# Camera调试寄存器参考

CHIP的文档为GL5211

PMU的文档为GL5307

## MIPI

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| ===============================================================================  SI: irq=44: cat /proc/interrupt  SI： 0xE0268000  0xe0268040：  bit[1:0]: out fmt: 00(YUV 420 planner), 01(YUV 422 semiplanner),  10(YUV 420 semiplanner), 11(YVYU interleaved)  ===============================================================================  上电：  root@gs700c:/ # busybox devmem 0xe0268000 32  0x00000000  root@gs700c:/ # busybox devmem 0xe0268004 32  0x002200E4  root@gs700c:/ # busybox devmem 0xe0268010 32  0x00000000  root@gs700c:/ # busybox devmem 0xe0268014 32  0x00000000  root@gs700c:/ # busybox devmem 0xe0268018 32  0x00000000  root@gs700c:/ # busybox devmem 0xe026801c 32  0x00000000  root@gs700c:/ # busybox devmem 0xe0268030 32  0x00000000  root@gs700c:/ # busybox devmem 0xe0268034 32  0x00000000  root@gs700c:/ # busybox devmem 0xe0268038 32  0x00000000  root@gs700c:/ # busybox devmem 0xe0268040 32  0x00000000  root@gs700c:/ # busybox devmem 0xe0268044 32  0x00000000  root@gs700c:/ # busybox devmem 0xe0268048 32  0x00000000  root@gs700c:/ # busybox devmem 0xe026804c 32  0x00000000  root@gs700c:/ # busybox devmem 0xe0268080 32  0x00000400  busybox devmem 0xe0268004 32 0x002200E4  打开相机  root@gs700c:/ # busybox devmem 0xe0268000 32  0x02000953  root@gs700c:/ # busybox devmem 0xe0268004 32  0x002200E4  root@gs700c:/ # busybox devmem 0xe0268010 32  0x00000000  root@gs700c:/ # busybox devmem 0xe0268014 32  0x00000010  root@gs700c:/ # busybox devmem 0xe0268018 32  0x04370000  root@gs700c:/ # busybox devmem 0xe026801c 32  0x077F0000  root@gs700c:/ # busybox devmem 0xe0268030 32  0x04383C00  root@gs700c:/ # busybox devmem 0xe0268034 32  0x00000000  root@gs700c:/ # busybox devmem 0xe0268038 32  0x00000000  root@gs700c:/ # busybox devmem 0xe0268040 32  0x00008002  root@gs700c:/ # busybox devmem 0xe0268044 32 //AddrY  0x20E00000 //0x20200000  root@gs700c:/ # busybox devmem 0xe0268048 32 //AddrU  0x212FA400 //0x203FA400  root@gs700c:/ # busybox devmem 0xe026804c 32 //AddrV  0x00000000  root@gs700c:/ # busybox devmem 0xe0268080 32  0x00000801  busybox devmem 0xe0268030 32 0x04383C00 |
| ===============================================================================  CSI： 0xE0240000  0xe0240010  ===============================================================================  上电  root@gs700c:/ # busybox devmem 0xe0240000 32  0x00000000  root@gs700c:/ # busybox devmem 0xe0240010 32  0x00000000  root@gs700c:/ # busybox devmem 0xe0240014 32  0x000001FF  root@gs700c:/ # busybox devmem 0xe0240018 32  0x000000F3  root@gs700c:/ # busybox devmem 0xe024001c 32  0x000000F3  root@gs700c:/ # busybox devmem 0xe0240020 32  0x00000000  root@gs700c:/ # busybox devmem 0xe0240100 32  0x0000003C  root@gs700c:/ # busybox devmem 0xe0240104 32  0x00000000    打开相机  root@gs700c:/ # busybox devmem 0xe0240000 32  0x000001D5  root@gs700c:/ # busybox devmem 0xe0240010 32  0x00000000 //?0x0000000C  root@gs700c:/ # busybox devmem 0xe0240014 32  0x000000F4  root@gs700c:/ # busybox devmem 0xe0240018 32  0x000000A8  root@gs700c:/ # busybox devmem 0xe024001c 32  0x000000A8  root@gs700c:/ # busybox devmem 0xe0240020 32  0x0000001F  root@gs700c:/ # busybox devmem 0xe0240100 32  0x0000003D  root@gs700c:/ # busybox devmem 0xe0240104 32  0x00000000 |
