio 2'b01: cif_data3 2'b10: ts_data1 2'b11: reserved
1:0	RW	0x0	gpio1a0_sel GPIO1A[0] iomux select 2'b00: gpio 2'b01: cif_data2

图 41 IOMUX 复用位说明

Picture 46 IOMUX reuse bit instruction

使用命令：io -4 0xff770000，查看 GPIO 复用情况，结果如下：没有被赋值为：CIF_DATA;

Use the command io -4 0xff770000, to check GPIO reuse status. The result is as below: it is not configured as: CIF_DATA;

```
rk3368:/ # io -4  0xff770000
ff770000:  00000000
rk3368:/ #
```

图 42 异常 IOMUX 结果

Picture 47 abnormal result of IOMUX

而正常的如下：IOMUX 正常赋值成了 CIF_DATA 引脚；

The normal result is as below: IOMUX is normally configured as CIF_DATA pin.

```
D:\Install Program Packages\plat
rk3368:/ #  io -4  0xff770000
ff770000:  00005555
```

图 43 正常 IOMUX 结果

Picture 48 normal result of IOMUX

4.10.1.3 解决办法 Solution

在 dts 的 rkisp1 结点中把相应的 pinctrl 加上即可。

Just need to add the corresponding pinctrl in rkisp1 node in dts.

```
&rkisp1 {
        status = "okay";
        pinctrl-names = "default";
```

```
pinctrl-0 = < &cif_clkout &isp_dvp_d2d9 &isp_dvp_d10d11 >;
```

4.10.2 可能原因 2：模组供电少了 Possible reason 2: power supply of the module is missing

4.10.2.1 问题现象 Issue phenomenon

以调试 OV5648 为例，导致 Check ID 虽然成功了，但后面寄存器写失败。

Take OV5648 debugging as example, although Check ID succeeds, the register fails to write later.

4.10.2.2 调试方法 Debugging method

在 static int ov5648_write_reg()函数中添加调试 LOG 如下：

Add debugging LOG in static int ov5648_write_reg() function as below:

```
687: static int ov5648_write_reg(struct i2c_client *client, u16 reg,
688:                u32 len, u32 val)
689: {
690:     u32 buf_i, val_i;
691:     u8 buf[6];
692:     u8 *val_p;
693:     __be32 val_be;
694:
695:     dev_info(&client->dev, "%s(%d) enter!\n", __func__, __LINE__);
696:     dev_info(&client->dev, "ov5648 write reg(0x%x val:0x%x)!\n", reg, val);
697:
```

图 44 打印信息添加示例

Picture 49 example of adding print information

然后核对打印信息，查看寄存器值是否写入 OK。因为 OV5648 模组需要 1.5v 供电；而 dts 中如果未提供，可能导致 Check ID 虽然成功了，但后面寄存器写失败。

Then compare the print information, and check if the register value is written OK. Because OV5648 module requires 1.5V power, but if it is not provided in dts, it may cause the register fails to write although Check ID successfully.

4.10.2.3 解决办法 Solution

参考原理图，在 Sensor 的结点配置加上对应供电：dvdd-supply = <&vcc1v5_dvp>。

Refer to the schematic, configure the corresponding power in Sensor node: dvdd-supply = <&vcc1v5_dvp>

```
45
46          avdd-supply = <&vcc2v8_dvp>;
47          dovdd-supply = <&vcc1v8_dvp>;
48          dvdd-supply = <&vcc1v5_dvp>;
49
```

图 45 添加 DVDD 供电

Picture 50 add power supply of DVDD

4.10.3 可能原因 3：驱动中配置的 MIPI 速率不对 Possible reason 3: MIPI rate configured in the driver is incorrect

4.10.3.1 问题现象 Issue phenomenon

以 RK3326-Android9.0 上调试 OV5648 为例。

Take OV5648 debugging on RK3326-Android9.0 as example.

使用命令：cat /proc/interrupts | grep isp ，查看 ISP 中断情况如下：

Use the command cat /proc/interrupts | grep isp to check ISP interrupt status as below:

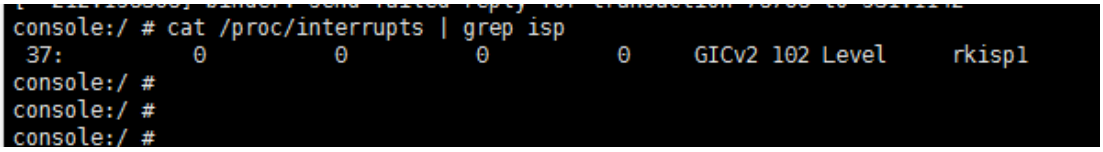


图 46 isp 中断

Picture 51 isp interrupt

没有中断过来，说明 isp 这边没有收到数据。

There is no interrupt coming, which means isp doesn't receive data.

4.10.3.2 调试方法 Debugging method

使用如下命令进行数据流获取：

Use the following command to acquire the data flow:

v4l2-ctl --verbose -d /dev/video0 --set-fmt-video=width=2592,height=1944,pixelformat='NV12' --stream-mmap=4 --set-selection=target=crop,flags=0,top=0,left=0,width=2592,height=1944

配置好后，使用命令： io -4 -l 0x100 0xff4a1c00，查看 ISP 识别数据情况；

After configuration, use the command io -4 -l 0x100 0xff4a1c00 to check the data status recognized by ISP.

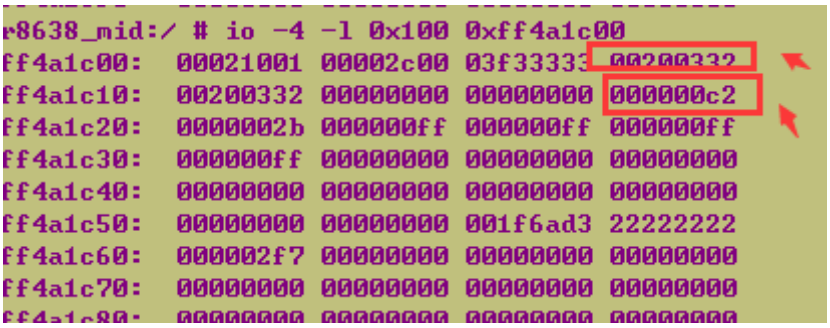


图 47 ISP 识别数据类型情况

Picture 52 data type status recognized by ISP

识别到的数据类型异常。

The data type recognized is abnormal.

4.10.3.3 尝试解决办法 Try the solution

将 MIPI_FREQ 改成 210MhZ。

Change MIPI_FREQ to 210MHz.

```
40:
41: /* pixel_rate = link_frequency * 2 * lanes / BITS_PER_SAMPLE */
42: #define MIPI_FREQ    210000000U
```

```
471:
472: static const s64 link_freq_menu_items[] = {
473:     MIPI_FREQ
474: };
```

图 48 MIPI 速率配置修改

Picture 53 modify MIPI rate configuration

结果如下：数据流通了；

The result is as below: the data flow is normal now.

```
VIDIOC_QBUF: OK
VIDIOC_STREAMON: ok
idx: 0 seq:       0 bytesused: 7558272 ts: 100.677721
idx: 1 seq:       1 bytesused: 7558272 ts: 100.744237 delta: 66.516 ms
idx: 2 seq:       2 bytesused: 7558272 ts: 100.810744 delta: 66.507 ms
idx: 3 seq:       3 bytesused: 7558272 ts: 100.877253 delta: 66.509 ms
idx: 0 seq:       4 bytesused: 7558272 ts: 100.943763 delta: 66.510 ms fps: 15.04
idx: 1 seq:       5 bytesused: 7558272 ts: 101.010275 delta: 66.512 ms fps: 15.04
idx: 2 seq:       6 bytesused: 7558272 ts: 101.076785 delta: 66.510 ms fps: 15.04
idx: 3 seq:       7 bytesused: 7558272 ts: 101.143297 delta: 66.512 ms fps: 15.04
idx: 0 seq:       8 bytesused: 7558272 ts: 101.209808 delta: 66.511 ms fps: 15.04
```

图 49 数据流通示例

Picture 54 example of normal data flow

4.10.4 可能原因 4：模组的 MIPI CLK P/N 或 data P/N 和主板的 P/N 反了；

4.10.4.1 问题现象 Issue phenomenon

使用 io 命令查看 phy stop state 的跳变；

4.10.4.2 调试方法 Debugging method

找硬件配合核对原理图；

4.10.4.3 解决办法 Solution

如果确实反了，可以查看 Sensor 是否支持 MIPI CLK/Data P/N 反向；

如果不行只能重新打样模组；

4.11 常见更新 SDK 后，摄像头打不开问题分析排查步骤 Steps to analyze the issue of failing to open the camera after updating SDK

4.11.1 先将 camera3_profiles.xml 中 先改成 SOC 类型 First change the sensor type to SOC in camera3_profiles.xml

```
<Sensor_info_RKISP1> <!-- Information that parametrizes the behavior or qualities of t
    <sensorType value="SENSOR_TYPE_SOC"/> <!-- SENSOR_TYPE_SOC or SENSOR_TYPE_RAW -->
    <exposure.sync value="true"/> <!-- compensate expsure sync-->
    <sensor.digitalGain value="false"/> <!-- digital gain support on sensor-->
    <gain.lag value="2"/> <!-- camera3 HAL CPF parameters moved here start-->
    <exposure.lag value="2"/>
    <fov value= "54.8" value_v="42.5"/>
    <statistics.initialSkip value="1"/> <!-- camera3 HAL CPF parameters moved here end
    <frame.initialSkip value="3"/> <!-- camera3 HAL CPF parameters moved here end-->
    <isoAnalogGain1 value="75"/> <!--Pseudo ISO corresponding analog gain value 1.0. -
    <cITMaxMargin value="10"/> <!--coarse integration time max margin -->
</Sensor_info_RKISP1>
```

图 50 SENSOR TYPE 修改示例图

Picture 30 example of SENSOR TYPE modification

如果不会报错，说明 tuning 文件版本不对；请联系对应 tuning 调试工程师进行版本更新。因为对于输出 RAW 格式的 Camera 来说，SDK 更新过程中，camera_engine_rkisp 的代码有更新 tuning 参数结构可能有修改，从而导致更新 SDK 后摄像头打不开问题。

If it doesn't report error, it means tuning file version is incorrect. Please contact with the corresponding tuning engineer to update the version. Because for the camera outputting RAW format, during SDK updating process, camera_engine_rkisp code is updated and the tuning parameter structure may change, which will cause the issue that the camera fails to work after updating SDK.

如果是 SOC 的 Camera，可以忽略这步，跳到下一步排查。

If for SOC Camera, you can skip this step.

4.11.2 如果还报错，先重启，然后使用 v4l2-ctl 工具底层抓数据流,看下是否正常 If still error, first restart, then use v4l2-ctl tool to capture bottom layer data flow to see if it is normal

如果正常，说明是 camera3_profiles.xml 配置问题，对照最新 SDK 目录下对应平台的 xml 配置进行修改；

If normal, it means it is camera3_profiles.xml configuration issue. Modify according to xml configuration of the corresponding platform in the latest SDK directory.

如果不正常，说明底层驱动问题，排查 dts 是否配置正确，驱动和最新 SDK 目录下驱动对照修改。

If it is abnormal, it means it is the bottom layer driver problem. Check if dts is configured correctly or not. Modify the driver according to the driver in the latest SDK directory.

4.12 如何判断驱动中摄像头配置是 RAW 还是 SOC 类型？ How to judge the sensor type configured in the driver is RAW or SOC?

如果驱动中 xxxx_enum_mbus_code 配置为 MEDIA_BUS_FMT_UYVY/YUYV/VYUY 等，则为 SOC 摄像头；如果需要调试效果，找对应 Sensor 原厂。

If xxxx_enum_mbus_code in the driver is configured as MEDIA_BUS_FMT_UYVY/YUYV/VYUY, it is SOC camera. If need camera tuning, please ask Sensor vendor for help.

例如：GC2145 输出 YUV 数据配置如下：

For example: configure as below for GC2145 to output YUV data:

```
1935: static const struct gc2145_pixfmt gc2145_formats[] = {
1936:     {
1937:         .code = MEDIA_BUS_FMT_UYVY8_2X8,
1938:     }
1939: };
```

图 51 SOC 类型示例

Picture 31 example of SOC type

如果驱动中 xxxx_enum_mbus_code 配置为 MEDIA_BUS_FMT_SBGGR/SRGGB/SGBRG 等，则为 RAW 摄像头，如果需要调试效果，找业务申请；

If xxxx_enum_mbus_code in the driver is configured as MEDIA_BUS_FMT_SBGGR/SRGGB/SGBRG, it is RAW camera. If need camera tuning, ask sales to apply.

例如：OV5648 输出 RAW 数据配置如下：

For example: configure as below for OV5648 to output RAW data:

```
685: static int ov5648_enum_mbus_code(struct v4l2_subdev *sd,
686:                                  struct v4l2_subdev_pad_config *cfg,
687:                                  struct v4l2_subdev_mbus_code_enum *code)
688: {
689:     if (code->index != 0)
690:         return -EINVAL;
691:     code->code = MEDIA_BUS_FMT_SBGGR10_1X10;
692:
693:     return 0;
694: }
```

图 52 RAW 类型示例

Picture 32 example of RAW type

4.13 RK3399-9.0-摄像头的 clk 是否可以从 sdk 默认的 A 配到 B 问题咨询

4.13.1 问题分析：

dts 默认配置都是 GPIO2_B3 作为 cif_clkout，cif_clkoutb 没有用过

```
4860
4861  &pinctrl {
4862   isp {
4863    cif_clkout: cif-clkout {
4864     rockchip,pins =
4865
4866      <2 11 3 &pcfg_pull_none>;
4867     };
4868
```

图 53 默认 cif_clkout 引脚查看

figure 47 default cif_clkout gpio view

而 cif_clkoutb 为 GPIO3_b7

			software;
15:14	RW	0x0	gpio3b7_sel GPIO3B[7] iomux select 2'b00: gpio 2'b01: mac_crs 2'b10: uart3gps_sout 2'b11: cif_clkoutb

图 54 cif_clkoutb 对应引脚可复用功能查看

Figure 48 cif_clkoutb iomux

4.13.2 尝试修改方法：

使用 GPIO3_B7 作为 cif_clkoutb 修改如下：

```
--- a/arch/arm64/boot/dts/rockchip/rk3399-android.dtsi
+++ b/arch/arm64/boot/dts/rockchip/rk3399-android.dtsi
@@ -375,7 +375,7 @@
                        cif_clkout: cif-clkout {
                                rockchip,pins =
                                        /*cif_clkout*/
-                                       <2 11 RK_FUNC_3 &pcfg_pull_none>;
+                                       <3 15 RK_FUNC_3 &pcfg_pull_none>;
                        };

                        isp_dvp_d0d7: isp-dvp-d0d7 {
```

使用命令：cat /sys/kernel/debug/pinctrl/pinctrl/pinmux-pins

查看 gpio3_b7 是否已经是 cif_clkout 功能了？结果如下：说明已经为 cif-clkout 了

```
pin 110 (gpio3-14): (MUX UNCLAIMED) (GPIO UNCLAIMED)
pin 111 (gpio3-15): ff920000.rkisp1 (GPIO UNCLAIMED) function isp group cif-clkout
pin 112 (gpio3-16): (MUX UNCLAIMED) (GPIO UNCLAIMED)
```

图 55 GPIO3_B7 设置为 cif_clkoutb 功能查看

figure 56 GPIO3_ B7 configured cif_clkout function view

经测量可以正常输出 24MHZ、12MHX 的 MCLK，OK；

4.14 如何查看驱动注册后各 video/v4l-subdev 结点名称信息？how to view the name information of each video/v4l-subdev node after driver registration?

4.14.1 查看 video 结点名称信息：

使用命令：grep -H " /sys/class/video4linux/video*/name

```
C:\Users\lzw>adb shell
rk3288_Android10:/ # grep -H '' /sys/class/video4linux/video*/name
/sys/class/video4linux/video0/name:rkisp_mainpath
/sys/class/video4linux/video1/name:rkisp_selfpath
/sys/class/video4linux/video2/name:rkisp-statistics
/sys/class/video4linux/video3/name:rkisp-input-params
/sys/class/video4linux/video4/name:rkisp-mipi-luma
rk3288_Android10:/ #
```

图 57 GPIO3_B7 设置为 cif_clkoutb 功能查看

figure 58 GPIO3_ B7 configured cif_clkout function view

4.14.2 v4l-subdev 结点名称信息

使用命令：grep -H " /sys/class/video4linux/v4l-subdev*/name

```
CRTB1001:/ #
CRTB1001:/ # grep -H ''  /sys/class/video4linux/v4l-subdev*/name
/sys/class/video4linux/v4l-subdev0/name:rkisp1-isp-subdev
/sys/class/video4linux/v4l-subdev1/name:m01_f_gc0312 2-0021
/sys/class/video4linux/v4l-subdev2/name:m00_b_gc2145 2-003c
CRTB1001:/ #
```

4.15 rk356x-11.0-双目摄像头调试底层常见问题

4.15.1 双目摄像头示例链路连接

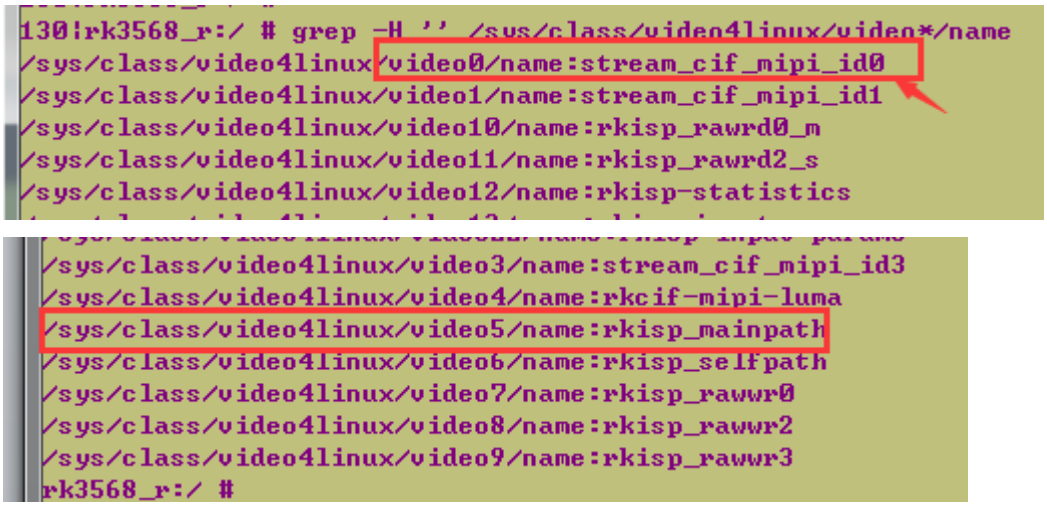
链接关系 1： sensor1->csi2_dphy1->isp_vir0

链接关系 2： sensor2->csi2_dphy2->mipi_csi2->vicap->isp_vir1

4.15.2 如何确定链路正确

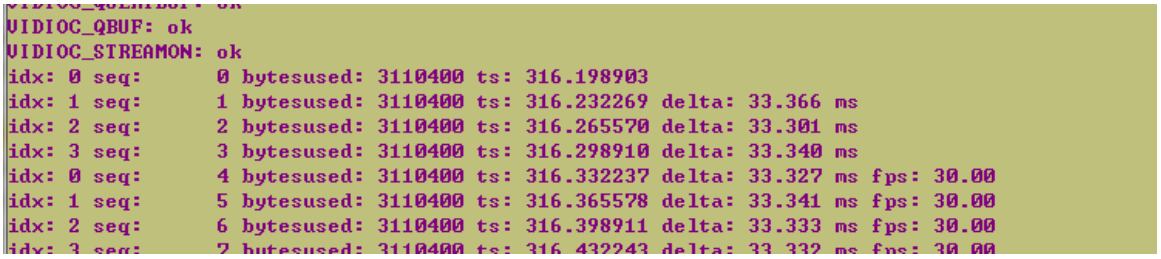
4.15.2.1 使用 grep -H '' /sys/class/video4linux/video*/name

这个命令看下哪个 video 结点是 stream_cif_mipi_id0 和 rkisp-vir0 的 mainpath
一般是 video0 和 video5 结点；

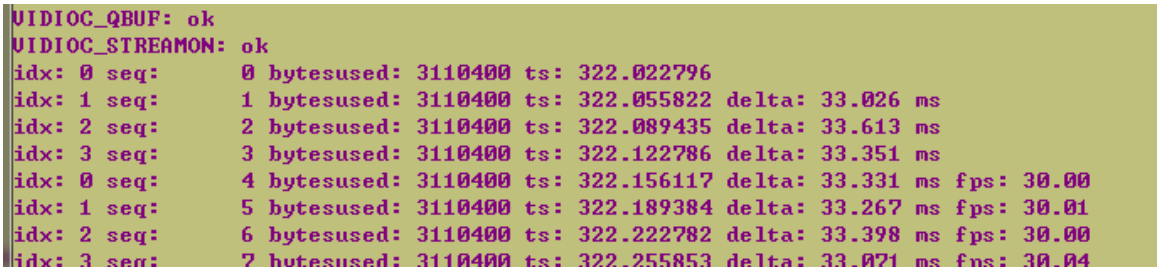


4.15.2.2 使用如下两个命令同时抓取两个结点的数据流，如果正常，说明底层通路 OK

v4l2-ctl --verbose -d /dev/video0 --set-fmt-video=width=1920,height=1080,pixelformat='NV12' --stream-mmap=4 --set-selection=target=crop,flags=0,top=0,left=0,width=1920,height=1080



v4l2-ctl --verbose -d /dev/video5 --set-fmt-video=width=1920,height=1080,pixelformat='NV12' --stream-mmap=4 --set-selection=target=crop,flags=0,top=0,left=0,width=1920,height=1080



如果异常，说明底层通路就异常了，需要先按照 4.9 说明进行排查；

4.16 rk356x-11.0-双目摄像头调试上层常见问题

4.16.1 上层未识别到摄像头，使用 APK 打不开摄像头

使用命令： dumpsy media.camera

Number of camera devices: 0，说明 framework 层没有识别到摄像头；

则先参考 4.2.1，将 CameraHal3 的 log 开关打开；

然后使用命令： logcat -G 128M && logcat -c && pkill provider && logcat

抓取相应的 log，查看是否有： E RkCamera:报错，根据报错原因进行排查；

一般客户出现上述原因，基本是 camera3_profiles.xml 配置不对导致异常；

参考 camera_hal3_user_manual_vx.x.pdf 文档，进行排查。

4.16.2 上层识别到摄像头，使用 APK 打不开摄像头

Number of camera devices: 2，说明 framework 层识别到摄像头，但是使用 APK 还是打不开；

这种情况一般是客户缺少 tuning 效果文件导致，参考 logcat 中提示将板子推对应的效果文件：

```
E rkisp : [XCORE]:XCAM ERROR RkAiqCalibDb.cpp:186: calibdb
/vendor/etc/camera/rkisp2/xxxxxx_default.xml and bin are all not exist!
```

