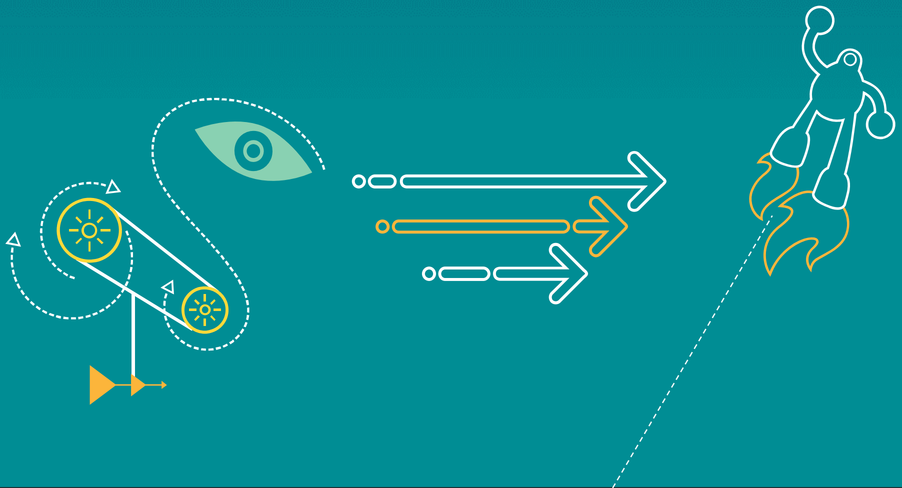
高通多媒体技术期刊　20150408

Qualcomm Technologies, Inc.



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Revision History

Revision	Date	Description
A	April 2015	Initial release

Note: There is no Rev. I, O, Q, S, X, or Z per Mil. standards.

内容

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Display

如何debug wait4pingpong timeout 问题

- 对于command mode panel，经常会发生wait4pingpong timeout的问题，比如下面log：

```
W/Kernel  (    0): <4>[ 2261.021620] ------------[ cut here ]------------
W/Kernel  (    0): <4>[ 2261.021656] WARNING: at
/home/project/kernel/drivers/video/msm/mdss/mdss_mdp_intf_cmd.c:617
mdss_mdp_cmd_wait4pingpong+0x244/0x3b8()
I/Kernel  (    0): <6>[ 2261.021667] cmd kickoff timed out (0) ctl=0
I/Kernel  (    0): <6>[ 2261.021671] Modules linked in: wlan(O) texfat(PO)
I/Kernel  (    0): <6>[ 2261.021692] CPU: 4 PID: 5782 Comm: mdss_fb0 Tainted: P           O
3.10.49-perf-g6f05a8e-00363-ga132c4f-dirty #455
I/Kernel  (    0): <6>[ 2261.021698] Call trace:
I/Kernel  (    0): <6>[ 2261.021711] [<ffffffc0000879b0>] dump_backtrace+0x0/0x214
I/Kernel  (    0): <6>[ 2261.021720] [<ffffffc000087bd4>] show_stack+0x10/0x1c
I/Kernel  (    0): <6>[ 2261.021731] [<ffffffc00099a920>] dump_stack+0x1c/0x28
I/Kernel  (    0): <6>[ 2261.021740] [<ffffffc00009b3b4>] warn_slowpath_common+0x74/0x9c
I/Kernel  (    0): <6>[ 2261.021748] [<ffffffc00009b428>] warn_slowpath_fmt+0x4c/0x58
I/Kernel  (    0): <6>[ 2261.021757] [<ffffffc00030b210>]
mdss_mdp_cmd_wait4pingpong+0x240/0x3b8
I/Kernel  (    0): <6>[ 2261.021767] [<ffffffc0002f6c50>] mdss_mdp_display_commit+0x710/0xaac
I/Kernel  (    0): <6>[ 2261.021776] [<ffffffc00031285c>] mdss_mdp_overlay_kickoff+0x578/0xadc
I/Kernel  (    0): <6>[ 2261.021787] [<ffffffc00032e89c>] __mdss_fb_display_thread+0x12c/0x2c4
I/Kernel  (    0): <6>[ 2261.021797] [<ffffffc0000bbe60>] kthread+0xac/0xb8
```