| ===============================================================================  GPIO: 0xE01B0000  ===============================================================================  0xE01B0000: AOUTEN  0xE01B0008: ADAT    0xE01B000c: BOUTEN  0xE01B0014: BDAT  0xE01B0024: DOUTEN  0xE01B002C: DDAT  busybox devmem 0xE01B0024 32  busybox devmem 0xE01B002C 32 |
| ===============================================================================  sensor-led:  ir-led: gpiod 31  ircut-gpio: gpiob 2  ircut-remove-gpio: gpiob 1  isp:  dvdd: gpiob 8  dvdd: ldo7  avdd: gpioa 28  dovdd: gpiob 0  sensor:  reset: gpiob 3  ===============================================================================  busybox devmem 0xE01B0000 32  busybox devmem 0xE01B0008 32  busybox devmem 0xE01B000c 32  busybox devmem 0xE01B0014 32  上电  root@gs700c:/ # busybox devmem 0xE01B0000 32  0x10000001  root@gs700c:/ # busybox devmem 0xE01B0008 32  0x12000000  root@gs700c:/ # busybox devmem 0xE01B000c 32  0x8000010F  root@gs700c:/ # busybox devmem 0xE01B0014 32  0x80000109  打开相机  root@gs700c:/ # busybox devmem 0xE01B0000 32  0x10000001  root@gs700c:/ # busybox devmem 0xE01B0008 32  0x12000000  root@gs700c:/ # busybox devmem 0xE01B000c 32  0x8000010F  root@gs700c:/ # busybox devmem 0xE01B0014 32  0x8000010D //?0x80000309 |
| ===============================================================================  lod7: 0x00+0x24  ===============================================================================  root@gs700c:/sys/devices/e0178000.i2c/i2c-2/2-0065 # echo 0x24 > reg\_dbg  [ 43.434656] [ATC260x] reg [0x0024] : 0x0001 |
| ===============================================================================MCU: 0xE0168000  ===============================================================================  上电：  root@gs700c:/ # busybox devmem 0xE0168020 32  0x00000000  root@gs700c:/ # busybox devmem 0xE016802C 32  0x00000013  root@gs700c:/ # busybox devmem 0xE0168034 32  0x00000010  root@gs700c:/ # busybox devmem 0xE01680A0 32  0x07BF6139  root@gs700c:/ # busybox devmem 0xE01680A8 32  0xF7FBF5B1  打开相机：  root@gs700c:/ # busybox devmem 0xE0168020 32  0x00000000  root@gs700c:/ # busybox devmem 0xE016802C 32  0x00000013  root@gs700c:/ # busybox devmem 0xE0168034 32  0x00000010  root@gs700c:/ # busybox devmem 0xE01680A0 32  0x87BF6539 //?0x07BF6539  root@gs700c:/ # busybox devmem 0xE01680A8 32  0xF7FBFFBF  root@gs700c:/ # busybox devmem 0xE01680A8 32  0xF7FBF5B1 //?0xF7FBFFBF  root@gs700c:/ # busybox devmem 0xE01680AC 32  0xFF807FFF |