4.17 rk3566-rkisp2x 2lane+2lane 双 mipi 硬件连接注意事项

前后摄切换使用的场景：

可以只使用 MIPI_RX_CLK0 这组，data lane 都从 MIPI_RX_D0 开始；

或者使用 CLK0 和 CLK1：

MIPI_RX_CLK0 和 MIPI_RX_D0-1 一组；

MIPI_RX_CLK1 和 MIPI_RX_D2-3 一组

双 MIPI 需要同时使用的场景：

MIPI_RX_CLK0 和 MIPI_RX_D0-1 一组；

MIPI_RX_CLK1 和 MIPI_RX_D2-3 一组

4.18 RK356x-BT1120-4 路 VC 芯片 NVP6158-DTS 配置说明

参考示例：SDK/kernel/Documentation/devicetree/bindings/media/i2c/nvp6158.txt

4.18.1 完整示例配置

```
nvp6158: nvp6158@30 {
    compatible = "nvp6158-v4l2";
    status = "okay";
    reg = <0x30>;
```

```
            clocks = <&cru CLK_CIF_OUT>;
            clock-names = "xvclk";
            power-domains = <&power RK3568_PD_VI>;
            pinctrl-names = "default";
            pinctrl-0 = <&cif_clk &cif_dvp_clk &cif_dvp_bus8 &cif_dvp_bus16>;
            pwr-gpios = <&gpio4 RK_PB2 GPIO_ACTIVE_HIGH>;
            pwr2-gpios = <&gpio4 RK_PB1 GPIO_ACTIVE_HIGH>;
            rst-gpios = <&gpio4 RK_PB5 GPIO_ACTIVE_HIGH>;
            /*rst2-gpios = <&gpio2 RK_PC5 GPIO_ACTIVE_HIGH>;*/
            /*pwdn-gpios = <&gpio4 RK_PA6 GPIO_ACTIVE_HIGH>;*/
            /*pwdn2-gpios = <&gpio4 RK_PA6 GPIO_ACTIVE_HIGH>;*/
            rockchip,camera-module-index = <0>;
            rockchip,camera-module-facing = "back";
            rockchip,camera-module-name = "default";
            rockchip,camera-module-lens-name = "default";
            rockchip,dvp_mode = "BT1120"; //BT656 or BT1120 or BT656_TEST
            rockchip,channel_nums = <4>; //channel nums, 1/2/4
            rockchip,dual_edge = <1>; // pclk dual edge, 0/1
            rockchip,default_rect= <1920 1080>; // default resolution
            port {
                nvp6158_out: endpoint {
                    remote-endpoint = <&dvp_in_bcam1>;
                };
            };
        };
&rkcif {
        status = "okay";
};

&rkcif_dvp {
        status = "okay";
        ports {
            #address-cells = <1>;
            #size-cells = <0>;

            port@0 {
                #address-cells = <1>;
                #size-cells = <0>;
                /* Parallel bus endpoint */
                dvp_in_bcam1: endpoint@1 {
```



```
                        reg = <1>;
                        remote-endpoint = <&nvp6158_out>;
                        bus-width = <16>;
                    };
                };
            };
        };

    &rkcif_mmu {
        status = "disabled";
    };

    &rkcif_mipi_lvds {
        status = "disabled";
    };

    &rkcif_mipi_lvds_sditf {
        status = "disabled";
    };
```

4.18.2 各部分配置说明

4.18.2.1 如下部分是和 camera 相同的配置

参考 Rockchip_Driver_Guide_ISP2x_CN_v1.x.x.pdf 文件说明即可

```
    nvp6158: nvp6158@30 {
                compatible = "nvp6158-v4l2";
                status = "okay";
                reg = <0x30>;
                clocks = <&cru CLK_CIF_OUT>;
                clock-names = "xvclk";
                power-domains = <&power RK3568_PD_VI>;
                pinctrl-names = "default";
                pinctrl-0 = <&cif_clk &cif_dvp_clk &cif_dvp_bus8 &cif_dvp_bus16>;
                pwr-gpios = <&gpio4 RK_PB2 GPIO_ACTIVE_HIGH>;
                pwr2-gpios = <&gpio4 RK_PB1 GPIO_ACTIVE_HIGH>;
                rst-gpios = <&gpio4 RK_PB5 GPIO_ACTIVE_HIGH>;
                /*rst2-gpios = <&gpio2 RK_PC5 GPIO_ACTIVE_HIGH>;*/
                /*pwdn-gpios = <&gpio4 RK_PA6 GPIO_ACTIVE_HIGH>;*/
                /*pwdn2-gpios = <&gpio4 RK_PA6 GPIO_ACTIVE_HIGH>;*/
```

```
            rockchip,camera-module-index = <0>;
            rockchip,camera-module-facing = "back";
            rockchip,camera-module-name = "default";
            rockchip,camera-module-lens-name = "default";
            …….
};

&rkcif {
    status = "okay";
};

&rkcif_dvp {
    status = "okay";
    ports {
        #address-cells = <1>;
        #size-cells = <0>;

        port@0 {
            #address-cells = <1>;
            #size-cells = <0>;
            /* Parallel bus endpoint */
            dvp_in_bcam1: endpoint@1 {
                reg = <1>;
                remote-endpoint = <&nvp6158_out>;
                bus-width = <16>;
            };
        };
    };
};

&rkcif_mmu {
    status = "disabled";
};

&rkcif_mipi_lvds {
    status = "disabled";
};

&rkcif_mipi_lvds_sditf {
    status = "disabled";
```



```
};
```

4.18.2.2 nvp6158 驱动私有配置说明

1、配置 nvp6158 的输出模式

```
rockchip,dvp_mode = "BT1120"; //BT656 or BT1120 or BT656_TEST
```

因为 nvp6158 支持 BT656 P 格式，BT656 I 测试格式，及 BT1120 P 格式的输出，通过上面可以配置相应的输出模式；

2、配置 nvp6158 的输出通道数

```
rockchip,channel_nums = <4>; //channel nums, 1/2/4
```

3、**配置 nvp6158 输出的 pclk 采样极性**

```
rockchip,dual_edge = <1>; // pclk dual edge, 0/1
```

支持单边沿和双边沿配置，0 表示单边沿输出模式；1 表示双边沿输出模式；

4、配置默认分辨率

```
rockchip,default_rect= <1920 1080>; // default resolution
```

支持：1080P，720P，及测试用的 BT656I 格式，具体见驱动；

4.18.2.3 BT656 和 BT1120 配置区别

BT1120 格式是 16bit 的数据位：pinctrl 配置如下：

```
pinctrl-names = "default";
pinctrl-0 = <&cif_clk &cif_dvp_clk &cif_dvp_bus8 &cif_dvp_bus16>;
```

BT656 格式是 8bit 的数据位：pinctrl 配置如下：

```
pinctrl-names = "default";
pinctrl-0 = <&cif_clk &cif_dvp_clk &cif_dvp_bus16>;
```

4.18.3 BT656 一路 I 格式输出配置示例

4.18.3.1 分辨率：720x480I

```
nvp6158: nvp6158@30 {
        ……
        rockchip,dvp_mode = " BT656_TEST "; //BT656 or BT1120 or BT656_TEST
        rockchip,channel_nums = <1>; //channel nums, 1/2/4
        rockchip,dual_edge = <0>; // pclk dual edge, 0/1
        rockchip,default_rect= <720 480>; // default resolution
};
&rkcif_dvp {
    status = "okay";
```

```
        port {
            #address-cells = <1>;
            #size-cells = <0>;
            /* Parallel bus endpoint */
            dvp_in_bcam1: endpoint@1 {
                reg = <1>;
                remote-endpoint = <&nvp6158_out>;
                bus-width = <8>;
            };
        };
    };
```

4.18.3.2 分辨率：720x576I

rkcif_dvp 配置同上：

```
    nvp6158: nvp6158@30 {
            ……
            rockchip,dvp_mode = " BT656_TEST "; //BT656 or BT1120 or BT656_TEST
            rockchip,channel_nums = <1>; //channel nums, 1/2/4
            rockchip,dual_edge = <0>; // pclk dual edge, 0/1
            rockchip,default_rect= <720 576>; // default resolution
};
```

4.18.3.3 分辨率：960x576I

rkcif_dvp 配置同上：

```
    nvp6158: nvp6158@30 {
            ……
            rockchip,dvp_mode = " BT656_TEST "; //BT656 or BT1120 or BT656_TEST
            rockchip,channel_nums = <1>; //channel nums, 1/2/4
            rockchip,dual_edge = <0>; // pclk dual edge, 0/1
            rockchip,default_rect= <960 576>; // default resolution
};
```

4.18.3.4 分辨率：1920x576I

rkcif_dvp 配置同上：

```
    nvp6158: nvp6158@30 {
```

```
                ……
                rockchip,dvp_mode = " BT656_TEST "; //BT656 or BT1120 or BT656_TEST
                rockchip,channel_nums = <1>; //channel nums, 1/2/4
                rockchip,dual_edge = <0>; // pclk dual edge, 0/1
                rockchip,default_rect= <1920 576>; // default resolution
};
```

4.18.4 BT656 一路 P 格式输出配置示例

4.18.4.1 分辨率：1280x720P

```
    nvp6158: nvp6158@30 {
                ……
                rockchip,dvp_mode = " BT656"; //BT656 or BT1120 or BT656_TEST
                rockchip,channel_nums = <1>; //channel nums, 1/2/4
                rockchip,dual_edge = <0>; // pclk dual edge, 0/1
                rockchip,default_rect= <1280 720>; // default resolution
    };

    &rkcif_dvp {
        status = "okay";
        port {
            #address-cells = <1>;
            #size-cells = <0>;
            /* Parallel bus endpoint */
            dvp_in_bcam1: endpoint@1 {
                reg = <1>;
                remote-endpoint = <&nvp6158_out>;
                bus-width = <8>;
            };
        };
    };
```

4.18.4.2 分辨率：1920x1080P

rkcif_dvp 配置同上：

```
    nvp6158: nvp6158@30 {
                ……
                rockchip,dvp_mode = " BT656"; //BT656 or BT1120 or BT656_TEST
                rockchip,channel_nums = <1>; //channel nums, 1/2/4
                rockchip,dual_edge = <0>; // pclk dual edge, 0/1
```

```
            rockchip,default_rect= <1920 1080>; // default resolution
    };
```

4.18.5 BT656-2 路无支持格式

4.18.6 BT656-4 路无支持格式

4.18.7 BT1120 一路 P 格式输出配置示例

4.18.7.1 分辨率：1280x720P

```
    nvp6158: nvp6158@30 {
            ……
            rockchip,dvp_mode = " BT1120"; //BT656 or BT1120 or BT656_TEST
            rockchip,channel_nums = <1>; //channel nums, 1/2/4
            rockchip,dual_edge = <0>; // pclk dual edge, 0/1
            rockchip,default_rect= <1280 720>; // default resolution
    };

    &rkcif_dvp {
        status = "okay";
        port {
            #address-cells = <1>;
            #size-cells = <0>;
            /* Parallel bus endpoint */
            dvp_in_bcam1: endpoint@1 {
                reg = <1>;
                remote-endpoint = <&nvp6158_out>;
                bus-width = <16>;
            };
        };
    };
```

4.18.7.2 分辨率：1920x1080P

rkcif_dvp 配置同上：

```
    nvp6158: nvp6158@30 {
            ……
            rockchip,dvp_mode = " BT1120"; //BT656 or BT1120 or BT656_TEST
            rockchip,channel_nums = <1>; //channel nums, 1/2/4
```

```
            rockchip,dual_edge = <0>; // pclk dual edge, 0/1
            rockchip,default_rect= <1920 1080>; // default resolution
    };
```

4.18.8 BT1120-2 路 P 格式输出配置示例

4.18.8.1 分辨率：1280x720P 只支持只能识别一路，两路相位差 180 度

i2ctransfer -y -f 1 w2@0x30 0xff 0x01
i2ctransfer -y -f 1 w1@0x30 0xcd r1
调整时序: i2ctransfer -y -f 1 w2@0x30 0xcd 0x
0xcd/0xce 为 0x1f 的时候，识别到 ID0， 为 0x06 的时候，识别到 ID1

```
    nvp6158: nvp6158@30 {
            ……
            rockchip,dvp_mode = " BT1120"; //BT656 or BT1120 or BT656_TEST
            rockchip,channel_nums = <2>; //channel nums, 1/2/4
            rockchip,dual_edge = <0>; // pclk dual edge, 0/1
            rockchip,default_rect= <1280 720>; // default resolution
    };

    &rkcif_dvp {
        status = "okay";
        port {
            #address-cells = <1>;
            #size-cells = <0>;
            /* Parallel bus endpoint */
            dvp_in_bcam1: endpoint@1 {
                reg = <1>;
                remote-endpoint = <&nvp6158_out>;
                bus-width = <16>;
            };
        };
    };
```

4.18.8.2 分辨率：1920x1080P

rkcif_dvp 配置同上：

```
    nvp6158: nvp6158@30 {
            ……
```

```
            rockchip,dvp_mode = " BT1120"; //BT656 or BT1120 or BT656_TEST
            rockchip,channel_nums = <2>; //channel nums, 1/2/4
            rockchip,dual_edge = <0>; // pclk dual edge, 0/1
            rockchip,default_rect= <1920 1080>; // default resolution
};
```

4.18.9 BT1120-4 路 P 格式输出配置示例

4.18.9.1 分辨率：1280x720P

```
nvp6158: nvp6158@30 {
            ……
            rockchip,dvp_mode = " BT1120"; //BT656 or BT1120 or BT656_TEST
            rockchip,channel_nums = <4>; //channel nums, 1/2/4
            rockchip,dual_edge = <1>; // pclk dual edge, 0/1
            rockchip,default_rect= <1280 720>; // default resolution
};

&rkcif_dvp {
    status = "okay";
    port {
        #address-cells = <1>;
        #size-cells = <0>;
        /* Parallel bus endpoint */
        dvp_in_bcam1: endpoint@1 {
            reg = <1>;
            remote-endpoint = <&nvp6158_out>;
            bus-width = <16>;
        };
    };
};
```

注意：这里需要配置 pclk 为双边沿采样才行；

如果配置成单边沿：nvp6158_video.c—》nvp6158_set_portmode

NVP6158_OUTMODE_4MUX_BT1120S 中需要使用如下配置才行；

```
case NVP6158_OUTMODE_4MUX_BT1120S:
    gpio_i2c_write(chipaddr, 0xFF, 0x00);
    gpio_i2c_write(chipaddr, 0x56, 0x32);
    gpio_i2c_write(chipaddr, 0xFF, 0x01);
    if(chip_id[chip] == NVP6158C_R0_ID || chip_id[chip] == NVP6168C_R0_ID)
    {
        //6158C makes 2 bt656 ports to 1 bt1120 port.  portsel=[1,2] to ch
        gpio_i2c_write(chipaddr, 0xC2, 0x54);
        gpio_i2c_write(chipaddr, 0xC3, 0x76);
        gpio_i2c_write(chipaddr, 0xC4, 0xdc);
        gpio_i2c_write(chipaddr, 0xC5, 0xfe);
        gpio_i2c_write(chipaddr, 0xC8, 0x88);
        gpio_i2c_write(chipaddr, 0xC9, 0x88);
        //dual_edge
        gpio_i2c_write(chipaddr, 0xCD, 0x06);    //74.25MHz clock
        gpio_i2c_write(chipaddr, 0xCE, 0x06);    //74.25MHz clock
//      //single edge
//      gpio_i2c_write(chipaddr, 0xCD, 0x46);    //148.5MHz clock
//      gpio_i2c_write(chipaddr, 0xCE, 0x46);    //148.5MHz clock
    }
```

4.18.9.2 分辨率：1920x1080P

rkcif_dvp 配置同上：

```
nvp6158: nvp6158@30 {
        ……
        rockchip,dvp_mode = " BT1120"; //BT656 or BT1120 or BT656_TEST
        rockchip,channel_nums = <4>; //channel nums, 1/2/4
        rockchip,dual_edge = <1>; // pclk dual edge, 0/1
        rockchip,default_rect= <1920 1080>; // default resolution
};
```

注意：这里需要配置 pclk 为双边沿采样才行；

4.18.10 注意：以上均是 color Bar 输出，接 AHD 的只验证过 1080P；

4.19 RK356x-BT1120-4 路 VC 芯片 NVP6158-驱动配置注意事项

4.18 讲述 dts 中将 bit 位配置为 16bit，用于 BT1120 传输；

而实现 BT1120 传输，对应 sensor 的驱动驱动中需要实现：**_querystd 函数，

从而提供参数给 vicap，告诉 vicap 当前 sensor 输出的是 bt656 还是 bt1120 模式；

```
static int nvp6158_querystd(struct v4l2_subdev *sd, v4l2_std_id *std)
{
    struct nvp6158 *nvp6158 = to_nvp6158(sd);

    if ((nvp6158->mode > BT656I_TEST_MODES) &&
        (nvp6158->mode < NVP6158_DVP_MODES_END)) {
        /* for vicap detect bt1120 */
        *std = V4L2_STD_ATSC;
    } else {
        *std = V4L2_STD_PAL;
    }
    return 0;
}
```

其中*std = V4L2_STD_ATSC;表示输出的是 BT1120 模式； 其他则表示 BT656，见如下匹配代码：

```
2116:
2117:     ret = v4l2_subdev_call(sensor_info->sd, video, querystd, &std);
2118:     if (ret == 0) {
2119:         /* retrieve std from sensor if exist */
2120:         switch (std) {
2121:         case V4L2_STD_NTSC:
2122:             mode = INPUT_MODE_NTSC;
2123:             break;
2124:         case V4L2_STD_PAL:
2125:             mode = INPUT_MODE_PAL;
2126:             break;
2127:         case V4L2_STD_ATSC:
2128:             mode = INPUT_MODE_BT1120;
2129:             break;
2130:         default:
2131:             v4l2_err(&dev->v4l2_dev,
2132:                  "std: %lld is not supported", std);
```

4.20 RK356x-11.0 –AHD-MIPI 多路驱动调试问题?

问：是否有调过 4 路 AHD 转 MIPI 输出接口的 VC4 通道芯片

答：我司调过的这类芯片有 NVP6324；

问：能提供下 NVP6324 相关的配置说明吗，dts 配置、参考代码之类的？

答：见 rk3568-evb1-bt1120-nvp6158.dtsi

VC 通道是 MIPI CSI 本身支持的功能，根据 DI 决定就行了，只要按照标准传输各个通道数据就能正常接收；数据标识（DI）高 2bit 用于虚拟通道，低 6bit 是数据类型。

4.21 RK356x-MIPI-4 路 VC 芯片 NVP6324-DTS 配置说明

参考示例：SDK/kernel/Documentation/devicetree/bindings/media/i2c/nvp6324.txt

4.21.1 示例配置

```
&i2c4 {
        status = "okay";

        jaguar1: jaguar1@30 {
                compatible = "jaguar1-v4l2";
                status = "okay";
                reg = <0x30>;
                clocks = <&cru CLK_CAM0_OUT>;
                clock-names = "xvclk";
                power-domains = <&power RK3568_PD_VI>;
                pd-gpios = <&gpio4 RK_PB4 GPIO_ACTIVE_HIGH>;
                rst-gpios = <&gpio3 RK_PB6 GPIO_ACTIVE_HIGH>;
```

```
            rockchip,camera-module-index = <0>;
            rockchip,camera-module-facing = "back";
            rockchip,camera-module-name = "jaguar1";
            rockchip,camera-module-lens-name = "jaguar1";
            rockchip,default_rect= <1920 1080>; // default resolution
            port {
                n4_out: endpoint {
                    remote-endpoint = <&mipi_in_ucam3>;
                    data-lanes = <1 2 3 4>;
                };
            };
        };
    };
```

4.21.1.1 N4 驱动私有配置说明

配置默认分辨率

```
            rockchip,default_rect= <1920 1080>; // default resolution
```

支持：1080P，720P；

4.22 RK356x-11.0-camera 如何打开 HDR？

4.22.1 确认 CMOS sensor 是否本身支持 HDR 模式？

选择 CMOS sensor 前询问 sensor 原厂是否支持 HDR 模式，如果不支持，肯定不能配置成 HDR 模式；只能配置成 NORMAL 的线性模式；

4.22.2 如何配置 camera3_profiles.xml 支持 HDR？

关键字段：aiq.workingMode；

正常线性模式配置示例：

```
        <aiq.workingMode value=" NORMAL "/> <!-- NORMAL or HDR2 or HDR3 -->
```

HDR2 模式配置示例：即 2 帧合成一帧的 hdr 模式

```
        <aiq.workingMode value=" HDR2 "/> <!-- NORMAL or HDR2 or HDR3 -->
```

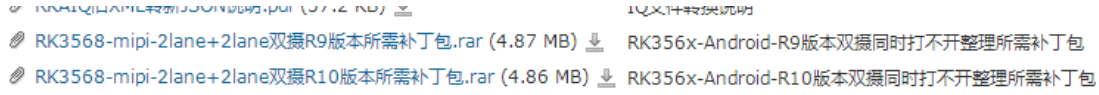
HDR3 模式配置示例：即 3 帧合成一帧的 hdr 模式

```
        <aiq.workingMode value=" HDR3"/> <!-- NORMAL or HDR2 or HDR3 -->
```

4.23 RK356x-11.0-R9/R10 版本双摄同时打开异常所需补丁包

补丁包位置：

https://redmine.rock-chips.com/documents/104



RK3568-mipi-2lane+2lane 双摄 R9 版本所需补丁包.rar
RK3568-mipi-2lane+2lane 双摄 R10 版本所需补丁包.rar

4.24 录像相关常见问题

4.24.1 跟录像相关的文件？

板子上位置：/vendor/etc/media_profiles_V1_0.xml
SDK 位置：sdk/device/rockchip/rkxxxx/media_profiles_default.xml

4.24.2 如何修改录像分辨率？

默认录像配置最高分辨率为 480P，如想修改，先确认 Camera 是否支持更高分辨率，
如果支持，可以尝试修改对应的分辨率。

4.25 如何区分 rkisp 是直通还是回读模式？

使用命令： cat /proc/rkisp* | grep frame
Isp read 是回读模式，示例信息如下：

```
rk3588s_s:/ # cat /proc/rkisp* | grep frame
Isp Read      mode:frame1 (frame:1332 rate:33ms idle time:7ms frameloss:0) cnt(total:1332 X1:1332 X2:-1 X3:-1)
Output        rkisp_mainpath Format:NV12 Size:3200x2400 Dcrop(0,0|3200x2400) (frame:1328 rate:500ms delay:42ms frameloss:1242)
                module outform vertical counter(L:0 R:0), out frame counter:(L:0 R:0)
```

Isp online 是直通模式，示例信息如下：

```
rk3588_s:/ # cat /proc/rkisp*
Isp online frame:254 working time:32ms v-blank:709us
Output        rkisp_mainpath Format:NV12 Size:3840x2160 Dcrop(0,0|3840x2160) (frame:0 rate:0ms delay:0ms frameloss:255)
Output        rkisp_selfpath Format:NV12 Size:1920x1080 Dcrop(0,0|3840x2160) (frame:254 rate:33ms delay:32ms frameloss:6)
```

5 调试案例 Debugging example

5.1 SDK 自带驱动，使用 v4l2-ctl 命令获取数据流出现 kernel 崩溃问题 SDK built-in driver, kernel panic when using v4l2-ctl command to acquire the data flow

5.1.1 问题描述 Issue description

在 Android 9.0 中使用已调试好的驱动，配置好链路后，使用 v4l2-ctl 命令获取数据流出现 kernel 奔溃问题。关键崩溃 LOG 如下：

Use the available driver in Android 9.0, after configuring the link, use v4l2-ctl command to acquire the data flow, but kernel panic issue happens. The key panic LOG are as below:

```
[    37.667090] Internal error: Oops: 96000005 [#1] PREEMPT SMP
[    37.669853] dwmmc_rockchip ff0f0000.dwmmc: Unexpected interrupt latency
[    37.679306] Modules linked in: 8723cs
[    37.683058] CPU: 0 PID: 0 Comm: swapper/0 Not tainted 4.4.167 #13
[    37.689164] Hardware name: Rockchip rk3368 xkp avb board (DT)
[    37.694936] task: ffffff80091757d0 task.stack: ffffff8009160000
[    37.700893] PC is at camsys_mrv_irq+0x2c/0x308
[    37.705378] LR is at handle_irq_event_percpu+0x9c/0x250
```

5.1.2 问题分析 Issue analysis

查看 LOG 中有 camsys_mrv_irq 字样，camsys_mrv 这个为 Android8.1 及更低版本使用的 isp 驱动代码中包含的；所以分析是 dts 中旧的 isp 结点和新的 rkisp1 结点同时配置，出现冲突导致异常。

We can see there is camsys_mrv_irq existing in LOG. camsys_mrv is included in isp driver code of Android8.1 or lower versions. So the issue is caused by the conflict due to the old isp node and new rkisp1 node are configured at the same time in dts.

