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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 Hal1 及对应新框架的 Camera Sensor 驱动常见问题分析排查和处理方法。文档后面部分所说的 Hal 均指 Camera Hal1。

This document is only suitable for debugging and dealing with FAQ related with Camera Hal1 and the Camera Sensor driver with the corresponding new framework on Android platform. Please note the Hal mentioned in this document later all means Camera Hal1.

3 已有 Camera HAL1 文档说明 Available Camera HAL1 documents

文档位置：SDK/RKDocs/common/camera/HAL1 目录及 redmine 上 camera 文档地址：https://redmine.rockchip.com.cn/documents/53。

Document location: SDK/RKDocs/common/camera/HAL1 directory and the link of camera documents in redmine: https://redmine.rockchip.com.cn/documents/53.

3.1 CameraAVL_v2.1.pdf

获取文档位置：https://redmine.rockchip.com.cn/documents/53 中的 Rockchip_Camera_AVL_v2.1_Package_20181016.7z 解压文件后，doc 目录包含该文档。

Document location: after unzip Rockchip_Camera_AVL_v2.1_Package_20181016.7z in https://redmine.rockchip.com.cn/documents/53, you can see this document in doc directory.

文档介绍目前 RK 调试支持的 Camera 模组列表。如果所需 Camera 型号已在支持列表中，但驱动未在 SDK 找到，可以参考 Rockchip_Camera_AVL_v2.1_Package_20181016.7z 解压后的 readme.txt 文件，在解压文件的 data 目录查找看下。

This document introduces Camera module list currently supported by RK. If the required Camera type is already included in the support list, but the driver is not found in SDK, you can refer to readme.txt file, trying to look up in data directory after unzip Rockchip_Camera_AVL_v2.1_Package_20181016.7z.

3.2 RK_ISP10_Camera_User_Manual_v2.x.pdf

获取文档位置：https://redmine.rockchip.com.cn/documents/53。

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

文档主要介绍 RK3326、RK3288、RK3368、RK3399、RK3399pro 带 ISP 控制器的平台，Android8.1 及其以下版本 Camera Hal 层的 Sensor 驱动移植调试。

This document mainly introduces RK3326, RK3288, RK3368, RK3399, RK3399Pro platforms with ISP controller, Sensor driver porting and debugging at Camera Hal layer for Android8.1 and previous versions.

对应 HAL 层 Sensor 驱动代码目录：SDK/ hardware/rockchip/camera/SiliconImage/isi/drv。

The Sensor driver code directory of the corresponding HAL layer: SDK/ hardware/rockchip/camera/SiliconImage/isi/drv.

3.3 RK312x_Camera_User_Manual_v1.4(3288&3368).pdf

获取文档位置：https://redmine.rockchip.com.cn/documents/53 ，或者 SDK/RKDocs/common/camera/HAL1 目录。

Document location: https://redmine.rockchip.com.cn/documents/53, or the directory of SDK/RKDocs/common/camera/HAL1.

文档主要介绍 RK3126C、RK3326、PX3SE、RK3288、RK3368 带 CIF 控制器的平台中，Android8.1 及其以下版本 kernel 目录下的 Sensor 驱动移植和支持列表。

This document mainly introduces RK3126C, RK3326, RK3288 and RK3368 platforms with CIF controller, Sensor driver porting and support list in kernel directory for Android8.1 and previous versions.

对应的 Sensor 驱动代码目录：SDK/ kernel/drivers/media/video。

The corresponding Sensor driver code directory: SDK/ kernel/drivers/media/video.

3.4 Camera_External_FAQ_v1.0 .pdf

获取文档位置：https://redmine.rockchip.com.cn/documents/53。

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

文档介绍 RK 平台 Camera 的 FAQ， 既有 Linux 系统，也有 Android 系统的。

This document introduces Camera FAQ based on RK platforms, including Linux system and Android system.

3.5 HDMI_IN_ 开 发 指 南 _V1.1.pdf HDMI_IN_Developer_Guide_V1.1.pdf

获取文档位置：https://redmine.rockchip.com.cn/documents/53。

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

文档介绍 HDMI IN 应用原理、配置方法、常见问题排查方法。HDMI IN 应用采用 camera hal1 框架，与 MIPI Camera 调试方法有相似之处，可参考。

This document introduces HDMI IN application principle, configuration method and debugging method of common issues. HDMI IN application uses camera hal1 framework, which debugging method is similar with MIPI Camera.

4 FAQ

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

在机器的 shell 中执行以下命令：

Execute the following command in the device shell:

```
rk3399_all:/ # getprop | grep sys_graphic.cam
```

```
rk3399_all:/ # getprop | grep sys_graphic.cam
[sys_graphic.cam_back.iq]: [/etc/OV12895.xml]
[sys_graphic.cam_back.iq.ver]: [2018-05-10_RK_OV12895_NONE_v0.1.0]
[sys_graphic.cam_back.len]: []
[sys_graphic.cam_back.modulename]: []
[sys_graphic.cam_camboard.ver]: [0x0.0xf.0x0]
[sys_graphic.cam_drv_camsys.ver]: [0x0.0x0.0x1]
[sys_graphic.cam_hal.ver]: [0x2.0x0.0x0]
[sys_graphic.cam_isi.ver]: [0x0.0xe.0x0]
[sys_graphic.cam_libisp.ver]: [0x3.0x1.0x0]
[sys_graphic.cam_otp_awb]: [false]
[sys_graphic.cam_otp_awb_enable]: [false]
[sys_graphic.cam_otp_lsc]: [false]
[sys_graphic.cam_otp_lsc_enable]: [false]
[sys_graphic.cam_trace]: [0]
```

图 1 Camera 相关版本号示例

Picture 1 Example of Camera related version number

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

4.2.1 camera hal1 的 LOG 抓取 Capture camera hal1 LOG

抓取 camera hal1 不同等级 LOG 命令；

Use the following command to capture different level LOG of camera hal1.

setprop sys_graphic.cam_trace 1， 可以设置(0-3)。You can set (0-3).

按照不同 Android 版本，抓取 LOG 的步骤分别如下：

For different Android versions, the steps to capture LOG are as below:

Android6.0 抓取 LOG 步骤：

The steps to capture LOG on Android6.0:

```
sync
stop media
logcat -c
start media
logcat | grep CameraHal
```

The steps to capture LOG on Android7.1:

Android7.1 抓取 LOG 步骤：

```
stop cameraserver
logcat -c
start cameraserver
logcat
```

The steps to capture LOG on Android8.1:

Android8.1 抓取 LOG 步骤：

```
sync
logcat -c;
pkill provider && pkill camera*;
logcat
```

4.2.2 isp 控制器驱动相关 LOG 抓取 Capture isp controller driver related LOG

通过如下命令打开 debug 开关：

Use the following command to enable the switch of debug:

echo 3 > /sys/module/camsys_drv/parameters/camsys_debug

或者修改 SDK/kernel/ drivers/media/video/rk_camsys/camsys_drv.c 中

Or modify in SDK/kernel/ drivers/media/video/rk_camsys/camsys_drv.c

unsigned int camsys_debug = 3;

4.2.3 cif 控制器驱动相关 LOG 抓取 Capture cif controller driver related LOG

通过如下命令打开 debug 开关：

Use the following command to enable the switch of debug:

echo 3 >/sys/module/rk30_camera_oneframe/parameters/debug

或者修改 SDK/kernel/drivers/media/video\rk30_camera_oneframe.c 中

Or modify in SDK/kernel/drivers/media/video\rk30_camera_oneframe.c

static int debug = 3;

4.2.4 HAL 层 camera 驱动相关 LOG 抓取 Capture HAL layer camera driver related LOG

通过如下方式打开 debug 开关：以 OV8858 为例：

Use the following method to enable the switch of debug: take OV8858 as example:

SDK/ hardware/rockchip/camera/SiliconImage/isi/drv/ OV8858/source/OV8858_MIPI.c 中

```
44:  * local macro definitions
45:  ******************************************************************************
46: CREATE_TRACER( OV8858_INFO , "OV8858: ", INFO,    0U );
47: CREATE_TRACER( OV8858_WARN , "OV8858: ", WARNING, 1U );
48: CREATE_TRACER( OV8858_ERROR, "OV8858: ", ERROR,   1U );
49:
50: CREATE_TRACER( OV8858_DEBUG, "OV8858: ", INFO,     0U );
51:
52: CREATE_TRACER( OV8858_NOTICE0 , "OV8858: ", TRACE_NOTICE0, 1);
53: CREATE_TRACER( OV8858_NOTICE1, "OV8858: ", TRACE_NOTICE1, 1U );
54:
```

图 2 HAL 层驱动 debug 示例

Picture 2 Example of HAL layer driver debug

1、使用 TRACE(OV8858_ERROR，"some log"); 来打印新增的 log 信息，例如：

Use TRACE(OV8858_ERROR，"some log"); to print new log information, for example:

TRACE(OV8858_ERROR, "%s: Can't allocate OV8858 context\n", __FUNCTION__);

2、将部分或所有的 TRACER 都修改为 ERROR，可打印出对应 log 等级或所有的 log 信息，修改方法参考如下：

Modify some or all TRACER to ERROR can print out the corresponding level log or all log information. Refer to the modification as below:

```
45:  ******************************************************************************/
46: CREATE_TRACER( OV8858_INFO , "OV8858: ", ERROR,    1U );
47: CREATE_TRACER( OV8858_WARN , "OV8858: ", ERROR,    1U );
48: CREATE_TRACER( OV8858_ERROR, "OV8858: ", ERROR,    1U );
49:
50: CREATE_TRACER( OV8858_DEBUG, "OV8858: ", ERROR,    1U );
51:
52: CREATE_TRACER( OV8858_NOTICE0 , "OV8858: ", ERROR,  1U);
53: CREATE_TRACER( OV8858_NOTICE1, "OV8858: ", ERROR,   1U );
54:
```

4.2.5 kernel 层 camera 驱动相关 LOG 抓取 Capture kernel layer camera driver related LOG

通过如下命令打开驱动信息的 debug 开关：以 gc2145 为例

Use the following commands to enable the debug switch of the driver information: take gc2145 as example:

```
echo 3 > /sys/module/rk_camera/parameters/camera_debug
echo 3 > /sys/module/generic_sensor/parameters/debug
```

```
echo 3 > /sys/module/gc2145/parameters/debug
```

或者修改对应代码位置为：

Or modify the corresponding code location to:

SDK/kernel/drivers/soc/rockchip/rk_camera.c 中 static int camera_debug = 3;

static int camera_debug = 3; in SDK/kernel/drivers/soc/rockchip/rk_camera.c

SDK/kernel/drivers/media/video/generic_sensor.c 中 static int debug = 3;

static int debug = 3; in SDK/kernel/drivers/media/video/generic_sensor.c

SDK/kernel/drivers/media/video/gc2145.c 中 static int debug = 3;

static int debug = 3; in SDK/kernel/drivers/media/video/gc2145.c

4.3 camera 的 HAL 层驱动和 kernel 层驱动区别 Difference between camera HAL layer driver and kernel layer driver

Android8.1 及以下版本中包含两套 camera sensor 驱动。

There are two sets of camera sensor drivers in Android8.1 and previous versions.

