APPLICATION NOTE

ATBM 驱动配置说明_FAQ

ATBM603X

1x1 802.11b/g/n Wi-Fi 芯片

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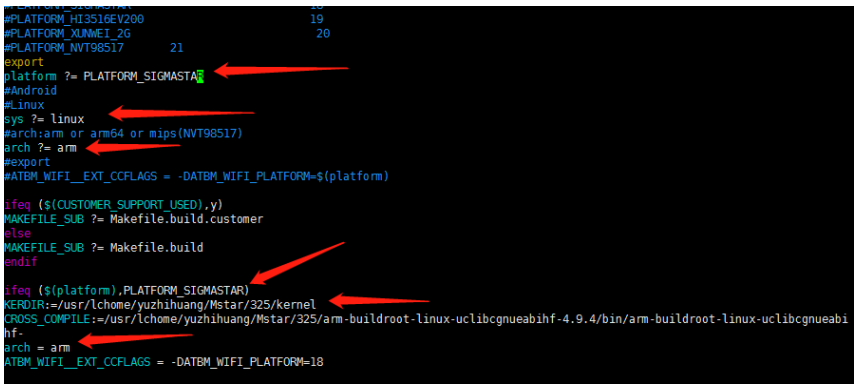
1 单独编译驱动的编译方法

1.1 驱动通过 Make menuconfig 进行配置相关参数

(1) 配置编译环境

修改驱动根目录的 Makefile,配置对应的内核路径，平台架构以及交叉编译工具链

22684 以前的版本编译配置：



22684 以后的版本配置：

```
35:
36:
37: platform ?= PLATFORM_SIGMASTAR
38: #ATBM_BUILD_IN_KERNEL?=
39:
40:
41: ifeq ($(KERNELRELEASE),)
42: export
43: ATBM_BUILD_IN_KERNEL=n
44:
45: ifeq ($(CUSTOMER_SUPPORT_USED),y)
46: MAKEFILE_SUB ?= Makefile.build.customer
47: else
48: MAKEFILE_SUB ?= Makefile.build
49: endif
50:
51:
52: KERDIR ?= /usr/lchome/yuzhihuang/Mstar/IPC_I3/linux3.18_i3/
53: CROSS_COMPILE ?= /usr/lchome/yuzhihuang/Mstar/IPC_I3/arm-linux-gnueabihf-4.8.3-201404/bin/arm-linux-gnueabihf-
54: #Android
55: #Linux
56: sys ?= Linux
57: #arch:arm or arm64 or mips(NVT98517)
58: arch ?= arm
59:
```

参数说明：

platform ：配置平台，客户自己设置，平台设置对应的值需要按照如下累加，

需要通过这个方式配置将平台对应的值在驱动中生效：

```
export ATBM_WIFI__EXT_CCFLAGS ?= -DATBM_WIFI_PLATFORM=18
```

#PLATFORM_XUNWEI	1
#PLATFORM_SUN6I	2
#PLATFORM_FRIENDLY	3

#PLATFORM_SUN6I_64	4
#PLATFORM_SUN8I	5
#PLATFORM_HI3518E	6
#PLATFORM_X86PC	7
#PLATFORM_AMLOGIC	8
#PLATFORM_AMLOGIC_905	8
#PLATFORM_AMLOGIC_905X	9
#PLATFORM_ROCKCHIP	10
#PLATFORM_MSTAR	11
#PLATFORM_CDLINUX	12
#PLATFORM_AMLOGIC_S805	13
#PLATFORM_HIS_LINUX_3_4	14
#PLATFORM_ROCKCHIP_3229	15
#PLATFORM_ROCKCHIP_3229_ANDROID8	16
#PLATFORM_HS_IPC	17
#PLATFORM_SIGMASTAR	18
#PLATFORM_HI3516EV200	19
#PLATFORM_XUNWEI_2G	20
#PLATFORM_NVT98517	21
#PLATFORM_INGENICT31	22
#PLATFORM_INGENICT41	23

