Spreadtrum SC7731 DTS 介绍

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DTS背景与概念

- 一些术语
  - **DTS ----- Device Tree Source**，用于描述板级硬件资源的文本文件，扩展名是**.dtsi**或**.dts**。
  - **DTB ----- Device Tree Blob**，用于描述板级硬件资源的二进制文件，扩展名是**.dtb**。
  - **DTC ----- Device Tree Compiler**，用于将**.dts**文件编译转换成**.dtb**的编译器。

DTS基本语法

```
/ {
    node1 {
            a-string-property = "A string";
            a-string-list-property = "first string", "second string";
            a-byte-data-property = [0x01 0x23 0x34 0x56];
            child-node1 {
                        first-child-property;
                        second-child-property = <1>;
                         a-string-property = "Hello, world";
                       };
           child-node2 {
                      };
          };
node2 {
          a-cell-property = <1 2 3 4>;
          child-node1 {
                    };
        };
 };
```

该属性类型没有值

DTS语法

- /dts-v1/; /* linux DTS version,不同于DTB文件头中的version字段，目前固定为dts-v1 */
- /memreserve/ 0x87800000 0x400000; /* memory reserved. Base Size. */
- /include/ "skeleton.dtsi" /* include the file skeleton.dtsi, similar with the ‘include’ directive in C.*/
- 参考Power_ePAPR_APPROVED_v1.1

sprd-scx35_sp7731gea.dts

```
/{
    model = “Spreadtrum SP8835EB board”;
    compatible = “sprd,sp8835eb”;
    sprd,sc-id = <8830 1 0x20000>;
    #address-cells = <1>;
    #size-cells = <1>;
    interrupt-parent = <&gic>;
    chosen {
            bootargs = "loglevel=1 console=ttyS1,115200n8 init=/init root=/dev/ram0 rw";
            linux,initrd-start = <0x85500000>;
            linux,initrd-end= <0x855a3212>;
        };
    memory {
            device_type = "memory";
            reg = <0x80000000  0x20000000>;
        };
```

传递给内核的命令行参数

Ram disk 起始和结束地址

内存的物理基址

size

sprd-scx35_sp7731gea.dts

```
uart0: uart@f5360000{
        compatible  = "sprd,serial";
        interrupts = <0 2 0x0>;
        reg = <0xf5360000 0x1000>;
        clock-names = "clk_uart0";
        clocks = <&clock 60>;
        sprdclk = <48000000>;
        sprdwaketype = "BT_RTS_HIGH_WHEN_SLEEP";
};
```

描述uart0本身的时钟,参考scx35l-clocks.dtsi

Sprdclk描述父时钟的频率

描述唤醒类型,
BT_RTS_HIGH_WHEN_SLEEP,
BT_RX_WAKE_UP,
BT_NO_WAKE_UP

sprd-scx35_sp7731gea.dts

```
pinctrl{
        compatible = "sprd,pinctrl";
        reg = <0xf5224000 0x1000>;
        pwr_domain = "vdd28",
                     "vdd28",
                     "vddsim0",
                     "vddsim1",
                     "vddsim2",
                     "vddsd",
                      "vdd18";
        ctrl_desc = <0x10 0 1
                     0x10 1 1
                       0x10 2 1
                  0x10 3 1
                  0x10 4 1
                  0x10 5 1
                  0x10 6 1>;
    };
```

对应Regulator驱动中的字符串,参考scx30g-regulator.dtsi

描述的是PIN_CTRL_REG4寄存器，分别是reg offset,bit offset和bit width。基地址是0x402a_0000

sprd-scx35_sp7731gea.dts

```
headset_detect {
        compatible = "sprd,headset-detect";
          gpio_switch = <0>;
          ……
          adc_max = <170>;
          code = <226>;
          type = <0>;
    };
```

描述了驱动中用到的一些变量，
详见Headset_sprd.c

sprd-scx35_sp7731gea.dts

```
keypad@f5208000{
            compatible = "sprd,sci-keypad";
            reg = <0Xf5208000 0x1000>;
            gpios = <&a_eic_gpio 2 0>;
           …….
           key_volume_down {
                              keypad,row = <0>;
                             ………
                  };
            key_volume_up {
                  keypad,row = <1>;
                       …….
                  };
            key_home {
                  keypad,row = <0>;
                 …… };
     };
```

描述Power key,详见sc_keypad.c

Key配置,详见sc_keypad.c

sprd-scx35_sp7731gea.dts

```
adi: adi_bus{
        compatible = "sprd,adi-bus";
        interrupts = <0 38 0x0>;
            ....
        ranges = <0X40 0Xf51c8040 0x40>,
                 <0X80 0Xf51c8080 0x80>,
                 <0X100 0Xf51c8100 0x80>;
        rtc@80{
              compatible = "sprd,rtc";
              reg = <0X80 0x80>;
              interrupts = <2 0x0>;
            };
    };
```

(child-bus-address, parent-bus-address, length).

The *child-bus-address is a physical address within the child bus' address space .*

The *parent-bus-address is a physical address within the parent bus' address space.*

The *length specifies the size of the range in the child's address space.*

Refer to address.c in drivers/of/

sprd-scx35_sp7731gea.dts

```
fb0: fb@20800000 {
        compatible = "sprd,sprdfb";
        clock-names = "dispc_clk_parent",  …;
        clocks = <&clk_256m>, <&clk_256m>, … ;
        clock-src = <256000000 256000000 384000000>;
        dpi_clk_div = <7>;
        sprd,fb_use_reservemem;
        sprd,fb_mem = <0x9F956000 0x3AA000>;
    };
```

在LCD驱动中,没有用到clock-names和clocks,而是使用了clock-src来设定clock，所以具体问题最好还是要参看一下代码。

misc

在DTS文件中,如果出现相同名称的节点,那么后面节点的内容会覆盖前面节点的内容.如skeleton.dtsi中的chosen{};会被sprd-scx35l_sp9630ea.dts中的chosen{…};覆盖(代替).

同时skeleton.dtsi中,

```
memory {
                #address-cells = <1>;
                #size-cells = <1>;
                device_type = "memory“;
                 reg = <0 0>;
        };
```

会被sprd-scx35l_sp9630ea.dts中的

```
memory {
        device_type = "memory“;
        reg = <0x80000000 0x20000000>;
        };
```

覆盖(代替).

misc

如果节点中有名为status的属性,如果其值为”okay”或”ok”以外的值 ,那么该节点会被disable,也就是说linux设备模型感知不到该节点的存在.

如sprd-sound.dtsi中,

```
sprd_codec_v3: sprd-codec-v3 {
                              compatible = "sprd,sprd-codec-v3";
                              status = "disable";
                              ….
                              };
```

节点sprd-codec-v3将不会被注册和创建.

++++++++++++++++++++++++++++++++++ ++

另外,虽然sprd-sound.dtsi中,

```
sprd_codec: sprd-codec {
                              compatible = "sprd,sprd-codec";
                               status = "disable";
                              ….
                              };
```

但是, sprd-scx35l_sp9630ea.dts中,

```
&sprd_codec {
               status = "okay";
               sprd,audio_power_ver = <4>;
               };
```

将会覆盖(代替) sprd-sound.dtsi中的sprd-codec,

所以, sprd-codec节点仍然会被注册和创建.

谢谢！