查看Panel的TE信号和配置

- 对于command mode panel，HW TE信号来自于panel端，故通过示波器查看TE的信号是否正常。
- 如果TE信号不正常，同时需要与Panel vendor来一起查看。
- 如果TE信号的波形正常，接下来需要查看TE的pin脚是否配置正确。
- 对于不用的chipset，TE 的GPIO有所不同，请查看相关的GPIO手册。

查看TE pin的config

- 在dtsi中，举例如下，对于8994来说，TE的pin 脚为GPIO 10

```
--- a/arch/arm/boot/dts/qcom/msm8994-xxx.dtsi
+++ b/arch/arm/boot/dts/qcom/msm8994-xxx.dtsi
@@ -293,11 +293,16 @@
qcom,pins = <&gp 78>;
};

+&pmx_mdss_te {
+ qcom,num-grp-pins = <1>;
+ qcom,pins = <&gp 10>;
+};

&mdss_dsi0 {
qcom,dsi-pref-prim-pan = <&dsi_r63419_wqhd_cmd0>;
pinctrl-names = "mdss_default", "mdss_sleep";
- pinctrl-0 = <&mdss_dsi_active>;
- pinctrl-1 = <&mdss_dsi_suspend>;
+ pinctrl-0 = <&mdss_dsi_active &mdss_te_active>;
+ pinctrl-1 = <&mdss_dsi_suspend &mdss_te_suspend>;
qcom,dsi-panel-bias-vreg;
qcom,platform-reset-gpio = <&msm_gpio 78 0>;
qcom,regulator-ldo-mode;
```

调试wait4pingpong timeout的方法

- 对于此问题，xlog的信息可以有效地帮助定位问题的所在。
- 目前xlog默认为enable，请看下面link：

  msm: mdss: debugfs: xlog: enable xlog debug by default

  https://www.codeaurora.org/cgit/quic/la/kernel/msm-3.10/commit/?h=LA.BF.2.1_rb1.10&id=3a24c32d82ac25d6801c54aa7dd546b9430a5be3

- 1：提高 panel 的FPS 来查看是否对问题有所改善，例如

  qcom,mdss-dsi-panel-framerate= 65 或者70

调试wait4pingpong timeout的方法 – 续一

- 2：增加patch来查看TE信号是否到来，如下，
  - qcom,platform-te-gpio = <&msm_gpio 10 0>; // 以8994为例
  - 增加 HW vsync test 函数

```
diff --git a/drivers/video/msm/mdss/mdss_dsi.c b/drivers/video/msm/mdss/mdss_dsi.c
index 660e400..7c249bf 100644
--- a/drivers/video/msm/mdss/mdss_dsi.c
+++ b/drivers/video/msm/mdss/mdss_dsi.c
@@ -926,6 +926,13 @@ end:
        return dsi_pan_node;
 }

+      irqreturn_t test_hw_vsync_handler(int irq, void *data)
+      {
+      pr_err("HW VSYNC\n");
+
+      return IRQ_HANDLED;
+      }
```

调试wait4pingpong timeout的方法 – 续二

```
 static int __devinit mdss_dsi_ctrl_probe(struct platform_device *pdev)
 {
            int rc = 0;
@@ -1047,8 +1054,12 @@ static int __devinit mdss_dsi_ctrl_probe(struct platform_device *pdev)
            }

            pr_debug("%s: Dsi Ctrl->%d initialized\n", __func__, index);
-           return 0;

+           f (devm_request_irq(&pdev->dev, gpio_to_irq(ctrl_pdata->disp_te_gpio), test_hw_vsync_handler, IRQF_TRIGGER_FALLING, "VSYNC_GPIO",NULL))
+           {
+                           pr_err("request_irq failed.\n");
+           }
+           return 0;

 error_pan_node:
            of_node_put(dsi_pan_node);
 error_vreg:
```

调试wait4pingpong timeout的方法 – 续三

- 3：在mdss_mdp_cmd_pingpong_done() 函数中，把pr_debug改为pr_err，可以帮助跟踪PP done interrupts 是否从MDP h/w 端触发。

- 4：为了debug的意图，可以使用模拟的TE信号，如下：

```
qcom,mdss-tear-check-sync-cfg-height = <...>; /* Height + VBP + VFP + VSW */
qcom,mdss-tear-check-sync-init-val = <...>; /* Height */
qcom,mdss-tear-check-sync-threshold-start = <4>;
qcom,mdss-tear-check-sync-threshold-continue = <4>;
qcom,mdss-tear-check-start-pos = <...>; /* Height */
qcom,mdss-tear-check-rd-ptr-trigger-intr = <...>; /* Height + 1 */
```