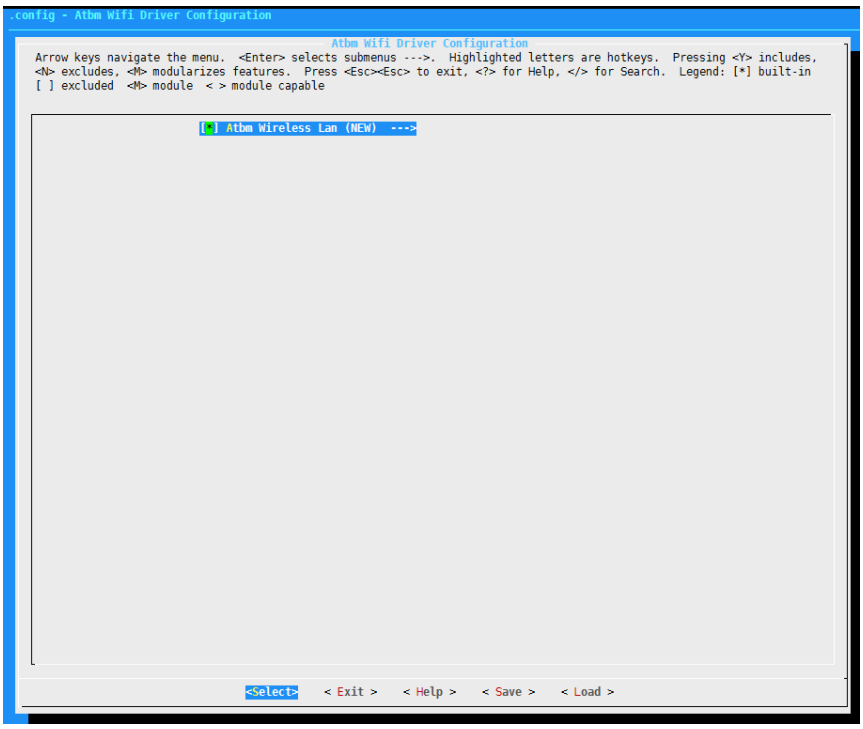
KERDIR ： 内核路径

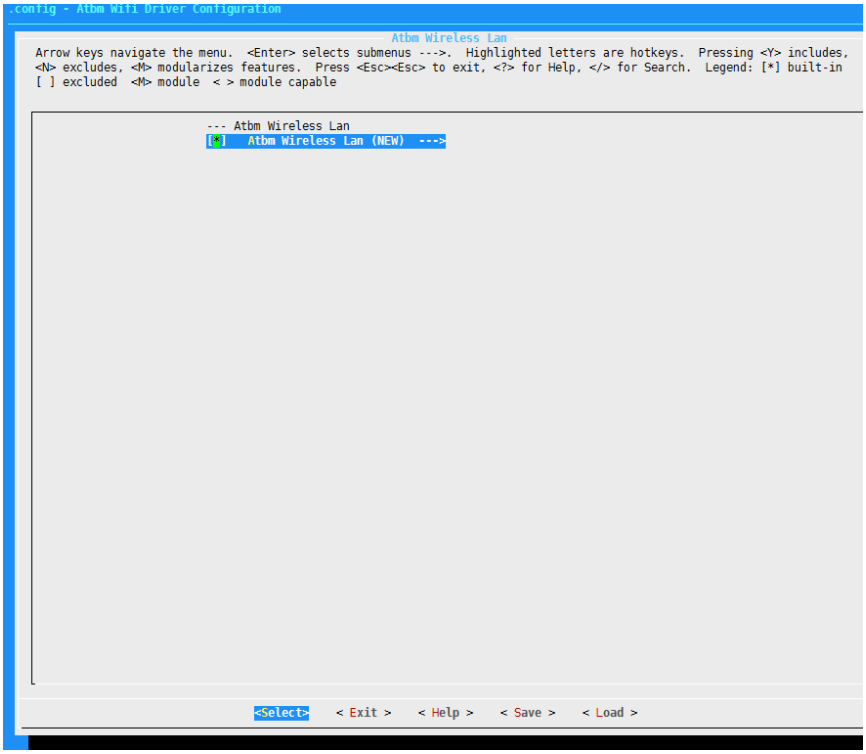
CROSS_COMPILE ： 交叉编译器

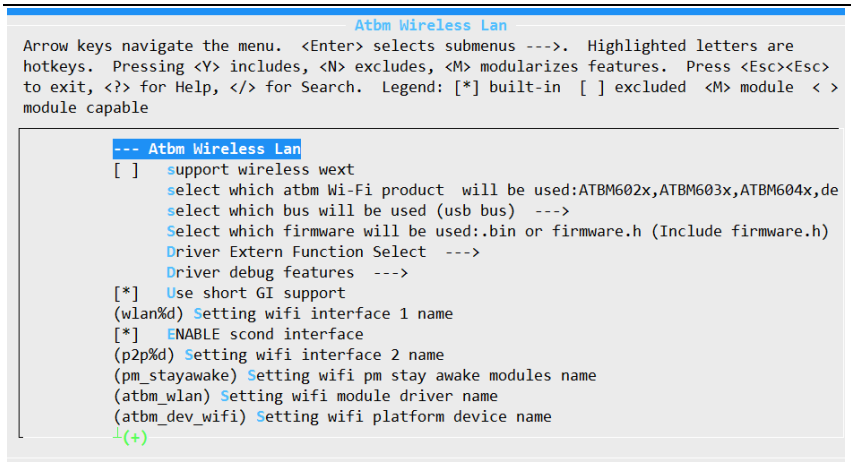
sys ： 当前运行的系统，有 Linux ， Android

arch ： 平台架构，arm,arm64,mips 等

（2） 进到驱动根目录执行，make menuconfig

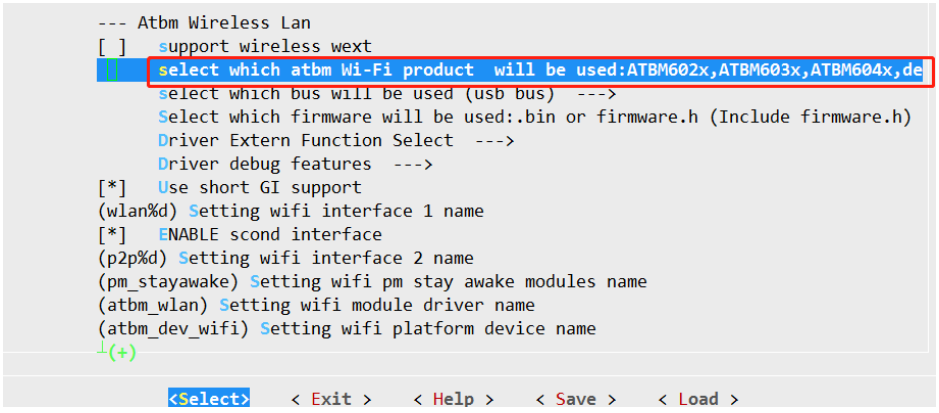


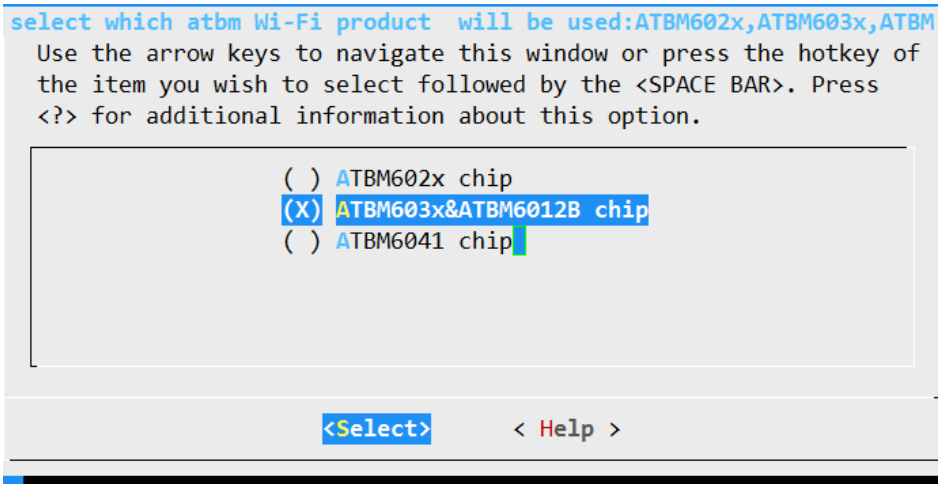




1.2 配置说明

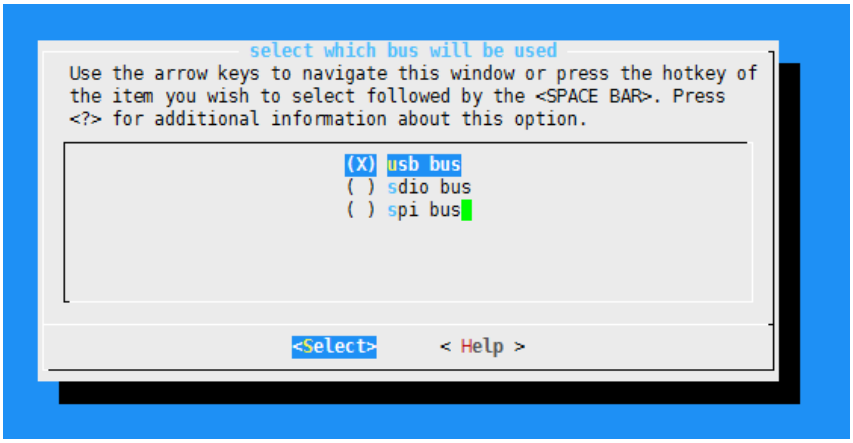
(1) 选择 **wifi** 芯片型号





(2) 选择通信总线接口

```
--- Atbm Wireless Lan
[ ]   support wireless wext
      select which atbm Wi-Fi product  will be used:ATBM602x,ATBM603x,ATBM604x,de
      select which bus will be used (usb bus)  --->
      select which firmware will be used:.bin or firmware.h (Include firmware.h)
      Driver Extern Function Select  --->
      Driver debug features  --->
[*]   Use short GI support
(wlan%d) Setting wifi interface 1 name
[*]   ENABLE scond interface
(p2p%d) Setting wifi interface 2 name
(pm_stayawake) Setting wifi pm stay awake modules name