# camera电源调试

/\* DVDD:LOD7:1.8V - DOVDD:LDO1:3.3V - AVDD:GPIOB19:5V \*/

## 修改dts

1. 检查Clock-names
2. 检查ldo和gpio设置是否正确
3. 检查pinctrl-0
4. 检查i2c\_adapter

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| 修改dts |
| isp0: isp@0xe0268000 {  compatible = "actions,s700-isp";  reg = <0 0xe0268000 0 0x90>,<0 0xe0240000 0 0x134>;  interrupts = <GIC\_SPI 12 IRQ\_TYPE\_LEVEL\_HIGH>;  power-domains = <&powergate POWER\_DOMAIN\_VCE>;  clocks = <&clock CLK\_SI>, <&clock CLK\_CSI>, <&clock CLK\_SENSOR0>;  clock-names = "si", "csi", "sensor0";  resets = <&reset RESET\_SI>, <&reset RESET\_CSI>;  reset-names = "si", "csi";  };  isp0: isp@0xe0268000 {  mirror\_flip = <3>; /\* bit-0:rear camera; bit-1:front camera; 0: no flip,no mirror; 1: no flip,horizontal mirror; 2:vertical flip,no mirror; 3: vertical flip,horizontal mirror \*/  /\* DVDD:LOD7:1.8V - DOVDD:LDO1:3.3V - AVDD:GPIOB19:5V \*/  dvdd-src = "regulator"; /\* only: "gpio", "regulator" \*/  dvdd-regulator = "ldo7"; /\* only when vbus-src is "regulator" \*/  dvdd-regulator-scope = <1800000 1810000>; /\* uV \*/  dovdd-src = "regulator"; /\* only: "gpio", "regulator" \*/  dovdd-regulator = "ldo5";  dovdd-regulator-scope = <3300000 3300000>; /\* uV \*/  avdd-src = "gpio"; /\* only: "gpio", "regulator" \*/  avdd-gpios = <&gpiob 19 1>; /\* GPIOB19 \*/  pxhvdd-gpios = <&gpiob 18 1>; /\* GPIOB18 \*/  vbs-gpios = <&gpiob 30 1>; /\* GPIOB30 \*/  board\_type = "evb";/\* "ces" or "evb"\*/  sensors = "rear"; /\* "dual", "front" or "rear" \*/  //pwdn-rear-gpios = <&gpioc 17 1>; /\* GPIOA27 \*/  //pwdn-front-gpios = <&gpioc 15 1>; /\* GPIOA26 \*/  reset-gpios = <&gpiob 25 1>; /\*GPIOB25\*/  pinctrl-names = "default";  pinctrl-0 = <&isp0\_state\_csi\_dvp>;  status = "okay"; /\* create platform-device \*/  };  sensors: isp-sensor {  compatible = "sensor\_common";  i2c\_adapter = <&i2c3>; /\* 0-3 begin from enabled ones \*/  status = "okay";  }; |

## GPIOB状态检查

1. 检查gpio是否被复用，如果复用，设置正确的gpio状态
2. 检查复用gpio是否能正确的被代码初始化和释放，如果不能，检查在dts文件中是否被调用。
3. 检查gpio初始值是否设置正确的电平状态。

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| * 确保GPIOB19和GPIOB25是否被复用，如果复用设置相应复用状态寄存器，搜指定GPIO, 看在复用gpio表格中查看状态。MFP\_CTL为复用gpio控制寄存器。 * 查看gpio的值 * 检查gpio是否在dts中被使用。   gpio\_init(fdt\_node, "avdd-gpios", gpio, GPIO\_LOW) |
| busybox devmem 0xE01B000C 32  busybox devmem 0xE01B0010 32  busybox devmem 0xE01B0014 32  busybox devmem 0xE01B0018 32 0x09000001  busybox devmem 0xE01B001c 32  busybox devmem 0xE01B0020 32 0x09000401 |
| root@AD700A:/data/test # busybox devmem 0xE01B000C 32  0x420C0016  root@AD700A:/data/test # busybox devmem 0xE01B0010 32  0x00000000  root@AD700A:/data/test # busybox devmem 0xE01B0014 32  0x420C0010 |
| GPIOB的寄存器值：  root@AD700A:/data/test # busybox devmem 0xE01B000C 32  0x02080016 //b[19] = 1, b[25] = 1  root@AD700A:/data/test # busybox devmem 0xE01B0010 32  0x00000000  root@AD700A:/data/test # busybox devmem 0xE01B0014 32  0x02080010 //b[19] = 1, b[25] = 1  MFP寄存器值：  root@AD700A:/data/test # busybox devmem 0xE01B0044 32  0x8E203C60 //b[22:21] = 01b  root@AD700A:/data/test # busybox devmem 0xE01B0048 32  0x700B4600 //b[28:27] = 10b |
| Gpio在dts中被使用，关掉相关代码  lcd: lcd@e02a0000 {      pinctrl-names = "default";  // pinctrl-0 = <&lcd0\_state\_default>;  //pinctrl-0 = <&lvds\_state\_default>;  ｝  --------------------------------------------------------------------------------------------------------------------------------  /\*  lcd0\_state\_default: lcd0\_default {  lcd0\_mux {  actions,groups = "mfp0\_25\_23", "mfp1\_22\_21", "mfp1\_16\_14\_d2", "mfp1\_13\_12", "mfp1\_11\_10", "mfp1\_6\_5", "mfp2\_30\_29\_d17", "mfp2\_28\_27";  actions,function = "lcd0";  };  };  \*/  --------------------------------------------------------------------------------------------------------------------------------  /\*  lvds\_state\_default: lvds\_default {  lvds\_mux {  actions,groups = "mfp1\_22\_21", "mfp1\_6\_5", "mfp2\_28\_27";  actions,function = "lvds";  };  };  \*/  -------------------------------------------------------------------------------------------------------------------------------- |
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## Ldo状态检查