对于上面的变量的描述如下：

mdss-tear-check-sync-init-val = (Panel active height)
mdss-tear-check-sync-cfg-height = (Panel active height + VBP, VFP, VSW)
mdss-tear-check-rd-ptr-trigger-intr = (Panel active height + 1)
mdss-tear-check-start-pos = (Panel active height)

同时，可以阅读下面的文件：
/kernel/Documentation/devicetree/bindings/fb/mdss-dsi-panel.txt

对wait4pingpong timeout log的分析

- 比如，suspend-resume 测试，有时候panel不能被唤醒，同时有wait4pingpong timeout log，请看下面log的分析：

- **Good logs：**

```
E/Kernel  (    0): <3>[  596.696892] mdss_dsi_panel_reset: enable 5 rst_gpio=1
E/Kernel  (    0): <3>[  596.717262] mdss_dsi_start_hs_clk_lane: ndx=0, set_hs, cnt=1
E/Kernel  (    0): <3>[  596.848092] mdss_dsi_stop_hs_clk_lane: ndx=0, cnt=0
E/Kernel  (    0): <3>[  596.848105] lcd::mipi_disp_inc sharp 1080p panel
E/Kernel  (    0): <3>[  596.848119] mdss_dsi_start_hs_clk_lane: ndx=0, set_hs, cnt=1
E/Kernel  (    0): <3>[  596.855791] HW VSYNC  // TE signal的时间点
E/Kernel  (    0): <3>[  596.857468] mdss_dsi_stop_hs_clk_lane: ndx=0, cnt=0
E/Kernel  (    0): <3>[  596.857488] mdss_dsi_start_hs_clk_lane: ndx=0, set_hs, cnt=1
E/Kernel  (    0): <3>[  596.865846] mdss_dsi_stop_hs_clk_lane: ndx=0, cnt=0
E/Kernel  (    0): <3>[  596.872651] HW VSYNC  // 596.872651 - 596.855791 = 16.86ms
E/Kernel  (    0): <3>[  596.876463] mdss_dsi_start_hs_clk_lane: ndx=0, set_hs, cnt=1
```

- 从上面logs来看，HW TE信号的产生正常。

对wait4pingpong timeout log的分析 –续一

- **Bad logs:**
  - E/Kernel (0): <3>[**2260.657187**] mdss_dsi_panel_reset: enable 5 rst_gpio=1 -> resume for the issue case
  - E/Kernel (0): <3>[2260.873857] mdss_dsi_start_hs_clk_lane: ndx=0, set_hs, cnt=1 -> frame kickoff happened and not TE signal till next suspend/resume
  - ……………………….
  - I/Kernel (0): <6>[2261.021667] cmd kickoff timed out (0) ctl=0 -> **issue happens**
  - ……………………….
  - E/Kernel (0): <3>[**4341.546745**] mdss_dsi_panel_reset: enable 5 rst_gpio=1 -> next resume, no issue is seen
  - E/Kernel (0): <3>[4341.769660] HW VSYNC -> first TE signal from the panel after resume.

- 从上面logs来看，当问题发生时，没有收到 panel TE的信号，Not see the log “HW VSYNC” when the issue is seen after resume.
- 实际上，No TE signal coming from the panel until the next suspend/resume. (No TE signal from the panel from **2260.657187** to **4341.546745**).

Dump MDP相关的TE config的寄存器

- 以8994为例，MDP register dump如下：
- // 0xFD971000 ~ 0xFD97103C
  ```
  # Register offset and length in hex #echo 71000 3C > /d/mdp/off
  #cat /d/mdp/reg
  ```
  - 0x00071000: 00000001 0018007c 0000fff0 00000000
  - 0x00071010: 00000a00 0000767b 00040004 00000a00
  - 0x00071020: 00000a01 00000000 00000000 00000000
  - 0x00071030: 00000000 00000000 00000000
-

  // 0xFD971800 ~ 0xFD97183C
  ```
  # Register offset and length in hex #echo 71800 3C > /d/mdp/off
  #cat /d/mdp/reg
  ```
  - 0x00071800: 00000001 0018007c 0000fff0 00000000
  - 0x00071810: 00000a00 00006621 00040004 00000a00
  - 0x00071820: 00000a01 00000000 00000000 00000000
  - 0x00071830: 00000000 00000000 00000000

