密级状态： 绝密(　　) 秘密(　　) 内部资料(　　) 公开(√)
Security Class: Top-Secret (　　) Secret (　　) Internal (　　) Public (√)

显示参数存储和配置说明文档

Display_Parameter_Storage_and_Configuration_Introduction

（技术部，第二系统产品部）

(Technical Department, R & D Dept. II）

文件状态： **Status:** [　] 草稿 [　] Draft [　] 正在修改 [　] Modifying [√] 正式发布 [√] Released	**文件标识：** **File No.:**	RK-SM-YF-229
	当前版本： **Current Version：**	V1.1
	作　　者： **Author:**	林垚 Lin Yao
	完成日期： **Finish Date:**	2018-10-24
	审　　核： **Auditor:**	张文平 Zhang Wenping
	审核日期： **Finish Date:**	2018-10-24

福州瑞芯微电子股份有限公司
Fuzhou Rockchip Electronics Co., Ltd.

免责声明

本文档按“现状”提供，福州瑞芯微电子股份有限公司（“本公司”，下同）不对本文档的任何陈述、信息和内容的准确性、可靠性、完整性、适销性、特定目的性和非侵权性提供任何明示或暗示的声明或保证。本文档仅作为使用指导的参考。

由于产品版本升级或其他原因，本文档将可能在未经任何通知的情况下，不定期进行更新或修改。

Disclaimer

This document is provided “as is” and Fuzhou Rockchip Electronics Co. Ltd (“the company”) makes no express or implied statement or warranty as to the accuracy, reliability, completeness, merchantability, specific purpose and non-infringement of any statement, information and contents of the document. This document is for reference only.

This document may be updated without any notification due to product version upgrades or other reasons.

商标声明

“Rockchip”、“瑞芯微”、“瑞芯”均为本公司的注册商标，归本公司所有。

本文档可能提及的其他所有注册商标或商标，由其各自拥有者所有。

Brand Statement

Rockchip, Rockchip™ icon, Rockchip and other Rockchip trademarks are trademarks of Fuzhou Rockchip Electronics Co., Ltd., and are owned by Fuzhou Rockchip Electronics Co., Ltd.

All other trademarks or registered trademarks mentioned in this document are owned by their respective owners.

福州瑞芯微电子股份有限公司
Fuzhou Rockchip Electronics Co., Ltd.
地址： 福建省福州市铜盘路软件园 A 区 18 号
网址： www.rock-chips.com
客户服务电话： +86-4007-700-590
客户服务传真： +86-591-83951833
客户服务邮箱： fae@rock-chips.com

Fuzhou Rockchip Electronics Co., Ltd.
Address: No. 18 Building, A District, No.89,software Boulevard Fuzhou,Fujian,PRC
Website: www.rock-chips.com
Customer service tel.: +86-4007-700-590
Customer service fax: +86-591-83951833
Customer service e-mail: fae@rock-chips.com

版 本 历 史 Revision History

版本号 Version no.	作者 Author	修改日期 Revision Date	修改说明 Revision description	备注 Remark
V1.0	林垚 Lin Yao	2018-9-26	发布初稿 Initial version release	
V1.1	林垚 Lin Yao	2018-10-24	添加显示参数动态配置接口说明 Add the description of display parameter dynamic configuration interface	

目 录 Contents

1 开启 Baseparameter 分区 Enable Baseparameter partition

BaseParameter 分区有以下两种功能：

BaseParameter partition has the following two functions:

(1) 保存和调整 LCD 色温、亮度、对比度、饱和度、色调等信息；

Save and adjust LCD color temperature, brightness, contrast, saturation, hue and other information.

(2) 保存和调整 hdmi 或者 dp 等显示设备支持的分辨率、时序等信息；

Save and adjust the resolution, timing, and other parameters supported by the display device with hdmi or dp.