5.1.3 解决办法 Solution

如果是 RK3326 平台，需要将如下结点 disabled 掉：

For RK3326 platform, need to disable the following node:

```
&rk_isp {
        status = "disabled";
};
```

如果是 RK3288、RK3368 平台，需要 disabled 的结点如下：

For RK3288, RK3368 platform, need to disable the following node:

```
&isp {
        status = "disabled";
};
```

如果是 RK3399 平台，因为包含两个 ISP，需要 disabled 的结点如下：

For RK3399 platform, because it includes two ISP, need to disable the node as below:

```
&isp 0 or 1{
        status = "disabled";
};
```

5.2 RK3126C-9.0-GC0312-预览必现分屏显示问题 RK3126C-9.0-GC0312- preview screen split issue with 100%

5.2.1 问题描述 Issue description

GC0312 预览分屏显示异常如图，并且每次打开都是分屏。

GC0312 preview screen split is displayed as below picture, and every time the screen is split.

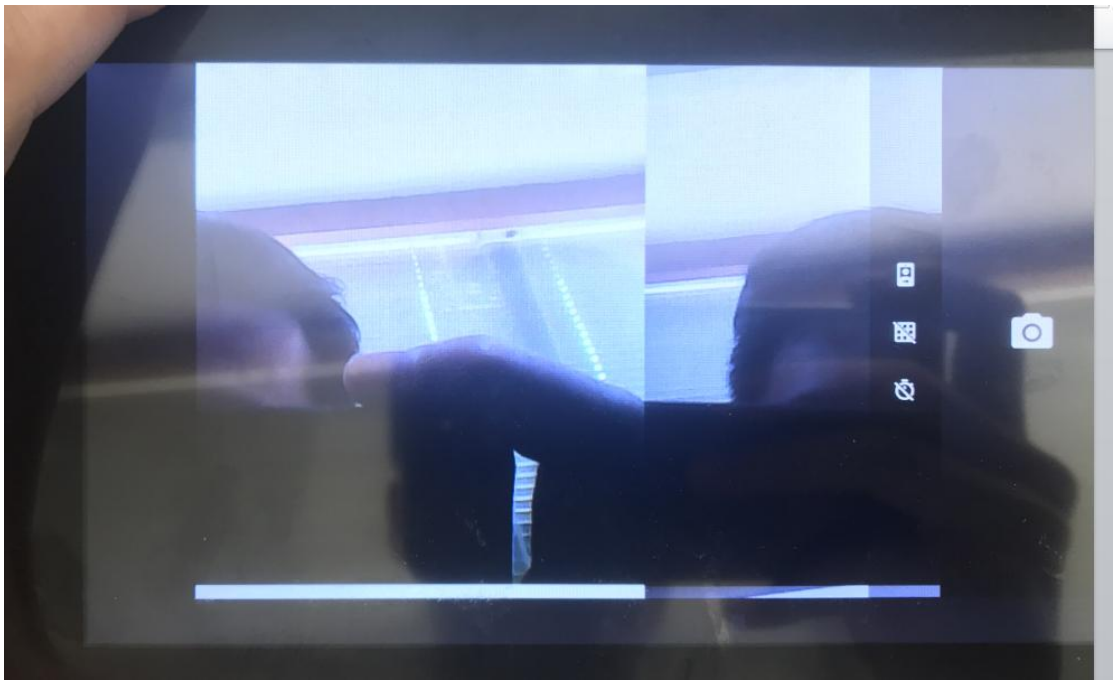


图 59 分屏显示异常图

Picture 33 abnormal picture of screen split

5.2.2 问题分析 Issue analysis

因为是必现，分析可能是 vsync/hsync 极性配置不对导致，尝试修改 DTS 中配置的极性试试。

Because the probability is 100%, maybe it is caused by wrong polarity configuration of vsync/hsync. Try to modify the polarity configuration in DTS

5.2.3 解决办法 Solution

修改 dts 中 vsync 极性，原始极性配置如下：

Modify the polarity of vsync in dts. The original polarity configuration is as below:

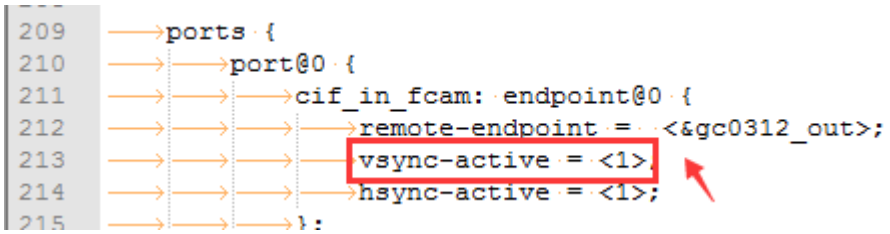


图 60 原始 vsync 极性

Picture 34 original polarity of vsync

改成如下：

Change to:

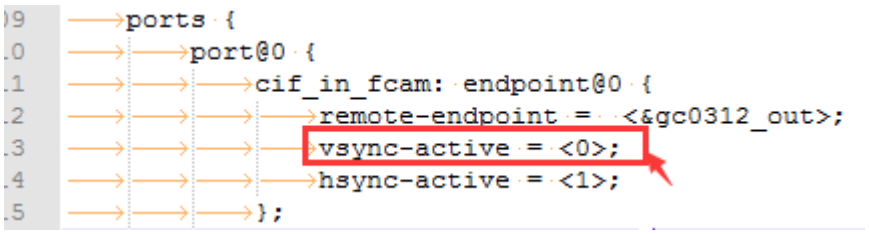


图 61 修改后的 vsync 极性

Picture 35 modified polarity of vsync

5.3 RK3126C-9.0-GC2145-预览概率性分屏显示问题 RK3126C-9.0-GC2145- preview screen split issue

5.3.1 问题描述 Issue description

GC2145-预览概率性分屏显示如图，而且如果打开 Touch Point 触摸屏划线，概率会加大。

GC2145- preview screen split occurs with probability as below picture, and if enable Touch Point to draw line, the probability will become bigger.

图 62 分屏显示示例图 1

Picture 36 example 1 of screen split display

图 63 分屏显示示例图 2

Picture 37 example 2 of screen split display

5.3.2 问题分析 Issue analysis

和 5.2 中现象不同的是，打开 Camera 预览是概率性的分屏显示；而且打开 TP 触摸屏划线概率增大。概率性出现分屏显示时候，rkcif 驱动有如下 LOG 打印：

Different from the phenomenon in 5.2, the screen split happens with probability, and enable TP will enlarge the probability. When the issue happens, rkcif driver will print the following LOG:

```
rkcif: Bad frame, irq:0xf frmst:0x10001 size:605x3200
```

初步分析可能原因：

Analyze the possible reason:

1、跟 DDR 带宽有关系；

Related with DDR bandwidth.

2、VSYNC 和 HSYNC 可能配置不对没问题；

VSYNC and HSYNC configuration may have some problem.

3、CIF 控制器和 CIS（CMOS IMAGE SENSOR）的开启时序可能不对；

Start timing of CIF controller and CIS (CMOS IMAGE SENSOR) may be incorrect.

根据分析的可能原因做如下尝试：

According to the possible reasons, try as below:

1、尝试提高 DDR 频率，概率性分屏显示问题有改善，但多测试还是会出现；

Try to increase DDR frequency. The screen split issue can be improved, but still happens.

2、尝试修改 VSYNC 和 HSYNC 极性，出现打不开摄像头，说明跟 VSYNC 和 HSYNC 无关；

Try to modify the polarity of VSYNC and HSYNC, then the camera cannot work. That means it is not related with VSYNC and HSYNC.

3、尝试调整 CIF 控制器和 CIS（CMOS IMAGE SENSOR）的开启数据流的时序，有效；

Try to adjust the timing for CIF controller and CIS (CMOS IMAGE SENSOR) to start the data flow. It works.

5.3.3 解决办法 Solution

调整 CIF 控制器和 CIS（CMOS IMAGE SENSOR）开启数据流的时序，先将 SENSOR 的数据流开启，然后再开启 CIF 控制器，CIF 控制器驱动代码修改如下：

Adjust the timing for CIF controller and CIS (CMOS IMAGE SENSOR) to start the data flow, first enable the data flow of SENSOR, and then enable CIF controller. Modify CIF controller driver code as below:

```
--- a/drivers/media/platform/rockchip/cif/capture.c
+++ b/drivers/media/platform/rockchip/cif/capture.c
@@ -536,9 +536,6 @@ static int rkcif_start_streaming(struct vb2_queue *queue, unsigned int count)
                        v4l2_err(v4l2_dev, "Failed to get runtime pm, %d\n", ret);
                        goto destroy_dummy_buf;
                }
-               ret = rkcif_stream_start(stream);
-               if (ret < 0)
-                       goto runtime_put;

                /* start sub-devices */
                sd = dev->active_sensor->sd;
@@ -549,6 +546,10 @@ static int rkcif_start_streaming(struct vb2_queue *queue, unsigned int count)
                if (ret < 0)
                        goto subdev_poweroff;

+               ret = rkcif_stream_start(stream);
+               if (ret < 0)
```

```
+                       goto runtime_put;
+
        return 0;

 subdev_poweroff:
```

5.4 RK3126C-9.0-GC2145 录像帧率只有 20fps 左右，不到 30fps 问题 RK3126C-9.0-GC2145 video recording frame rate is only around 20fps, cannot reach 30fps

5.4.1 问题描述 Issue description

打开 CameraHal3 的 debug 开关，然后打开 Camera APK 切换到录像预览界面；使用命令查看帧率： logcat | grep FPS ，结果如下，只有 20fps 左右。

Enable debug of CameraHal3, then open Camera APK to switch to the preview interface of video recording. Use the command to check the frame rate: logcat | grep FPS. The result is shown as below, only 20fps around.

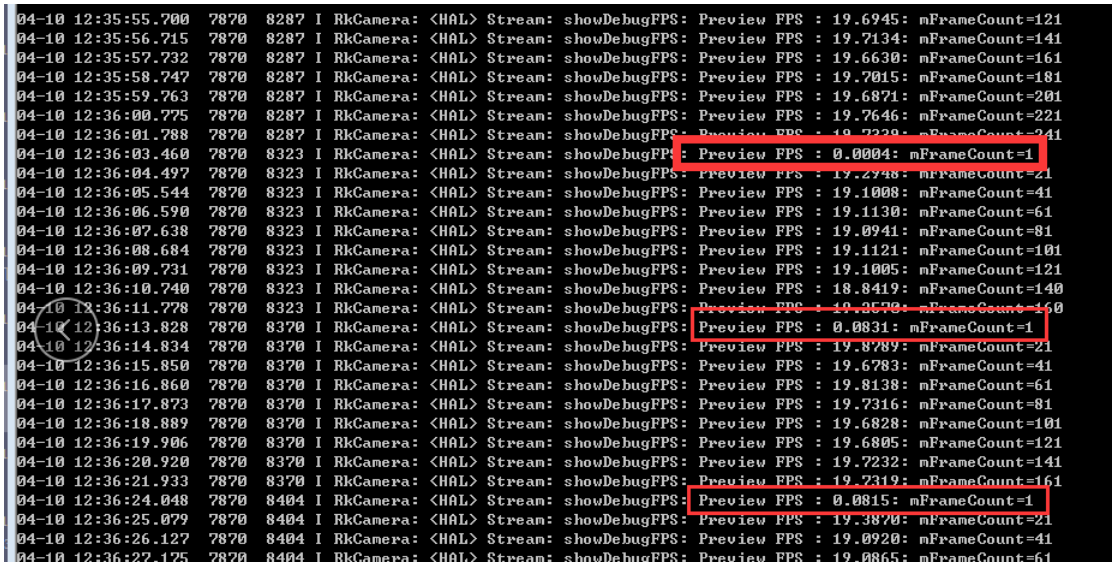


图 64 录像预览帧率图

Picture 38 picture of video recording preview frame rate

5.4.2 问题分析 Issue analysis

RK3126C-9.0 的 SDK 代码中，GC2145 驱动有 1600x1200@20fps 和 800x600@20fps 这两组 20fps 的寄存器配置，在 GC2145 驱动里面加下如下打印信息；

In RK3126C-9.0 SDK code, GC2145 driver includes 1600x1200@20fps and 800x600@20fps two groups of 20fps register configuration. Add the following print information in GC2145 driver.

```
@@ -2095,7 +2098,11 @@ static int gc2145_s_stream(struct v4l2_subdev *sd, int on)
        struct gc2145 *gc2145 = to_gc2145(sd);
        int ret = 0;
```



```
-       dev_dbg(&client->dev, "%s: on: %d\n", __func__, on);
+       //dev_dbg(&client->dev, "%s: on: %d\n", __func__, on);
+       dev_info(&client->dev, "%s: on: %d, %dx%d@%d\n", __func__, on,
+                                gc2145->frame_size->width,
+                                gc2145->frame_size->height,
+                                gc2145->frame_size->fps);

        mutex_lock(&gc2145->lock);
```

看录像预览调下来的分辨率和帧率是多少，结果如下：

Check what the resolution and frame rate of the video recording are. The results are as below:

```
] gc2145 2-003c: gc2145_s_stream: on: 1, 800x600@20
] yujian rk816_ldo4_disable
] gc2145 2-003c: gc2145_s_stream: on: 0, 800x600@20
```

图 65 录像预览分辨率帧率选择

Picture 39 Select video recording preview resolution and frame rate

说明录像预览的时候 Camera Hal 层下发的预览帧率只有 20fps，经定位分析是 camera3_profiles.xml 中的 entity 没配对导致异常。

It means preview frame rate of Camera Hal while video recording is only 20fps. After analyzing, the issue is caused by entity which is not configured correctly in camera3_profiles.xml.

5.4.3 解决办法 Solution

camera3_profiles.xml 中的原始配置的 entity name 如下：为 gc2145 0-003c

The entity name in camera3_profiles.xml is originally configured as below: it is gc2145 0-003c

```
<MediaCtl_elements_RKISP1>
  <element name="gc2145 0-003c" type="pixel_array"/>
  <!--
  <element name="rockchip-mipi-dphy-rx" type="csi_receiver"/>
  -->
  <element name="stream_cif" type="isys_backend"/>
</MediaCtl_elements_RKISP1>
```

图 66 原始配置的 entity name

Picture 40 originally configured entity name

而通过 media-ctl -p 命令查看结果如下：

But the result checked by the command media-ctl -p is as below:

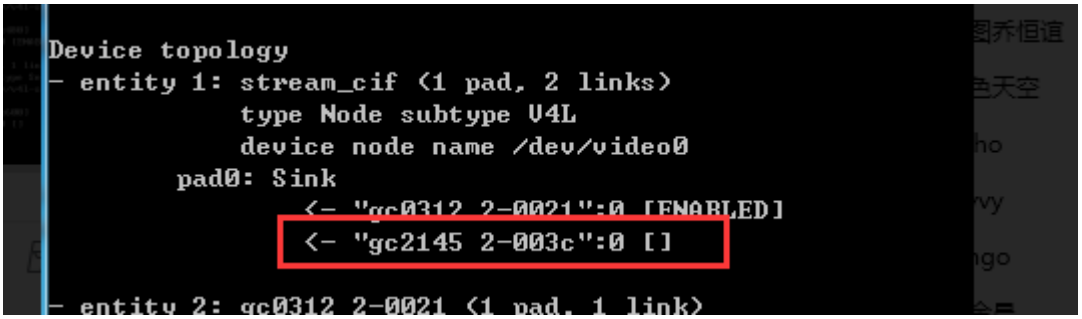


图 67 板子查看的 entity name

Picture 41 check entity name of the board

所以上面的 entity name 应该修改成：gc2145 2-003c。

So the above entity name should be changed to: gc2145 2-003c.

5.5 RK3326-9.0-GC2145 烧完机后进 camera 概率性报错问题 Error happens with probability while entering camera after flashing RK3326-9.0-GC2145

5.5.1 问题描述 Issue description

RK3326-9.0 烧完机后进 camera 概率性报错，刷 5 台有 1 台的样子报错，重启机器、或恢复出厂设置就好了，2019 年 8 月 5 号的安全补丁。

After flashing RK3326-9.0, with 2019-8-5 security patch, open camera will report error with the probability 1 out of 5, reboot the device, or factory reset can recover.

5.5.2 问题分析 Issue analysis

将 CameraHal 的 log 打开，查看有如下关键 LOG：

Enable log of CameraHal, and there is the following key LOG:

```
D RkCamera: <HAL> FlashLight: @getFlashLightInfo : hasFlash 1, flashNode0: , flashNode1:
E RkCamera: <HAL> FlashLight: init: Unable to open node "
```

分析可能跟 FLASH 相关参数初始化有关。

It may be related with the initialization of FLASH related parameters.

5.5.3 解决办法 Solution

在 SDK/hardware/rockchip/camera 目录查看是否有如下提交： 如果没有找 FAE 获取

Check if there is the following commit existing in SDK/hardware/rockchip/camera directory: if not, contact FAE to acquire

```
commit 2fb29b54b6e94ee6303bc4988abaf085247fb87b
Author: Zhong Yichong <zyc@rock-chips.com>
Date:   Thu Oct 10 08:28:24 2019 +0800

    fix hal crashed by uninitialized var mFlashNum

    Change-Id: I3fc16e8dada0201eb2158ab500e5c95a1ec401bc
    Signed-off-by: Zhong Yichong <zyc@rock-chips.com>
```

图 68 问题解决提交点

Picture 55 commit to resolve this issue

或者直接使用如下增加 mFlashNum 初始化修改：

Or directly add the following mFlashNum initialization modification:

```
diff --git a/common/platformdata/PlatformData.cpp b/common/platformdata/PlatformData.cpp
index b183dff..a416061 100644
--- a/common/platformdata/PlatformData.cpp
+++ b/common/platformdata/PlatformData.cpp
@@ -747,6 +747,8 @@ status_t CameraHWInfo::findAttachedSubdevs(const std::string &mcPath,

     LOGI("@%s", __FUNCTION__);

+    drv_info.mFlashNum = 0;
+
     int fd = open(mcPath.c_str(), O_RDONLY);
     if (fd == -1) {
         LOGW("Could not openg media controller device: %s!", strerror(errno));
```

5.6 RK3326-9.0-打开 camera 预览界面概率性出现绿屏

5.6.1 问题描述 Issue description

恢复出厂设置后第一次打开 Camera 的概率更大，一般重新开机第一次打开 camera 后容易复现这个问题。

测试过程中发现，深度休眠后，打开摄像头会整个预览界面都是绿色的，切换一下模式（拍照->录像）或者退出再进，预览就会正常，附件是图片和 log，请看下

5.6.2 问题分析 Issue analysis

打开相机进入深度休眠，然后唤醒后就会出现绿屏；可能跟 IOMMU 有关；

深度休眠后，ISP_IOMMU 被关闭了；唤醒后没有被打开，从而导致绿屏；

5.6.3 解决办法 Solution

在 SDK/kernel 目录查看是否有如下提交： 如果没有找 FAE 获取

```
commit 4b00ec7c60d66c36608504d9f453e4799f6cf122
Author: Cai YiWei <cyw@rock-chips.com>
Date:   Mon Jun 17 08:53:27 2019 +0800

    media: rockchip: isp1: fix isp iommu work after suspend

    Change-Id: Ie89ec58c6f99a751bc1fdf681a85a6595716c649
    Signed-off-by: Cai YiWei <cyw@rock-chips.com>
```

5.7 RK3326-9.0-mipi camera 预览卡顿问题

5.7.1 问题描述 Issue description

打开系统相机，预览画面很卡顿，点击拍照也是很卡；

5.7.2 问题分析 Issue analysis

分析目前预览画面卡顿可能原因有如下几个：

1、本身摄像头输出的帧率比较低，看着预览卡顿；

2、rga 没有打开，导致使用软件做裁剪和缩放,从而卡顿；

问题分析所需 log：

1、参考附 4.2 把 camera_hal 的 log 打开， logcat | grep FPS 看下预览帧率；

抓取完整的 logcat；

2、kernel 的完整 log;

经查看关键 LOG 如下：有 rga 报错，很大可能就是 rga 未使能

```
E rockchiprga: This output the user patamaters when rga call blit fail
E               : CropScaleNV12Or21:rga blit failed
```

5.7.3 解决办法 Solution

客户参考 rk3326-863-lp3-v10-avb.dts 配置把 rga 相关的结点打开就正常了；

```
&rk_rga {
    status = "okay";
};
```

5.8 RK3326-9.0-支持同时打开两路 camera(Defect #258741)

5.8.1 问题描述 Issue description

基于 rkpx30 android9.0 客户需要支持同时打开两路 camera,目前测试只能单独打开，当打开第二个的时候报错；

5.8.2 问题分析 Issue analysis

因为双摄需要同时工作，则需要两个控制器+两个接口同时进行接收和处理。如果 RK3326 需要支持双摄，则 camera 的连接方式要求如下：

1、ISP 控制器使用 MIPI 接口 camera；

2、CIF 控制器使用 DVP 接口 camera;

经查看客户原理图，连接方式符合要求；那就是 dts 中 cif 控制器和 isp 控制器配置了；及 CameraHal3 对于支持多个摄像头需要做些修改；

5.8.3 解决办法 Solution

1）示例 dts 配置如下：

```
&rkisp1 {
	status = "okay";
	ports {
		#address-cells = <1>;
		#size-cells = <0>;
			// mipi
		isp0_mipi_in: endpoint {
			reg = <0>;
			remote-endpoint = <&dphy_rx0_out>;
};
	};
};
&isp_mmu {
	status = "okay";
};
&cif_new {
	status = "okay";
	pinctrl-names = "default";
	pinctrl-0 = <&dvp_d0d1_m0 &dvp_d2d9_m0>;
	  port {
		dvp_in_fcam: endpoint {
			reg = <0>;
```

```
                    remote-endpoint = <&gc2145_out>;
                    vsync-active = <0>;
                    hsync-active = <1>;
                };
        };
};
&vip_mmu {
        status = "okay";
};
```

2）SDK/hardware/rockchip/camera 目录作如下修改：

```
diff --git a/Camera3HALModule.cpp b/Camera3HALModule.cpp
old mode 100644
new mode 100755
index ef01fe0..1bf208a
--- a/Camera3HALModule.cpp
+++ b/Camera3HALModule.cpp
@@ -176,13 +176,13 @@ static int hal_dev_open(const hw_module_t* module, const char* name,
         }

         std::lock_guard<std::mutex> l(sCameraHalMutex);
-
+#if 0
         if ((!PlatformData::supportDualVideo()) &&
               sInstanceCount > 0 && !sInstances[camera_id]) {
             LOGE("Don't support front/primary open at the same time");
             return -EUSERS;
         }
-
+#endif
         return openCameraHardware(camera_id, module, device);
  }
```

5.9 RK3326-9.0-打开补光灯录像模式，重新进入 camera app 会闪一下灯再常亮补光灯(Defect # 254851)

5.9.1 问题描述 Issue description

打开补光灯录像模式，重新进入 camera app 会闪一下灯再常亮补光灯，

5.9.2 问题分析 Issue analysis

因为 camera 的 cts 都过了，所以应该是上层 APK 调用问题；需要分析 APK 调用哪里不对；

5.9.3 解决办法 Solution

查看 SDK/packages/apps/Camera2 目录是否有如下提交：如果没有找 FAE 获取；

```
commit 9ccd5504ce70669f526343c48ff200f7cbad0e76
Author: chenxiao <cx@rock-chips.com>
Date:   Thu Jun 18 17:18:19 2020 +0800
Camera v1.0.16:
    fix flash torch->off->torch status change error when video Module.
    refs for redmine#254851

Signed-off-by: chenxiao <cx@rock-chips.com>
Change-Id: I92c6d098d45a1b8a5c4761a5792b1390ffceb641
```

10.0 对应提交点：

```
commit ef0ca6db282e5b3bb245a2deae199e0a0b901716
Author: chenxiao <cx@rock-chips.com>
Date:   Thu Jun 18 17:18:19 2020 +0800

    Camera v1.0.16:
        fix flash torch->off->torch status change error when video Module.
        refs for redmine#254851

    Signed-off-by: chenxiao <cx@rock-chips.com>
    Change-Id: I2b680ede456488a56e4af589952d8e7f3de56862
```

5.10 RK3399-9.0-IMX214 调试中 binning 分辨率 2104x1560 拍照，一拍照相机 APK 立马退出问题 RK3399-9.0-IMX214 debugging binning photo resolution 2104 x1560, APK quits immediately when taking photo

5.10.1 问题描述 Issue description

相机中选择拍照分辨率：3.3M

Select photo resolution in camera: 3.3M

图 69 APK 选择 3.3M

Picture 56 Select 3.3M in APK

然后一点击拍照，相机立马退出。

Then click to take photo, and the camera quits immediately.