背光的使能

- 背光的使能是显示bring up中重要的一环，在使能背光之前，请先和H/W工程师确认屏的背光类型

- 背光控制类型
  - - qcom,mdss-dsi-bl-pmic-control-type:dtsi文件中指明背光控制类型的参数，一般有三种类型，如下
  - "bl_ctrl_pwm" = 背光由PWM控制.
  - "bl_ctrl_wled" = 背光由WLED控制.
  - "bl_ctrl_dcs" = 背光由DCS命令控制.
  - other: Unknown backlight control. (default)
  - 您也可以在如下帮助文件中找到具体的说明

    Kernel/Documentation/devicetree/bindings/fb/mdss-dsi-panel.txt

- 对于bl_ctrl_pwm背光控制类型，需要在dtsi文件中另外设置如下参数：
  - - qcom,mdss-dsi-bl-pmic-bank-select: LPG channel for backlight.
  - - qcom,mdss-dsi-bl-pmic-pwm-frequency:PWM period in microseconds.
  - - qcom,mdss-dsi-pwm-gpio:PMIC gpio binding to backlight.

背光常见问题的调试

- 背光抖动问题
  - 首先请使能mdss_fb.c中的dynamic debug信息来查看背光等级的变化

    ```
    echo -n "file mdss_fb.c +tp" > d/dynamic_debug/control
    ```

  - 如果背光等级变化非常平滑，则可排除背光软件问题，请确认是否是显示抖动，或者背光IC的硬件问题
  - 如果背光等级变化不平滑，举例如下

    ```
    [ 10.244546] mdss_fb_set_backlight: mdss_fb_set_backlight bkl_lvl = 0
    [ 18.314944] mdss_fb_set_backlight: mdss_fb_set_backlight bkl_lvl = 255
    [ 18.913691] mdss_fb_set_backlight: mdss_fb_set_backlight bkl_lvl = 10
    [ 18.996094] mdss_fb_set_backlight: mdss_fb_set_backlight bkl_lvl = 255
    ```

我们可以看到背光等级跳动在短时间内非常厉害，此时请先排除如下影响

1). disable CABL:可从QualcommSetting关闭或者在build.prop设置ro.qualcomm.cabl=0

2). 排除lightsensor的影响:请关闭根据环境光调节背光功能

背光常见问题的调试– 续一

- 唤醒时背光比显示先亮问题，具体表现就是唤醒时的白屏或者黑屏问题
  - 请添加如下debug信息

```
--- a/drivers/video/msm/mdss/mdss_fb.c
+++ b/drivers/video/msm/mdss/mdss_fb.c
@@ -1005,6 +1011,7 @@ static int mdss_fb_blank_sub(int blank_mode, struct fb_info *info,
                switch (blank_mode) {
                case FB_BLANK_UNBLANK:
+                               pr_err("[DEBUG] UNBLANK START!\n");
                                if (!mfd->panel_power_on && mfd->mdp.on_fnc) {
                                                ret = mfd->mdp.on_fnc(mfd);
                                                if (ret == 0) {
@@ -1028,6 +1035,7 @@ static int mdss_fb_blank_sub(int blank_mode, struct fb_info *info,
                                                mdss_fb_set_backlight(mfd, mfd->unset_bl_level);
                                }
                                mutex_unlock(&mfd->bl_lock);
+                               pr_err("[DEBUG] UNBLANK DONE!\n");
                                break;
--- a/drivers/video/msm/mdss/mdss_mdp_overlay.c
+++ b/drivers/video/msm/mdss/mdss_mdp_overlay.c
@@ -1365,6 +1365,7 @@ int mdss_mdp_overlay_kickoff(struct msm_fb_data_type *mfd,
                bool need_cleanup = false;
                struct mdss_mdp_commit_cb commit_cb;
+               pr_err("[DEBUG] KICKOFF!\n");
                ATRACE_BEGIN(__func__);
                if (ctl->shared_lock)
                                mutex_lock(ctl->shared_lock);
```

  - echo -n "file mdss_fb.c +tp" > d/dynamic_debug/control

- 请提case到高通来帮忙解决

Questions?

https://support.cdmatech.com