上述数据都存放在 Baseparameter 分区中，该分区大小为 1MB，通过烧写 baseparameter.img 来设置初始值。将 device/rockchip/common/BoardConfig.mk 中的 BOARD_BASEPARAMETER_SUPPORT ?= false 改为 true 即可开启 Baseparameter 分区。

如下所示：

The above data are all saved in the Baseparameter partition, the partition size is 1MB, and the initial value is set by flashing baseparameter.img. Set BOARD_BASEPARAMETER_SUPPORT ?= false to true in device/rockchip/common/BoardConfig.mk can enable the baseparameter partition.

As follows:

```
device/rockchip/common$ git diff
diff --git a/BoardConfig.mk b/BoardConfig.mk
index afeb107..b371b97 100755
--- a/BoardConfig.mk
+++ b/BoardConfig.mk
@@ -56,7 +56,7 @@ TARGET_CPU_ABI2 ?=
TARGET_CPU_SMP ?= true
endif



-BOARD_BASEPARAMETER_SUPPORT ?= false
+BOARD_BASEPARAMETER_SUPPORT ?= true



ifeq ($(strip $(BOARD_BASEPARAMETER_SUPPORT)), true)
        TARGET_RECOVERY_OVERSCAN_PERCENT := 2
```

2 Baseparameter.img

Baseparameter.img 可以使用 saveBaseParameter 工具或者 BizLineAdjustWithBcsh.apk 生成。3399 7.1 的 SDK 中默认使用的 baseparameter.img 的路径为

device/rockchip/common/baseparameter/baseparameter_fb1080.img。在 BoardConfig.mk 中可以修改 TARGET_BASE_PARAMETER_IMAGE 的路径，例如改为：

TARGET_BASE_PARAMETER_IMAGE:=device/rockchip/common/baseparameter/baseparameter.img。

You can use saveBaseParameter tool or BizLineAdjustWithBcsh.apk to generate baseparameter.img. The default path of baseparameter.img in 3399 7.1 SDK is device/rockchip/common/baseparameter/baseparameter_fb1080.img.You can set TARGET_BASE_PARAMETER_IMAGE in BoardConfig.mk to modify the path of baseparameter.img, for example:

TARGET_BASE_PARAMETER_IMAGE:=device/rockchip/common/baseparameter/baseparameter.img.

3 SaveBaseparameter 工具 SaveBaseparameter tool

SDK 自带了 saveBaseParameter 工具能够查看、设置和导出 baseparameter 分区。该工具的源码位于 device/rockchip/common/baseparameter/saveBaseParameter 目录。默认 eng 和 userdebug 编译模式下会编译该工具，可以直接在设备中执行 saveBaseParameter 命令。

The SDK has the saveBaseParameter tool, which can view, set, and export baseparameter partition. The tool source code is in device/rockchip/common/baseparameter/saveBaseParameter directory. The tool will be compiled in eng and userdebug mode by default. You can directly execute the saveBaseParameter command on the device.

命令的常用参数如下：

The commonly used commands are as follows:

3.1 帮助信息打印 Print help information

使用-h 参数可以打印出命令的帮助，如下所示：

Use the -h parameter can print out the help information of the command as below:

```
rk3328_box:/ $ saveBaseParameter -h

saveParameter: read and write baseparameter partition tool

Usage:
        -h      Help info
        -p      Print Baseparamter
        -t      output to target file (e: "/sdcard/baseparameter.img)"
        -d      Choose Display to Setting (e: 0 or 1)
        -f      Framebuffer Resolution (e: 1920x1080@60)
        -D      Display Attach Devices (e: HDMI-A,TV)
        -c      Color (e: RGB-8bit or YCBCR444-10bit)
        -u      Is Enable Auto Resolution (2:auto resolution; 1:set one fixed resolution)
        -o      Overscan (e: overscan "100,100,100,100")
        -b      BCSH (e: "50,50,50,50")
        -R      Reset Baseparameter (1:only reset user setting baseparameter partition; 2:reset baseparameter paratition include backup)

Example: saveBaseParameter -d 0 -f 1920x1080@60 -D "HDMI-A,TV" -c Auto -u 2 -o "100,100,100,100" -b "50,50,50,50"

===== Rockchip All Rights Reserved =====

rk3328_box:/ $
```