一套驱动位于：SDK/ hardware/rockchip/camera/SiliconImage/isi/drv，称为 HAL 层驱动；

One set of driver is in SDK/ hardware/rockchip/camera/SiliconImage/isi/drv, which is called HAL layer driver.

另外一套位于：SDK/ kernel/drivers/media/video，称为 kernel 层驱动。

The other set is in SDK/ kernel/drivers/media/video, which is called kernel layer deriver.

两套驱动的区别是：

The differences between these two set of drivers are:

- HAL 层驱动使用的是 ISP 控制器接收和处理 camera sensor 数据；
  HAL layer driver uses ISP controller to receive and handle camera sensor data.
- Kernel 层驱动使用的是 CIF 控制器接收和处理 camera sensor 数据；
  Kernel layer driver uses CIF controller to receive and handle camera sensor data.

目前包含 ISP 控制器的主控型号有：RK3326、RK3368、RK3288、RK3399、RK3399pro。

Current SoC types with ISP controller include: RK3326, RK3368, RK3288, RK3399 and RK3399Pro.

包含 CIF 控制器的主控型号有：RK3126C、PX3SE、RK3326、RK3368、RK3288。

The SoC types with CIF controller include: RK3126C, PX3SE, RK3326, RK3368 and RK3288.

4.4 双摄支持需要哪些条件？ Conditions required to support dual camera

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。目前支持双摄的主控型号及对应搭配参考如下：

Because dual cameras need to work at the same time, it requires two controllers and two interfaces to receive and handle in parallel. The SoC types that currently support dual camera and the corresponding

configuration refer to below:

RK3326：ISP 控制器使用 MIPI 接口 camera + CIF 控制器使用 DVP 接口 camera;

RK3326: ISP controller using MIPI interface camera + CIF controller using DVP interface camera.

RK3368：ISP 控制器使用 MIPI 接口 camera + CIF 控制器使用 DVP 接口 camera;

RK3368: ISP controller using MIPI interface camera + CIF controller using DVP interface camera.

RK3288：ISP 控制器使用 MIPI 接口 camera + CIF 控制器使用 DVP 接口 camera;

RK3288: ISP controller using MIPI interface camera + CIF controller using DVP interface camera.

RK3399：ISP0 控制器使用 MIPI_RX0 接 camera + ISP1 控制器使用 MIPI_RX1/TX1 接 camera;

RK3399: ISP0 controller using MIPI_RX0 to connect camera + ISP controller using MIPI_RX1/TX1 to connect camera.

RK3399pro：ISP0 控制器使用 MIPI 接口 camera + ISP1 控制器使用 MIPI_RX1/TX1 接 camera;

RK3399Pro: ISP0 controller using MIPI interface camera + ISP1 controller using MIPI_RX1/TX1 to connect camera.

4.5 调试新的 RAW Camera，需要哪些资料？ Material required for debugging new RAW Camera

硬件原理图：

Hardware schematic:

1. 板子原理图及 PCB 位图；

The board schematic and PCB bitmap.

Camera Module:

1. 模组规格书；

Module datasheet.

2. 镜头规格书；

Lens datasheet.

3. Camera Sensor Datasheet；

4. Camera Sensor Application note；

5. Camera sensor 寄存器序列

Camera sensor register sequence

如果支持 VCM，需提供以下资料

If support VCM, need to provide the following material:

1 马达驱动 IC 资料

Motor driver IC document

2. 马达规格书、

Motor datasheet

3. 马达振荡曲线数据

Motor oscillation curve data

如果支持 OTP，需提供以下资料

If support OTP, need to provide the following material:

1. OTP 烧录规范

OTP flashing spec

2. OTP 数据

OTP data

4.6 如何配置 cam_board.xml 文件？ How to configure cam_board.xml file?

一般是在各平台默认的 cam_board.xml 基础上进行修改，修改参考 Camera Hal 层的 Sensor 驱动移植调试文档：

Generally it is modified based on the default cam_board.xml of each platform. Refer to Camera Hal layer Sensor driver porting and debugging document for the modification:

SDK\RKDocs\common\camera\HAL3\ RK_ISP10_Camera_User_Manual_v2.x.pdf ， 或 https://redmine.rockchip.com.cn/documents/53 上的 RK_ISP10_Camera_User_Manual_v2.x.pdf 文档。

SDK\RKDocs\common\camera\HAL3\ RK_ISP10_Camera_User_Manual_v2.x.pdf or RK_ISP10_Camera_User_Manual_v2.x.pdf document in https://redmine.rockchip.com.cn/documents/53.

4.7 马达常见问题调试/分析 Motor common issues debugging/analyzing

只有 RAW 输出的 Camera Sensor 支持主控这边的马达驱动控制，对应 HAL 层 Sensor 驱动代码目录：SDK/ hardware/rockchip/camera/SiliconImage/isi/drv。

Only Camera Senor with RAW output supports to be controlled by SoC motor driver. The corresponding HAL layer Sensor driver code directory: SDK/ hardware/rockchip/camera/SiliconImage/isi/drv.

4.7.1 HAL 层驱动中马达相关修改的函数是哪些？ Motor related functions to be modified in HAL layer driver

以调试带 MD9714 马达 IC 的 IMX214 为例，驱动代码位置如下：

Take the debugging of IMX214 with MD9714 motor IC as example, the driver code location is as below:

SDK/hardware/rockchip/camera/SiliconImage/isi/drv/IMX214/source/IMX214_MIPI.c

Camera 马达驱动相关函数如下：

Camera motor driver related functions are as below:

4.7.1.1 Sensor_IsiCreateSensorIss（）

配置马达的 I2C 地址与马达寄存器的 size

Configure I2C address of the motor and size of motor register.

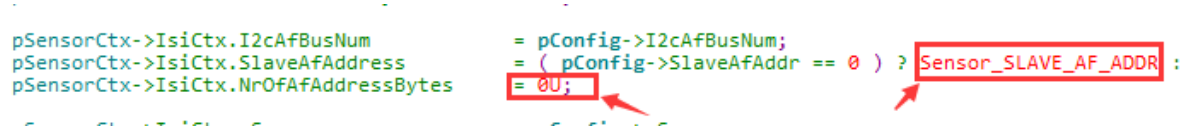


图 3 马达 I2C 地址及 size 配置

Picture 3 Motor I2C address and size configuration

以及一些步长及模式设置

And some step length and mode configurations.

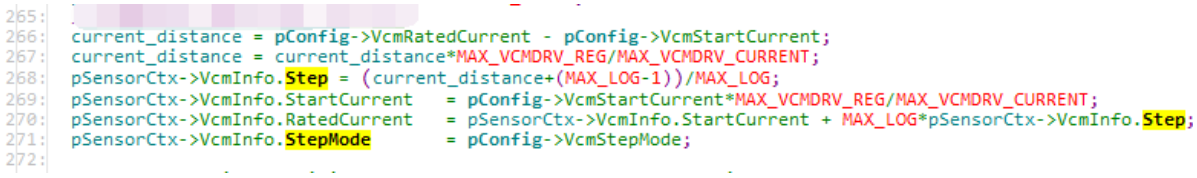


图 4 马达步长及模式设置

Picture 4 Motor step length and mode configuration

4.7.1.2 IMX214_IsiMdiSetupMotoDrive()

用来保存马达全程移动时间：vcm_movefull_t，以及 ISP 中可以设置的马达最大步数：MAX_LOG，供 ISP 内部计算使用。

Use to save the full time of motor move: vcm_movefull_t, and the max step length of the motor configurable in ISP: MAX_LOG, used for ISP internal computing.

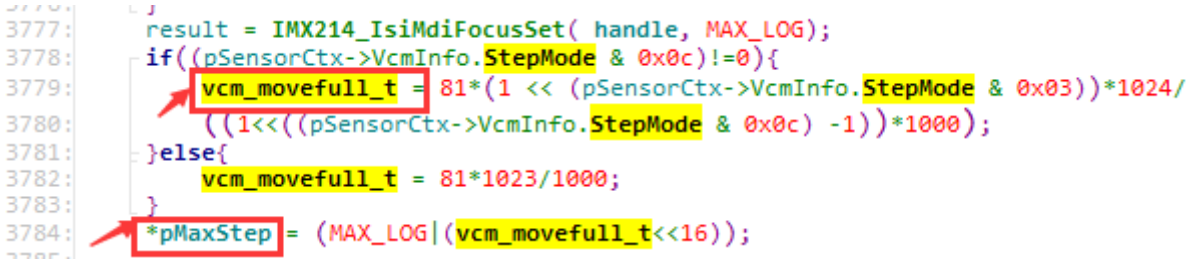


图 5 供 ISP 内部计算参数

Picture 5 Parameter used for ISP internal computing

4.7.1.3 IMX214_IsiMdiFocusSet()

将从 ISP 传过来的 Position 值转换成：D[9:0]的值即 nPosition，然后设置对应马达位置：

Convert the Position value transmitted from ISP to: the value of D[9:0], that is nPosition, and then set the motor location accordingly:

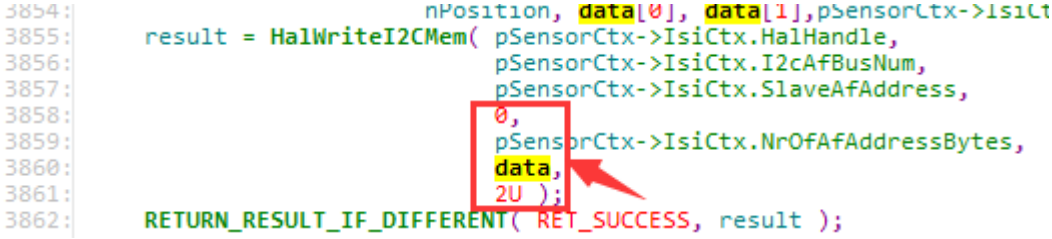


图 6 设置马达位置

Picture 6 Set the motor location

4.7.1.4 IMX214_IsiMdiFocusGet()

获取马达当前位置，转换成 ISP 对应的：0 ~MAX_LOG(64)的值，供计算使用：

Acquire current motor location, and convert to ISP corresponding value: 0 ~MAX_LOG(64), which will be used for computing:

```
#if 1
    result = HalReadI2CMem( pSensorCtx->IsiCtx.HalHandle,
                            pSensorCtx->IsiCtx.I2cAfBusNum,
                            pSensorCtx->IsiCtx.SlaveAfAddress,
                            0,
                            pSensorCtx->IsiCtx.NrOfAfAddressBytes,
                            data,
                            2U );
    RETURN_RESULT_IF_DIFFERENT( RET_SUCCESS, result );
#endif
```

图 7 获取马达当前位置

Picture 7 Acquire current motor location

```
    if( *pAbsStep <= pSensorCtx->VcmInfo.StartCurrent)
    {
        *pAbsStep = MAX_LOG;
    }
    else if((*pAbsStep>pSensorCtx->VcmInfo.StartCurrent) && (*pAbsStep<=pSensorCtx->VcmInfo.Ratec
    {
        *pAbsStep = (pSensorCtx->VcmInfo.RatedCurrent - *pAbsStep ) / pSensorCtx->VcmInfo.Step;
    }
    else
    {
        *pAbsStep = 0;
    }
```