(atbm_wlan) Setting wifi module driver name
(atbm_dev_wifi) Setting wifi platform device name
```



如果选择 sdio 总线，需要选择是 sdio 中断还是 gpio 中断

```
--- Atbm Wireless Lan
[ ]   support wireless wext
      select which atbm Wi-Fi product  will be used:ATBM602x,ATBM603x,ATBM604x,de
      select which bus will be used (sdio bus)  --->
      Select which firmware will be used:.bin or firmware.h (Include firmware.h)
      Driver Extern Function Select  --->
      Driver debug features  --->
(mmc0) which mmc will be used
[ ]   Use GPIO interrupt
[*]   Use short GI support
(wlan%d) Setting wifi interface 1 name
[*]   ENABLE scond interface
(p2p%d) Setting wifi interface 2 name
(pm_stayawake) Setting wifi pm stay awake modules name
```

a) 如果需要使用 GPIO 中断，

需要做如下修改，否则跳过此部分 ：

hal_apollo/Makefile 中，根据 platform 添加 GPIO 中断的宏。

```
ccflags-y += -DOPER_CLOCK_USE_SEM
ccflags-y += -DEXIT_MODULE_RESET_USB=0
ccflags-y += -DATBM_VIF_LIST_USE_RCU_LOCK
#ccflags-y += -DATBM_SUPPORT_SMARTCONFIG