5.10.2 问题分析 Issue analysis

查看问题 LOG：

Check LOG of the issue:

```
D              : (pCfgFull->inputWidth & (15)) != 0
D              : JpegEncSetPictureSize: ERROR Out of range image dimension(s)
E hw_jpeg_encode: JPEGENCDOER: JpegEncSetPictureSize fail.
D              : JpegEncRelease#
D              : JpegEncRelease: OK
D hw_jpeg_encode: --- RUN OUT JPEGENCDOER. jpeg len : 0
E RkCamera: <HAL> ImgHWEncoder: @encodeSync 263: hw jpeg encode fail.
E RkCamera: <HAL> PostProcessPipeline: @processFrame, JPEG conversion failed!
[-2147483648]!
```

关键 LOG：(pCfgFull->inputWidth & (15)) != 0

Key LOG: (pCfgFull->inputWidth & (15)) != 0

分析应该是因为 HWENC 编码 JPEG 要求 16 位对齐。

Suppose it is because JPEG requires 16 bit alignment for HWENC encoding.

5.10.3 解决办法 Solution

把 camera3_profiles.xml 里面的拍照分辨率：2104x1560 改成：2096x1560，修改后 3.3M 拍照 OK；

Change the photo resolution in camera3_profiles.xml from 21040 x1560 to 2096x1560. After modifying, it is OK to take photo with 3.3M.

5.11 RK3399-9.0-IMX214-配置为 RAW 之后，预览出现后马上卡死问题

5.11.1 问题描述 Issue description

单独点前摄 IMX214，配置为 SOC 的时候，预览拍照都正常，但是配置为 RAW 之后，预览出现之后就马上卡死。

5.11.2 问题分析 Issue analysis

查看问题 LOG：

Check LOG of the issue:

```
E rkisp     : [NO]:XCAM ERROR rkisp_control_loop_impl.cpp:358: can't access iq file
/vendor/etc/camera/rkisp1/imx214_f_lens1_50013A7_OTP1.xml !
```

从 LOG 看出是缺少效果文件；

5.11.3 解决办法 Solution

复制一份对应版本的 imx214 效果文件，改成复制一份示例效果文件改成 imx214_f_lens1_50013A7_OTP1.xml，然后推到板子/vendor/etc/camera/rkisp1/目录后重启下应该就能正常打开了。

5.12 RK3399-9.0-OV8858-4lane 录像 1080P 帧率只有 15FPS 问题 RK3399-9.0-OV8858-4lane video recording 1080P frame rate is only 15FPS

5.12.1 问题描述 Issue description

RK3399 上两个 ISP 均连接有 Camera，一个 ISP 接 hm2051，一个 ISP 接 OV8858。如果 dts 中两个都配置上，OV8858-4lane 只能到 15FPS；而如果不配置 H2051，只配置 OV8858-4lane 就能到 30FPS。

Both ISP of RK3399 connect camera, one ISP connects with hm2051, and the other connects with OV8858. If they are both configured in dts, OV8858-4lane can only reach 15FPS. But if H2051 is not configured and only configure OV8858-4lane, it can reach 30FPS.

5.12.2 问题分析 Issue analysis

逻辑上 Sensor 输出的帧率只跟写入 OV8858 的寄存器配置一样，驱动及配置一样的话，帧率应该一样的，分析可能跟 MCLK 有关。经分析定位最终发现前置 hm2051 驱动里面用的 MCLK 是用 12MHZ，而 OV8858 所需 MCLK 为 24MHZ；但是摄像头驱动中只在 probe 的时候设置了一次 MCLK，导致后置摄像头中的 MCLK 设置被前置覆盖，从而导致 OV8858 的输出帧率减半。

Logically the output frame rate of Sensor is only the same as the configuration written into the register of OV8858. If the driver and the configuration are the same, the frame rate should be the same. So it may be related with MCLK. After analyzing, it is finally found that MCLK used in the driver of front hm2051 is 12MHz, but MCLK required for OV8858 is 24MHz. but the camera driver only set MCLK once when probe, which cause MCLK setting of back camera is overridden by front camera, and then cause the output frame rate of OV8858 is halved.

5.12.3 解决办法 Solution

参考 ov5695 驱动在 xxxx_power_on 或 xxxx_s_power 中重新设置 clk;

Re-configure clk in xxxx_power_on or xxxx_s_power referring to ov5695 driver:

```
    ret = clk_set_rate(ov5695->xvclk, OV5695_XVCLK_FREQ);
```

```
if (ret < 0) {
        dev_err(dev, "Failed to set xvclk rate (24MHz)\n");
        return ret;
}
if (clk_get_rate(ov5695->xvclk) != OV5695_XVCLK_FREQ)
        dev_warn(dev, "xvclk mismatched, modes are based on 24MHz\n");
ret = clk_prepare_enable(ov5695->xvclk);
if (ret < 0) {
        dev_err(dev, "Failed to enable xvclk\n");
        return ret;
}
```

5.13 RK3326-10.0-OV2680 拍照预览帧率一直为 30FPS 问题

5.13.1 问题描述 Issue description

拍照预览帧率是 30FPS，而不是变动的 16.6 到 30FPS

```
showDebugFPS: Preview FPS : 29.9151: mFrameCount=116
showDebugFPS: Preview FPS : 29.9789: mFrameCount=146
showDebugFPS: Preview FPS : 30.0605: mFrameCount=177
showDebugFPS: Preview FPS : 29.9664: mFrameCount=208
showDebugFPS: Preview FPS : 30.0456: mFrameCount=239
showDebugFPS: Preview FPS : 29.9766: mFrameCount=270
showDebugFPS: Preview FPS : 30.0216: mFrameCount=301
```

5.13.2 问题分析 Issue analysis

CameraHal3_v2.1.0 之前的 camerahal，是 profile 优先；

CameraHal3_v2.1.0&& camera_engine_rkisp_v2.3.0 之后是 tuning 文件优先。

5.13.3 解决办法 Solution

修改效果文件：

```
<ExposureSeparate index="1" type="cell" size="[1 2]">
    <cell index="1" type="struct" size="[1 7]">
        <name index="1" type="char" size="[1 6]">
            normal
        </name>
        <TimeDot index="1" type="double" size="[1 6]">
            [0 0.03 0.03 0.03 0.03 0.03]
        </TimeDot>
        <LTimeDot index="1" type="double" size="[1 6]">
            [0 0.03 0.03 0.03 0.03 0.03]
        </LTimeDot>
        <STimeDot index="1" type="double" size="[1 6]">
            [0 0.03 0.03 0.03 0.03 0.03]
        </STimeDot>
```

修改成如下：

```
<ExposureSeparate index="1" type="cell" size="[1 2]">
    <cell index="1" type="struct" size="[1 7]">
        <name index="1" type="char" size="[1 6]">
            normal
        </name>
        <TimeDot index="1" type="double" size="[1 6]">
            [0 0.1 0.1 0.1 0.1 0.1]
        </TimeDot>
        <LTimeDot index="1" type="double" size="[1 6]">
            [0 0.03 0.03 0.03 0.03 0.03]
        </LTimeDot>
```

第一个元素认为是最小帧间隔

最后一个元素认为是最大帧间隔

<TimeDot index="1" type="double" size="[1 6]">

[0 0.1 0.1 0.1 0.1 0.1]

</TimeDot>

```
<cell index="1" type="struct" size="[1 7]">
   <name index="1" type="char" size="[1 6]">
      normal
   </name>
   <TimeDot index="1" type="double" size="[1 6]">
      [0 0.03 0.03 0.03 0.03 0.03]
   </TimeDot>
   <LTimeDot index="1" type="double" size="[1 6]">
      [0 0.03 0.03 0.03 0.03 0.03]
   </LTimeDot>
```

```
<cell index="1" type="struct" si
   <name index="1" type="char" s
      normal
   </name>
   <TimeDot index="1" type="doub
      [0 0.1 0.1 0.1 0.1 0.1]
   </TimeDot>
   <LTimeDot index="1" type="dou
      [0 0.03 0.03 0.03 0.03 0.0
   </LTimeDot>
```

5.14 RK3326-10.0-MIPI 和 DVP 摄像头兼容配置问题

5.14.1 问题描述 Issue description

后摄的 dvp 和 mipi 的摄像头都兼容进来，但兼容了 mipi 的摄像头后摄的 dvp 就都不亮了，把 mipi 摄像头去掉又能亮了。

问题 LOG：

```
gc2145 2-003c: Found GC2145 sensor
gc2145 2-003c: gc2145_detect success!
gc2145 2-003c: gc2145->module_index = 00, facing = b, dev_name = 2-003c
gc2145 2-003c: async_register_subdev_sensor_return = -16
```

5.14.2 问题分析 Issue analysis

查看 LOG，GC2145 的 ID 已经识别到了，但 async_register_subdev_sensor_return = -16；说明是注册失败，这个 LOG 打印地方为：

v4l2_async_register_subdev_sensor_common 这个函数返回-16，

```
#define    ENOTBLK      15    /* Block device required */
#define    EBUSY        16    /* Device or resource busy */
```

对应 device or resource busy

跟踪查看 v4l2_async_register_subdev_sensor_common 调用的哪个函数可能返回-16；

即 return －EBUSY；

一步步分析定位：n->ops->bound(n, subdev, asd);调用的是：

drivers/media/platform/rockchip/isp/dev.c 中的 subdev_notifier_bound 函数；

```
static int subdev_notifier_bound(struct v4l2_async_notifier *notifier,
                                 struct v4l2_subdev *subdev,
                                 struct v4l2_async_subdev *asd)
{
    struct rkisp1_device *isp_dev = container_of(notifier,
                                                 struct rkisp1_device, notifier);
    struct rkisp1_async_subdev *s_asd = container_of(asd,
                                                     struct rkisp1_async_subdev, asd);

    if (isp_dev->num_sensors == ARRAY_SIZE(isp_dev->sensors))
        return -EBUSY;
```

这里返回-EBUSY；

分析是 ARRAY_SIZE(isp_dev->sensors)这个值太小；

```
    struct v4l2_ctrl_handler ctrl_handler;
    struct media_device media_dev;
    struct v4l2_async_notifier notifier;
    struct v4l2_subdev *subdevs[RKISP1_SD_MAX];
    struct rkisp1_sensor_info *active_sensor;
    struct rkisp1_sensor_info sensors[RKISP1_MAX_SENSOR];
    int num_sensors;
```

```
#define RKISP1_MAX_BUS_CLK  8
#define RKISP1_MAX_SENSOR   2
#define RKISP1_MAX_PIPELINE 4
```

RKISP1_MAX_SENSOR 为 2，而如果是有 mipi camera 的情况，可能 mipi sensor 在后面注册；

但是 phy-rockchip-mip-rx 已经先有结点了，导致 isp_dev->num_sensors 的值达到了 2，从而导致异常。通过添加如下打印信息：

```
diff --git a/drivers/media/platform/rockchip/isp1/dev.c b/drivers/media/platform/rockchip/isp1/dev.c
old mode 100644
new mode 100755
index a865baaea6f7..ff527c67e79a
--- a/drivers/media/platform/rockchip/isp1/dev.c
+++ b/drivers/media/platform/rockchip/isp1/dev.c
@@ -474,6 +474,8 @@ static int subdev_notifier_bound(struct v4l2_async_notifier *notifier,
                struct rkisp1_async_subdev *s_asd = container_of(asd,
                                                         struct rkisp1_async_subdev, asd);

+               v4l2_info(subdev, "isp_dev->num_sensors(%d), ARRAY_SIZE(isp_dev->sensors)(%d)\n",
```

```
+                       isp_dev->num_sensors, ARRAY_SIZE(isp_dev->sensors));
        if (isp_dev->num_sensors == ARRAY_SIZE(isp_dev->sensors))
                        return -EBUSY;
```

结果如下，和分析一致；所以解决办法是将 RKISP1_MAX_SENSOR 值加大。

```
RK3326-10.0\白 能达-RK3326 10.0 摄像头兼容问题(Defect #283140):\双GC2145兼容\双21
| rockchip-mipi-dphy-rx: isp_dev->num_sensors(0), ARRAY_SIZE(isp_dev->sensors)(4)
| m01_f_gc0312 2-0021-1: isp_dev->num_sensors(1), ARRAY_SIZE(isp_dev->sensors)(4)
| m01_f_gc2145 2-003c: isp_dev->num_sensors(2), ARRAY_SIZE(isp_dev->sensors)(4)
```

5.14.3 解决办法 Solution

```
diff --git a/drivers/media/platform/rockchip/isp1/dev.h b/drivers/media/platform/rockchip/isp1/dev.h
old mode 100644
new mode 100755
index 980f7711302d..762c9d9ff498
--- a/drivers/media/platform/rockchip/isp1/dev.h
+++ b/drivers/media/platform/rockchip/isp1/dev.h
@@ -56,7 +56,7 @@
 #define GRP_ID_ISP_DMARX                       BIT(5)

 #define RKISP1_MAX_BUS_CLK        8
-#define RKISP1_MAX_SENSOR         2
+#define RKISP1_MAX_SENSOR         4
 #define RKISP1_MAX_PIPELINE       4

 #define RKISP1_MEDIA_BUS_FMT_MASK          0xF000
```

5.15 RK3326-10.0-camera-GTS 错误

5.15.1 问题描述 Issue description

com.google.android.assistant.gts.AssistanTest#testAssistantTakeSelfieWithoutVoiceInteraction
com.google.android.assistant.gts.AssistanTest#testAssistantOpenFrontCameraWithVoiceInteraction
com.google.android.assistant.gts.AssistanTest#testAssistantOpenRearCameraWithoutVoiceInteraction
com.google.android.assistant.gts.AssistanTest#testAssistantTakePhotoWithoutVoiceInteraction
com.google.android.assistant.gts.AssistanTest#testAssistantOpenFrontCameraWithVoiceInteraction

armeabi-v7a GtsAssistantHostTestCases

Test	Result	
com.google.android.assistant.gts.AssistantTest#testAssistantTakeSelfieWithoutVoiceInteraction	fail	java.lang.AssertionError
com.google.android.assistant.gts.AssistantTest#testAssistantOpenFrontCameraWithVoiceInteraction	fail	java.lang.AssertionError
com.google.android.assistant.gts.AssistantTest#testAssistantOpenRearCameraWithoutVoiceInteraction	fail	java.lang.AssertionError
com.google.android.assistant.gts.AssistantTest#testAssistantTakePhotoWithoutVoiceInteraction	fail	java.lang.AssertionError
com.google.android.assistant.gts.AssistantTest#testAssistantOpenRearCameraWithVoiceInteraction	fail	java.lang.AssertionError
com.google.android.assistant.gts.AssistantTest#testAssistantOpenFrontCameraWithoutVoiceInteraction	fail	java.lang.AssertionError

5.15.2 问题分析 Issue analysis

CX 分析

5.15.3 解决办法 Solution

packages/apps/Camera2 这下面打上这个补丁：
0001-camera-support-voice-action-from-Google-Assistant.patch

5.16 RK3326-10.0-camera-vts 错误

5.16.1 问题描述 Issue description

报错 log 如下：
03-30 04:47:02.711 22197 22197 W ServiceManagement: Waited one second for android.hardware.camera.provider@2.4::ICameraProvider/legacy/0
03-30 04:47:02.712 22197 22197 I ServiceManagement: getService: Trying again for android.hardware.camera.provider@2.4::ICameraProvider/legacy/0...
03-30 04:47:03.713 22197 22197 W ServiceManagement: Waited one second for android.hardware.camera.provider@2.4::ICameraProvider/legacy/0

5.16.2 问题分析 Issue analysis

和前面调试 RK3399-10.0-CTS 的有点类似：
'android.hardware.camera.provider@2.4::ICameraProvider/external/0' for ctl.interface_start
[175.768249] init: Received control message 'interface_start' for 'android.hardware.camera.provider@2.4::ICameraProvider/external/0' from pid: 231 (/system/bin/hwservicemanager)
只是这个是 external camera 的服务；
尝试正常的时候复现如下错误：
W ServiceManagement: Waited one second for android.hardware.camera.provider@2.4::ICameraProvider/legacy/0
I ServiceManagement: getService: Trying again for android.hardware.camera.provider@2.4::ICameraProvider/legacy/0..
如何在正常版本复现上述报错：

尝试把\vendor/etc/init 目录的 android.hardware.camera.provider@2.4- service.rc 删除，然后重启后，板子的 logcat 就出现上面循环报错；

5.16.3 解决办法 Solution

不是 camera 相关问题，是系统本身异常导致；

5.17 RK3326-9.0-SOC 摄像头录像过程拍照，录像视频拍照时间点会闪一下问题

5.17.1 问题描述 Issue description

APk 退出后第一次打开，录像点击拍照第一张照片异常问题：

5.17.2 问题分析 Issue analysis

使用命令：while true;do cat /proc/kmsg; done;

关键 LOG：

```
6] ←[33mrkisp1←[0m: emd kfifo size: 0, frame_id 0
8] ←[33mrkisp1←[0m: emd kfifo size: 0, frame_id 0
6] ←[33mgc2145 2-003c←[0m: gc2145_s_frame_interval match wxh@FPS is 800x600@20
7] ←[33mrkisp1←[0m: emd kfifo size: 0, frame_id 0
1] ←[33mgc2145 2-003c←[0m: gc2145_s_frame_interval match wxh@FPS is 800x600@30
5] ←[33mrkisp1←[0m: emd kfifo size: 0, frame_id 0
```

为什么录像的时候点击拍照会调用 20fps 帧率去？

gc2145 2-003c: gc2145_s_frame_interval match wxh@FPS is 800x600@20

5.17.2.1 跟踪 CameraHal 代码

经跟踪 CameraHal 中 psl/rkisp1/ControlUnit.cpp 中录像第一次拍照点击拍照的时候

```
557: ControlUnit::processSoCSettings(const CameraMetadata *settings)
558: {
559:     // fill target fps range, it needs to be proper in results anyway
560:     camera_metadata_ro_entry entry =
561:         settings->find(ANDROID_CONTROL_AE_TARGET_FPS_RANGE);
562:     ALOGE("%s:%d enter!\n ", __FUNCTION__, __LINE__);
563:     if (entry.count == 2) {
564:         int32_t maxFps = entry.data.i32[1];
565:         // set to driver
566:         ALOGE("%s:%d enter maxFps = %d!\n ", __FUNCTION__, __LINE__, maxFps);
567:         if (mSensorSubdev.get())
568:             mSensorSubdev->setFramerate(0, maxFps);
569:     }
570:
571:     return OK;
572: }
573:
574: /**
```

```
2 E ControlUnit: processSoCSettings:566 enter maxFps = 30!
2 E ControlUnit: processSoCSettings:566 enter maxFps = 30!
2 E ControlUnit: processSoCSettings:566 enter maxFps = 20!
2 E ControlUnit: processSoCSettings:566 enter maxFps = 30!
2 E ControlUnit: processSoCSettings:566 enter maxFps = 30!
2 E ControlUnit: processSoCSettings:566 enter maxFps = 30!
2 E ControlUnit: processSoCSettings:566 enter maxFps = 30!
```

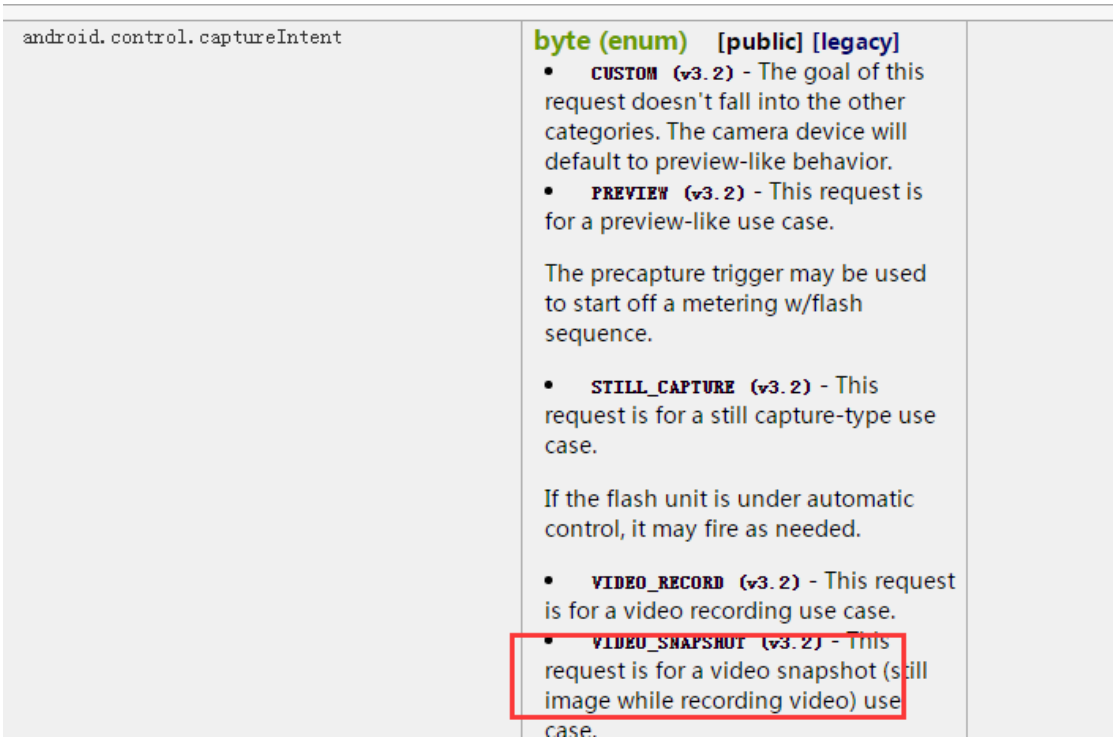
钟工说是上层设置下来的；第一次录像点击拍照会设置如下参数：

```
E ControlUnit: processSoCSettings:567 enter: minFps= 30 maxFps = 30!
E ControlUnit: processSoCSettings:567 enter: minFps= 30 maxFps = 30!
E ControlUnit: processSoCSettings:567 enter: minFps= 30 maxFps = 30!
E ControlUnit: processSoCSettings:567 enter: minFps= 15 maxFps = 20!
E ControlUnit: processSoCSettings:567 enter: minFps= 30 maxFps = 30!
E ControlUnit: processSoCSettings:567 enter: minFps= 30 maxFps = 30!
E ControlUnit: processSoCSettings:567 enter: minFps= 30 maxFps = 30!
E ControlUnit: processSoCSettings:567 enter: minFps= 30 maxFps = 30!
```

5.17.2.2 尝试获取：ANDROID_CONTROL_CAPTURE_INTENT 的 entry 看看

```
./common/platformdata/metadataAutoGen/6.0.1/MetadataInfoAutoGen.h:466:        {"control.captureIntent", AND
ROID_CONTROL_CAPTURE_INTENT},
wpzz@ubuntu:~/4 rk3399 9.0 Gerrit code/hardware/rockchip/camera$
```

有如下选项：



对应：hardware\rockchip\camera_engine_rkisp\metadata\libcamera_metadata\include\system 中 camera_metadata_tags.h 文件的如下位置：

```
// ANDROID_CONTROL_CAPTURE_INTENT
typedef enum camera_metadata_enum_android_control_capture_intent {
    ANDROID_CONTROL_CAPTURE_INTENT_CUSTOM,
    ANDROID_CONTROL_CAPTURE_INTENT_PREVIEW,
    ANDROID_CONTROL_CAPTURE_INTENT_STILL_CAPTURE,
    ANDROID_CONTROL_CAPTURE_INTENT_VIDEO_RECORD,
    ANDROID_CONTROL_CAPTURE_INTENT_VIDEO_SNAPSHOT,
    ANDROID_CONTROL_CAPTURE_INTENT_ZERO_SHUTTER_LAG,
    ANDROID_CONTROL_CAPTURE_INTENT_MANUAL,
```

5.17.3 尝试解决办法 Solution

尝试根据 ANDROID_CONTROL_CAPTURE_INTENT 的获取的 entry 值区分录像拍照
当获取的是录像时候拍照情况，控制 SOC 的 camera 不再设置帧率；
获取 ANDROID_CONTROL_CAPTURE_INTENT 的获取的 entry 值和 metadata 是对应的：
PREVIEW 为：1；
VIDEO_RECORD 为：3；
VIDEO_SNAPSHOT 为：4；
尝试修改后初步 OK 的提交：
commit a52845a91c728aa10cfe80b94a1a3cfb6f047150
Author: Wang Panzhenzhuan <randy.wang@rock-chips.com>
Date: Fri Mar 6 09:52:12 2020 +0800

fix soc camera video Snapshot issues

The framerate changes when take video snapshot for the first time;

it will causes the recorded video flashed in the snapshot moment;
so fix it.