图 8 转换成 step 供 ISP 计算

Picture 8 Convert to step for ISP computing

4.7.1.5 如果模组中不支持马达，设置示例 Setting example for modules not supporting motor

建议在 xxxx_IsiGetSensorIss 函数中将对应函数指针设置为 NULL，示例如下：

Recommend to set the pointer of the corresponding function as NULL in xxxx_IsiGetSensorIss function, for example:

```
        /* AF functions */
#if OV12895_AF_ENABLE
        pIsiSensor->pIsiMdiInitMotoDriveMds          = OV12895_IsiMdiInitMotoDriveMds;
        pIsiSensor->pIsiMdiSetupMotoDrive            = OV12895_IsiMdiSetupMotoDrive;
        pIsiSensor->pIsiMdiFocusSet                  = OV12895_IsiMdiFocusSet;
        pIsiSensor->pIsiMdiFocusGet                  = OV12895_IsiMdiFocusGet;
        pIsiSensor->pIsiMdiFocusCalibrate            = OV12895_IsiMdiFocusCalibrate;
#else
        pIsiSensor->pIsiMdiInitMotoDriveMds          = NULL;
        pIsiSensor->pIsiMdiSetupMotoDrive            = NULL;
        pIsiSensor->pIsiMdiFocusSet                  = NULL;
        pIsiSensor->pIsiMdiFocusGet                  = NULL;
        pIsiSensor->pIsiMdiFocusCalibrate            = NULL;
#endif
```

图 9 马达相关函数指针设置示例

Picture 9 Example of motor related function pointer setting

4.7.2 cam_board.xml 如何配置？ How to configure cam_board.xml

可以参考已有文档：RK_ISP10_Camera_User_Manual_v2.x.pdf 中“5.2 VCM 注册信息”部分，对

cam_board.xml 配置中马达相关部分做了说明。

You can refer to "5.2 VCM registration information" part in the document RK_ISP10_Camera_User_Manual_v2.x.pdf, which describes the motor related configurations in cam_board.xml.

4.8 如何抓取和查看 yuv 图像 How to capture and check yuv image?

调试 camera 预览图像异常的问题时，我们通常将其分为显示异常或是接收异常两个方向来排查，可通过抓取查看 isp 接收输出到 camerahal 的 yuv 图像是否正常来分析定位。

When debugging camera preview image issues, we generally analyze from two directions display abnormal or reception abnormal. You can capture and check if the yuv image output to camerahal from isp is normal or not.

抓取图像的方法，以 CameraIspAdapter 为例，在 CameraIspAdapter::bufferCb 分发到 DisplayAdapter 时添加如下代码修改：

The method to capture the image, take CameraIspAdapter as example, is to add the following code when distributing CameraIspAdapter::bufferCb to DisplayAdapter:

```
diff --git a/CameraHal/CameraIspAdapter.cpp b/CameraHal/CameraIspAdapter.cpp
index daa3ffd..287b893 100755
--- a/CameraHal/CameraIspAdapter.cpp
+++ b/CameraHal/CameraIspAdapter.cpp
@@ -2625,6 +2625,28 @@ void CameraIspAdapter::bufferCb( MediaBuffer_t* pMediaBuffer )
                     mDispFrameLeak++;

                 }
+
+#if 1
+                 {
+                     FILE* fp =NULL;
+                     char filename[40];
+                     static char cnt = 0;
+
+                     if (cnt <=200) {
+                         filename[0] = 0x00;
+                         sprintf(filename, "/data/camera/bf_%dx%d_%d.yuv",
+                             tmpFrame->frame_width,tmpFrame->frame_height,
+                             cnt++);
+                         fp = fopen(filename, "wb+");
+                         if (fp > 0) {
+                             fwrite((char*)tmpFrame->vir_addr, 1,
+                             tmpFrame->frame_width*tmpFrame->frame_height*3/2,
+                             fp);
+                             fclose(fp);
+                             LOGD("Write success yuv data to %s",filename);
+                         } else {
+                             LOGE("Create %s failed(%d, %s)",filename,fp,
+                                 strerror(errno));
+                         }
+                     }
+                 }
+#endif
```



```
+
                mRefDisplayAdapter->notifyNewFrame(tmpFrame);

            }
```

该方法较简单，可根据需要做修改变通，或在使用不同类型的 camera 设备时进行移植调试，例如：

This method is relatively simple. The modification is flexible according to actual requirement, or used for porting and debugging when using different types of camera. For example:

1、使用 CameraIspSOCAdapter 时，与 CameraIspAdapter 类似是在 CameraIspSOCAdapter::bufferCb()抓取。

When using CameraIspSOCAdapter, similar as CameraIspAdapter, capture in CameraIspSOCAdapter::bufferCb().

2、使用 soc camera 或是 usb camera 时，将补丁移植到：CameraAdapter.cpp 的 reprocessFrame(tmpFrame)之后，抓取 tmpFrame。

When using soc camera or usb camera, capture tmpFrame after applying the patch to reprocessFrame(tmpFrame) of CameraAdapter.cpp.

查看 yuv 图像，可使用 7yuv 软件，打开抓取到的 yuv 图像后，正确配置 frame width/height、format 即可正常预览查看，通常情况下，format 是选择 NV12。

You can use 7yuv software to view yuv image. Open the captured yuv image, correctly configure frame width/height and format, and then you can preview and check the image normally. Generally format selects NV12.

5 调试案例 Debugging cases

5.1 RK3126C-8.1-前摄 GC0312 预览花屏问题 RK3126C-8.1-front camera GC0312 preview issue with abnormal screen

5.1.1 问题描述 Issue description

RK3126C-8.1 调试 GC2145+GC0312，GC2145 预览正常，GC0312 预览是花屏如图：

With RK3126C-8.1 debugging GC2145+GC0312, GC2145 preview is normal, but GC0312 preview is abnormal as below picture:

图 10 预览花屏

Picture 10 Preview screen abnormal

5.1.2 问题分析 Issue analysis

分别测量 GC2145 和 GC0312 工作时候的 VSYNC 和 HSYNC 信号图：

Separately measure the VSYNC and HSYNC signals when GC2145 and GC0312 are working:

1、测量 GC0312 工作时 VSYNC 和 HSYNC 的信号图如下：

VSYNC and HSYNC signals while GC0312 is working are shown as below:

VSYNC 如图：

VSYNC signal:

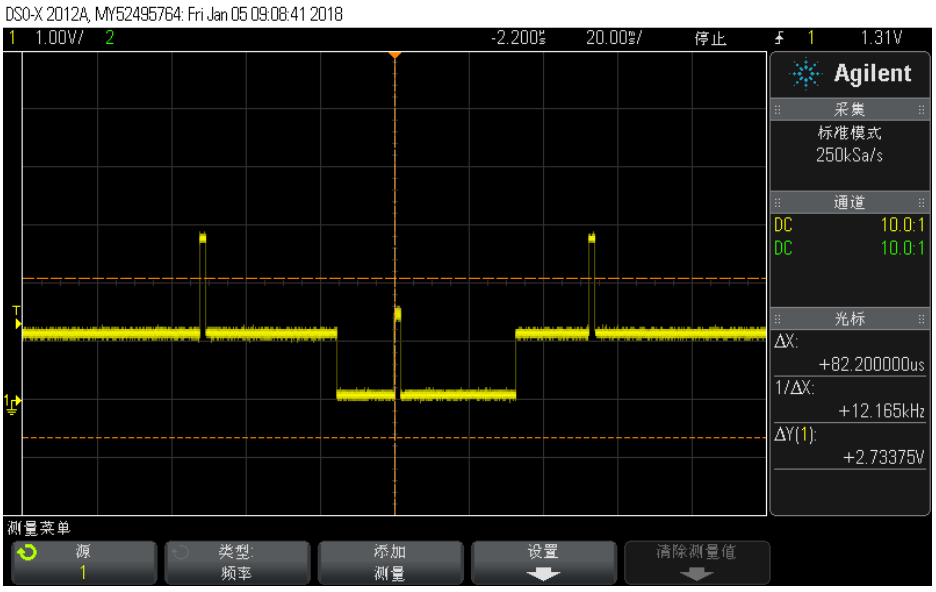


图 11 GC0312 的 VSYNC 图

Picture 11 VSYNC of GC0312

HSYNC 如图：

HSYNC signal:

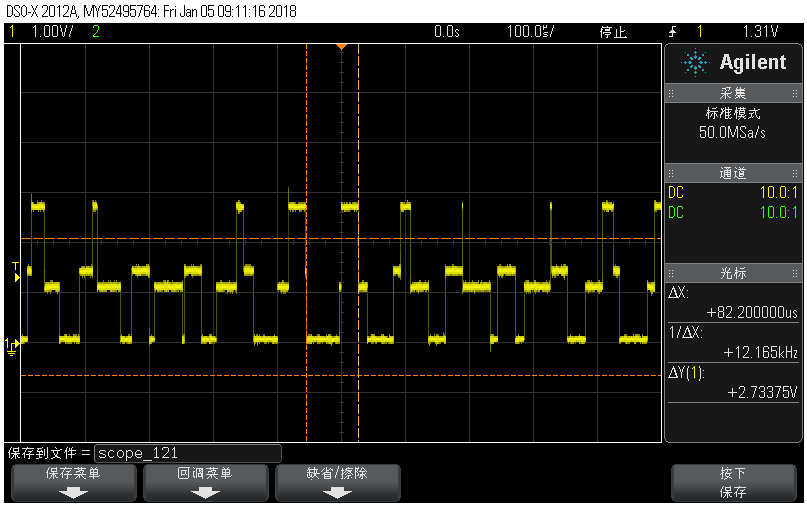


图 12 GC0312 的 HSYNC 图

Picture HSYNC of GC0312

GC2145 工作时候的 HSYNC 和 VSYNC 如图：

VSYNC and HSYNC signals while GC2145 is working are shown as below:

VSYNC：

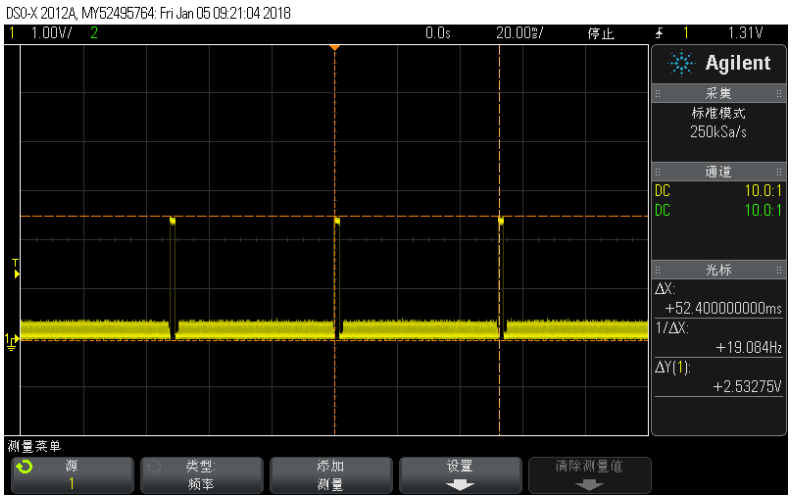


图 13 GC2145 的 VSYNC 图

Picture 13 VSYNC of GC2145

HSYNC:

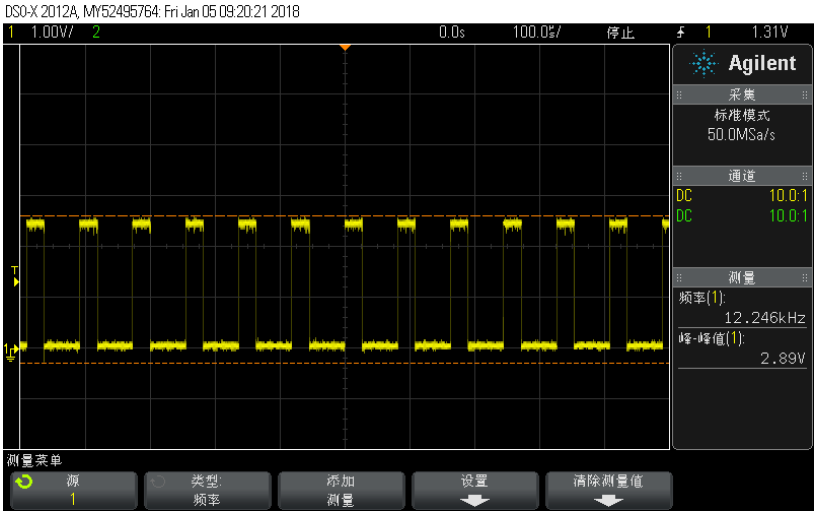


图 14 GC2145 的 HSYNC 图

Picture 14 HSYNC of GC2145

对比 GC0312 和 GC2145 的 VSYNC 和 HSYNC，GC0312 工作的时候可能有混叠 GC2145 的信号；分析是 GC2145 的 POWER DOWN 没有关，导致异常。因而需要测量 GC0312 和 GC2145 工作时候 POWER DOWN 控制情况。查看原理图找对应的 PWDN 引脚。

Comparing VSYNC and HSYNC of GC0312 and GC2145, GC0312 may mix the signal of GC2145 while it is working. As analyzed, it is due to POWER DOWN of GC2145 is not closed. So it is necessary to measure the POWER DOWN control status when GC0312 and GC2145 are working. Look up the schematic to find out the corresponding PWDN pin.

CIF_PDN1 对应 GPIO2_B0 即 GC2145 的 PWDN 引脚;

CIF_PDN1 corresponds to GPIO2_B0 which is PWDN pin of GC2145.

CIF_PDN 对应 GPIO3_B3 即 GC0312 的 PWDN 引脚

CIF_PDN corresponds to GPIO3_B3 which is PWDN pin of GC0312.

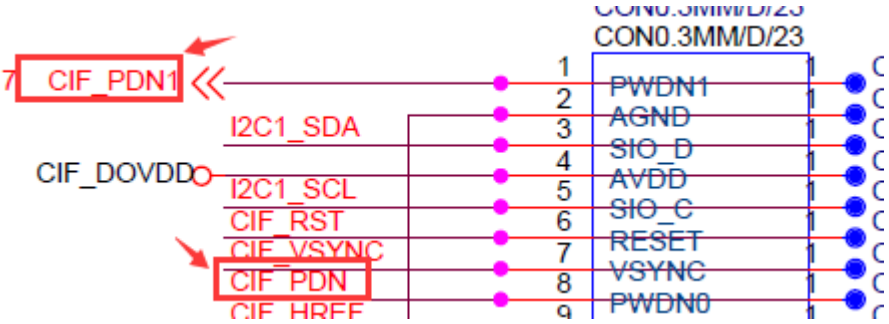


图 15 PDN 原理图位置

Picture 15 PDN schematic location

测量确认 GC2145 正常工作的时候：CIF_PDN1 为 0；CIF_PDN 为 1；

When GC2145 is working normally: CIF_PDN1 is 0, CIF_PDN is 1.

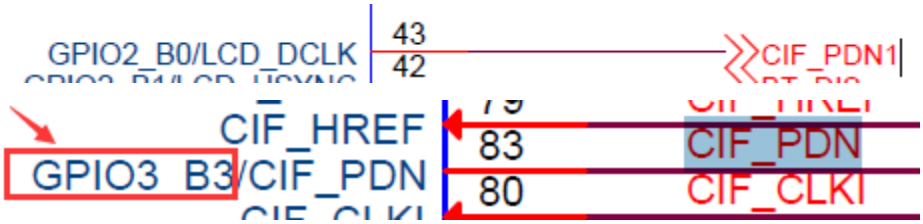


图 16 PDN 对应 GPIO

Picture 16 Corresponding GPIO of PDN

切换到 GC0312 不正常的时候：CIF_PDN1 还是为 0；CIF_PDN 为 0；

When GC0312 is not working normally: CIF_PDN1 is still 0, CIF_PDN is 0.

说明是 CIF_PDN1 即 GC2145 的 PWDN 控制不对，此时相当于两个摄像头都工作，从而造成 VYSNC 和 HSYNC 混叠；查看对比 DTS 配置中 POWER DOWN 控制如下：

It means CIF_PDN1 which is PWDN of GC2145 is not controlled correctly. In this case, both cameras are working at the same time, and lead to the mix of VSYNC and HSYNC. Check and compare the POWER DOWN control in DTS configuration as below:

```
7         gc2145_b {
8             is_front = <0>;
9             rockchip,powerdown = <&gpio2 8 GPIO_ACTIVE_HIGH>;
10            pwdn_active = <gc2145_PWRDN_ACTIVE>;
11            pwr_active = <PWR_ACTIVE_HIGH>;
12            mir = <0>;
13            flash_attach = <0>;
14            resolution = <gc2145_FULL_RESOLUTION>;
15            powerup_sequence = <gc2145_PWRSEQ>;
16            orientation = <90>;
17            i2c_add = <gc2145_I2C_ADDR>;
18            i2c_chl = <2>;
19            cif_chl = <0>;
20            mclk_rate = <24>;
21        };
22
23        gc0312_f {
24            is_front = <1>;
25            powerdown-gpios = <&gpio3 11 GPIO_ACTIVE_HIGH>;
26            pwdn_active = <gc0312_PWRDN_ACTIVE>;
27            pwr_active = <PWR_ACTIVE_HIGH>;
28            mir = <0>;
```

图 17 DTS 中配置

Picture 17 DTS configuration

名字不同，需要修改试试：

The names are different, need to change and try.

5.1.3 解决办法 Solution

将 GC2145 的 POWER DOWN 控制改成和 GC0312 一样就可以了，修改如下：

Change the POWER DOWN control of GC2145 to be the same as GC0312 as below:

```
rockchip,powerdown = <&gpio2 8 GPIO_ACTIVE_HIGH>;
```

改成：to:

```
powerdown-gpios = <&gpio3 11 GPIO_ACTIVE_HIGH>;
```

5.2 RK3126c-8.1-GC2145-200w 插值为 500W

RK3126c-8.1-GC2145-200w with interpolation 500W

5.2.1 插值方法 Interpolation method

需要将 arch/arm/boot/dts/rk3126-cif-sensor.dtsi 中的 gc2145 的 resolution 字段如下修改：

Need to modify the resolution field of GC2145 in arch/arm/boot/dts/rk3126-cif-sensor.dtsi as below:

```
resolution = <gc2145_FULL_RESOLUTION>;
```

改成：to:

```
resolution = <0x500000>;
```

5.2.2 插值后拍照报错问题解决办法 Solution for the error of taking photo after interpolation

报错 LOG 如下：

Error LOG is as below:

```
[drm:rockchip_gem_alloc_cma] *ERROR* failed to allocate 7589888 byte dma buffer
```

问题是 cma 的 buffer 不够导致分配失败，从而拍照报错；

This issue is caused by the allocation failure due to insufficient cma buffer.

解决办法如下：

The solution is as below:

```
--- a/arch/arm/boot/dts/rk312x-android.dtsi
+++ b/arch/arm/boot/dts/rk312x-android.dtsi
@@ -126,7 +126,7 @@
cma_region: region@88000000 {
compatible = "shared-dma-pool";
reusable;
- reg = <0x88000000 0x1800000>;
```

```
+ reg = <0x88000000 0x3800000>;
};

ramoops_mem: ramoops@68000000 {
```

如果还不行 0x3800000 改为 0x4400000，再不行改为 0x4800000。

If still not work, change 0x3800000 to 0x4400000, or 0x4800000.

5.3 RK3399-7.1 camera 使用 I2C7 出现打不开问题 RK3399-7.1 camera fails to open while using I2C7

5.3.1 问题描述 Issue description

抓取 Camera 的关键 LOG 如下：

Capture Camera critical LOG as below:

```
E/CameraHal_Marvin( 1507): HAL-MOCKUP: HalReadI2CMem(2018): bus_num(7) or
reg_addr_size(2) is invalidate
```

5.3.2 问题分析 Issue analysis

使用的 I2C Bus num 超出了 ISP 库默认支持的限制，默认支持到 I2C5，因而需要修改 ISP 库。

I2C Bus num used is over the limitation supported by ISP lib which default is I2C5, so need to modify ISP lib.

5.3.3 解决办法 Solution

提供给 FAE 当前使用 SDK 的 camera 相关版本号，FAE 会协助编译新的 ISP 库。

Provide camera related version number of currently used SDK to FAE, and FAE will help to compile new ISP lib.

5.4 RK3326-8.1-GC2385 读取到 ID，但获取不到数据问题 RK3326-8.1-GC2385 can read ID, but fails to acquire data

5.4.1 问题描述 Issue description

在 PX30/RK3326-8.1 平台调试 GC2385，i2c 通信成功，可以读取到 ID，但是 camera 获取不到数据。

When debugging GC2385 on PX30/RK3326-8.1 platform, i2c communication works well and it can read ID, but camera cannot acquire data.

5.4.2 问题分析 Issue analysis

抓取 Camera 的包含的关键 LOG 如下：

Capture Camera critical LOG as below:

01-16 19:45:01.940 1427 1427 E : * ASSERT: In File ../CameraHal00_Release/CameraHal00_Release/SiliconImage/isp_cam_api/calib_xml/calibdb.cpp, line 1642 *

从 LOG 中初步分析是 IQ 效果文件和 SDK 版本不匹配问题，需要找到对应版本的效果文件。

Initially analyzing from LOG, it is caused by the mismatch between IQ effect file and SDK version. Need to find the corresponding effect file.

5.4.3 解决办法 Solution

1、如果已经在该 SDK 上调试过分辨率相同的 Camera sensor，将调好的 IQ 效果文件 xxxx.xml 修改成 gc2385.xml 然后推到板子上。

If this SDK already debug some camera sensor with the same resolution, just modify the IQ effect file xxxx.xml to gc2385.xml and push it to the board.