1. 检查ldo是否能正确的被代码初始化和释放，如果不能，检查在dts文件中是否被配置正确。如ldo电压值，” regulator-always-on”开关是否关闭

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| root@AD700A:/data/test # echo 0x1e > /sys/devices/e0170000.i2c/i2c-0/0-0065/ reg\_dbg  [ 445.126217] [ATC260x] reg [0x001e] : 0xe000  root@AD700A:/data/test # echo 0x24 > /sys/devices/e0170000.i2c/i2c-0/0-0065/reg\_dbg  [ 403.956217] [ATC260x] reg [0x0024] : 0x6001 |
| struct dts\_regulator \*dr = &ir->dovdd.regul;  if (dr->regul) {  int enable = 0;  int count = 10;  while(count--) {  enable = regulator\_is\_enabled(dr->regul);  if(enable) {  DBG\_INFO("enable = %d, disable regulator\n", enable);  regulator\_disable(dr->regul);  }  else {  DBG\_INFO("enable = %d, break\n", enable);  break;  }  } |

## CLK状态检查

1. 检查clk相关寄存器设置是否正确
2. 检查SI, CSI, 相关模块是否使能。

DVP接口的sensor不需要配置CSI模块

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| busybox devmem 0xE0168020 32  busybox devmem 0xE0168034 32  busybox devmem 0xE01680A0 32  busybox devmem 0xE01680A8 32 |
| root@AD700A:/data/test # busybox devmem 0xE0168020 32  0x00000000  root@AD700A:/data/test # busybox devmem 0xE0168034 32  0x0000000F  root@AD700A:/data/test # busybox devmem 0xE01680a0 32  0x031F4123 //b[14] = 1, si enable  root@AD700A:/data/test # busybox devmem 0xE01680a8 32  0xFFFB9DB3 //b[14] = 0, si reset |

## I2c检查

1. 检查i2c编号是否设置正确

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| sensors: isp-sensor {  compatible = "sensor\_common";  i2c\_adapter = <&i2c3>; /\* 0-3 begin from enabled ones \*/  status = "okay";  }; |
| static struct soc\_camera\_link camera\_module\_link = {  .bus\_id = 0,  .power = camera\_module\_power,  .reset = camera\_module\_reset,  .board\_info = &asoc\_i2c\_camera,  .i2c\_adapter\_id = 3, /\*id num start from 0 \*/  .module\_name = CAMERA\_MODULE\_NAME,  .priv = &camera\_module\_info,  }; |