Signed-off-by: Wang Panzhenzhuan <randy.wang@rock-chips.com>
Change-Id: I445af271bb50845a42b3a34e9c8c077faf436c15

5.18 RK3126C-10.0-GC0312-预览必现分屏显示问题 RK3126C-10.0-GC0312- preview screen split issue with 100%

5.18.1 问题描述 Issue description

GC0312 预览分屏显示异常如图，并且每次打开都是分屏。
GC0312 preview screen split is displayed as below picture, and every time the screen is split.

图 70 分屏显示异常图

Picture 33 abnormal picture of screen split

5.18.2 问题分析 Issue analysis

因为是必现，分析可能是 vsync/hsync 极性配置不对导致，尝试按照 5.2 中修改，无效；查看代码中还有哪里配置 vsync/hsync 极性，跟踪发现 gc0312.c 驱动中 gc0312_g_mbus_config 这个函数中会配置

```
895: static int gc0312_g_mbus_config(struct v4l2_subdev *sd,
896:                 struct v4l2_mbus_config *config)
897: {
898:     config->type = V4L2_MBUS_PARALLEL;
899:     config->flags = V4L2_MBUS_HSYNC_ACTIVE_HIGH |
900:             V4L2_MBUS_VSYNC_ACTIVE_HIGH |
901:             V4L2_MBUS_PCLK_SAMPLE_RISING;
902:
903:     return 0;
904: }
905:
```

这里面 VSYNC 的极性配置反了，需要修改；

5.18.3 解决办法 Solution

```
--- a/drivers/media/i2c/gc0312.c
+++ b/drivers/media/i2c/gc0312.c
@@ -897,7 +897,7 @@ static int gc0312_g_mbus_config(struct v4l2_subdev *sd,
 {
        config->type = V4L2_MBUS_PARALLEL;
        config->flags = V4L2_MBUS_HSYNC_ACTIVE_HIGH |
-                       V4L2_MBUS_VSYNC_ACTIVE_HIGH |
+                       V4L2_MBUS_VSYNC_ACTIVE_LOW |
                        V4L2_MBUS_PCLK_SAMPLE_RISING;

        return 0;
```

5.19 RK3288-9.0/10.0-IMX327/214 摄像头拍照及录像预览闪绿屏问题

5.19.1 问题描述 Issue description

Defect #274492、Defect #278358
客户反馈：使用原生自动的 APK 预览，都显示绿色或者预览画面与绿色交替显示，拍照可以保存图片，图片颜色正常。但如果用客户自己写的 app 预览都是正常的。

5.19.2 问题分析 Issue analysis

逻辑上不管使用的哪个 APK，都是会调到驱动和效果文件的，除非客户写的 APK 调的另外一个摄像头；建议客户把用他们 APP 预览的 kernel 的 log 也抓出来看下。

5.19.2.1 先定位是不是 hwc 问题：

1. adb 下 敲 screenrecord /sdcard/1.mp4 然后打开系统 camera app，几秒后退出， 暂停 screenrecord 命令，然后打开 1.mp4 看下录屏是否也有绿屏；
如果没有 ，那就是 hwc 模块有问题，
如果也有绿屏请按下面第 2 点抓下 camera 图像数据

2. 执行以下指令后，打开系统 camera app，几秒后退出 app，camera 数据会保存到/data/dump 目录下，请打包上来分析

adb root
adb remount
adb shell setprop persist.vendor.camera.dump 1
adb shell setenforce 0
adb shell mkdir /data/dump
adb shell chmod 777 /data/dump/
adb shell setprop persist.vendor.camera.dump.skip 10
adb shell setprop persist.vendor.camera.dump.cnt 10
adb shell setprop persist.vendor.camera.dump.path /data/dump/
dump 出来的 就是绿的.

5.19.2.2 使用 v4l2-ctl 工具抓取原始数据查看

v4l2-ctl -d /dev/video0 --set-fmt-video=width=1280,height=720,pixelformat=NV12 --stream-mmap=8 --stream-count=5 --stream-to=/data/dump/cap_720p.yuv --stream-poll

v4l2-ctl -d /dev/video0 --set-fmt-video=width=1920,height=1080,pixelformat=NV12 --stream-mmap=8 --stream-count=5 --stream-to=/data/dump/cap_1080p.yuv --stream-poll
不用打开 camera ，直接敲下这两个指令 ，把保存下来的 cap_720p.yuv 和 cap_1080p.yuv 发上来经查看 v4l2 抓的数据也没问题

5.19.2.3 对比客户 APP 预览和原生 APP 预览的 pipeline 配置差异

在客户应用 camera 预览时抓下 media-ctl -p /dev/media0 和
系统 camera app 预览时的 media-ctl -p /dev/media0


```
Device topology
- entity 1: rkisp1-isp-subdev (4 pads, 6 links)
            type V4L2 subdev subtype Unknown
            device node name /dev/v4l-subdev0
        pad0: Sink
                [fmt:SRGGB10/1920x1080
                 crop.bounds:(0,0)/1920x1080
                 crop:(0,0)/1920x1080]
                <- "rkisp1_dmapath":0 []
                <- "rockchip-mipi-dphy-rx":1 [ENABLED]
        pad1: Sink
                <- "rkisp1-input-params":0 [ENABLED]
        pad2: Source
                [fmt:YUYV2X8/1920x1080
                 crop.bounds:(0,0)/1920x1080
                 crop:(0,0)/1920x1080]
                -> "rkisp1_selfpath":0 [ENABLED]
                -> "rkisp1_mainpath":0 [ENABLED]
```

图 71 原生 apk media-ctrl

```
- entity 1: rkisp1-isp-subdev (4 pads, 6 links)
            type V4L2 subdev subtype Unknown
            device node name /dev/v4l-subdev0
        pad0: Sink
                [fmt:SRGGB10/1920x1080
                 crop.bounds:(0,0)/1920x1080
                 crop:(0,0)/1920x1080]
                <- "rkisp1_dmapath":0 []
                <- "rockchip-mipi-dphy-rx":1 [ENABLED]
        pad1: Sink
                <- "rkisp1-input-params":0 [ENABLED]
        pad2: Source
                [fmt:YUYV2X8/1920x1080
                 crop.bounds:(0,0)/1920x1080
                 crop:(0,0)/1920x1080]
                -> "rkisp1_selfpath":0 []
                -> "rkisp1_mainpath":0 [ENABLED]
```

图 72 客户 apk media-ctrl

经对比发现在没有打开 selfpath 数据流情况下是正常的；

分析是如果 MP 和 SP 同时输出的话，会增加 DDR 带宽；

客户内部跟硬件确认了下

三星的内存 -- 没有问题，没有补丁，摄像头预览也是正常

南亚的内存 -- 有问题，只有打了补丁，摄像头预览才是正常

说明确实是 DDR 问题；

5.19.3 解决办法 Solution

只用 mainpath 输出，而不用 selfpath 输出，因为如果 MP 和 SP 同时输出的话，会增加 DDR 带宽；

```
diff --git a/psl/rkisp1/RKISP1CameraHw.cpp b/psl/rkisp1/RKISP1CameraHw.cpp
index 8bf6bc5..04965f5 100644
--- a/psl/rkisp1/RKISP1CameraHw.cpp
+++ b/psl/rkisp1/RKISP1CameraHw.cpp
```

```
    @@ -596,7 +596,9 @@ status_t RKISP1CameraHw::doConfigureStreams(UseCase newUseCase,
                        newUseCase == USECASE_STILL ? "USECASE_STILL" :
"USECASE_TUNING",
                        streams.size());

    -       mGCM.enableMainPathOnly(newUseCase == USECASE_STILL ? true : false);
    +       //mGCM.enableMainPathOnly(newUseCase == USECASE_STILL ? true : false);
    +       mGCM.enableMainPathOnly(true);
    +       LOGE("wpzz====, enable Main Path Only\n");

            status_t status = mGCM.configStreams(streams, operation_mode, testPatternMode);
            if (status != NO_ERROR) {
```

5.20 Android10.0-CTS 和 GSI CaptureRequestTest#testFlashTurnOff 失败问题

5.20.1 问题描述 Issue description

CtsCameraTestCases
android.hardware.camera2.cts.CaptureRequestTest#testFlashTurnOff
这个闪光灯的 fail 过不了

5.20.2 问题分析 Issue analysis

android.hardware.camera2.cts.CaptureRequestTest#testFlashTurnOff 这项为 10.0 新增的测试；
CX 分析问题 LOG：
E TestRunner: failed: testFlashTurnOff(android.hardware.camera2.cts.CaptureRequestTest)
E TestRunner: ----- begin exception -----
E TestRunner: java.lang.Exception: There were 6 errors:
E TestRunner: java.lang.Throwable(Test failed for camera 0: Invalid state 3 not in expected list[4, 2] (expected = -1, actual = -1))
E TestRunner: java.lang.Throwable(Test failed for camera 0: state 3 index -1 is expected to be >= 0: (expected = 0 was not greater than actual = -1))
E TestRunner: java.lang.Throwable(Test failed for camera 0: Invalid state 3 not in expected list[4, 2] (expected = -1, actual = -1))
E TestRunner: java.lang.Throwable(Test failed for camera 0: state 3 index -1 is expected to be >= 0: (expected = 0 was not greater than actual = -1))
E TestRunner: java.lang.Throwable(Test failed for camera 0: Invalid state 3 not in expected list[4, 2] (expected = -1, actual = -1))
E TestRunner: java.lang.Throwable(Test failed for camera 0: state 3 index -1 is expected to be >= 0:

(expected = 0 was not greater than actual = -1))

5.20.3 解决办法 Solution

如果是 SOC 的 camera 如下修改：

/hardware/rockchip/camera$ git diff

```
diff --git a/psl/rkisp1/ControlUnit.cpp b/psl/rkisp1/ControlUnit.cpp
index d6a6a97..56f7229 100755
--- a/psl/rkisp1/ControlUnit.cpp
+++ b/psl/rkisp1/ControlUnit.cpp
@@ -155,9 +155,14 @@ int SocCamFlashCtrUnit::updateFlashResult(CameraMetadata *result)

        uint8_t flashState = ANDROID_FLASH_STATE_READY;
        if (mV4lFlashMode == V4L2_FLASH_LED_MODE_FLASH ||
-           mV4lFlashMode == V4L2_FLASH_LED_MODE_TORCH)
+           mV4lFlashMode == V4L2_FLASH_LED_MODE_TORCH) {
            flashState = ANDROID_FLASH_STATE_FIRED;

+           if (mAeMode >= ANDROID_CONTROL_AE_MODE_ON
+                   && mAeFlashMode == ANDROID_FLASH_MODE_OFF) {
+               flashState = ANDROID_FLASH_STATE_PARTIAL;
+           }
+       }
        //# ANDROID_METADATA_Dynamic android.flash.state done
        result->update(ANDROID_FLASH_STATE, &flashState, 1);
```

如果是 RAW 的 camera 如下修改：

/hardware/rockchip/camera_engine_rkisp$ git diff

```
diff --git a/modules/isp/rkiq_handler.cpp b/modules/isp/rkiq_handler.cpp
index 5dec438..3612b9b 100755
--- a/modules/isp/rkiq_handler.cpp
+++ b/modules/isp/rkiq_handler.cpp
@@ -698,6 +698,7 @@ AiqCommonHandler::processMiscMetaResults(struct CamIA10_Results
&ia10_results, X
                    const CameraMetadata* settings    =
                        &_aiq_compositor->getAiqInputParams()->settings;
                    uint8_t flash_mode = ANDROID_FLASH_MODE_OFF;
+                   uint8_t ae_mode = ANDROID_CONTROL_AE_MODE_ON;
                    camera_metadata_ro_entry entry_flash =
                        settings->find(ANDROID_FLASH_MODE);
```

```
    @@ -705,7 +706,9 @@ AiqCommonHandler::processMiscMetaResults(struct CamIA10_Results
&ia10_results, X
                            flash_mode = entry_flash.data.u8[0];
                        }
                        metadata->update(ANDROID_FLASH_MODE, &flash_mode, 1);
    -
    +                   camera_metadata_ro_entry entry_ae_mode =
settings->find(ANDROID_CONTROL_AE_MODE);
    +                   if (entry_ae_mode.count == 1)
    +                       ae_mode = entry_ae_mode.data.u8[0];
                        uint8_t flashState = ANDROID_FLASH_STATE_READY;

                        struct CamIA10_Stats& camia10_stats =
    @@ -715,8 +718,12 @@ AiqCommonHandler::processMiscMetaResults(struct CamIA10_Results
&ia10_results, X
                            camia10_stats.flash_status.flash_mode == HAL_FLASH_TORCH ||
                            /* CTS required */
                            flash_mode == ANDROID_FLASH_MODE_SINGLE||
    -                       flash_mode == ANDROID_FLASH_MODE_TORCH)
    +                       flash_mode == ANDROID_FLASH_MODE_TORCH){
                            flashState = ANDROID_FLASH_STATE_FIRED;
    +                       if (ae_mode >= ANDROID_CONTROL_AE_MODE_ON
    +                           && flash_mode == ANDROID_FLASH_MODE_OFF)
    +                           flashState = ANDROID_FLASH_STATE_PARTIAL;
    +                   }
                        else if (camia10_stats.frame_status ==
CAMIA10_FRAME_STATUS_FLASH_PARTIAL)
                            flashState = ANDROID_FLASH_STATE_PARTIAL;
                        metadata->update(ANDROID_FLASH_STATE, &flashState, 1);
```

5.21 Android9.0 CaptureRequestTest#testEdgeModeControl 失败问题

5.21.1 问题描述 Issue description

RAW Camera 进行 CtsCameraTestCases

android.hardware.camera2.cts.CaptureRequestTest#testEdgeModeControl[1]

android.hardware.camera2.cts.CaptureRequestTest#testNoiseReductionModeControl[1]

失败 LOG：

camera 1: Frame duration must be in the range of [33333333, 66666666], value 32813000 is out of range [32833332, 67666664])

camera 1: Frame duration must be in the range of [33333333, 66666666], value 32815000 is out of range [32833332, 67666664])

5.21.2 问题分析 Issue analysis

32815000 这个值很接近 33333333 了，只是后面三位可能因为精度问题被过滤掉了；需要修改下；

5.21.3 解决办法 Solution

查看 SDK/hardware/rockchip/camera_engine_rkisp$需要包含如下提交即可；

commit f636d4ddde37e6ecbb52778af05d4d64c514bf6b

Author: Zhong Yichong <zyc@rock-chips.com>

Date: Mon Jun 10 10:39:14 2019 +0800

fix cts frame_duration bug caused by precision

Change-Id: I3fdcc2a1b9cc73806cf02b6f6bd63f9fc831c0a5

Signed-off-by: Zhong Yichong <zyc@rock-chips.com>

5.22 RK3326-10.0 接后摄 MIPI 口 GC2145，前摄 DVP 口 GC032A 出现切换报错

5.22.1 问题描述 Issue description

打开 gc2145 出现：如下报错

```
[  170.987576] gc2145 2-003c: gc2145_s_stream: on: 1, 800x600@16
[  171.238218] rkisp1: MIPI error: err2: 0x00010000
[  171.293869] rkisp1: MIPI error: err2: 0x00010000
```

切换到 gc032a 出现如下报错：

```
[   93.394564] rkisp1 ff4a0000.rkisp1: can not get first iq setting in stream on
[   93.395319] rkisp1: CIF_ISP_PIC_SIZE_ERROR (0x00000001)
[   93.395337] rkisp1: CIF_ISP_PIC_SIZE_ERROR (0x00000001)
[   93.395930] rkisp1: CIF_ISP_PIC_SIZE_ERROR (0x00000001)
[   93.396494] rkisp1: isp icr v_statr err: 0x48
[   93.397173] gc032a 2-0021: gc032a_s_stream: on: 1
[   93.397396] rkisp1: CIF_ISP_PIC_SIZE_ERROR (0x00000001)
[   93.397420] rkisp1: CIF_ISP_PIC_SIZE_ERROR (0x00000001)
[   93.398397] rkisp1: CIF_ISP_PIC_SIZE_ERROR (0x00000001)
```

5.22.2 问题分析 Issue analysis

这些报错原因基本就两种：
1、本身 sensor 输出信号质量差，导致报错；
2、sensor 输出相互影响，导致信号异常；
排查方法：
1、尝试更换板子或者模组试试；
2、怀疑可能是 gc032a 影响 gc2145 信号，将 gc032a 驱动 stream off 后等待一帧时间，然后在切换到 gc2145 试试；
3、gc2145 驱动中， clk_set_rate(gc2145->xvclk, 24000000);改成 120000000 或者 6000000 试试；
4、gc2145 的供电电压,要你们硬件根据 gc2145 的 Datasheetz 再核对下；

5.22.3 解决办法 Solution

两 camera 硬件的 i2c io 电源域不同，一个 1.8v，一个 2.8v，解决办法是客户修改硬件。

5.23 RK3326-10.0-DVP 和 MIPI 摄像头都兼容问题

5.23.1 问题描述 Issue description

Android10.0 系统，想把后摄的 dvp 和 mipi 的摄像头都兼容进来，但兼容了 mipi 的摄像头后摄的 dvp 就都不亮了，把 mipi 摄像头去掉又能亮了，能不能做到所有 mipi 和 dvp 摄像头都兼容进来？

5.23.2 问题分析 Issue analysis

经分析问题原因：
是 MIPI camera 中的 rockchip-mipi-dphy-rx:有先注册占用了一个 isp_dev->num_sensors，
然后 DVP 注册的时候如果已经注册了一个，
但只要多一个就超了 2 的界限，而这时 MIPI camera 还没有进行解析，所以相关资源还没有释放，所以导致异常了。
kernel 添加打印 LOG 位置：

```
diff --git a/drivers/media/platform/rockchip/isp1/dev.c b/drivers/media/platform/rockchip/isp1/dev.c
old mode 100644
new mode 100755
index a865baaea6f7..ff527c67e79a
--- a/drivers/media/platform/rockchip/isp1/dev.c
+++ b/drivers/media/platform/rockchip/isp1/dev.c
@@ -474,6 +474,8 @@ static int subdev_notifier_bound(struct v4l2_async_notifier *notifier,
                struct rkisp1_async_subdev *s_asd = container_of(asd,
                                                 struct rkisp1_async_subdev, asd);
```

```
+            v4l2_info(subdev, "isp_dev->num_sensors(%d),
ARRAY_SIZE(isp_dev->sensors)(%d)\n",
+                      isp_dev->num_sensors, ARRAY_SIZE(isp_dev->sensors));
             if (isp_dev->num_sensors == ARRAY_SIZE(isp_dev->sensors))
                      return -EBUSY;
```

5.23.3 解决办法 Solution

kernel 按照如下修改：

```
diff --git a/drivers/media/platform/rockchip/isp1/dev.h b/drivers/media/platform/rockchip/isp1/dev.h
old mode 100644
new mode 100755
index 980f7711302d..762c9d9ff498
--- a/drivers/media/platform/rockchip/isp1/dev.h
+++ b/drivers/media/platform/rockchip/isp1/dev.h
@@ -56,7 +56,7 @@
 #define GRP_ID_ISP_DMARX                BIT(5)

 #define RKISP1_MAX_BUS_CLK      8
-#define RKISP1_MAX_SENSOR       2
+#define RKISP1_MAX_SENSOR       4
 #define RKISP1_MAX_PIPELINE     4

 #define RKISP1_MEDIA_BUS_FMT_MASK       0xF000
```

5.24 RK3566/68- android11.0 如何配置 MIPI YUV camera 问题

5.24.1 问题描述及问题解答 Q & A

5.24.1.1 ：使用的 MIPI 摄像头，在 RK3399-7.1 上配置的是 CamSys_Fmt_Yuv422_8b，在 rk3566 上应该怎么配置呢？

CamSys_Fmt_Yuv422_8b 是 7.1 上用的，9.0 及以上的框架不一样，需要参考新的文档进行配置。

5.24.1.2 ： 有没文档或类似的例程？

可以参考 SDK/RKDocs/common/camera/HAL3 中 RKISP_Driver_User_Manual_v1.xx.pdf 和 amera_hal3_user_manual_vx.x.pdf 文档；rk3566 比较新，结点名称和文档有些差异；

5.24.1.3 ： 是否有参考的 dts 配置？

可参考如下 dts 或 dtsi 配置：

1、rk3566-evb2-lp4x-v10.dtsi：包含 MIPI-4lane 及 2lane+2lane 配置；

其中 csi2_dphy0 对应正常 MIPI-4lane 配置；

2lane+2lane 配置参考：csi2_dphy1 和 csi2_dphy2 示例连接；

2、rk3566-evb3-ddr3-v10.dtsi：包含 ov5695-mipi camera+ gc2145-dvp camera 配置；

3、rk3566-rk817-tablet.dts 、rk3566-rk817-tablet-k108.dts、rk3566-rk817-tablet-rkg11.dts、rk3566-rk817-eink-w6.dts 等这些 dts 中也包含 camera 配置，只是可能使用的时钟和模组有些差异客户可自行参考；

具体参考：4.4.6 rk356x 平台摄像头 DTS 注册

5.24.1.4 ： camera_hal3_user_manual_v2.3.pdf 这个文档提到的 RAW sensor 及:SOC sensor 其中 SOC sensor 类型就是 YUV 输出的 sensor 吗？

是的，RAW Sensor 指的就是输出 Bayer Pattern 格式的 sensor；

而 SOC Sensor 指的是输出 YUV 格式的 sensor；

5.24.1.5 ： dts 中，这些 name 要与哪些代码或配置保持一致？

rockchip,camera-module-name = "HS5885-BNSM1018-V01";

rockchip,camera-module-lens-name = "default";

YUYV 输出的 SOC sensor，没影响；只有 RAW 输出的 sensor 需要考虑，

具体参考 camera_engine_rkisp_user_manual_vx.x.pdf 文档说明；

5.24.1.6 不能获取到摄像头数据大概是什么原因，模组测量是有数据输出的?