如果是 Android7.1：adb push gc2385.xml /etc/gc2385.xml

If it is Android7.1: adb push gc2385.xml /etc/gc2385.xml

如果是 Android8.1：adb push gc2385.xml /vendor/etc/gc2385.xml

If it is Android8.1: adb push gc2385.xml /vendor/etc/gc2385.xml

2、如果没有，则需要找 FAE 帮助修改调试下。

If not, need to ask FAE to modify and debug.

5.5 camera 模组 I2C 通讯异常 I2C communication error with camera module

5.5.1 问题描述 Issue description

Camera 无法正常使用，查询 logcat 发现，i2c failed 报错。

Camera cannot work normally. Check logcat and find there is i2c failed error.

```
D CameraHal:
D CameraHal:  CamSys_Head.h Version Check:
D CameraHal:     Kernel camsys_head.h: v0x1.0x0.0x0
D CameraHal:     Kernel camsys_drv :   v0x0.0x0.0x1
D CameraHal:     CameraHal camsys_head.h : v0x1.0x0.0x0
D CameraHal:
D CameraHal:
D CameraHal:
E CameraHal: WARNING: TC358749XBG soft reset by i2c failed!, please check follow information:
E CameraHal:     Slave_addr: 0xf 0x3f
E CameraHal:     Soft reset reg: 0x7080  val: 0x0
E CameraHal:     Power/PowerDown/Reset/Mclk/I2cBus
E CameraHal: TC358749XBG device register failed!
E CameraHal: camera_get_number_of_cameras(779): load sensor name(TC358749XBG) connect 0
```

图 18 I2C 通讯异常 log 示例

Picture 18 I2C communication abnormal log example

5.5.2 问题分析 Issue analysis

Camera 模组 I2C 通讯异常问题排查解决，详情可参考 FAQ 文档第 1 章 1.1 如何处理 Camera sensor i2c 不通问题：

For more details on analyzing Camera module I2C communication abnormal issue, refer to chapter 1 section 1.1 How to deal with Camera sensor i2c failure issue in FAQ document:

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

Camera_External_FAQ_v1.0 .pdf

此处主要说明为了排查 I2C 异常时，测试供电、控制信号的时机和方法。Camera 模组要正常使用，需要在开机 camera service 启动后进行注册，注册成功，后续才能正常打开预览。一般来说，不是常供电的 camera 模组，在注册异常结束，或是打开失败自动关闭后，会对模组进行下电操作，不方便测试供电和控制信号排查问题。为保证模组一直处于工作状态，需要增加补丁修改，如下：

Here we mainly introduce the moment and method to measure the power supply and control signal for debugging I2C abnormality. To make Camera module work normally, need to register after camera service is started after power on, and only with successful registration it can normally open to preview. Generally, the camera module without constant power supply will power down after the registration is ended abnormally or the camera automatically closed due to failure, which is inconvenient for measuring the power supply and control signal. To ensure the module is in working state all the time, need to add the following patch:

```
diff --git a/CameraHal/CameraHal_board_xml_parse.cpp b/CameraHal/CameraHal_board_xml_parse.cpp
index 89ecdf4..d23f039 100755
--- a/CameraHal/CameraHal_board_xml_parse.cpp
+++ b/CameraHal/CameraHal_board_xml_parse.cpp
@@ -1649,7 +1649,8 @@ int camera_board_profiles::RegisterSensorDevice(rk_cam_total_info* pCamInfo)
   #else
     rk_sensor_pwrseq(camsys_fd, pCamInfo, 1);
   #endif
-    usleep(2000);
+while(1) {
+      usleep(2000*1000);
       i2cinfo.bus_num = pSensorInfo->mSensorI2cBusNum;
       i2cinfo.slave_addr = pLoadInfo->mpI2cInfo->i2c_addr;
       i2cinfo.reg_addr = pLoadInfo->mpI2cInfo->soft_reg_addr;
@@ -1676,9 +1677,16 @@ int camera_board_profiles::RegisterSensorDevice(rk_cam_total_info* pCamInfo)
                         pLoadInfo->mpI2cInfo->i2c_addr,
                         pLoadInfo->mpI2cInfo->i2c_addr2,
                         i2cinfo.reg_addr, i2cinfo.val);
                 ret = RK_RET_DEVICEERR;
-                goto power_off;
-            }
+                // goto power_off;
+            } else {
+            LOGE("%s Line:%d, addr2 write soft reset reg ok!",
+            __func__, __LINE__);
```

```
+            break;
+            }
+       } else {
+            LOGE("%s Line:%d, write soft reset reg ok!", __func__,
+            __LINE__);
+            break;
        }
+}

        //query iommu is enabled ?
        {
```

修改后需要重新编译并用 adb 更新 camera.rk30board.so 库，更新方法如下：

After modification, need to re-compile and use adb to update camera.rk30board.so lib. The update method is as below:

Android8.1：adb push camera.rk30board.so 到/vendor/lib/hw/ camera.rk30board.so

Android8.1: adb push camera.rk30board.so to /vendor/lib/hw/ camera.rk30board.so

Android5.1 至 7.1：adb push camera.rk30board.so 到/ system/lib/hw/camera.rk30board.so

Form Android5.1 to 7.1: adb push camera.rk30board.so to / system/lib/hw/camera.rk30board.so

更新 camera.rk30board.so 库后重启设备，上电启动过程中会反复写 soft reset 寄存器直到写成功才会退出，未退出时 camera 模组始终处于上电工作状态，注意此时设备可能会卡在 android 启动界面，无法正常进入桌面。此时可参考 Camera_External_FAQ_v1.0 .pdf 文档说明，测试 AVDD、DVDD、DOVDD、Power Down、Reset 等信号逐一排查。

Reboot the device after updating camera.rk30board.so lib. It will write soft reset register repeatedly during power on process and exit until written successfully. Camera module is always working before exit. Note that the device may halt at android boot interface and cannot enter the desk normally. Now you can refer to the document Camera_External_FAQ_v1.0 .pdf to test AVDD, DVDD, DOVDD, Power Down, Reset and other signals for debugging.

5.5.3 解决办法 Solution

打上补丁，使 camera 模组处于上电工作状态，再参考 FAQ 文档，测试信号排查解决。

Apply the patch to make camera module keep in working state. Then refer to FAQ document to test signals for debugging.

5.6 lib isp crash 出现 AfSearchFine 异常 lib isp crash with AfSearchFine error

5.6.1 问题描述 Issue description

系统出现 crash，backtrace 定位异常出现在 lib isp 的 AfSearchFine。

System crash occurs, and as located by backtrace, the abnormal is in AfSearchFine of lib isp.


```
--------- beginning of crash
10-09 17:15:06.216   217  1346 F libc    : Fatal signal 11 (SIGSEGV), code 1, fault addr 0x4 in tid 1346 (HwBinder:217_2), pid 217 (provider@2.4-se)
10-09 17:15:06.346  1355  1355 I chatty  : uid=1047(cameraserver) expire 2 lines
10-09 17:15:06.347   281   281 I /system/bin/tombstoned: received crash request for pid 217
10-09 17:15:06.348  1355  1355 F DEBUG   : *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
10-09 17:15:06.349  1355  1355 F DEBUG   : Build fingerprint: 'rockchip/rk3326_32bit/rk3326_32bit:8.1.0/OPM8.190405.001/162246:userdebug/test-keys'
10-09 17:15:06.349  1355  1355 F DEBUG   : Revision: '0'
10-09 17:15:06.349  1355  1355 F DEBUG   : ABI: 'arm'
10-09 17:15:06.349  1355  1355 F DEBUG   : pid: 217, tid: 1346, name: HwBinder:217_2  >>> /vendor/bin/hw/android.hardware.camera.provider@2.4-service <<<
10-09 17:15:06.349  1355  1355 F DEBUG   : signal 11 (SIGSEGV), code 1 (SEGV_MAPERR), fault addr 0x4
10-09 17:15:06.349  1355  1355 F DEBUG   : Cause: null pointer dereference
10-09 17:15:06.349  1355  1355 F DEBUG   :     r0 00000000  r1 e257769c  r2 e257769c  r3 e90f81c0
10-09 17:15:06.349  1355  1355 F DEBUG   :     r4 00001007  r5 e2577970  r6 e2577970  r7 00000078
10-09 17:15:06.349  1355  1355 F DEBUG   :     r8 000000d9  r9 00000522  sl eb0a3981  fp 00000000
10-09 17:15:06.349  1355  1355 F DEBUG   :     ip eb147a8c  sp e2577588  lr eb0eab9d  pc eb0ec572  cpsr 60030030
10-09 17:15:06.391  1355  1355 F DEBUG   :
10-09 17:15:06.391  1355  1355 F DEBUG   : backtrace:
10-09 17:15:06.391  1355  1355 F DEBUG   :     #00 pc 000c7572  /vendor/lib/lib_rkisp12_api.so (AfSearchFine+53)
10-09 17:15:06.391  1355  1355 F DEBUG   :     #01 pc 000c5b99  /vendor/lib/lib_rkisp12_api.so (AfSearchAdaptiveRange+976)
10-09 17:15:06.391  1355  1355 F DEBUG   :     #02 pc 000c43f7  /vendor/lib/lib_rkisp12_api.so (AfSearching+414)
10-09 17:15:06.391  1355  1355 F DEBUG   :     #03 pc 000c68a1  /vendor/lib/lib_rkisp12_api.so (AfProcessFrame+1160)
10-09 17:15:06.391  1355  1355 F DEBUG   :     #04 pc 000a1b65  /vendor/lib/lib_rkisp12_api.so (CamEngineCamerIcDrvMeasureCb+1280)
10-09 17:15:06.391  1355  1355 F DEBUG   :     #05 pc 000cf61f  /vendor/lib/lib_rkisp12_api.so (CamerIcIspAfmSignal+474)
10-09 17:15:06.391  1355  1355 F DEBUG   :     #06 pc 000ccff3  /vendor/lib/lib_rkisp12_api.so (CamerIcIspIrq+1138)
10-09 17:15:06.391  1355  1355 F DEBUG   :     #07 pc 00082285  /vendor/lib/lib_rkisp12_api.so (halIsrHandler+140)
10-09 17:15:06.391  1355  1355 F DEBUG   :     #08 pc 0007e9a5  /vendor/lib/lib_rkisp12_api.so (osThreadProc+36)
10-09 17:15:06.391  1355  1355 F DEBUG   :     #09 pc 0004751f  /system/lib/libc.so (__pthread_start(void*)+22)
10-09 17:15:06.391  1355  1355 F DEBUG   :     #10 pc 0001af8d  /system/lib/libc.so (__start_thread+32)
10-09 17:15:06.669   429   568 W NativeCrashListener: Couldn't find ProcessRecord for pid 217
10-09 17:15:06.671   281   281 E /system/bin/tombstoned: Tombstone written to: /data/tombstones/tombstone_10
10-09 17:15:06.674   429   448 I BootReceiver: Copying /data/tombstones/tombstone_10 to DropBox (SYSTEM_TOMBSTONE)
```

图 19 AfSearchFine 异常 log 示例

Picture 19 Example of AfSearchFine abnormal log

5.6.2 问题分析 Issue analysis

问题原因是，camera 模组驱动中未支持 AF 功能，但 cam_board.xml 却配置了 VCM 和 AF 功能。

The reason is camera module driver doesn't support AF function, but cam_board.xml configured VCM and AF functions.