ifeq ($(platform),PLATFORM_AMLOGIC_S805)
ccflags-y += -DCONFIG_ATBM_APOLLO_USE_GPIO_IRQ
endif
ifeq ($(platform),PLATFORM_FH_IPC)
ccflags-y += -DCONFIG_ATBM_APOLLO_USE_GPIO_IRQ
endif

ifeq ($(platform),PLATFORM_AMLOGIC)
#ccflags-y += -DCONFIG_ATBM_APOLLO_USE_GPIO_IRQ
endif
```

hal_apollo/apollo_plat.h 添加宏,该宏的值和顶层 Makefile 中 export 出来的值一样

```
*PLATFORM_FRIENDLY:based on linux3.086
*
*******************************************************
*/
#define PLATFORM_XUNWEI                         (1)
#define PLATFORM_SUN6I                          (2)
#define PLATFORM_FRIENDLY                       (3)
#define PLATFORM_SUN6I_64                       (4)
#define PLATFORM_CDLINUX                        (12)
#define PLATFORM_AMLOGIC_S805           (13)
#define PLATFORM_AMLOGIC_905            (8)
#define PLATFORM_FH_IPC                         (18)

#ifndef  ATBM_WIFI_PLATFORM
#define ATBM_WIFI_PLATFORM                      PLATFORM_XUNWEI
#endif
```