参考本文档 4.9 部分。

5.25 RK356x-android11.0-gc5035-rkisp0: MIPI error: packet: 0x01000000 报错问题

5.25.1 问题描述 Issue description

打开 camera 后报如下 mipi 错误：

```
824.486548] rkisp0: MIPI error: packet: 0x01000000
824.486630] rkisp0: MIPI error: packet: 0x01000000
824.486750] rkisp0: MIPI error: packet: 0x01000000
824.487049] rkisp0: MIPI error: packet: 0x01000000
```

```
824.487549] rkisp0: MIPI error: packet: 0x01000000
824.487619] rkisp0: MIPI error: packet: 0x01000000
```

5.25.2 问题分析 Issue analysis

查找报错位置：

```
./drivers/media/platform/rockchip/isp/capture_v21.c:1468:        v4l2_warn(v4l2_dev,
"MIPI error: packet: 0x%08x\n", packet);
    packet = readl(hw_dev->base_addr + CSI2RX_ERR_PACKET);
```

查找 rk3568.dtis 中 isp 的基地址为：0xfdff0000

对应寄存器偏移地址：0x1c00+0x0024 = 0x1c24

```
#define CSI2RX_BASE                0x00001C00
#define CSI2RX_CTRL0               (CSI2RX_BASE + 0x00000)
#define CSI2RX_CTRL1               (CSI2RX_BASE + 0x00004)
#define CSI2RX_CTRL2               (CSI2RX_BASE + 0x00008)
#define CSI2RX_CSI2_RESETN         (CSI2RX_BASE + 0x00010)
#define CSI2RX_PHY_STATE_RO        (CSI2RX_BASE + 0x00014)
#define CSI2RX_DATA_IDS_1          (CSI2RX_BASE + 0x00018)
#define CSI2RX_DATA_IDS_2          (CSI2RX_BASE + 0x0001c)
#define CSI2RX_ERR_PHY             (CSI2RX_BASE + 0x00020)
#define CSI2RX_ERR_PACKET          (CSI2RX_BASE + 0x00024)
#define CSI2RX_ERR_OVERFLOW        (CSI2RX_BASE + 0x00028)
#define CSI2RX_ERR_STAT            (CSI2RX_BASE + 0x0002c)
```

0x01000000 对应 bit[27:24] = 1，即 CRC checksum error，就是 mipi 信号质量问题导致出错；

CSI2RX_1C00_ERR_PACKET

Address: Operational Base + offset (0x0024)

Bit	Attr	Reset Value	Description
31:28	RO	0x0	reserved
27:24	RC	0x0	checksum_error CRC checksum error
23:21	RO	0x0	reserved
20	RC	0x0	ecc_2bit_error ecc 2bit error
19:16	RC	0x0	ecc_1bit_error ecc 1bit error
15:12	RC	0x0	err_id id err
11:8	RC	0x0	err_frame_data The frame whose fransfer is being finished had at last one CRC err detected
7:4	RC	0x0	err_f_seq The Frame Number of two consecutive packets does not follow the expcted order

尝试方法：

尝试将 MCLK 降低到 12MHZ 后，没有出现上面报错，说明就是 mipi 信号质量的问题；

需要模组重新打样。

5.25.3 解决办法 Solution

模组优化 mipi 走线，重新打样。

5.26 RK356x-android11.0-ov8858-rkisp0: MIPI error: overflow: 0x00000001 报错问题

5.26.1 问题描述 Issue description

打开 camera 后报如下 mipi 错误：

```
[  498.458507] rkisp0: MIPI error: overflow: 0x00000001
[  498.458519] rkisp0: MIPI error: packet: 0x01100000
[  498.458530] rkisp0: MIPI error: packet: 0x00100000
[  498.466320] rkisp0: MIPI error: packet: 0x01000000
[  498.466326] rkisp0: MIPI error: packet: 0x00010000
```

5.26.2 问题分析 Issue analysis

查找报错位置：

```
./drivers/media/platform/rockchip/isp/capture_v21.c:1470:        v4l2_warn(v4l2_dev, "MIPI error: overflow: 0x%08x\n", overflow);
./drivers/media/platform/rockchip/isp/capture_v21.c:1468:        v4l2_warn(v4l2_dev, "MIPI error: packet: 0x%08x\n", packet);
    packet = readl(hw_dev->base_addr + CSI2RX_ERR_PACKET);
    overflow = readl(hw_dev->base_addr + CSI2RX_ERR_OVERFLOW);
```

查找 rk3568.dtis 中 isp 的基地址为：0xfdff0000

对应寄存器偏移地址：0x1c00+0x0024 = 0x1c24 和 0x1c28

```
512:
513: #define CSI2RX_BASE          0x00001C00
514: #define CSI2RX_CTRL0         (CSI2RX_BASE + 0x00000)
515: #define CSI2RX_CTRL1         (CSI2RX_BASE + 0x00004)
516: #define CSI2RX_CTRL2         (CSI2RX_BASE + 0x00008)
517: #define CSI2RX_CSI2_RESETN   (CSI2RX_BASE + 0x00010)
518: #define CSI2RX_PHY_STATE_RO  (CSI2RX_BASE + 0x00014)
519: #define CSI2RX_DATA_IDS_1    (CSI2RX_BASE + 0x00018)
520: #define CSI2RX_DATA_IDS_2    (CSI2RX_BASE + 0x0001c)
521: #define CSI2RX_ERR_PHY       (CSI2RX_BASE + 0x00020)
522: #define CSI2RX_ERR_PACKET    (CSI2RX_BASE + 0x00024)
523: #define CSI2RX_ERR_OVERFLOW  (CSI2RX_BASE + 0x00028)
524: #define CSI2RX_ERR_STAT      (CSI2RX_BASE + 0x0002C)
525: #define CSI2RX_MASK_PHY      (CSI2RX_BASE + 0x00030)
```

5.26.3 解决办法 Solution

经分析排查，是 OV8858 驱动中添加 sensor_g_mbus_config 中 4lane 配置出错了；
4lane 配置成了 2lane；

```
+static int sensor_g_mbus_config(struct v4l2_subdev *sd,
+                        struct v4l2_mbus_config *config)
+{
+    struct ov8858    *sensor = to_ov8858 (sd);
+    struct device *dev = &sensor->client->dev;
+
+    dev_info(dev, "%s(%d) enter!\n", __func__, __LINE__);
+
+    if (2 == sensor->lane_num) {
+        config->type = V4L2_MBUS_CSI2;
+        config->flags = V4L2_MBUS_CSI2_2_LANE |
+                                V4L2_MBUS_CSI2_CHANNEL_0 |
+                                V4L2_MBUS_CSI2_NONCONTINUOUS_CLOCK;
+    } else if (4 == sensor->lane_num) {
+        config->type = V4L2_MBUS_CSI2;
+        config->flags = V4L2_MBUS_CSI2_2_LANE |
+                                V4L2_MBUS_CSI2_CHANNEL_0 |
+                                V4L2_MBUS_CSI2_NONCONTINUOUS_CLOCK;
+    } else {
+        dev_err(&sensor->client->dev,
+                        "unsupported lane_num(%d)\n", sensor->lane_num);
+    }
+    return 0;
+}
```

改成如下即可：

```
+static int sensor_g_mbus_config(struct v4l2_subdev *sd,
+                        struct v4l2_mbus_config *config)
+{
+    struct ov8858    *sensor = to_ov8858 (sd);
+    struct device *dev = &sensor->client->dev;
+
+    dev_info(dev, "%s(%d) enter!\n", __func__, __LINE__);
+
+    if (2 == sensor->lane_num) {
```

```
+           config->type = V4L2_MBUS_CSI2;
+           config->flags = V4L2_MBUS_CSI2_2_LANE |
+                           V4L2_MBUS_CSI2_CHANNEL_0 |
+                           V4L2_MBUS_CSI2_NONCONTINUOUS_CLOCK;
+    } else if (4 == sensor->lane_num) {
+           config->type = V4L2_MBUS_CSI2;
+           config->flags = V4L2_MBUS_CSI2_4_LANE |
+                           V4L2_MBUS_CSI2_CHANNEL_0 |
+                           V4L2_MBUS_CSI2_NONCONTINUOUS_CLOCK;
+    } else {
+           dev_err(&sensor->client->dev,
+                   "unsupported lane_num(%d)\n", sensor->lane_num);
+    }
+    return 0;
+}
```

5.27 RK356x-11.0-Camera 配置为 RAW 之后，预览出现后马上卡住问题

5.27.1 问题描述 Issue description

单独点 camera，配置为 SOC 的时候，预览拍照都正常，但是配置为 RAW 之后，预览出现之后就马上卡死。

5.27.2 问题分析 Issue analysis

使用如下命令抓取 LOG：

```
adb shell logcat -c && adb shell pkill provider && adb shell logcat > logcat.txt
```

查看问题 LOG：

Check LOG of the issue:

```
E rkisp     : [XCORE]:XCAM ERROR RkAiqCalibDb.cpp:186: calibdb
/vendor/etc/camera/rkisp2/ov8858_KYT-4878-V01_default.xml and bin are all not exist!
```

从 LOG 看出是缺少效果文件；

5.27.3 解决办法 Solution

因为 rk356x 是 rkisp2x 版本，效果文件位于：sdk\external\camera_engine_rkaiq\iqfiles

复制一份分辨率相同，版本相同的效果文件，改成一份示例效果文件，名字改成：ov8858_KYT-4878-V01_default.xml，然后推到板子/vendor/etc/camera/rkisp2/目录后重启下应该就能正常打开了。

5.28 RK356x-11.0- CTS 和 GSI CaptureRequestTest#testFlashTurnOff[1] 失败问题

5.28.1 问题描述 Issue description

CtsCameraTestCases
android.hardware.camera2.cts.CaptureRequestTest#testFlashTurnOff[1]
这个闪光灯的 fail 过不了
问题 LOG：

```
    java.lang.Throwable(Test failed for camera 0: Invalid state 3 not in expected list[4, 2] (expected = -1, actual = -1) )
    java.lang.Throwable(Test failed for camera 0: state 3 index -1 is expected to be >= 0: (expected = 0 was not greater than actual = -1) )
    java.lang.Throwable(Test failed for camera 0: Invalid state 3 not in expected list[4, 2] (expected = -1, actual = -1) )
    java.lang.Throwable(Test failed for camera 0: Invalid state 3 not in expected list[4, 2] (expected = -1, actual = -1) )
    java.lang.Throwable(Test failed for camera 0: Invalid state 3 not in expected list[2, 4] (expected = -1, actual = -1) )
```

5.28.2 问题分析 Issue analysis

同 5.19 类似；只是目前 RK356x 的 RAW 和 SOC 都是类似 5.19 中 SOC 修改；

5.28.3 解决办法 Solution

修改如下：

```
    sdk/hardware/rockchip/camera$ git diff
    diff --git a/psl/rkisp2/RKISP2ControlUnit.cpp b/psl/rkisp2/RKISP2ControlUnit.cpp
    index b8fbbb1..bdd9021 100755
    --- a/psl/rkisp2/RKISP2ControlUnit.cpp
    +++ b/psl/rkisp2/RKISP2ControlUnit.cpp
    @@ -180,6 +180,12 @@ int SocCamFlashCtrUnit::updateFlashResult(CameraMetadata *result)
                    }
            }

    +       /* Using android.flash.mode == TORCH or SINGLE will always return FIRED.*/
    +       if (mAeFlashMode == ANDROID_FLASH_MODE_TORCH ||
    +               mAeFlashMode == ANDROID_FLASH_MODE_SINGLE) {
```

```
    +            ALOGD("%s:%d mAeFlashMode: %d, set flashState FIRED!", __FUNCTION__,
__LINE__, mAeFlashMode);
    +            flashState = ANDROID_FLASH_STATE_FIRED;
    +        }
             //# ANDROID_METADATA_Dynamic android.flash.state done
             result->update(ANDROID_FLASH_STATE, &flashState, 1);
```

5.29 RK356x-11.0- CTS 和 GSI CaptureRequestTest#testFlashControl[1] 失败问题

5.29.1 问题描述 Issue description

CtsCameraTestCases
android.hardware.camera2.cts.CaptureRequestTest#testFlashControl[1]
这个闪光灯的 fail 过不了
问题 LOG：

```
    java.lang.Exception: There were 2 errors:
        java.lang.Throwable(Test failed for camera 0: Flash state result must be FIRED (expected = 3,
actual = 2) )
        java.lang.Throwable(Test failed for camera 0: Flash state result must be FIRED (expected = 3,
actual = 2) )
```

加上 android.hardware.camera2.cts.CaptureRequestTest#testFlashTurnOff[1]的解决修改后：
剩余一个：

```
    java.lang.Exception: Test failed for camera 0: Flash state result must be FIRED (expected = 3, actual
= 2)
```

5.29.2 问题分析 Issue analysis

分析是 android.flash.state 的状态返回不对；
应该是 FIRED 即 3 状态，而实际返回的时候 READY 状态；

android.flash.state	**byte (enum) [public] [limited]** • **UNAVAILABLE (v3.2)** - No flash on camera. • **CHARGING (v3.2)** - Flash is charging and cannot be fired. • **READY (v3.2)** - Flash is ready to fire. • **FIRED (v3.2)** - Flash fired for this capture. • **PARTIAL (v3.2)** - Flash partially illuminated this frame. This is usually due to the next or previous frame having the flash fire, and the flash spilling into this capture due to hardware limitations.	Current state of t

返回 FIRED 状态有如下两种情况

When the camera device doesn't have flash unit (i.e. android.flash.info.available == false), this state will always be current flash status.

In certain conditions, this will be available on LEGACY devices:

- Flash-less cameras always return UNAVAILABLE.
- Using android.control.aeMode == ON_ALWAYS_FLASH will always return FIRED.
- Using android.flash.mode == TORCH will always return FIRED.

In all other conditions the state will not be available on LEGACY devices (i.e. it will be null).

5.29.3 解决办法 Solution

RK356x 的 camera 如下修改：

```
sdk/hardware/rockchip/camera$ git diff
diff --git a/psl/rkisp2/RKISP2ControlUnit.cpp b/psl/rkisp2/RKISP2ControlUnit.cpp
index b8fbbb1..bdd9021 100755
--- a/psl/rkisp2/RKISP2ControlUnit.cpp
+++ b/psl/rkisp2/RKISP2ControlUnit.cpp
@@ -180,6 +180,12 @@ int SocCamFlashCtrUnit::updateFlashResult(CameraMetadata *result)
                }
        }

+       /* Using android.flash.mode == TORCH or SINGLE will always return FIRED.*/
+       if (mAeFlashMode == ANDROID_FLASH_MODE_TORCH ||
+               mAeFlashMode == ANDROID_FLASH_MODE_SINGLE) {
+               ALOGD("%s:%d mAeFlashMode: %d, set flashState FIRED!", __FUNCTION__,
__LINE__, mAeFlashMode);
+               flashState = ANDROID_FLASH_STATE_FIRED;
+       }
        //# ANDROID_METADATA_Dynamic android.flash.state done
        result->update(ANDROID_FLASH_STATE, &flashState, 1);
```

5.30 RK356x-11.0- CTS FlashlightTest 失败问题

5.30.1 问题描述 Issue description

CtsCameraTestCases
android.hardware.camera2.cts.FlashlightTest#testTorchCallback[1]
android.hardware.camera2.cts.FlashlightTest#testTorchModeExceptions[1]
android.hardware.camera2.cts.FlashlightTest#testCameraDeviceOpenAfterTorchOn[1]
android.hardware.camera2.cts.FlashlightTest#testSetTorchModeOnOff[1]
这几个闪光灯的 fail 过不了
失败 LOG：

```
java.lang.IllegalArgumentException: setTorchMode:1948: Camera "0" has no flashlight
at android.hardware.camera2.CameraManager.throwAsPublicException(CameraManager.java:1001)
at
android.hardware.camera2.CameraManager$CameraManagerGlobal.setTorchMode(CameraManager.java
at android.hardware.camera2.CameraManager.setTorchMode(CameraManager.java:772)
at android.hardware.camera2.cts.FlashlightTest.resetTorchModeStatus(FlashlightTest.java:291)
at android.hardware.camera2.cts.FlashlightTest.testTorchCallback(FlashlightTest.java:148)
at android.hardware.camera2.cts.FlashlightTest.testTorchCallback(FlashlightTest.java:137)
```

5.30.2 问题分析 Issue analysis

上面就是打印了调用流程：
FlashlightTest.java:137—> FlashlightTest.java:148→ FlashlightTest.java:291→ CameraManager.java:772→
添加打印信息：
setprop log.tag.CameraManagerGlobal V

按照如下添加 LOG 定位：

```
--- a/services/camera/libcameraservice/CameraFlashlight.cpp
+++ b/services/camera/libcameraservice/CameraFlashlight.cpp
@@ -16,7 +16,7 @@

 #define LOG_TAG "CameraFlashlight"
 #define ATRACE_TAG ATRACE_TAG_CAMERA
-// #define LOG_NDEBUG 0
+#define LOG_NDEBUG 0

 #include <utils/Log.h>
 #include <utils/Trace.h>
```

```
diff --git a/services/camera/libcameraservice/CameraService.cpp
b/services/camera/libcameraservice/CameraService.cpp
old mode 100644
new mode 100755
index 4bfb441836..0ed116c6d2
--- a/services/camera/libcameraservice/CameraService.cpp
+++ b/services/camera/libcameraservice/CameraService.cpp
@@ -16,7 +16,7 @@

 #define LOG_TAG "CameraService"
 #define ATRACE_TAG ATRACE_TAG_CAMERA
-//#define LOG_NDEBUG 0
+#define LOG_NDEBUG 0

 #include <algorithm>
 #include <climits>
```

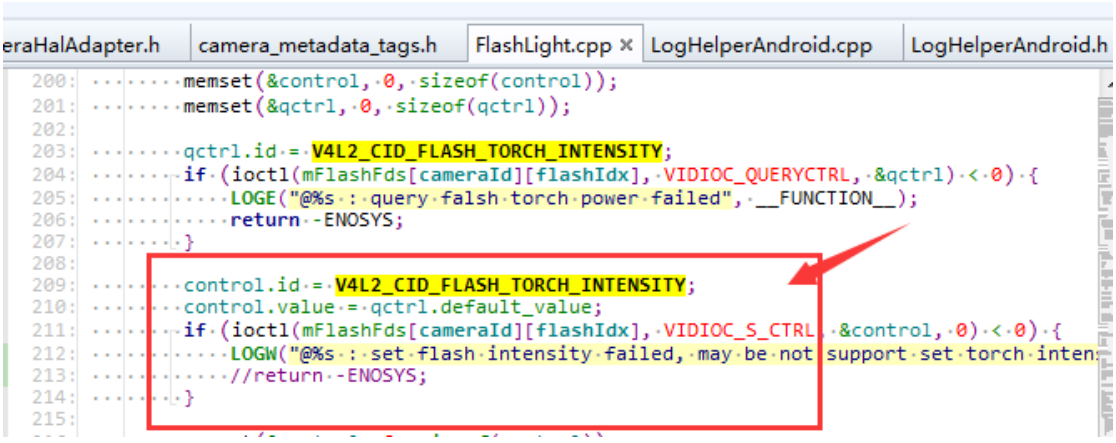
如下报错：

```
V CameraFlashlight: createFlashlightControl: creating a flash light control for camera 0
V CameraFlashlight: setTorchMode: set camera 0 torch mode to 1
D RkCamera: Debug log file is not enabled
D RkCamera: Debug log file is not enabled
E CameraService: setTorchMode: Camera "0" has no flashlight
```

继续定位如下：

```
E RkCamera: <HAL> FlashLight: @setFlashMode : set flash intensity failed
D Camera3HALModule: EXIT-hal_set_torch_mode
D CameraFlashlight: setTorchMode(123): wpzz Camera device 0: res(-38).
```

FlashLight.cpp 定位是这里报错：



使用命令：grep -H " /sys/class/video4linux/v4l-subdev*/name

查看闪光灯对应的结点：

```
RK3566:/ # grep -H "    /sys/class/video4linux/v4l-subdev*/name
/sys/class/video4linux/v4l-subdev0/name:rkisp-isp-subdev
/sys/class/video4linux/v4l-subdev1/name:rkisp-csi-subdev
/sys/class/video4linux/v4l-subdev2/name:rockchip-csi2-dphy2
/sys/class/video4linux/v4l-subdev3/name:rockchip-csi2-dphy1
/sys/class/video4linux/v4l-subdev4/name:m01_f_gc5025 2-0037-2
/sys/class/video4linux/v4l-subdev5/name:m00_b_hi846 2-0020-1
/sys/class/video4linux/v4l-subdev6/name:m00_b_gpio-flash
/sys/class/video4linux/v4l-subdev7/name:m00_b_dw9714 2-000c
```

然后使用命令： v4l2-ctl -d /dev/v4l-subdev6 –all，查看该结点支持的控制

V4L2_CID_FLASH_TORCH_INTENSITY 对应的 ioctl 仅支持读，不支持写；

因为 leds-rgb13h.c 驱动是 gpio 控制的闪光灯，确实不支持配置亮度；

```
ols

             led_mode 0x009c0901 (menu)   : min=0 max=2 default=0 value=0
        strobe_source 0x009c0902 (menu)   : min=0 max=0 default=0 value=0
              strobe 0x009c0903 (button) : flags=write-only, execute-on-write
         stop_strobe 0x009c0904 (button) : flags=write-only, execute-on-write
        strobe_status 0x009c0905 (bool)   : default=0 value=0 flags=read-only, volatile
      strobe_timeout 0x009c0906 (int)    : min=1000 max=1000000 step=1000 default=1000000 value=500000
intensity_flash_mode 0x009c0907 (int)    : min=0 max=20000 step=1 default=20000 value=20000 flags=read-only
intensity_torch_mode 0x009c0908 (int)    : min=0 max=20000 step=1 default=20000 value=20000 flags=read-only
              faults 0x009c090a (bitmask): max=0x0000000f default=0x00000000 value=0x00000000 flags=volatile
```

只能将 camerahal 中根据是否支持设置亮度，进行处理就行了；

5.30.3 解决办法 Solution

```
diff --git a/common/FlashLight.cpp b/common/FlashLight.cpp
index 4383b8d..99915f4 100644
--- a/common/FlashLight.cpp
+++ b/common/FlashLight.cpp
@@ -205,12 +205,14 @@ int32_t FlashLight::setFlashMode(const int cameraId, int flashIdx, const bool mo
                     LOGE("@%s : query falsh torch power failed", __FUNCTION__);
                     return -ENOSYS;
                 }
-
-            control.id = V4L2_CID_FLASH_TORCH_INTENSITY;
-            control.value = qctrl.default_value;
-            if (ioctl(mFlashFds[cameraId][flashIdx], VIDIOC_S_CTRL, &control, 0) < 0) {
-                LOGE("@%s : set flash intensity failed", __FUNCTION__);
-                return -ENOSYS;
+            LOGD(" qctrl.flags(0x%08x)", qctrl.flags);
+            if (qctrl.flags != V4L2_CTRL_FLAG_READ_ONLY) {
```

```
    +                   control.id = V4L2_CID_FLASH_TORCH_INTENSITY;
    +                   control.value = qctrl.default_value;
    +                   if (ioctl(mFlashFds[cameraId][flashIdx], VIDIOC_S_CTRL, &control, 0) < 0) {
    +                       LOGE("@%s : set flash intensity failed, may be not support set torch
intensity.", __FUNCTION__);
    +                       return -ENOSYS;
    +                   }
                    }

                    memset(&control, 0, sizeof(control));
```

5.31 RK356x-11.0 -CTS StaticMetadataTest#testCapabilities[1]失败问题

5.31.1 问题描述 Issue description

CtsCameraTestCases
android.hardware.camera2.cts.StaticMetadataTest#testCapabilities[1]
问题 LOG：

```
    java.lang.Exception: Test failed for camera 1: CONTROL_AF_REGIONS is available but
afMaxRegion is 0
        at
android.hardware.camera2.cts.testcases.Camera2AndroidTestCase.tearDown(Camera2AndroidTestCase.j
ava:155)
        at java.lang.reflect.Method.invoke(Native Method)
        at org.junit.runners.model.FrameworkMethod$1.runReflectiveCall(FrameworkMethod.java:50)
```

5.31.2 问题分析 Issue analysis

从上述 LOG 分析应该是马达相关的一些配置没去掉；

5.31.3 解决办法 Solution

主要是 sensor 不支持 AF 的话需要去掉相应字段：
<request.availableRequestKeys 中需要去掉：control.afRegions 字段
<request.availableResultKeys 中需要去掉： control.afRegions 字段

5.32 RK3126-11.0-2G-rgo 版单前摄 2145-CTS 的 CtsAppTestCases 失败问题

5.32.1 问题描述 Issue description

CtsAppTestCases
android.app.cts.SystemFeaturesTest#testCameraFeatures
单测 case 项失败

5.32.2 问题分析 Issue analysis

跟 camera 的配置有关系；

5.32.3 解决办法 Solution

单前摄 2145 不支持聚焦，机器中关于 camera 的 feature 只需以下两个 feature:
rkxxxx:$ pm list features |grep camera
feature:android.hardware.camera.any
feature:android.hardware.camera.front
所以需要做如下修改配置才能 pass：
1. CAMERA_SUPPORT_AUTOFOCUS = false
2. device/rockchip/common/device.mk 文件中的 frameworks/native/data/etc/android.hardware.camera.xml:$(TARGET_COPY_OUT_VENDOR)/etc/permissions/android.hardware.camera.xml 去掉
3. frameworks/native/data/etc/go_handheld_core_hardware.xml 文件中的 <feature name="android.hardware.camera" />也去掉
问题关闭了

5.33 RK356x-11.0-AHD to DVP 接口转换芯片报错调试建议

5.33.1 问题描述 Issue description

```
[ 139.967158] rkcif_dvp: ERROR: DVP_ALL_ERROR_INTEN:0x706!!
[ 139.986431] rkcif_dvp: Bad frame, pp irq:0x403 frmst:0x10001 size:720x24
[ 139.987065] rkcif_dvp: dvp line err
```