5.6.3 解决方法 Solution

修改 cam_board.xml，将 VCMDrvName 配置为 NC，将 AF 的相关功能支持配置为 0，参考如下：

Modify cam_board.xml to configure VCMDrvName as NC and AF related function support as 0, referring to below:

```
        <SensorAWB_Frame_Skip fps="15"></SensorAWB_Frame_Skip>
        <SensorPhy phyMode="CamSys_Phy_Mipi" lane="2"  phyIndex="0" sens
</Sensor>
<VCM>
        <VCMDrvName name="NC"></VCMDrvName>
        <VCMName name="NC"></VCMName>
        <VCMI2cBusNum busnum="2"></VCMI2cBusNum>
        <VCMI2cAddrByte byte="0"></VCMI2cAddrByte>
        <VCMI2cRate rate="0"></VCMI2cRate>
        <VCMVdd name="NC" min="0" max="0" delay="0"></VCMVdd>
        <VCMGpioPower ioname="NC" active="0" delay="1000"></VCMGpioPower
        <VCMGpioPwdn ioname="NC" active="0" delay="0"></VCMGpioPwdn>
        <VCMCurrent start="20" rated="80" vcmmax="100" stepmode="13"  dr
</VCM>
```

```
        <SensorAWB_Frame_Skip fps="15"></SensorAWB_Fram
        <SensorPhy phyMode="CamSys_Phy_Mipi" lane="2"
</Sensor>
<VCM>
        <VCMDrvName name="BuiltInSensor"></VCMDrvName>
        <VCMName name="NC"></VCMName>
        <VCMI2cBusNum busnum="2"></VCMI2cBusNum>
        <VCMI2cAddrByte byte="0"></VCMI2cAddrByte>
        <VCMI2cRate rate="0"></VCMI2cRate>
        <VCMVdd name="NC" min="0" max="0" delay="0"></V
        <VCMGpioPower ioname="NC" active="0" delay="100
        <VCMGpioPwdn ioname="NC" active="0" delay="0"><
        <VCMCurrent start="20" rated="80" vcmmax="100"
</VCM>
```

```
<FocusMode>
        <Focus_Mode_Auto support="0"></Focus_Mode_Auto>
        <Focus_Mode_Infinity support="0"></Focus_Mode_Infinity>
        <Focus_Mode_Marco support="0"></Focus_Mode_Marco>
        <Focus_Mode_Fixed support="1"></Focus_Mode_Fixed>
        <Focus_Mode_Edof support="0"></Focus_Mode_Edof>
        <Focus_Mode_Continuous_Video support="0"></Focus_Mode_Continuous_Video>
        <Focus_Mode_Continuous_Picture support="0"></Focus_Mode_Continuous_Picture>
</FocusMode>
```

```
<FocusMode>
        <Focus_Mode_Auto support="1"></Focus_Mode_Auto>
        <Focus_Mode_Infinity support="1"></Focus_Mode_Infinity>
        <Focus_Mode_Marco support="1"></Focus_Mode_Marco>
        <Focus_Mode_Fixed support="1"></Focus_Mode_Fixed>
        <Focus_Mode_Edof support="1"></Focus_Mode_Edof>
        <Focus_Mode_Continuous_Video support="0"></Focus_Mode_Cont
        <Focus_Mode_Continuous_Picture support="1"></Focus_Mode_Co
</FocusMode>
```

图 20 取消 VCM 和 AF 的配置方法

Picture 20 Method to cancel VCM and AF configurations

5.7 lib isp crash 出现 isSOCSensor 异常 lib isp crash with isSOCSensor error

5.7.1 问题描述 Issue description

系统出现 crash，backtrace 定位异常出现在 lib isp 的 isSOCSensor，并且从 logcat 也有发现 Camera service 报错 log，参考如下：

System crash occurs, and as located by backtrace the abnormal is in isSOCSensor of lib isp, and camera service error log is also found from logcat, referring to below:

```
01-18 08:54:05.239  639  1004 I CameraManagerGlobal: Connecting to camera service
01-18 08:54:05.240  639  1004 E CameraManagerGlobal: Camera service is unavailable
01-18 08:54:05.258 1550  1550 F DEBUG  :
01-18 08:54:05.258 1550  1550 F DEBUG  : backtrace:
01-18 08:54:05.258 1550  1550 F DEBUG  :    #00 pc 00038daa  /system/lib/lib_rkisp1_api.so (_ZN12CamEngineItf11isSOCSensorEv+13)
01-18 08:54:05.258 1550  1550 F DEBUG  :    #01 pc 00030013  /system/lib/hw/camera.rk30board.so (_ZN7android16CameraIspAdapter21initDefaultParametersEi+3498)
01-18 08:54:05.258 1550  1550 F DEBUG  :    #02 pc 00023355  /system/lib/hw/camera.rk30board.so (_ZN7android13CameraAdapter10initializeEv+44)
01-18 08:54:05.258 1550  1550 F DEBUG  :    #03 pc 00034631  /system/lib/hw/camera.rk30board.so (_ZN7android9CameraHalC1Ei+932)
01-18 08:54:05.258 1550  1550 F DEBUG  :    #04 pc 0001b1d3  /system/lib/hw/camera.rk30board.so
01-18 08:54:05.258 1550  1550 F DEBUG  :    #05 pc 00060cb3  /system/lib/libcameraservice.so (_ZN7android12CameraModule4openEPKcPP11hw_device_t+62)
01-18 08:54:05.259 1550  1550 F DEBUG  :    #06 pc 0005d7c9  /system/lib/libcameraservice.so
```

图 21 isSOCSensor 异常 log 示例

Picture 21 Example of isSOCSensor abnormal log

5.7.2 问题分析 Issue analysis

详细分析 log 可发现，crash 之前 open sensor 时出现 IsiCheckSensorConnectionIss 报错。isSOCSensor crash 及 Camera service 报错，均是由之前的 open sensor 出错引起。

After analyzing log carefully, you can find IsiCheckSensorConnectionIss error is reported when open sensor before crash. Both isSOCSensor crash and Camera service errors are caused by previous open sensor error.

```
01-18 08:54:04.996  1524  1524 E CameraHal_Marvin: PR2001: PR2001_IsiCreateSensorIss don't support lane numbers :4,set to default 4
01-18 08:54:05.114  1524  1524 E CameraHal_Marvin: HAL-MOCKUP: I2c bus #3 write failed
01-18 08:54:05.116  1524  1524 E CameraHal_Marvin: HAL-MOCKUP: I2c bus #3 read failed
01-18 08:54:05.117  1524  1524 E CameraHal_Marvin: HAL-MOCKUP: I2c bus #3 read failed
01-18 08:54:05.117  1524  1524 E CameraHal_Marvin: PR2001: PR2001_IsiGetSensorRevisionIss (exit)
01-18 08:54:05.118  1524  1524 E CameraHal_Marvin: PR2001: PR2001_IsiCheckSensorConnectionIss RevId = 0x00002000, value = 0x00000000
01-18 08:54:05.118  1524  1524 E CameraHal_Marvin: CAM_API_CAMENGINE: openSensor (IsiCheckSensorConnectionIss failed)
01-18 08:54:05.118  1524  1524 E CameraHal_Marvin: PR2001: PR2001_IsiSensorSetStreamingIss (enter) on:off=0
01-18 08:54:05.132  1524  1524 E CameraHal: loadSensor(1927): void android::CameraIspAdapter::loadSensor(const int)(1927):failed!
```

图 22 CheckSensorConnection 异常 log 示例

Picture 22 Example of CheckSensorConnection abnormal log

5.7.3 解决方法 Solution

排查 IsiCheckSensorConnectionIss 对应接口读取和对比 chip id 是否正常，及 camera sensor 的 I2C 通讯是否正常。

Check whether the corresponding interface read of IsiCheckSensorConnectionIss and chip id comparison is normal or not, and whether camera sensor I2C communication is normal or not.

5.8 changeResolution 异常 changeResolution abnormal issue

5.8.1 问题描述 Issue description

较小分辨率的 camera 模组，使用 isp 控制器接收，logcat 中出现 changeResolution 报错，参考如下 log：

For the camera module with small resolution, use isp controller to receive, there is changeResolution error in logcat as below:

```
09-25 01:42:39.872   220  2195 D CameraHal_Marvin: Request 800x600, Exp(>= 0.000000), Fps(>= 0fps)
09-25 01:42:39.873   220  2195 W CameraHal_Marvin: CAM_API_CAMENGINE: Request 800x600, Exp(>= 0.000000), Fps(>= 0fps) failed, select max_res:
640x480@15fps
09-25 01:42:39.872  2125  2125 V CAM_CameraAppUI: onPreviewStarted
09-25 01:42:39.873   220  2195 D CameraHal_Marvin: getPreferedSensorRes is 640x480@15fps
09-25 01:42:39.873   220  2195 D CameraHal: stop(1902): m_camDevice->stopPreview success!
09-25 01:42:39.873  2125  2125 I CAM_IndicatorIconCtrlr: smileShutterAnimator on = false
09-25 01:42:39.875   220  2195 E CameraHal_Marvin: CAM_API_CAMENGINE: changeResolution (can't change resolution of sensor)
09-25 01:42:39.875   220  2195 D CameraHal: setupPreview(333): isp out put format is YUV420SP.
09-25 01:42:39.875   220  2195 D CameraHal: setupPreview(345): Sensor output: 640x480 --(0,0,640,480)--> User request: 800x600
09-25 01:42:39.877  2125  2125 V CAM_CameraActivity: invoking onChangeCamera
09-25 01:42:39.878  2125  2125 I CAM_PhotoModule: onSettingChanged = pref_flash_supported_back_camera
09-25 01:42:39.880   220  2195 D CameraHal: start(1857): m_camDevice->startPreview success
09-25 01:42:39.881   220  2171 D CameraHal: displayThread(624): displayThread(624): receive CMD_DISPLAY_START
09-25 01:42:39.881   220  2171 D CameraHal: cameraDisplayBufferDestory(417): cameraDisplayBufferDestory(417): mANativeWindow is NULL, destory is
ignore
```

图 23 changeResolution 异常 log 示例

Picture 23 Example of changeResolution abnormal log

5.8.2 问题分析 Issue analysis

从完整的 logcat 中可找到 camera 模组支持的分辨率，如：

You can find the resolutions supported by camera module from the complete logcat, for example:

```
D CameraHal: initDefaultParameters(1362): Support Preview sizes: 176x144,320x240,352x288,640x480,720x480,800x600 640x480(default) 0x0(force)
```

若 Support Preview sizes 中包含了大于驱动支持的分辨率（驱动支持的分辨率可查看 HAL 驱动对应接口 IsiGetCapsIssInternal），如驱动中最大分辨率为 640x480，Support Preview sizes 包含了 720x480,800x600，则会导致异常。

If Support Preview sizes includes the resolution which is over the support limitation in the driver (you can check HAL driver corresponding interface IsiGetCapsIssInternal for the resolutions supported by the driver), for example, the maximum resolution of the driver is 640x480, but Support Preview sizes includes 720x480,800x600, it will cause the abnormal.

