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## 一、内核添加蓝牙声卡

```
diff --git a/arch/arm64/boot/dts/rockchip/rk3399-excavator-sapphire.dtsi
b/arch/arm64/boot/dts/rockchip/rk3399-excavator-sapphire.dtsi
old mode 100644
new mode 100755
index 4ecdad4..a9302f0
--- a/arch/arm64/boot/dts/rockchip/rk3399-excavator-sapphire.dtsi
+++ b/arch/arm64/boot/dts/rockchip/rk3399-excavator-sapphire.dtsi
@@ -66,6 +66,26 @@
        };

        };

+       bt_sco: bt-sco {
+               compatible = "delta,dfbmcs320";
+               #sound-dai-cells = <0>;
+               status = "okay";
+       };
+
+       bt-sound {
+               compatible = "simple-audio-card";
+               simple-audio-card,format = "dsp_b";
+               simple-audio-card,bitclock-inversion = <1>;
+               simple-audio-card,mclk-fs = <256>;
+               simple-audio-card,name = "rockchip,bt";
+               simple-audio-card,cpu {
+                       sound-dai = <&i2s1>;
+               };
+               simple-audio-card,codec {
+                       sound-dai = <&bt_sco>;
+               };
+       };

        spdif_sound: spdif-sound {
                status = "okay";
                compatible = "simple-audio-card";

+
+&i2s1 {
+       #sound-dai-cells = <0>;
+       /* rockchip,bclk-fs = <64>; */
+       status = "okay";
+ };
```

## 二、Audio Hal 层声卡配置

Android.mk添加下面两个宏: RK3399\_LAPTOP\_BT\_AP\_SCO (其他芯片, 如果蓝牙走的是PCM连接SOC的, 一样可以用这两个宏) 另外配置下蓝牙声卡的信息

### 1、Android7.1 Audio HAL补丁:

```
lsh@rk-intel-1:~/rk3399-androidn-all/hardware/rockchip/audio$ git diff
diff --git a/tinyalsa_hal/Android.mk b/tinyalsa_hal/Android.mk
index 3989fc2..da66b9b 100755
--- a/tinyalsa_hal/Android.mk
+++ b/tinyalsa_hal/Android.mk
@@ -64,7 +64,7 @@
@@ -64,7 +64,7 @@ endif
    ifeq ($(strip $(TARGET_BOARD_PLATFORM)),rk3128)
```

```

LOCAL_CFLAGS += -DRK3128
endif
-ifeq ($(strip $(TARGET_BOARD_PLATFORM_PRODUCT)), laptop)
+ifeq ($(strip $(TARGET_BOARD_PLATFORM)), rk3399)
LOCAL_CFLAGS += -DRK3399_LAPTOP
LOCAL_CFLAGS += -DBT_AP_SCO
endif
diff --git a/tinyalsa_hal/audio_hw.h b/tinyalsa_hal/audio_hw.h
index a81c85f..d3c417f 100755
--- a/tinyalsa_hal/audio_hw.h
+++ b/tinyalsa_hal/audio_hw.h
@@ -85,7 +85,7 @@ int PCM_CARD = 0;
int PCM_CARD_HDMI = 1;
int PCM_CARD_SPDIF = 2;
#endif
-int PCM_BT = 3;
+int PCM_BT = 1;
#define PCM_TOTAL 4
#define PCM_DEVICE 0
#define PCM_DEVICE_SCO 1

```

## 2、Android8.1 Audio HAL层补丁

主要是往is\_bt\_in\_sound\_card is\_bt\_out\_sound\_card 添加蓝牙声卡支持

```

diff --git a/tinyalsa_hal/Android.mk b/tinyalsa_hal/Android.mk
index 9655ac6..fce3764 100755
--- a/tinyalsa_hal/Android.mk
+++ b/tinyalsa_hal/Android.mk
@@ -62,7 +62,8 @@ ifeq ($(strip $(TARGET_BOARD_PLATFORM)),rk3128h)
LOCAL_CFLAGS += -DRK3228
endif
ifeq ($(strip $(TARGET_BOARD_PLATFORM)),rk3399)
- LOCAL_CFLAGS += -DRK3399
+ LOCAL_CFLAGS += -DRK3399_LAPTOP
+ LOCAL_CFLAGS += -DBT_AP_SCO
endif
ifeq ($(strip $(TARGET_BOARD_PLATFORM)),rk3399pro)
LOCAL_CFLAGS += -DRK3399

diff --git a/tinyalsa_hal/audio_hw.c b/tinyalsa_hal/audio_hw.c
index 941129f..ab73bc5 100755
--- a/tinyalsa_hal/audio_hw.c
+++ b/tinyalsa_hal/audio_hw.c
static bool is_bt_out_sound_card(char* buf)
{
+ /*add sound card name of speaker here*/
+ const char* NAME [] =
+ {
+ "rockchipbt"
+ };
+
int length = sizeof(NAME)/sizeof(char*);
if(buf == NULL)
return false;

- // add codes here
+ /*
+ * speaker: diffrent product may have diffrent card name,modify codes here
+ * for example: 0 [rockchiprk3328 ]: rockchip-rk3328 - rockchip-rk3328
+ */
+