3.2 分区数据打印 Print partition data

```
rk3328_box:/ # saveBaseParameter -p
print baseparameter
========== base parameter ==========
-main:
        resolution: 3840x2160@p-4016-4104-4400-2168-2178-2250-5
        corlor: format 0 depth 8
        fbinfo: 1920x1080@60.000000 device:HDMI-A,TV
        bcsh: 50 50 50 50
        overscan: 95 100 95 100
        feature:  0x0
-aux:
        resolution: 0x0@p-0-0-0-0-2178-0-0
        corlor: format 0 depth 0
        fbinfo: 0x0@0.000000 device:
        bcsh: 0 0 0 0
        overscan: 0 0 0 0
        feature:  0x0

========= backup parameter ==========
-main:
        resolution: 0x0@p-0-0-0-0-0-0-0
        corlor: format 4 depth 0
        fbinfo: 1920x1080@60.000000 device:HDMI-A,TV
        bcsh: 50 50 50 50
        overscan: 100 100 100 100
        feature:  0x3
-aux:
        resolution: 0x0@p-0-0-0-0-0-0-0
        corlor: format 0 depth 0
        fbinfo: 0x0@0.000000 device:
        bcsh: 0 0 0 0
        overscan: 0 0 0 0
        feature:  0x0
====================================
```

使用 saveBaseParameter 打印分区数据

Use saveBaseParameter to print partition data

其中 baseparameter 分区主要分为两区域：基本区域和备份区域。基本区域在设置时候会被写入用户设置，当恢复出厂设置时，会将基本区域数据擦除，然后将备份区域数据写入基本区域。每个区域又分为主显示和副显示，其中每个都有如下的值：

Baseparameter partition is mainly divided into two parts: base parameter and backup parameter. The base parameter will be written as user settings, when factory reset, the base parameter data will be erased, and then the backup parameter data will be written into the base parameter. Each parameter is divided into main display and aux display as well, with each having the following values:

- **resolution**：分辨率 resolution
- **color**：颜色 color
- **fbinfo**：framebuffer 分辨率 framebuffer’s resolution
- **device**：显示设备 display device
- **bcsh**：亮度、对比度、饱和度、色调 Brightness, Contrast, Saturation , Hue
- **overscan**：调整缩放（顺序依次为：left,top,right,bottom）adjust the zoom (The order is left,top,right,bottom)

- **feature：**特殊功能字段 special function field

3.3 导出文件 Output baseparameter.img

使用-t <path>参数能将 baseparameter 分区导出至指定文件路径，而后将该 img 文件 pull 出来，就可以直接使用该 img 进行烧写。

Use -t <path> command can output baseparameter partition to the specific file path, then pull out the baseparameter.img, then you can directly use the baseparameter.img for flashing.

3.4 常见问题 FAQ

将 framebuffer 分辨率更改为 1280x720 要如何操作？

How to change the framebuffer resolution to 1280x720?

a) 获取 root 权限

Get root access

```
su
```

b) 清除分区

Reset baseparameter

```
saveBaseParameter -R 2
```

c) 写入设置

Write the settings

```
saveBaseParameter -d 0 -f 1280x720@60 -D "HDMI-A,TV" -c Auto -u 2 -o "100,100,100,100" -b "50,50,50,50"
```

d) 打印确认

Print baseparameter

```
saveBaseParameter -p
```

e) 导出 image

Output image

```
saveBaseParameter -t /sdcard/baseparameter.img
adb pull /sdcard/baseparameter.img
```

f) 烧写确认

Flashing

烧写生成的 baseparameter.img，而后重启开机后执行 logcat |grep BP 确认 HWC 所读取的数据是否正确。

Flash the generated baseparameter.img, then reboot the device and execute logcat |grep BP to confirm whether the data read by HWC is correct or not.