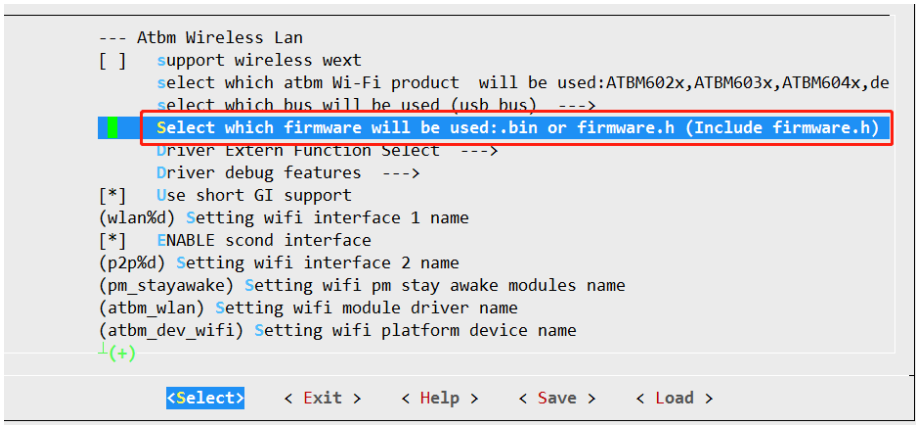
hal_apollo/atbm_platform.c 添加 GPIO 中断引脚号

```
^M
#endif  //CONFIG_ATBM_APOLLO_USE_GPIO_IRQ^M
#endif^M
struct atbm_platform_data platform_data = {^M
#if (ATBM_WIFI_PLATFORM == 10)^M
        .mmc_id         = "mmc1",^M
#else^M
        .mmc_id         = "mmc2",^M
#endif^M
        .clk_ctrl       = NULL,^M
        .power_ctrl     = atbm_power_ctrl,^M
        .insert_ctrl    = atbm_insert_crtl,^M
#if(ATBM_WIFI_PLATFORM == PLATFORM_XUNWEI)^M
        .irq_gpio       = EXYNOS4_GPX2(4),^M
        .power_gpio     = EXYNOS4_GPC1(1),^M
#endif^M
#if(ATBM_WIFI_PLATFORM == PLATFORM_AMLOGIC_S805)^M
        .irq_gpio       = INT_GPIO_4,^M
        .power_gpio     = 0,^M
#endif^M
#if(ATBM_WIFI_PLATFORM == PLATFORM_AMLOGIC_905)^M
        .irq_gpio       = 100,^M
        .power_gpio     = 0,^M
#endif^M
#if(ATBM_WIFI_PLATFORM == PLATFORM_FRIENDLY)^M
        .power_gpio     = EXYNOS4_GPK3(2),^M
#endif^M
#if(ATBM_WIFI_PLATFORM == PLATFORM_FH_IPC)^M
        .irq_gpio       = 0,^M
#endif^M
        .reset_gpio = 0,^M
};^M
^M
struct atbm_platform_data *atbm_get_platform_data(void)^M
{^M
        return &platform_data;^M
```

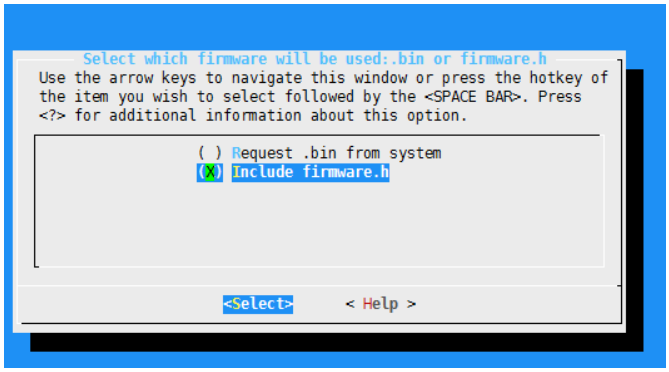
b) 整体设定完毕后，在驱动源码下执行 make 即可。

(3) 选择固件方式

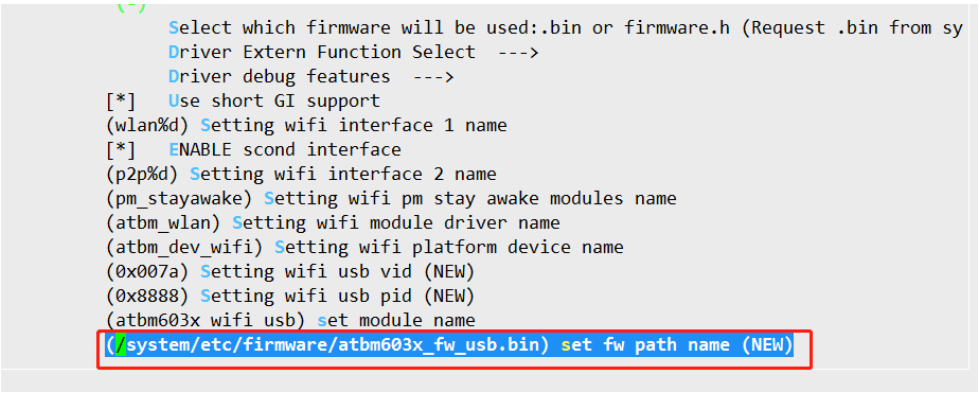
可以选择独立于驱动之外的 bin 文件，或者选择包含在驱动里面的 hal_apollo/firmware.h