```

```

+   for(int i = 0; i < length; i++) {
+       if(strstr(buf,NAME[i]) && strstr(buf,":"))
+           return true;
+   }

    return false;
}
@@ -620,11 +635,21 @@ static bool is_mic_in_sound_card(char* buf)

static bool is_bt_in_sound_card(char* buf)
{
+   /*add sound card name of mic here*/
+   static char* NAME [] =
+   {
+       "rockchipbt"
+   };
+   int length = sizeof(NAME)/sizeof(char*);
+
    if(buf == NULL)
        return false;

-   // add codes here
-
+   for(int i = 0; i < length; i++) {
+       if(strstr(buf,NAME[i]) && strstr(buf,":")) {
+           return true;
+       }
+   }
    return false;
}

```

### 三、device目录修改

#### 1、修改补丁

```

lsh@rk-intel-1:~/rk-sdk/rk3399-androidn-all/device/rockchip/common$ git diff
diff --git a/overlay/packages/apps/Bluetooth/res/values/config.xml
b/overlay/packages/apps/Bluetooth/res/values
index 029b26a..30e0208 100644
--- a/overlay/packages/apps/Bluetooth/res/values/config.xml
+++ b/overlay/packages/apps/Bluetooth/res/values/config.xml
@@ -16,7 +16,7 @@
    <bool name="profile_supported_a2dp">true</bool>
    <bool name="profile_supported_a2dp_sink">false</bool>
    <bool name="profile_supported_hdp">false</bool>
-   <bool name="profile_supported_hs_hfp">false</bool>
+   <bool name="profile_supported_hs_hfp">true</bool>
    <bool name="profile_supported_hfpclient">false</bool>
    <bool name="profile_supported_hid">true</bool>
    <bool name="profile_supported_opp">true</bool>

```

注：如果不希望编译整个系统，push Bluetooth.apk，需要关掉下面的宏WITH\_DEXPREOPT

```

lsh@rk-intel-1:~/rk-sdk/rk3399-androidn-all/device/rockchip/rk3399$ git diff
diff --git a/rk3399_all/BoardConfig.mk b/rk3399_all/BoardConfig.mk
index 813afc4..adf8a11 100755
--- a/rk3399_all/BoardConfig.mk
+++ b/rk3399_all/BoardConfig.mk
@@ -7,7 +7,7 @@ BOARD_SENSOR_MPU_VR := false

BOARD_SENSOR_COMPASS_AK8963-64 := true

-WITH_DEXPREOPT := true

```

**+WITH\_DEXPREOPT := false**

TARGET\_BOARD\_PLATFORM\_PRODUCT := tablet

## 2、编译:

lsh@rk-intel-1:~/rk-sdk/rk3399-androidn-all/packages/apps/Bluetooth\$ mm

## 3、PUSH安装

adb push Bluetooth.apk system/app/Bluetooth/Bluetooth.apk

通话音质不好:

1、库的区别 /system/vendor/lib/libbt-vendor.so

2、SOC PCM 电源域与配置

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

    bt656-supply = <&vcc_3v0>;      /* bt656_gpio2ab_ms */
    audio-supply = <&vccalv8_codec>; /* audio_gpio3d4a_ms */
    sdmmc-supply = <&vccio_sd>;      /* sdmmc_gpio4b_ms */
    gpio1830-supply = <&vcc_3v0>;    /* gpio1833_gpio4cd_ms */
};
```

电源域可以设计成1.8V或者是3.0V

需要注意的是软件配置需要跟硬件设计保持一致