g) 放置到 SDK 中使用

Put baseparameter.img into the SDK for use

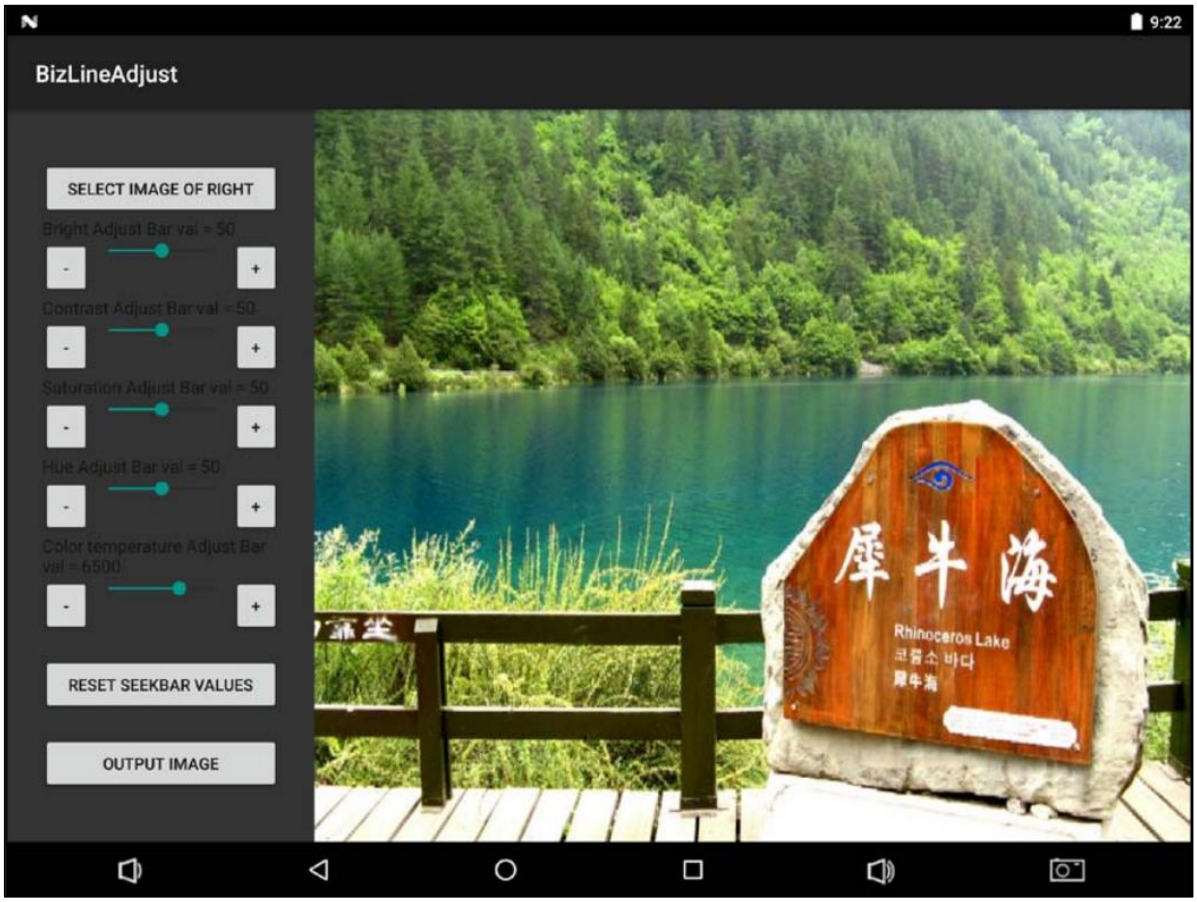
将 baseparameter.img 放在 device/rockchip/common/baseparameter/目录下并在 BoardConfig.mk