IPC 考虑到使用方便的原因一般选择 firmware.h，安卓平台一般都是用的 bin 文件



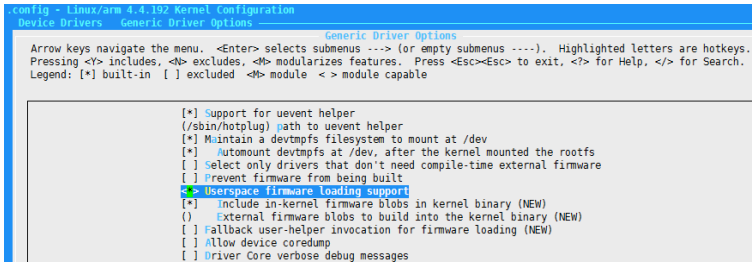
出现下图的提示说明固件使用的是独立的 bin 文件，需要将红框固件名前缀去掉，只留下 atbm602x_fw_usb.bin。



PS:

1）固件使用 bin 文件需要内核支持下载 firmware,所以在内核需要打开 FW_LOADER 宏,不打开没法正常下载固件。

```
Symbol: FW_LOADER [=y]
Type  : tristate
Prompt: Userspace firmware loading support
  Location:
    -> Device Drivers
(1)   -> Generic Driver Options
  Defined at drivers/base/Kconfig:80
  Selected by: IXP4XX_NPE [=n] && ARCH_IXP4XX [=n] || PCM
```



2）最终的固件只能放在内核预定义的路径

2.1）该路径定义于：kernel/drivers/base/firmware_class.c

```
/* direct firmware loading support */
static char fw_path_para[256];
static const char * const fw_path[] = {
        fw_path_para,
        "/lib/firmware/updates/" UTS_RELEASE,
        "/lib/firmware/updates",
        "/lib/firmware/" UTS_RELEASE,
        "/lib/firmware"
};
```

2.2）在运行系统里面添加存放固件的路径

例如固件放的路径为/mnt/sdcard/firmware/添加路径的方法如下：

```
echo /mnt/sdcard/firmware/ > /sys/module/firmware_class/parameters/path
```

(4) 驱动一些扩展功能

```
--- Atbm Wireless Lan
[ ]   support wireless wext
      select which atbm Wi-Fi product  will be used:ATBM602x,ATBM603x,ATBM604x,de
      select which bus will be used (usb bus)  --->
      Select which firmware will be used:.bin or firmware.h (Request .bin from sy
      Driver Extern Function Select  --->
      Driver debug features  --->
[*]   Use short GI support
(wlan%d) Setting wifi interface 1 name
[*]   ENABLE scond interface
(p2p%d) Setting wifi interface 2 name
(pm_stayawake) Setting wifi pm stay awake modules name
(atbm_wlan) Setting wifi module driver name
(atbm_dev_wifi) Setting wifi platform device name
```

```
[*] Enable wifi interface bridge function
[*] Enable Tx no confirm function to enhance performance
[ ] Enable early suspend function for some platform power save
[*] Enable rx monitor function to receive all package
[ ]   Enable rx monitor header prism
[ ] Enable skb debug function to debug skb alloc and free
[ ] Enable memory debug function to debug memory alloc and free
[*] Enable 2.4g useing 5g channel function ,only support special frequnce
[ ] Enabel usb aggr tx funciton to enchance tx performance
[ ] Enable usb use dam buff for xmit
[ ] Enable usb cmd send directly function
[ ] Enable usb data send directly function
[ ] Enable usb wakeup reload fw function
[ ] Enable hw do tcp/ip checksum function
[ ] Enable P2P
[ ] enable sw enc function
[*] enabel dev_ctrl api
[*] enable modules fs
[ ] enable smartconfig function
[*] Enable loader driver fast function
[*] Enable iwpriv some prive func
```