5.8.3 解决方法 Solution

将 Support Preview sizes 中大于 camera 模组驱动支持分辨率的部分，如 720x480,800x600 删除即可，参考如下修改：

Just remove the resolution not supported by camera module from Support Preview sizes, such as 720x480,800x600, referring to the modification as below:

```
diff --git a/CameraHal/CameraIspAdapter.cpp b/CameraHal/CameraIspAdapter.cpp
index 97ec07a..8845dda 100755
--- a/CameraHal/CameraIspAdapter.cpp
+++ b/CameraHal/CameraIspAdapter.cpp
@@ -887,7 +887,7 @@ void CameraIspAdapter::initDefaultParameters(int camFd)
         unsigned int max_w,max_h,max_fps,maxfps_res;
         bool chk_720p,chk_1080p;

-        parameterString = "176x144,320x240,352x288,640x480,720x480,800x600";
+        parameterString = "176x144,320x240,352x288,640x480";
         LOG1("Sensor resolution list:");

         max_w = 0;
```

图 24 changeResolution 异常解决方法

Picture 24 Solution to changeResolution abnormal

5.9 camerahal 流程在 rk_sensor_pwrseq 接口卡住的异常 Issue of camerahal process stuck in rk_sensor_pwrseq interface

5.9.1 问题描述 Issue description

Camerahal 流程卡住，跟踪代码发现是在 CameraHal_board_xml_parse.cpp 的 rk_sensor_pwrseq 接口卡住了。

Camerahal process is stuck. By tracing the code, it is found that rk_sensor_pwrseq interface in CameraHal_board_xml_parse.cpp is stuck.

5.9.2 问题分析 Issue analysis

继续要跟踪代码，发现在 power off 执行到 rk_sensor_pwrseq，控制 avdd/dovdd/dvdd 时 off 时，没有正常退出，且当前配置 camera 模组为 pmu 供电，判断对 pmu 的供电控制出现异常。查看 dts 配置中，camera 模组使用的 pmu 供电配置为 regulator-always-on，导致无法关闭，参考代码如下：

Continue to trace the code, and it is found that when power off executing to rk_sensor_pwrseq, to control avdd/dovdd/dvdd off, it didn’t exit normally, and current power supply of camera module is configured as pmu, so we think pmu power control has some problem. Check dts configuration, pmu power configuration used by camera module is regulator-always-on, which makes it unable to close. The reference code is as below:

```
vcc2v8_dvp: LDO_REG7 {
        /* regulator-always-on; */
        regulator-boot-on;
        regulator-min-microvolt = <2800000>;
        regulator-max-microvolt = <2800000>;

        regulator-name = "vcc2v8_dvp";
        regulator-state-mem {
                regulator-off-in-suspend;
                regulator-suspend-microvolt = <2800000>;
        };
};
```

图 25 PMU 配置示例

Picture 25 PMU configuration example

```
1: i/m/camsys_head.h  2: d/m/v/r/camsys_internal.h
430 static inline int camsys_sysctl_extdev(
431 camsys_extdev_t *extdev, camsys_sysctrl_t *devctl, camsys_dev_t *camsys_dev)
432 {
433         int err = 0;
434         camsys_regulator_t *regulator;
435         camsys_gpio_t *gpio;
436
437         if ((devctl->ops > CamSys_Vdd_Start_Tag) &&
438                 (devctl->ops < CamSys_Vdd_End_Tag)) {
439                 regulator = &extdev->avdd;
440                 regulator += devctl->ops-1;
441
442                 if (!IS_ERR_OR_NULL(regulator->ldo)) {
443                         if (devctl->on) {
444                                 err = regulator_set_voltage(
445                                         regulator->ldo, regulator->min_uv,
446                                         regulator->max_uv);
447                                 err |= regulator_enable(regulator->ldo);
448                                 camsys_trace(1,
449                                         "Sysctl %d success, regulator set (%d,%d) uv!",
450                                         devctl->ops, regulator->min_uv,
451                                         regulator->max_uv);
452                         } else {
453                                 while (regulator_is_enabled(regulator->ldo) > 0)
454                                         regulator_disable(regulator->ldo);
455                                 camsys_trace(1,
456                                         "Sysctl %d success, regulator off!",
457                                         devctl->ops);
458                         }
```

图 26 Camera 电源控制代码示例

Picture 26 Example of camera power control code

5.9.3 解决方法 Solution

将 dts 中给 camera 模组供电的 pmu 配置 regulator-always-on 删除即可，regulator-boot-on 建议也删除。

Just delete pmu configuration regulator-always-on in dts which supplies power for camera module, and also delete regulator-boot-on.

5.10 MIPI camera 导致 MIPI 屏异常 MIPI panel abnormality caused by MIPI camera

5.10.1 问题描述 Issue description

MIPI camera 和 MIPI 屏一起使用，MIPI 屏会出现异常，关闭 MIPI camera 配置，不使用 MIPI camera，MIPI 屏则可正常工作。

MIPI camera and MIPI panel are used together, and MIPI panel is abnormal. Disable MIPI camera

configuration and not to use MIPI camera, then MIPI panel can work normally.

5.10.2 问题分析 Issue analysis

在 rk3288 等平台，有两个 MIPI PHY 可以接 camera，分别是 MIPI_RX0 和 MIPI_TX1/RX1。其中 MIPI_TX1/RX1 是 TX 和 RX 复用，既可以用于 MIPI camera 也可用于 MIPI 屏。分析为在使用 camera 时对 MIPI_TX1/RX1 的配置出错，影响了 MIPI 屏的使用。跟踪分析 MIPI camera 中对 MIPI PHY 配置的历史代码修改，发现其中存在异常。

On platforms such as RK3288, there are two MIPI PHY which can be used to connect cameras, that is MIPI_RX0 and MIPI_TX1/RX1. MIPI_TX1/RX1 is reused by TX and RX, which can connect both MIPI camera and MIPI panel. It is analyzed that there was some problem with MIPI_TX1/RX1 configuration for camera usage and then affected MIPI panel usage. Trace and analyze the code revision history of MIPI PHY configuration in MIPI camera, and it turns out there is something wrong.

5.10.3 解决方法 Solution

部分历史版本的代码存在异常，需要注释以下代码，以 rk3399 为例：

There is abnormality with some historical version code. Need to comment out the following code. Take RK3399 as example:

kernel/drivers/media/video/rk_camsys/camsys_soc_rk3399.c

```
#define MRV_AFM_BASE        0x0000
#define VI_IRCL         0x0014
int camsys_rk3399_cfg
(camsys_dev_t *camsys_dev, camsys_soc_cfg_t cfg_cmd, void *cfg_para)
{
    unsigned int *para_int;

    switch (cfg_cmd) {
    case Clk_DriverStrength_Cfg: {
        para_int = (unsigned int *)cfg_para;
        __raw_writel((((*para_int) & 0x03) << 3) | (0x03 << 3),
        (void *)(camsys_dev->rk_grf_base + 0x204));
        /* TX1/RX1 DPHY switch to RX status */
        //__raw_writel(0x300020, (void *)(camsys_dev->rk_grf_base + 0x6260));
        break;
    }
```

图 27 RK3399 MIPI PHY 配置代码示例

Picture 27 Example of RK3399 MIPI PHY configuration code

可关注 camera 对于 MIPI PHY 配置的以下提交：

Pay attention to the following commit related with camera MIPI PHY configuration:

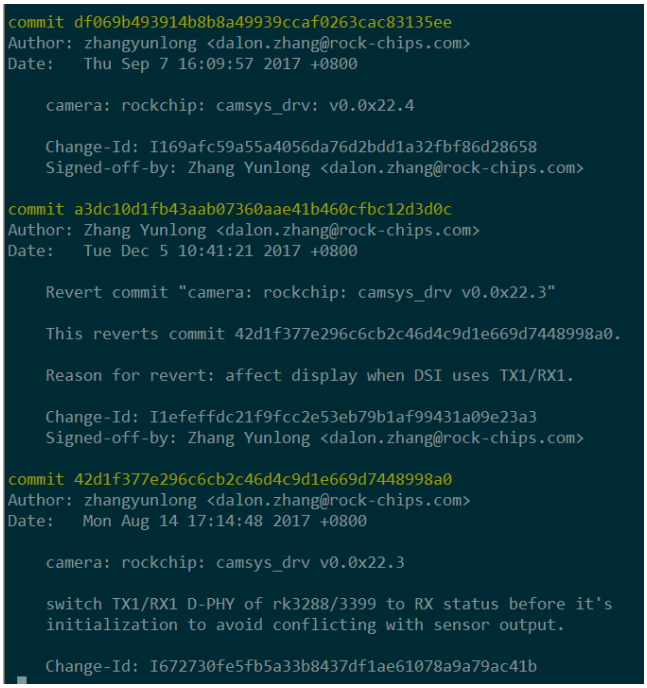


图 28 MIPI PHY 配置相关提交

Picture 28 MIPI PHY configuration related commit

5.11 Mclk 无输出异常 Mclk cannot output

5.11.1 问题描述 Issue description

Mclk 没有正常输出，camera 无法正常工作。

Mclk didn’t output normally, and camera cannot work normally.

5.11.2 问题分析 Issue analysis

Mclk 问题可从几个方向分析：

There are several ways to analyze mclk issue:

1、 查询 clk tree 确认 mclk 有正常分频，通常为 24M：

Check clk tree to confirm if mclk frequency is divided normally, which generally is 24M:

cat /d/clk/clk_summary | grep cifout

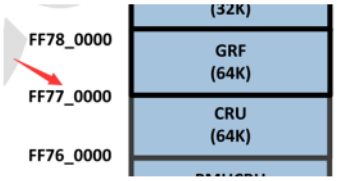
clk_cifout 17 19 24000000 0 0

2、 查询 iomux 是否有正常切换：

Check whether iomux is switched normally or not:

以 rk3399 为例，需要查询 GRF 寄存器 GRF_GPIO2B_IOMUX

Take RK3399 as example, need to check GRF register GRF_GPIO2B_IOMUX



GRF_GPIO2A_IOMUX	0x0e000	W	0x00000000	GPIO2A iomux control
GRF_GPIO2B_IOMUX	0x0e004	W	0x00000000	GPIO2B iomux control
GRF_GPIO2C_IOMUX	0x0e008	W	0x00000000	GPIO2C iomux control

RK3399 TRM

Bit	Attr	Reset Value	Description
7:6	RW	0x0	gpio2b3_sel GPIO2B[3] iomux select 2'b00: gpio 2'b01: spi2tpm_clk 2'b10: vop_den 2'b11: cif_clkouta
5:4	RW	0x0	gpio2b2_sel GPIO2B[2] iomux select 2'b00: gpio 2'b01: spi2tpm_txd 2'b10: i2c6tpm_scl 2'b11: cif_clkin

图 29 IOMUX 寄存器地址查询方法

Picture 29 The method to check IOMUX register address

通过以下 io 命令查询，确认 cif_clkouta 的 iomux 的配置：

Use the following io command to check, and confirm iomux configuration of cif_clkouta:

io -4 0xff77e004

3、 确认 dts 中 iodomain 是否有正确配置：

Confirm whether iodomain in dts is configured correctly or not:

需要根据实际的硬件连接，配置 mclk 的电源域，参考如下，则配置电源域为 1.8v：

Need to configure mclk power domain according to the actual hardware connection. Referring to below, the power domain is configured as 1.8V:

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

- bt656-supply = <&vcc_3v0>; /* bt656_gpio2ab_ms */
+ bt656-supply = <&vcc1v8_dvp>; /* bt656_gpio2ab_ms */
```

图 30 IO Domain 配置示例

Picture 30 IO Domain configuration example

4、 历史版本代码遗留问题：

Legacy issue with the historical version code:

部分 kernel 历史版本 mclk 有异常，需要包含以下提交：

Mclk is abnormal with some historical kernel version, and need to include the following commit:

```
commit 31b49b15c94033219080b29fd6a447b1aa63a1d4
Author: Finley Xiao <finley.xiao@rock-chips.com>
Date:   Thu Apr 12 16:05:09 2018 +0800

    Revert "clk: rockchip: rk3399: Fix clk_cifout and clk_cifout_src"

    This reverts commit 44822b10317558fc14d41962a7781d4267cd1592.