中将 TARGET_BASE_PARAMETER_IMAGE 设置为新镜像的路径：例如 TARGET_BASE_PARAMETER_IMAGE := device/rockchip/common/baseparameter/baseparameter.img。

Put baseparameter.img under device/rockchip/common/baseparameter/ directory and set TARGET_BASE_PARAMETER_IMAGE as the path of new baseparameter.img in BoardConfig.mk. For example, TARGET_BASE_PARAMETER_IMAGE := device/rockchip/common/baseparameter/baseparameter.img.

4 BizLineAdjustWithBcsh APK 使用说明

BizLineAdjustWithBcsh APK usage



主界面

Main screen

如上图所示，主界面主要包括两个部分：左侧的控制按钮和右侧的展示图片。控制按钮从上至下依次为：选择右侧展示图片按钮，亮度控制按钮，对比度控制按钮，饱和度控制按钮，色调控制按钮，色温控制按钮，重置按钮，保存 IMAGE 按钮。

As shown in above picture, the main screen mainly includes two parts: the control buttons on the left and the display picture on the right. The control buttons from top to bottom are: select image of right button, brightness control button, contrast control button, saturation control button, hue control button,

color temperature control button, reset button, output image button.

选择右侧展示图片按钮：可以根据需求从本地图片中选择右侧用于展示的图片；

Select image of right button：Select the image to display on the right from local images as required.

亮度控制按钮：可以通过“+”、“-”按钮或者 SeekBar 调节亮度，调节范围为 0-100；

Brightness control button: You can adjust the brightness via the "+", "-" button or SeekBar with the adjustment range 0-100.

对比度控制按钮：可以通过“+”、“-”按钮或者 SeekBar 调节对比度，调节范围为 0-100；

Contrast control button: You can adjust the contrast via the "+", "-" button or SeekBar with the adjustment range 0-100.

饱和度控制按钮：可以通过“+”、“-”按钮或者 SeekBar 调节饱和度，调节范围为 0-100；

Saturation control button: You can adjust the saturation via the "+", "-" button or SeekBar with the adjustment range 0-100.

色调控制按钮：可以通过“+”、“-”按钮或者 SeekBar 调节色调，调节范围为 0-100；

Hue control button: You can adjust the hue via the "+", "-" button or SeekBar with the adjustment range 0-100.

色温控制按钮：可以通过“+”、“-”按钮或者 SeekBar 调节色温，默认可以调节的值为 3500，5500，6500，7500。色温范围可以根据需求自行修改，修改 DRMBizLineAdjustActivity 中的 COLOR_TEMPERATURE_VALUE 数组即可。色温的取值范围从 1000 至 25100，必须能被 100 整除。6500 为默认标准值所以 COLOR_TEMPERATURE_VALUE 数组中必须包含 6500。

Color temperature control button: You can adjust the color temperature via the "+", "-" button or SeekBar. The default adjustable value is 3500. 5500. 6500. 7500. The color temperature range can be modified if needed. Just modify the COLOR_TEMPERATURE_VALUE array in DRMBizLineAdjustActivity. The color temperature range is from 1000 to 25,100 and must be divisible by 100. 6500 is the default standard value of the color temperature, so the COLOR_TEMPERATURE_VALUE array must contain 6500.

重置按钮：重置亮度、对比度、饱和度、色调和色温数值。其中亮度、对比度、饱和度、色调默认值为 50，色温默认值为 6500。亮度、对比度、饱和度、色调的默认值可以通过 DRMBizLineAdjustActivity 中的 DEFAULT_VALUE 修改，色温的默认值可以通过 DRMBizLineAdjustActivity 中的 DEFAULT_COLOR_TEMPERATURE 修改。

Reset button: Reset brightness, contrast, saturation, hue and color temperature values. The default values of brightness, contrast, saturation and hue are 50, and the default value of the color temperature is 6500. The default values of brightness, contrast, saturation, and hue can be modified by DEFAULT_VALUE in DRMBizLineAdjustActivity, and the default values of the color temperature can be modified by DEFAULT_COLOR_TEMPERATURE in DRMBizLineAdjustActivity.