5.33.2 问题分析 Issue analysis

看 LOG 是收到的行数不对；这输出的是逐行还是隔行的数据？
如下几点调试建议：

1、将 VSYNC 和 HSYNC 极性修改试试；

```
static int rn6752_g_mbus_config(struct v4l2_subdev *sd,
                        struct v4l2_mbus_config *config)
{
    config->type = V4L2_MBUS_PARALLEL;
    config->flags = V4L2_MBUS_HSYNC_ACTIVE_HIGH |
                V4L2_MBUS_VSYNC_ACTIVE_LOW |
                V4L2_MBUS_PCLK_SAMPLE_RISING;
    return 0;
}
```

2、如上是 bt656 传输格式，参考 adv7181 实现 querystd 函数；

```
.querystd = adv7181_querystd,
一般配置：V4L2_STD_PAL
```

如果是 BT601 就不用实现 querystd 函数；

3、驱动中根据情况配置，隔行和逐行

```
format->field = V4L2_FIELD_NONE; //逐行
或
format->field = V4L2_FIELD_INTERLACED;//隔行
```

5.34 RK356x-11.0-开启双摄支持修改

5.34.1 问题描述 Issue description

更新最新 R7 版本平台双摄用不了，

配置的这个链路：sensor2->csi2_dphy2->mipi_csi2->vicap->isp_vir1，出现打不开的问题，报错如下：

```
E rkcif_mipi_lvds: get_remote_sensor: remote pad is null
E rkisp     : [XCORE]:XCAM ERROR v4l2_device.cpp:184: open device(/dev/video0) failed
E rkcif_mipi_lvds: rkcif_update_sensor_info: stream[0] get remote sensor_sd failed!
E rkisp     : [XCORE]:XCAM ERROR v4l2_device.cpp:184: open device(/dev/video1) failed
E stream_cif_mipi_id0: update sensor info failed -19
E rkcif_mipi_lvds: get_remote_sensor: remote pad is null
E rkcif_mipi_lvds: rkcif_update_sensor_info: stream[1] get remote sensor_sd failed!
E stream_cif_mipi_id1: update sensor info failed -19
E RkCamera: <HAL> RKISP2ControlUnit: Could not retrieve media entity rkisp-isp-subdev
```

5.34.2 解决办法 Solution

只需要 SDK/hardware/rockchip/camera$目录如下修改即可；

```
diff --git a/common/platformdata/PlatformData.cpp b/common/platformdata/PlatformData.cpp
index 4d9257f..91cf277 100755
--- a/common/platformdata/PlatformData.cpp
+++ b/common/platformdata/PlatformData.cpp
@@ -1047,7 +1047,7 @@ CameraHWInfo::CameraHWInfo() :
         mProductName = "<not_set>";
         mManufacturerName = "<not set>";
         mCameraDeviceAPIVersion = CAMERA_DEVICE_API_VERSION_3_3;
-        mSupportDualVideo = false;
+        mSupportDualVideo = true;
         mSupportExtendedMakernote = false;
         mSupportFullColorRange = true;
         mSupportIPUAcceleration = false;
```

示例 redmine：#305756

5.35 RK356x-11.0-R6 版本 SOC 类型的 camera 点不亮问题

5.35.1 问题描述 Issue description

RK356x-11.0-发布的 R6 版本，如果 camera3_profiles.xml 里面的 sensorType 配置为 SENSOR_TYPE_SOC 点不亮，但是底层直接参考 4.8 节使用 v4l2-ctl 工具获取数据流正常。

5.35.2 问题分析 Issue analysis

关键报错 LOG 如下：

```
F DEBUG   :       #00 pc 00007286  /apex/com.android.vndk.v30/lib/libcamera_metadata.so
F DEBUG   :       #01 pc 0001e22d
/vendor/lib/android.hardware.camera.provider@2.4-legacy.so
F DEBUG   :       #02 pc 0001cb75
/vendor/lib/android.hardware.camera.provider@2.4-legacy.so
F DEBUG   :       #03 pc 00013b71
/vendor/lib/android.hardware.camera.provider@2.4-legacy.so
F DEBUG   :       #04 pc 00013993
/vendor/lib/android.hardware.camera.provider@2.4-legacy.so
F DEBUG   :       #05 pc 00002d27
/vendor/lib/hw/android.hardware.camera.provider@2.4-impl.so
F DEBUG   :       #06 pc 00044119  /apex/com.android.vndk.v30/lib/libhidlbase.so
F DEBUG   :       #07 pc 000404d5  /apex/com.android.vndk.v30/lib/libhidlbase.so
F DEBUG   :       #08 pc 00042c9b  /apex/com.android.vndk.v30/lib/libhidlbase.so
F DEBUG   :       #09 pc 0004136d  /apex/com.android.vndk.v30/lib/libhidlbase.so
```

```
F DEBUG   :       #10 pc 0003f655  /apex/com.android.vndk.v30/lib/libhidlbase.so
F DEBUG   :       #11 pc 0003f91b  /apex/com.android.vndk.v30/lib/libhidlbase.so
F DEBUG   :       #12 pc 00001a51
/vendor/bin/hw/android.hardware.camera.provider@2.4-service
F DEBUG   :       #13 pc 00001981
/vendor/bin/hw/android.hardware.camera.provider@2.4-service
```

跟 libcamera_metadata.相关，查看 sdk/hardware/rockchip/camera: 目录

最近跟 metadata 相关的提交如下：

```
commit 8bb7b62d77462253b1d25352df681c2f706054fb
Author: Jian Qiu <qiujian@rock-chips.com>
Date:   Fri Mar 12 16:15:06 2021 +0800

    rkisp2: support aiq control vendor tags

    Tag for hal:
    RK_CONTROL_AIQ_BRIGHTNESS
    RK_CONTROL_AIQ_CONTRAST
    RK_CONTROL_AIQ_SATURATION

    Key for apk:
    com.rockchip.control.aiq.brightness
    com.rockchip.control.aiq.contrast
    com.rockchip.control.aiq.saturation

    Signed-off-by: Jian Qiu <qiujian@rock-chips.com>
Change-Id: Iabb418fe3b4ed0b84914a064feab07b3be709336
```

经分析，这个提交只考虑了 SENSOR_TYPE_RAW 类型的 Meta，没有将 SOC 类型的 meta 上传给上层；需要修复即可。

5.35.3 解决办法 Solution

在 sdk/hardware/rockchip/camera: 目录添加如下提交：

```
commit 8e4e7d859df8588a239ec3e6f6fde7a6810c0d63
Author: Wang Panzhenzhuan <randy.wang@rock-chips.com>
Date:   Tue Apr 6 11:10:34 2021 +0800

    rkisp2: fix soc camrea can't open issue
Signed-off-by: Wang Panzhenzhuan <randy.wang@rock-chips.com>
Change-Id: Ia12f85a4bb074f4803cbd1d0463c72a15b891ff9
```

如果没有，请找 FAE 获取，或者将 SDK 更新到 R7 及以上版本就有上述提交了。

5.36 RK356x-11.0-更新到 R8 后 SOC-DVP 接口的 camera 用不了

5.36.1 问题描述 Issue description

更新最新 R8 版本，平台 SOC-DVP 接口的 camera 用不了，报错 LOG 如下：

```
E RkCamera: <HAL> RKISP2MediaCtlHelper: Getting MediaEntity "stream_cif" failed
E RkCamera: <HAL> RKISP2MediaCtlHelper: Cannot open video node (staitus = 0x80000000)
E RkCamera: <HAL> RKISP2MediaCtlHelper: Failed to open video
```

5.36.2 问题分析 Issue analysis

从上面报错 LOG 看是没有找到 stream_cif 对应的 video 结点，导致应用打开失败；
应该是 R8 的 rkcif 驱动因为兼容多路 VC 通道，将 video 结点名称改了，从 stream_cif 改成 stream_cif_dvp_id0/1/2/3。

5.36.3 解决办法 Solution

Kernel 添加如下修改：

```
diff --git a/drivers/media/platform/rockchip/cif/capture.c b/drivers/media/platform/rockchip/cif/capture.c
    old mode 100644
    new mode 100755
    index 83636607e251..501f33652712
    --- a/drivers/media/platform/rockchip/cif/capture.c
    +++ b/drivers/media/platform/rockchip/cif/capture.c
    @@ -3541,7 +3541,7 @@ static int rkcif_register_stream_vdev(struct rkcif_stream *stream,
                        } else {
                                switch (stream->id) {
                                case RKCIF_STREAM_MIPI_ID0:
    -                                   vdev_name = CIF_DVP_ID0_VDEV_NAME;
    +                                   vdev_name = CIF_VIDEODEVICE_NAME;
                                        break;
                                case RKCIF_STREAM_MIPI_ID1:
                                        vdev_name = CIF_DVP_ID1_VDEV_NAME;
```

或者 SDK/ hardware/rockchip/camera 添加如下适配修改： 如没有，找 FAE 获取；

```
commit 57cc58e5de7a1c8351a19b49ff6bc541ce69709d (HEAD)
Author: Wang Panzhenzhuan <randy.wang@rock-chips.com>
Date:   Thu Sep 2 11:13:59 2021 +0800
```

```
rkisp2: adapt to rk356x vicap dvp interface new registered name

Signed-off-by: Wang Panzhenzhuan <randy.wang@rock-chips.com>
Change-Id: I2c592ea51b7a5be84bad1927e222818c8533f124
```

5.37 RK356x-11.0- some iq features are not supported 报错

5.37.1 问题描述 Issue description

```
E rkisp-vir0: some iq features(0xffffffff7ffffff, 0x3fbf7fe67ff) are not supported
E rkisp-vir0: some iq features(0xffffffff7ffffff, 0x3fbf7fe67ff) are not supported
```

5.37.2 问题分析 Issue analysis

正常不影响；

5.38 RK356x-11.0-双摄开关拷机出现卡住黑屏问题

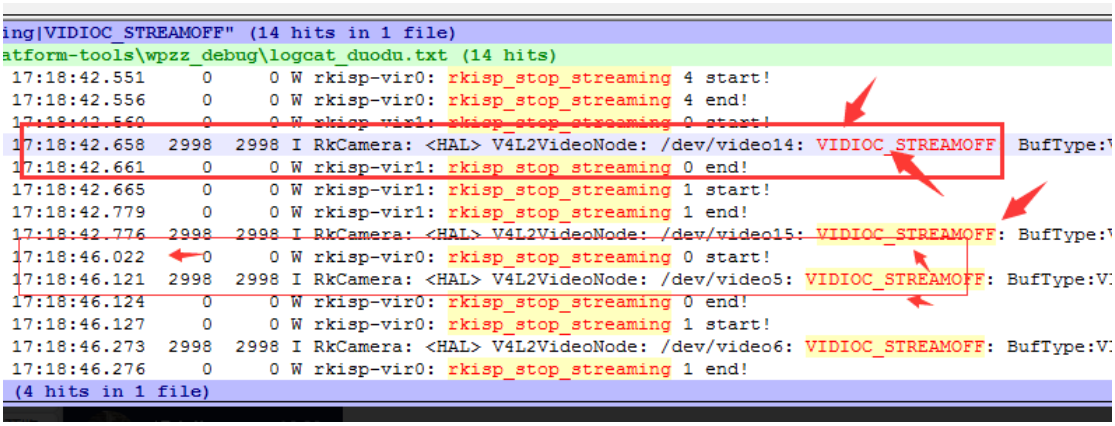
5.38.1 问题描述 Issue description

RK356x-11.0-两个摄像头进行开关拷机，很容易出现卡住黑屏问题。

5.38.2 问题分析 Issue analysis

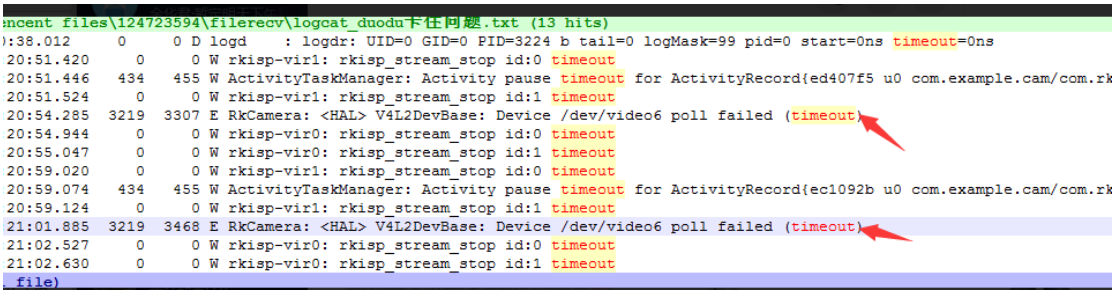
5.38.2.1 分析 1：

经反复开关查看问题现象，初步分析是 APK 关闭后，重新打开前上一次关闭流程还没结束，从而导致异常。这个需要分析关闭流程哪里耗时太多，或者哪里异常，导致关闭太慢。
跟踪 LOG 发现，HAL 层调用一个摄像头的 VIDIOC_STREAMOFF 后，过了接近 4s 才调到另外一个摄像头的 VIDIOC_STREAMOFF，从而导致退出比较慢；



继续分析查看 LOG 发现，关闭其中一个后，另外一个还在 poll 数据，会出现 poll timeout 异常；
关键 LOG：

```
E RkCamera: <HAL> V4L2DevBase: Device /dev/video6 poll failed (timeout)
E RkCamera: <HAL> RKISP2ImguUnit: Device poll failed
```



而这个 timeout 超时时间就是 3s 左右，从而导致卡住；

5.38.2.2 分析 2：

现在就是定位是底层关闭其中一个摄像头，导致另外一个 poll timeout 异常；
还是上层逻辑不对导致，关闭其中一个摄像头，导致另外一个异常；
需要运行 rkaiq_3A_server 单独将两路运行起来，然后使用 v4l2-ctl 工具模拟单独关闭场景，查看是否影响另外一路。模拟场景步骤如下：

1）先将 CameraHal3 库中对 camera 的调用去掉

```
rk3566_rgo:/ # cd /vendor/etc/camera/
rk3566_rgo:/vendor/etc/camera # mv camera3_profiles.xml camera3_profiles.xml.bak
```

2）对应 sensor 运行两个 rkaiq_3A_server

```
adb shell "rkaiq_3A_server --sensor_index=0 --hdrmode=HDR2"
adb shell "rkaiq_3A_server --sensor_index=1 --hdrmode=NORMAL"
```

其中: sensor 0 是 HDR 模式的，sensor1 是 NORMAL 模式配置

rkaiq_3A_server 参数配置参考：
sdk/external/camera_engine_rkaiq/hal_interface2.0/rkaiq_3A_server/readme.txt 说明

3）使用 v4l2-ctl 工具抓取数据流

```
adb shell "v4l2-ctl --verbose -d /dev/video14
--set-fmt-video=width=1920,height=1080,pixelformat='NV12'  \
--stream-mmap=4 --set-selection=target=crop,flags=0,top=0,left=0,width=1920,height=1080"
adb shell "v4l2-ctl --verbose -d /dev/video5
--set-fmt-video=width=1920,height=1080,pixelformat='NV12'  \
--stream-mmap=4 --set-selection=target=crop,flags=0,top=0,left=0,width=1920,height=1080"
```

同时打开上面两路 sensor 的数据流后，然后再关闭；
尝试多次开关其中一路，不会影响另外一路，应该是 HAL 层 poll 的函数调用参数哪里不对；
如其他同事分析，回读模式 isp 数据流是受 aiq 驱动（raw 数据走向 mipi->aiq->isp），aiq 被关掉 isp 是没输出的。从 log 上看，isp1 这路关闭，isp0 这路 mipi tx 也被关了，所以会 poll 不到数据，需检查上层逻辑控制。

```
75 D/rkisp-vir0(     0): rkisp_stop_streaming 0
02 D/rkisp-vir0(     0): rkisp_stop_streaming 1
17 D/rkisp-vir0(     0): rkisp_isp_stop refcnt:2
38 D/rkisp-vir0(     0): rkisp_isp_sd_s_power on:0
57 D/rkisp-vir0(     0): rkisp_isp_sd_s_power on:1
32 D/rkisp-vir0(     0): rkisp_start_streaming 4
43 D/rkisp-vir0(     0): rkisp_start_streaming 1
58 D/rkisp-vir0(     0): rkisp_isp_start refcnt:2
20 D/rkisp-vir0(     0): rkisp_start_streaming 0
55 D/rkisp-vir0(     0): rkisp_stop_streaming 4
90 D/rkisp-vir1(     0): rkisp_stop_streaming 0
02 D/rkisp-vir1(     0): rkisp_stop_streaming 1
17 D/rkisp-vir1(     0): rkisp_isp_stop refcnt:2
23 D/rkisp-vir1(     0): rkisp_isp_sd_s_power on:0
36 D/rkisp-vir1(     0): rkisp_isp_sd_s_power on:1
16 D/rkisp-vir1(     0): rkisp_start_streaming 1
22 D/rkisp-vir1(     0): rkisp_isp_start refcnt:2
22 D/rkisp-vir1(     0): rkisp_start_streaming 0
51 E/RkCamera(  460): <HAL> V4L2DevBase: Device /dev/video6 poll failed (timeout)
```

stream 4是mipi tx受控于aiq

5.38.2.3 分析定位 3

将 aiq 的 LOG 加上后发现，确实是关闭其中 1 个 sensor 的时候，aiq 被释放掉了两次，即把另外一个 sensor 对应的 aiq 服务也释放掉了；

而此时 HAL 还在处理 Flush，导致后面的 poll 流程卡住了，这个才是问题所在。

```
0023 D RkCamera: <HAL> V4L2DevBase: @pollDevices(358) flushFd(136), numFds(1)!
0036 D RkCamera: <HAL> RequestThread: @handleProcessCaptureRequest : mRequestsInHAL :4
0023 D RkCamera: <HAL> V4L2DevBase: @pollDevices(358) flushFd(136), numFds(1)!
0036 D RkCamera: <HAL> RequestThread: @handleProcessCaptureRequest : mRequestsInHAL :4
0023 D RkCamera: <HAL> V4L2DevBase: @pollDevices(358) flushFd(136), numFds(1)!
0036 D RkCamera: <HAL> RequestThread: @handleProcessCaptureRequest : mRequestsInHAL :4
9502 D rkisp    : [XCORE]:XCAM DEBUG rkisp_control_loop_impl.cpp:441: ----------------------------rkisp_cl_deinit
9502 D rkisp    : [XCORE]:XCAM DEBUG rkisp_control_loop_impl.cpp:445: ----------------------------rkisp_cl_deinit done
9502 D rkisp    : [XCORE]:XCAM DEBUG rkisp_control_loop_impl.cpp:441: ----------------------------rkisp_cl_deinit
9502 D rkisp    : [XCORE]:XCAM DEBUG rkisp_control_loop_impl.cpp:445: ----------------------------rkisp_cl_deinit done
9502 D RequestThread: ENTER-flush
9502 I RkCamera: <HAL> RequestThread: @flush, line:468, mRequestsInHAL:4
0023 D RkCamera: <HAL> V4L2DevBase: @pollDevices(358) flushFd(136), numFds(1)!
9502 I RkCamera: <HAL> RequestThread: @flush, line:479, mRequestsInHAL:0, time spend:1113697us
9502 D RequestThread: EXIT-flush
9502 D RequestThread: ENTER-flush
9502 I RkCamera: <HAL> RequestThread: @flush, line:468, mRequestsInHAL:0
9502 I RkCamera: <HAL> RequestThread: @flush, line:479, mRequestsInHAL:0, time spend:0us
9502 D RequestThread: EXIT-flush
9502 D RequestThread: ENTER-flush
9502 I RkCamera: <HAL> RequestThread: @flush, line:468, mRequestsInHAL:0
9502 I RkCamera: <HAL> RequestThread: @flush, line:479, mRequestsInHAL:0, time spend:0us
9502 D RequestThread: EXIT-flush
```

经定位是如下提交导致：加个了 sMap_aiq_ctx 的静态变量；

commit ecf342a1cbd1d3b120dcf4c486963b320de062e0

Author: Jian Qiu <qiujian@rock-chips.com>

Date: Wed Mar 10 15:20:21 2021 +0800

rkisp2: support dual camera

Signed-off-by: Jian Qiu <qiujian@rock-chips.com>

Signed-off-by: Wang Panzhenzhuan <randy.wang@rock-chips.com>

Change-Id: I61f23e604087b3668968a85bc6c0d682497e080b

释放 aiq 的时候，第一个 sensor 释放的时候就把两个都同时释放掉了，导致后面另外一个 sensor 的 HAL 层 poll 异常；

```
156
157 status_t RKISP2CtrlLoop::stop()
158 {
159     HAL_TRACE_CALL(CAM_GLBL_DBG_INFO);
160     PERFORMANCE_ATRACE_NAME("RKISP2CtrlLoop::stop");
161
162     if (mIsStarted == false)
163         return OK;
164
165     int ret = 0;
166
167     std::map<int, void*>::const_iterator it = sMap_aiq_ctx.begin();
168     for (; it != sMap_aiq_ctx.end(); ++it) {
169         ret = rkisp_cl_stop(it->second);
170     }
171     if (ret < 0) {
172         LOGE("%s: rkisp control loop stop failed !", __FUNCTION__);
173         return UNKNOWN_ERROR;
174     }
```

5.38.3 解决办法 Solution

sdk/hardware/rockchip/camera$目录的如下提交已有解决；

commit bdfbca8f27b19e7e47388841a0ab1c725c3fb28e (HEAD)

Author: Wang Panzhenzhuan <randy.wang@rock-chips.com>

Date: Mon Jul 26 09:55:36 2021 +0800

rkisp2: fix dual camera deinit aiq issue

Currently close one camera will deinit two camera's aiq,

so fix it

Signed-off-by: Wang Panzhenzhuan <randy.wang@rock-chips.com>

Change-Id: Iaf740878c0c822f5717a38025f0940ee00fa0bd8

5.39 RK356x-11.0-有关双摄更新代码打不开排查流程

1、v4l2-ctl --verbose -d /dev/video0 --set-fmt-video=width=1920,height=1080,pixelformat='NV12' --stream-mmap=4 --set-selection=target=crop,flags=0,top=0,left=0,width=1920,height=1080

看是是否有如下数据流，如果没有，说明 vicap 代码更新导致出现异常，对 vicap 代码最近提交二分排查；

```
VIDIOC_QBUF: ok
VIDIOC_STREAMON: ok
idx: 0 seq:       0 bytesused: 3110400 ts: 316.198903
idx: 1 seq:       1 bytesused: 3110400 ts: 316.232269 delta: 33.366 ms
idx: 2 seq:       2 bytesused: 3110400 ts: 316.265570 delta: 33.301 ms
idx: 3 seq:       3 bytesused: 3110400 ts: 316.298910 delta: 33.340 ms
idx: 0 seq:       4 bytesused: 3110400 ts: 316.332237 delta: 33.327 ms fps: 30.00
idx: 1 seq:       5 bytesused: 3110400 ts: 316.365578 delta: 33.341 ms fps: 30.00
idx: 2 seq:       6 bytesused: 3110400 ts: 316.398911 delta: 33.333 ms fps: 30.00
```

v4l2-ctl --verbose -d /dev/video5 --set-fmt-video=width=1920,height=1080,pixelformat='NV12' --stream-mmap=4 --set-selection=target=crop,flags=0,top=0,left=0,width=1920,height=1080

看是是否有如下数据流，如果没有说明 isp 代码更新导致出现异常，对 isp 代码最近提交进行排查；

```
VIDIOC_QBUF: ok
VIDIOC_STREAMON: ok
idx: 0 seq:       0 bytesused: 3110400 ts: 322.022796
idx: 1 seq:       1 bytesused: 3110400 ts: 322.055822 delta: 33.026 ms
idx: 2 seq:       2 bytesused: 3110400 ts: 322.089435 delta: 33.613 ms
idx: 3 seq:       3 bytesused: 3110400 ts: 322.122786 delta: 33.351 ms
idx: 0 seq:       4 bytesused: 3110400 ts: 322.156117 delta: 33.331 ms fps: 30.00
idx: 1 seq:       5 bytesused: 3110400 ts: 322.189384 delta: 33.267 ms fps: 30.01
idx: 2 seq:       6 bytesused: 3110400 ts: 322.222782 delta: 33.398 ms fps: 30.00
idx: 3 seq:       7 bytesused: 3110400 ts: 322.255853 delta: 33.071 ms fps: 30.04
```