    Change-Id: I4cc331caf0e6cd853099a770f438276762a219f3
    Signed-off-by: Finley Xiao <finley.xiao@rock-chips.com>
```

图 31 MCLK 相关提交点

Picture 31 MCLK related commit

5.11.3 解决方法 Solution

根据实际异常情况分析解决。

Analyze and fix the abnormality according to the actual situation.

5.12 Ov5640 图像模糊、马赛克状异常 OV5640 image blur , mask issue

5.12.1 问题描述 Issue description

Rk3326 android 8.1 平台 OV5640 接收图像出现模糊马赛克状，如下：

RK3326 android8.1 platform OV5640 occurs blur and mask issue while receiving image as below:

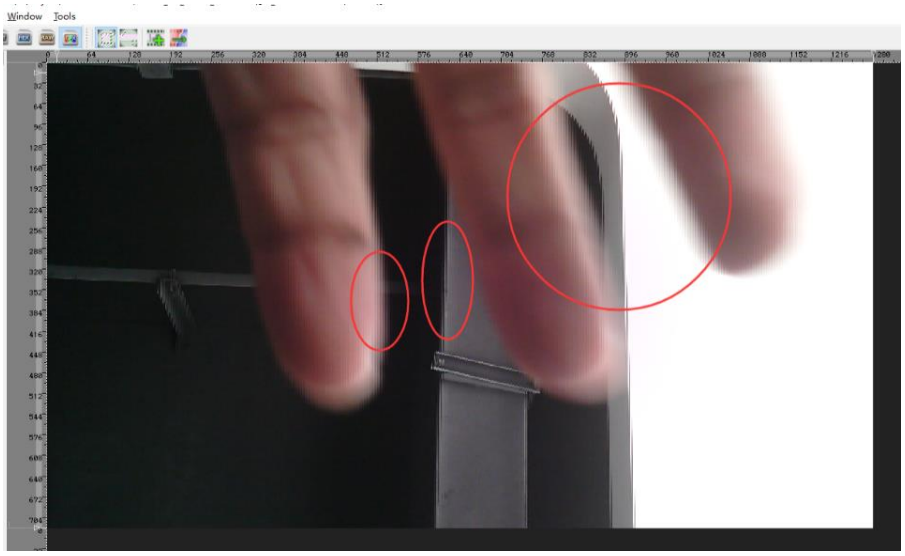


图 32 OV5640 模糊图像

Picture 32 OV5640 image blur

5.12.2 问题分析 Issue analysis

抓取 isp 输出的 yuv 图像，确认也有模糊状态，且分析 logcat 中并无其他异常报错，分析可能

与图像格式相关，排查确认 cam_bard.xml 配置，发现格式配置出错，将输出 yuv 格式的 camera 模组，在 sensorFmt 中错误配置为 CamSys_Fmt_Raw_10b 了。

Capture yuv image output by isp, confirm there is also blur existing, and there is no other error in logcat. So it is analyzed that may be related with image format. Check cam_bard.xml configuration, and it is found that format configuration is wrong. The camera module outputting yuv format is mistakenly configured as CamSys_Fmt_Raw_10b in sensorFmt.

5.12.3 解决方法 Solution

在 cam_board.xml 中进行正确的配置，格式配置为 CamSys_Fmt_Yuv422_8b：

Configure correctly in cam_board.xml. The format configuration is CamSys_Fmt_Yuv422_8b:

```
<SensorPhy phyMode="CamSys_Phy_Cif" sensor_d0_to_cif_d ="2" cif_num="0" sensorFmt="CamSys_Fmt_Yuv422_8b">
```

5.13 MIPI camera 无接收、帧率低、Pic err/Data loss 等异常 MIPI camera issues with no receiving, low frame rate, Pic err/Data loss etc.

5.13.1 问题描述 Issue description

打开 camera 预览时，黑屏无图像、图像花屏、图像正常但卡顿，且 logcat 中出现概率性或大量 pic err/data loss 的 log。

When starting camera preview, it occurs black screen without image, image abnormal, image normal but stuck, and there are some or lots of pic err/data loss log existing in logcat.

5.13.2 问题分析 Issue analysis

pic err/data loss 是 isp 库中接收异常的报错，可能原因有多种。详细可参考 FAQ 文档第 2 章 MIPI 相关和第 5 章 ISP 相关，逐步分析：

pic err/data loss is the receiving error of isp lib, and the possible reasons are multiple. For more details, you can refer to chapter 2 MIPI related and chapter 5 ISP related in FAQ document to analyze step by step:

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

Camera_External_FAQ_v1.0 .pdf

如仍无法自行解决，可查询提供如下信息，提交到 redmine，请 FAE 协助解决：

If still cannot resolve by yourself, you can check and provide the following information to redmine, asking FAE to support:

1、在 camera 预览状态下，查询 clk tree 及频率电压表。

In camera preview state, check clk tree and frequency voltage table.

cat /d/clk/clk_summary

cat /d/opp/opp_summary

2、用万用表实测 logic 电压。

Use the multimeter to measure logic voltage.

3、查询 isp 相关寄存器供分析，以 rk3399 平台使用 isp0 为例，查询以下寄存器（若使用 rk3399 平台 isp1，则偏移地址为 0xff920000，isp 控制器基址可查询对应芯片平台的 TRM 文档）：

Query isp related registers for analysis, take RK3399 platform using isp0 as example, query the following register (if for RK3399 platform using isp1, the offset address is 0xff920000, query the TRM document of the corresponding chipset platform can get the basic address of isp controller):

```
io -4 –w 0xff911c14 0xffffffff
io -4 –l 0x100 0xff911c00   // 连续执行 5 次  continuously execute 5 times
io -4 –l 0x300 0xff910400   // 连续执行 5 次  continuously execute 5 times
io -4 –l 0x120 0xff911400   // 连续执行 5 次  continuously execute 5 times
```

5.13.3 解决方法 Solution

根据实际异常情况分析解决。

Analyze and fix the abnormality according to the actual situation.

5.14 Camera apk 打开闪退异常 Camera apk open failure issue

5.14.1 问题描述 Issue description

Camera apk 打开预览，立即弹出报错窗口。

Camera apk immediately prompts error window once starting preview.

5.14.2 问题分析 Issue analysis

分析 logcat，发现有报错：PreviewSize not supported

By analyzing logcat, it is found there is error existing: PreviewSize not supported

```
.585 D/CAM_LcyLocProvider( 1455): stopReceivingLocationUpdates
.585 V/CAM_CameraActivity( 1455): onPause closing camera
.585 V/CAM_CameraController( 1455): Closing camera
.590 D/CameraHal(  252): commandThread(958): commandThread(958):receive CMD_PREVIEW_STOP
.590 D/CameraHal(  252): commandThread(979): commandThread(979): CMD_PREVIEW_STOP out
.590 D/CameraHal(  252): stopPreview(398): stop preview OK.
.591 D/CameraHal(  252): commandThread(1030): commandThread(1030): receive CMD_PREVIEW_CAPTURE_CANCEL
.592 E/CameraHal(  252): setParameters(571): PreviewSize(1280x720) not supported
.592 D/CameraHal(  252): commandThread(1038): commandThread(1038): CMD_PREVIEW_CAPTURE_CANCEL out
.592 D/CameraHal(  252): cancelPicture(603): cancel picture OK.
.592 I/CamDev@1.0-impl(  252): Closing camera 0
.592 D/CameraHal(  252): camera_device_close(455): camera_device_close
.592 D/CameraHal(  252): displayThread(650): displayThread(650): receive CMD_DISPLAY_STOP
```

图 33 PreviewSize not supported 异常 log 示例

Picture 33 Example of PreviewSize not supported abnormal log

对照支持分辨率列表，发现当前预览分辨率不在支持列表中：

Comparing with the resolution support list, it is found that current preview resolution is not included in the support list:

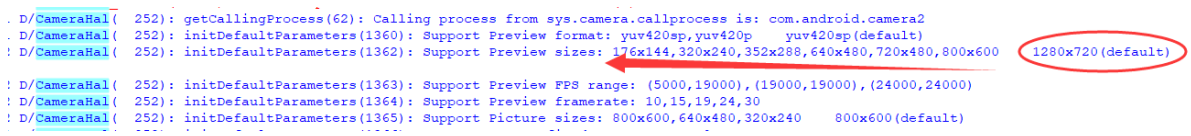


图 34 预览分辨率支持列表 log 示例

Picture 34 Log example of preview resolution support list

分析为 cam_board.xml 中 default preview size 配置出错

It is analyzed there is something wrong with default preview size configuration in cam_board.xml.

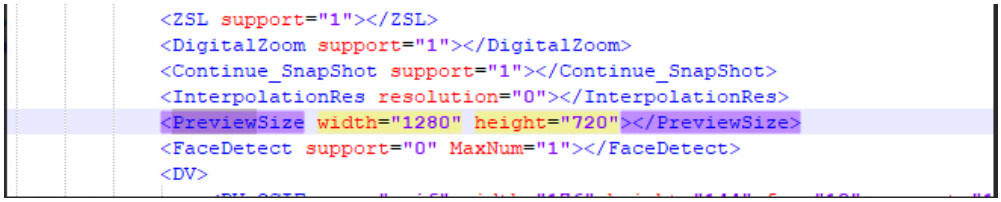


图 35 default preview size 配置示例

Picture 35 Example of default preview size configuration

5.14.3 解决方法 Solution

修改 cam_board.xml 中 default preview size 配置为 Support Preview sizes 中的分辨率值即可。

Just need to modify default preview size configuration in cam_board.xml to the resolution value of Support Preview sizes.