保存 IMAGE 按钮：将现有的亮度、对比度、饱和度、色调和色温配置保存到 baseparameter.img 中，其中保存的默认路径为：/sdcard/baseparameter.img，可以通过 DRMBizLineAdjustActivity 中的 OUTPUT_IMAGE_PATH 修改。

Output image button: Save current brightness, contrast, saturation, hue, and color temperature configurations to baseparameter.img. The default saving path is /sdcard/baseparameter.img, which can be modified by OUTPUT_IMAGE_PATH in DRMBizLineAdjustActivity.

5 显示参数动态设置接口 Display parameter dynamic configuration interface

我们提供一些接口可以直接操作 baseparameter 分区里面的数据，客户如果需要动态改变这些数据，请调用这些接口进行配置，接口代码所在位置为：

We provide some interfaces that can directly modify the data in the baseparameter partition. If customers need to dynamically change these data, please invoke these interfaces to configure. The interface code is in

frameworks\base\core\java\android\os\RkDisplayOutputManager.java

每个接口详细的说明如下：

Each interface is described as below:

- public int setFramebuffer(int dpy, int width, int height, int fps)

设置 framebuffer 的宽度、高度和帧数，设置结果将保存在 baseparameter 分区，重启后生效；

Set the width, height, and fps of the framebuffer, and the result will be saved in the baseparameter partition, which will take effect after reboot.

dpy：屏幕 ID　display id

width：framebuffer 宽度　framebuffer width

height：framebuffer 高度　framebuffer height

fps：帧数　frames per second

- public int setGamma(int dpy,int size,int[] red, int[] green, int[] blue)

设置色温，重启后失效，如需固化将色温保存到 baseparameter.img 并烧录；

Set the color temperature and it will be invalid after reboot. If need to solid the color temperature, save the color temperature to baseparameter.img and flash baseparameter.img;

dpy：屏幕 ID　display id

size：red，green，blue 数组长度，不同平台长度不同，例如 3399，3288 平台长度为 1024,3326，3368 平台为 256　The length of the red, green, blue array, different platforms have different lengths, for example, for 3399 3288 the length is 1024, while for 3326, 3368 it is 256

red，green，blue：rgb 三通道数组　RGB array

- public void setBrightness(int display, int brightness)

设置亮度，需调用 saveConfig()接口保存到分区里面；

Set the brightness, and need to invoke the saveConfig() interface to save it to the partition.

display：屏幕 ID　display id

brightness：亮度　brightness

- public void setContrast(int display, int contrast)

设置对比度，需调用 saveConfig()接口保存到分区里面；

Set the contrast, and need to invoke the saveConfig() interface to save it to the partition.

display：屏幕 ID　display id

contrast：对比度　contrast

- public void setSaturation(int display, int saturation)

设置饱和度，需调用 saveConfig()接口保存到分区里面；

Set the saturation, and need to invoke the saveConfig() interface to save it to the partition.

display：屏幕 ID　display id

saturation：饱和度　saturation

- public void setHue(int display, int hue)

设置色调，需调用 saveConfig()接口保存到分区里面；

Set the hue, and need to invoke the saveConfig() interface to save it to the partition.

display：屏幕 ID　display id

hue：色调　hue

- public int saveConfig()

保存显示参数，配合 setBrightness，setContrast，setSaturation，setHue 使用，调用这个接口后，相关的数据被写到了 baseparameter 分区。

Save the display parameters, used along with setBrightness, setContrast, setSaturation, setHue, after calling the interface, relative data will be written into the baseparameter partition.