2、开一个窗口运行

adb shell "rkaiq_3A_server --sensor_index=0 --hdrmode=NORMAL"

v4l2-ctl --verbose -d /dev/video14 --set-fmt-video=width=1920,height=1080,pixelformat='NV12' --stream-mmap=4 --set-selection=target=crop,flags=0,top=0,left=0,width=1920,height=1080

如果无数据流说明 aiq 代码更新导致出现异常，需对 aiq 代码最近提交进行排查；

5.40 RK356x-11.0-更新到 R9 后 SOC-DVP 接口的 camera 点击拍照录像异常问题

示例 redmine 号：Defect #308090

5.40.1 问题描述 Issue description

DVP 接口摄像头拍照报错如下

```
[   131.609570] gc2145 2-003c: gc2145_set_fmt enter
[   131.609916] gc2145 2-003c: gc2145_power(2638) on(1)
[   131.612166] gc2145 2-003c: gc2145_init(2622)
[   132.098197] gc2145 2-003c: gc2145_s_stream: on: 1, 800x600@16
[   132.117679] rkcif_dvp: set dual edge mode(off,0x2000000)!!!
[   134.379484] rkcif_dvp: not active buffer, skip current frame, dvp stream[0]
[   134.440845] rkcif_dvp: not active buffer, skip current frame, dvp stream[0]
[   134.502196] rkcif_dvp: not active buffer, skip current frame, dvp stream[0]
[   134.563592] rkcif_dvp: not active buffer, skip current frame, dvp stream[0]
[   134.624951] rkcif_dvp: not active buffer, skip current frame, dvp stream[0]
[   134.686308] rkcif_dvp: not active buffer, skip current frame, dvp stream[0]
[   134.747662] rkcif_dvp: not active buffer, skip current frame, dvp stream[0]
[   134.809024] rkcif_dvp: not active buffer, skip current frame, dvp stream[0]
[   134.870450] rkcif_dvp: not active buffer, skip current frame, dvp stream[0]
[   134.931715] rkcif_dvp: not active buffer, skip current frame, dvp stream[0]
[   134.993093] rkcif_dvp: not active buffer, skip current frame, dvp stream[0]
[   135.054514] rkcif_dvp: not active buffer, skip current frame, dvp stream[0]
```

5.40.2 问题分析 Issue analysis

从 LOG 看是 cif 驱动中 buf 出现异常了，查看最近提交，是将 dummy buffer 去掉的；

commit ea02130e2fd20c27ee0e94408c4224cf7e24be5a
Author: Zefa Chen <zefa.chen@rock-chips.com>
Date: Fri Jun 18 21:09:34 2021 +0800

media: rockchip: cif: remove dummy buffer

Signed-off-by: Zefa Chen <zefa.chen@rock-chips.com>
Change-Id: Ib1cdf85020d37a7a4a06b726fb88597797806411

经尝试分析，确实跟这个有关系；

5.40.3 解决办法 Solution

kernel 这个提交 revert 掉这个提交即可；

```
commit ea02130e2fd20c27ee0e94408c4224cf7e24be5a
Author: Zefa Chen <zefa.chen@rock-chips.com>
Date:   Fri Jun 18 21:09:34 2021 +0800

    media: rockchip: cif: remove dummy buffer

    Signed-off-by: Zefa Chen <zefa.chen@rock-chips.com>
    Change-Id: Ib1cdf85020d37a7a4a06b726fb88597797806411
```

后面 R10 版本有修复这个提交问题，就不用 revert 掉了；

5.41 RK356x-11.0 用 2lane+2lane mipi yuv 摄像头报错问题

示例 redmine 号：Defect #316820

5.41.1 问题描述 Issue description

有款摄像头 xc7160 配置 2lane 输出，使用 rk3568 2lane+2lane 的 mipi 摄像头配置，走 csi_dphy1。有一个问题，如果设备树中使能了 rkisp_vir1 节点，抓帧会报如下错误 LOG：

```
[  535.856420] rk_iommu fdff1a00.iommu: Enable stall request timed out, retry_count = 0, status: 0x00022b
[  535.856522] rk_iommu fdff1a00.iommu: Page fault at 0x00000000fe6a3000 of type write
[  535.856567] rk_iommu fdff1a00.iommu: iova = 0x00000000fe6a3000: dte_index: 0x3f9 pte_index: 0x2a3 page_offset: 0x0
```

```
[    535.856603] rk_iommu fdff1a00.iommu: mmu_dte_addr: 0x000000007b3f2000
dte@0x000000007b3f2fe4: 0x1d347001 valid: 1 pte@0x000000001d347a8c: 0x000000 valid: 0
page@0x0000000000000000 flags: 0x0
[    535.856628] rk_iommu fdff1a00.iommu: Page fault while iommu not attached to domain?
[    535.856667] rk_iommu fdff1a00.iommu: Page fault at 0x00000000fe6a3000 of type write
[    535.856726] rk_iommu fdff1a00.iommu: iova = 0x00000000fe6a3000: dte_index: 0x3f9 pte_index:
0x2a3 page_offset: 0x0
[    535.856782] rk_iommu fdff1a00.iommu: mmu_dte_addr: 0x000000007b3f2000
dte@0x000000007b3f2fe4: 0x1d347001 valid: 1 pte@0x000000001d347a8c: 0x000000 valid: 0
page@0x0000000000000000 flags: 0x0
[    535.856825] rk_iommu fdff1a00.iommu: Page fault while iommu not attached to domain?
[    535.857596] rk_iommu fdff1a00.iommu: Disable paging request timed out, retry_count = 0, status:
0x00022b
```

5.41.2 问题分析 Issue analysis

分析说明：
isp 处理多路 sensor，目前只支持多路 raw
yuv sensor 可以用 vicap 接收
rk356x isp 可以接收单路 yuv，多路不行。

5.41.3 解决办法 Solution

2lane+2lane 的双目摄像头都是 yuv 情况：需要 isp 和 vicap(也叫 cif)各接收一个。
如果一个 raw 格式一个 yuv 的，raw 格式的由 isp 接收，yuv 格式的 vicap 接收；

5.42 RK356x-11.0-sensor->csi2_dphy2->mipi_csi2->vicap->isp_vir1 链路兼容多个 sensor 问题

示例 redmine 号：Defect #336306

5.42.1 问题描述 Issue description

客户需求：sensor->csi2_dphy2->mipi_csi2->vicap->isp_vir1 这条配置链路，兼容多个 sensor；
即 sensor0/sensor1 -> csi2_dphy2 根据注册的情况

5.42.2 问题分析 Issue analysis

对比 vicap 只配置一个 sensor 和 2 个 sensor 的 media 情况，

```
- entity 67: rkcif_mipi_lvds (1 pad, 1 link)
type V4L2 subdev subtype Unknown
device node name /dev/v4l-subdev5
```

```
pad0: Source
[fmt:SBGGR10/1600x1200]
-> "rkisp-isp-subdev":0 [ENABLED]
```

2 个 sensor 比 1 个 sensor 的 media2 下，少了 rkcif_mipi_lvds 这个 entity 导致分辨率相关参数获取失败，从而导致异常；

5.42.3 解决办法 Solution

如下修改验证 OK

```
diff --git a/drivers/media/platform/rockchip/cif/dev.c b/drivers/media/platform/rockchip/cif/dev.c
old mode 100644
new mode 100755
index 33310e0bb9be..747c625738fc
--- a/drivers/media/platform/rockchip/cif/dev.c
+++ b/drivers/media/platform/rockchip/cif/dev.c
@@ -1238,8 +1238,8 @@ static int __maybe_unused __rkcif_clr_unready_dev(void)
        mutex_lock(&rkcif_dev_mutex);

        list_for_each_entry(cif_dev, &rkcif_device_list, list) {
-               subdev_asyn_register_itf(cif_dev);
                v4l2_async_notifier_clr_unready_dev(&cif_dev->notifier);
+               subdev_asyn_register_itf(cif_dev);
        }

        mutex_unlock(&rkcif_dev_mutex);
```

对应 kernel 下的提交点如下：如果不包含，手动按照上面修改；

```
commit 2ecefbd713f228b315bfe4f985f2c5b35bcb760f (HEAD)
Author: Zefa Chen <zefa.chen@rock-chips.com>
Date:   Wed Nov 24 19:48:38 2021 +0800

    media: rockchip: cif clean unready subdev before async subdev-itf

    Signed-off-by: Zefa Chen <zefa.chen@rock-chips.com>
    Change-Id: I2049f83a9d552109acca86d37d81ef0ceb2e9687
```

5.43 RK3326-11.0-raw-sensor 打开闪光灯拍照卡住问题

示例 redmine 号：Defect #337083

5.43.1 问题描述 Issue description

rk3326/rk3326s 按照之前 10.0 系统配置闪光灯现在打不开，图标有了，打开闪光灯拍照会卡住，
单独去控制闪光灯的 gpio 口强制拉高是可以亮的,使用 v4l2-ctl 命令也可以正常控制三种模式；
将 camera3_profiles.xml 中 sensorType 改成 SENSOR_TYPE_SOC 也可以正常打开闪光灯拍照；
但配置 SENSOR_TYPE_RAW，打开闪光灯拍照就卡住，录像预览打开闪光灯也不亮；

5.43.2 问题分析 Issue analysis

初步分析因为 v4l2-ctl 可以正常控制，说明底层驱动初步正常；soc 类型正常，raw 类型异常，说明是 rkisp 库这边逻辑可能出问题了；
查找关键异常 LOG 如下：

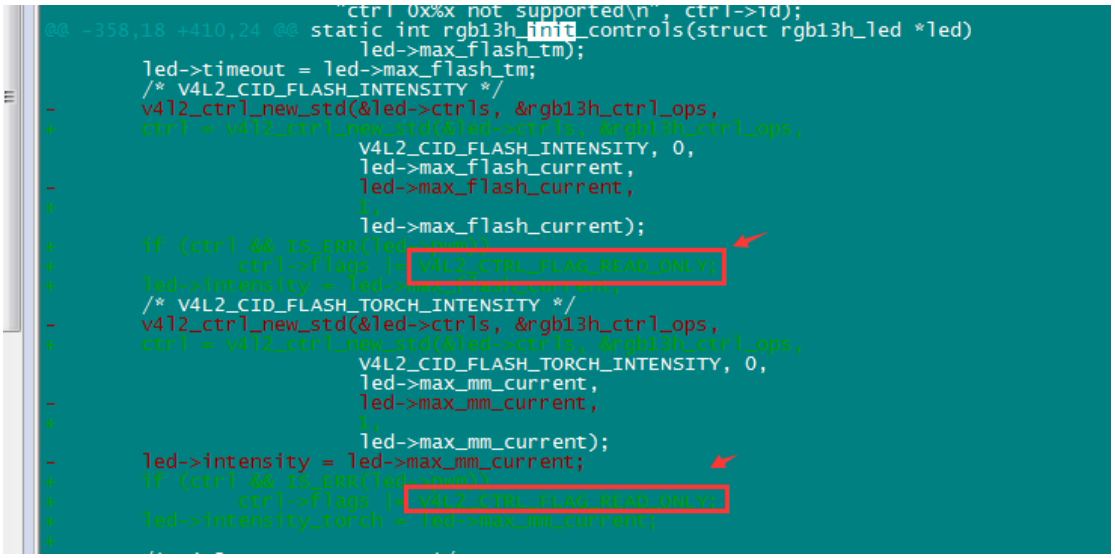
```
E rkisp     : [XCORE]:XCAM ERROR isp_controller.cpp:1456:    set fl
V4L2_CID_FLASH_TORCH_INTENSITY to 4000 failed
```

说明是 isp_controller.cpp 文件设置 V4L2_CID_FLASH_TORCH_INTENSITY 模式失败，跟踪代码发现 set_fl_contol_to_dev 失败后,直接返回，没有继续下面流程导致流程异常；所以录像模式灯也不亮；
set_fl_contol_to_dev(fl_device, V4L2_CID_FLASH_LED_MODE, V4L2_FLASH_LED_MODE_TORCH);

5.43.3 问题原因： reason of issue

10.0 可以，是因为 10.0 的闪光灯驱动版本比较旧，支持设置上面报错模式；
11.0 的驱动，闪光灯驱动有新提交修改东西，如下提交：导致上面几个模式只读，无法设置；

```
commit 46cff32208681605f109f9d22ebc91973cd1f763
Author: Zefa Chen <zefa.chen@rock-chips.com>
Date:   Thu Jun 4 20:22:36 2020 +0800

    leds: leds-rgb13h add pwm control

    Signed-off-by: Zefa Chen <zefa.chen@rock-chips.com>
Change-Id: Id8800dc98543d4e082182a027f3fb25dbd30295c
```



5.43.4 解决办法 Solution

按照如下修改验证 OK

sdk/hardware/rockchip/camera_engine_rkisp 目录

```
diff --git a/modules/isp/isp_controller.cpp b/modules/isp/isp_controller.cpp
index f93ca14..e2c6c83 100755
--- a/modules/isp/isp_controller.cpp
+++ b/modules/isp/isp_controller.cpp
@@ -1393,8 +1393,7 @@ IspController::set_3a_fl (int fl_mode, float fl_intensity[],
                    control.id = control_id; \
                    control.value = val; \
                    if (fl_dev->io_control (VIDIOC_S_CTRL, &control) < 0) { \
-                        XCAM_LOG_ERROR (" set fl %s to %d failed", #control_id, val); \
-                        return XCAM_RETURN_ERROR_IOCTL; \
+                        XCAM_LOG_WARNING (" set fl %s to %d failed, maybe not supported",
#control_id, val); \
                    } \
                    XCAM_LOG_DEBUG (" sof seq %d, set fl %p, cid %s to %d, success",\
                                    _frame_sequence, fl_dev.ptr(), #control_id, val); \
--
```

这样保证一些只读模式设置失败后也可以正常走后续流程；

5.44 RK3326-11.0-gc02m2 切到 gc032a 概率报错

示例 Defect #346316

5.44.1 问题描述 Issue description

旋转 rk3326 andorid11 gc032a+gc02m2 摄像头，生产发现部分机器从 gc02m2 切换到 gc032a 时报错， 测试发现跟着板子走。

5.44.2 问题分析 Issue analysis

报错 LOG：

```
E rkisp1    : CIF_ISP_PIC_SIZE_ERROR (0x00000001)
E rkisp1    : CIF_ISP_PIC_SIZE_ERROR (0x00000000)
E rkisp1    : CIF_ISP_PIC_SIZE_ERROR (0x00000001)
E rkisp1    : CIF_ISP_PIC_SIZE_ERROR (0x00000000)
E rkisp1    : CIF_ISP_PIC_SIZE_ERROR (0x00000001)
```

分析可能原因：

1、gc032a 前期输出异常到 rkisp 报错；

2、gc02m2 没有正确关闭，影响了 rkisp 接收 gc032a 信号

3、部分板子干扰较大，gc032a 驱动强度不够，导致接收异常；

4、未正确配置电源域，导致 mclk 赋值不对；

5.44.3 调试修改方法 Debug methods

1、核对下 powerdown 引脚，测量打开 gc032a 时候 gc02m2 的信号是否已经关闭；

2、核对硬件原理图，查看电源域： vccio3-supply = <&vcc2v8_dvp>;是否配置正确；

3、看如下提交是否有，没有参考修改上

```
commit 34913157111b3a8ae1631daeb2d857959ec299cf
Author: Wang Panzhenzhuan <randy.wang@rock-chips.com>
Date:   Tue Aug 3 11:48:45 2021 +0800

    media: i2c: gc032a: set default stream off state

    Set sensor in stream off state by default,
    to avoid sending abnormal data in the early stage.

    Signed-off-by: Wang Panzhenzhuan <randy.wang@rock-chips.com>
Change-Id: Iaae2fd3be95a5fcac05ebaf39a68614b7b807d4a
```

4、找 GC 原厂询问看是否能提高 gc032a 驱动强度；

5、把 DVP 相关的 IO 默认拉低；

```
&dvp_d2d9_m0 {
    rockchip,pins =
        <2 RK_PA0 1 &pcfg_pull_down>,/* cif_data2 */
        <2 RK_PA1 1 &pcfg_pull_down>,/* cif_data3 */
        <2 RK_PA2 1 &pcfg_pull_down>,/* cif_data4 */
        <2 RK_PA3 1 &pcfg_pull_down>,/* cif_data5 */
        <2 RK_PA4 1 &pcfg_pull_down>,/* cif_data6 */
        <2 RK_PA5 1 &pcfg_pull_down>,/* cif_data7 */
        <2 RK_PA6 1 &pcfg_pull_down>,/* cif_data8 */
        <2 RK_PA7 1 &pcfg_pull_down>,/* cif_data9 */
        <2 RK_PB0 1 &pcfg_pull_down>,/* cif_sync */
        <2 RK_PB1 1 &pcfg_pull_down>,/* cif_href */
        <2 RK_PB2 1 &pcfg_pull_down>,/* cif_clkin */
        <2 RK_PB3 1 &pcfg_pull_none_12ma>;/* cif_clkout */
};
```

5.44.4 解决办法 Solution

按照 5、把 DVP 相关的 IO 默认拉低就可以了；说明这个问题原因为 DVP 引脚初始的电平可能被 sensor 端影响，导致起始异常信号被错当做像素信号检测了，从而导致 pic size error。

5.45 RK3566-12.0-更新 SDK 后，后摄预览不停的对焦

(Defect #366374);

5.45.1 解决办法 Solution

sdk/external/camera_engine_rkaiq$ 目录：
参考这个提交，自行对比修改下 iq 文件，主要是因为 af 结构体有修改，需同步更新 iq；

```
commit 9166b0821597eb4416b745a6cefbbe7c000f18ed (tag: android-12.1-mid-rkr8, tag:
android-12.1-mid-rkr7)
Author: Wang Panzhenzhuan <randy.wang@rock-chips.com>
Date:   Mon Apr 11 11:12:07 2022 +0800

    iqfile: isp21: ov8858_HS5885-BNSM1018-V01_default.json fix af issue

    fix the auto focus cannot be fixed all the time issue
```

```
    Signed-off-by: Hu Kejun <william.hu@rock-chips.com>
    Change-Id: Ibadad246c67777bf4f565cbab4d78ec15e8631f5
```

5.46 RK3588-12.0-R10 版本拍照报错重启问题

示例：Defect #372974

5.46.1 解决办法 Solution

sdk/hardware/rockchip/libhwjpeg$ 目录加这个两个提交

提交 1：

```
commit 0ecd3d456000d47eccf28063d98c2d5055b9a983 (tag: android-12.1-mid-rkr11, rk/master,
m/rk35/mid/12.0/develop)
Author: Chen Jinsen <kevin.chen@rock-chips.com>
Date:   Fri Jul 15 14:18:56 2022 +0800

    [MpiJpegEncoder]: Fix RGA blit page fault issue

    Alloc enough buffer size to make sure the scene crop twice

    Signed-off-by: Chen Jinsen <kevin.chen@rock-chips.com>
    Change-Id: Ibba4e85edaff558e980449f7ce2290a85dcdd9e3
```

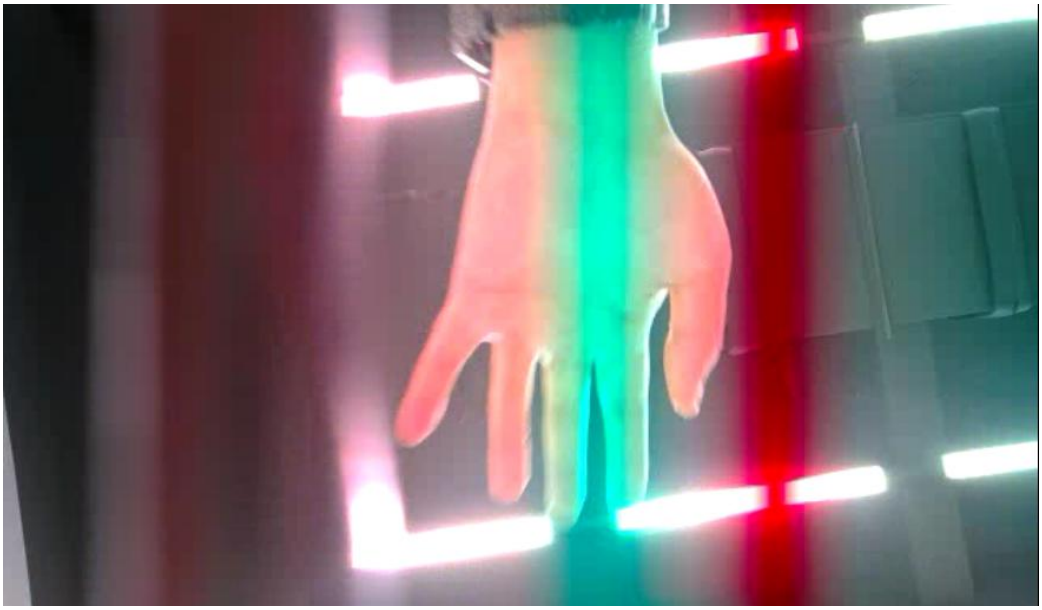
提交 2：

```
commit f2e2666da5401895db3a9efab9cbca011b11a9f2 (HEAD)
Author: Chen Jinsen <kevin.chen@rock-chips.com>
Date:   Sat Aug 13 16:31:01 2022 +0800

    [MpiJpegEncoder]: add support for import buffer

    Avoid rga2 accessing a physical address greater than 32 bits

    Signed-off-by: Chen Jinsen <kevin.chen@rock-chips.com>
    Change-Id: Ic0353e2e85d0a7437c7e3765c678c7e08ca177fd
```

5.47 RK3588-12.0-R10 版本预览画面随机出现五彩的块状问题

5.47.1 问题描述 Issue description

预览过程中晃动图像出现类似如图五彩块状；



5.47.2 问题分析 Issue analysis

试验烧写 R9 版本正常，先替换 boot.img 发现不会；根据 kernel 中间 isp 相关提交点进行定位：
定位问题提交点：

```
commit d07683b39573bed2389c3d7e6e277504a362ea24
Author: Cai YiWei <cyw@rock-chips.com>
Date:   Wed Jun 8 14:29:27 2022 +0800

    media: rockchip: isp: fix hold at lsc ram data config

    isp_raw_clk auto-gate and lsc ram config need lsc enable

    Change-Id: Id257c40bea4fea0bf89b799bbcb127a4827d5394
Signed-off-by: Cai YiWei cyw@rock-chips.com
```

将这个提交 revert 掉就好了；

5.47.3 解决办法 Solution

修复问题提交：

sdk/kernel-5.10 目录：

```
commit c6bee6d5ef274dacbfd418259c08ae173f7dc037
Author: Cai YiWei <cyw@rock-chips.com>
Date:   Tue Jul 26 10:39:17 2022 +0800

    media: rockchip: isp: fix error of lsc repeat switch

    Change-Id: I8b7948ad784c34d05a2495f9dde535cb4a265d7f
    Signed-off-by: Cai YiWei <cyw@rock-chips.com>
```

sdk/external/camera_engine_rkaiq：目录

```
commit b93a9d1c1ba2f86330bb0452c365194f36a64be2
Author: Cody Xie <cody.xie@rock-chips.com>
Date:   Tue Jun 28 11:01:18 2022 +0800

    kernel headers: Sync with driver

    Change-Id: I63ad0bb271365a1a12cef34d863f749dea9cb2b2
    Signed-off-by: Cody Xie <cody.xie@rock-chips.com>

commit 02c775a9b2d21b30c3e5ccab746a875ae9bcb7e4
Author: WuQiang <xianlee.wu@rock-chips.com>
Date:   Wed Jun 8 07:49:03 2022 +0000

    hwi: update lsc only when status change.

    Change-Id: Idb11b43879ca543ca1b2ff44edd3fa8f50596e79
    Signed-off-by: WuQiang <xianlee.wu@rock-chips.com>
    (cherry picked from commit 48b0e696812df5b539f36596f845dd7495f89c41)
    Signed-off-by: ZhongYichong <zyc@rock-chips.com>

    Change-Id: Ia879610d32c79ae11657f36724073e229c6b0a63
```