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## 遇到的问题

### GPIOB冲突

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| [ 35.969531] [gpio\_init:124]Camera INFO: reset-gpios: num-57, active-high  [ 35.976249] pinctrl-s700 e01b0000.pinctrl: request pin 57 (P\_LVDS\_ECN) for s700-pinctrl-gpio:57  [ 35.984968] [OWL] pinctrl: gpio\_request\_check\_pinmux  [ 35.989937] [OWL] pinctrl: CHECK PMX:P\_LVDS\_ECN has already been requested by e02a0000.lcd |
| 在GL5211文档中搜GPIOB19/ GPIOB25是否被复用。  在下表中发现GPIOB19和GPIOB25都被LCD模块使用。        在GL5211文档中搜GPIOB19对应的OAN和GPIOB25对应的ECN可以找到控制GPIO的寄存器。下表中的数据功能即为设置为LCD pin。  MFP\_CTL1    MFP\_CTL2 |
| **GPIOB25/GPIOB19**被LCD占用，而这个项目不需要LCD，故关闭LCD复用pin  /\*  lcd0\_state\_default: lcd0\_default {  lcd0\_mux {  actions,groups = "mfp0\_25\_23", "**mfp1\_22\_21**", "mfp1\_16\_14\_d2", "mfp1\_13\_12", "mfp1\_11\_10", "mfp1\_6\_5", "mfp2\_30\_29\_d17", "**mfp2\_28\_27**";  actions,function = "lcd0";  };  };  \*/  /\*  lvds\_state\_default: lvds\_default {  lvds\_mux {  actions,groups = "**mfp1\_22\_21**", "mfp1\_6\_5", "**mfp2\_28\_27**";  actions,function = "lvds";  };  };  \*/  在代码中设置MFP1[22:21] = 01b, 设置MFP2[28:27] = 10b。参考代码如下： |
| #define GPIO\_MFP\_PWM\_BASE 0xE01B0000  #define MFP\_CTL0 (GPIO\_MFP\_PWM\_BASE+0x0040)  int camera\_initmfp(void)  {  void \*mfp = NULL;  unsigned char \*pregs;  unsigned int value;    mfp = ioremap(MFP\_CTL0, 0x10);  if(mfp == NULL) {  DBG\_ERR("ioremap [ 0x%x] fail, return\n", MFP\_CTL0);  return -1;  }  pregs = (unsigned char \*)mfp+4;  value = readl\_relaxed(pregs);  value &= ~(0x3 << 21);  value |= (0x1 << 21);  DBG\_INFO("reg[0x%x] = 0x%x\n", MFP\_CTL0+4, value);  writel\_relaxed(value, pregs);    pregs = (unsigned char \*)mfp+8;  value = readl\_relaxed(pregs);  value &= ~(0x3 << 27);  value |= (0x2 << 27);  DBG\_INFO("reg[0x%x] = 0x%x\n", MFP\_CTL0+4, value);  writel\_relaxed(value, pregs);    iounmap(mfp);  } |

### I2c不通

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| 1. 用示波器抓i2c的波形，不是每次都能抓到，目前配置为400K，所以需要降低i2c的频率试试。 |
| busybox devmem 0xe0174004 32  0x00000004 //i2c freq = 400K |
| 修改DTS的i2c1的配置：  i2c1: i2c@e0174000 {  // clock-frequency = <400000>;  clock-frequency = <100000>;  status = "okay";  … …  ｝ |
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# SI调试

## 寄存器调试

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| busybox devmem 0xe0268000 32 0x00002063  b[0]=1 : Si enable  b[1]=1: output1 enable  b[5:4]=10: ch1 DR to outpit1, ch2 DS1 to output2  b[6]=1: ch1 input enable  b[8]=0: ch1 input interface: 0=parallel, 1=mipi  b[9]=0: ch1 clk trigger: 0=raising edge, 1=falling edge  b[10]=0: ch1 vsync polarity: 0=data active during low, 1=high  b[11]=0: ch1 hsync polarity: 0=data active during low, 1=high  b[13:12]=10, [00=YUV422, 01=YUV420, 10=RAW/RGB565, 11=YUV420]  b[25:24]=00: U0Y0V0Y1 |
| busybox devmem 0xe0268018 32 0x00770000  b[12:0] =0x000, CH1\_row\_start  b[28:16]=0x00EF, CH1\_row\_end //0x77=119 |
| busybox devmem 0xe026801C 32 0x013F0000  b[12:0] =0x000, CH1\_row\_start  b[28:16]=0x013f, CH1\_row\_end //0x13f=319 |
| busybox devmem 0xe0268070 32 0x20000000 //DR Addr |
| busybox devmem 0xe0268080 32 0x00010001  b[0]=1: Ch1 preline interrupt enable |

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# end