a) Enable wifi interface bridge function
选择驱动是否支持桥接

b) Enable Tx no confirm function to enhance performance
这个功能默认是打开的。

c) Enable early suspend function for some platform power save
与平台相关，安卓系统层支持休眠时候需要打开。

d) Enable rx monitor function to receive all package
驱动是否支持进入监听状态的功能，默认打开
子选项：Enable rx monitor header prism
Monitor 头部修改为 PRISM 格式，默认为 RATIO 格式

e) Enable skb debug function to debug skb alloc and free
打开 skb 泄露 debug 的功能，此功能通常不打开

f) Enable memory debug function to debug memory alloc and free
打开 memory 泄露 debug 的功能，此功能通常不打开

g) Enable 2.4g useing 5g channel function ,only support special frequnce
是否使用 5G 信道作为特殊频点，默认关闭状态

h) Enabel usb aggr tx funciton to enchance tx performance
打开 usb 聚合发送数据包的功能，目前关闭，cpu 频率较低时可以打开

i) Enable usb use dam buff for xmit
使用 usb 的 dma buff,一般打开 usb 聚合时打开此功能

j) Enable usb cmd send directly function
cpu 频率较低时打开此功能

k) Enable usb data send directly function
cpu 频率较低时打开此功能

l) Enable usb wakeup reload fw function
android 平台休眠唤醒时是否重新 load 固件，默认关闭

m) Enable hw do tcp/ip checksum function
是否使能 aresB 的 check sum 功能，默认关闭

n) Enable P2P
使能 P2P mirecast 功能

o) enable sw enc function
支持 enc 功能

p) enabel dev_ctrl api
使能 dev ioctl 相关命令功能

q) enable modules fs
使能 modules fs 功能,打开此功能会在/sys/module/<driver_name>/目录下生成 atbm_fs 目录
该目录可以进行功能调试

r) enable smartconfig function
使能 smart config 功能

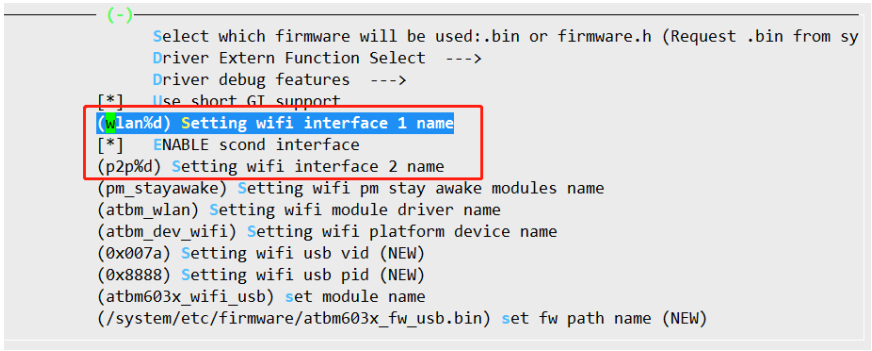
s) Enable loader driver fast function
打开此功能可以缩短加载 usb 驱动的时间

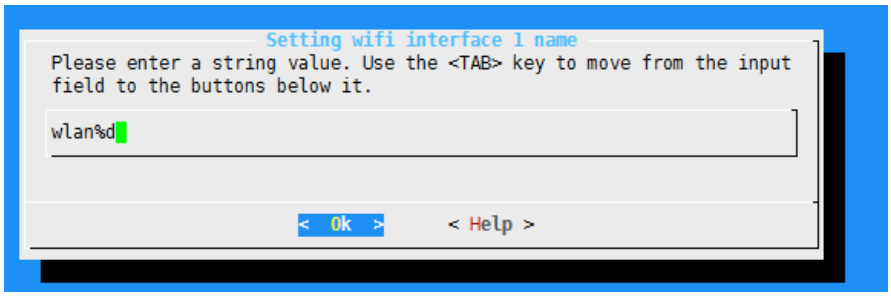
t) Enable iwpriv some prive func
打开此功能支持私有协议功能

(5) 内部调试使用

```
--- Atbm Wireless Lan
[ ]   support wireless wext
      select which atbm Wi-Fi product  will be used:ATBM602x,ATBM603x,ATBM604x,de
      select which bus will be used (usb bus)  --->
      Select which firmware will be used:.bin or firmware.h (Request .bin from sy
      Driver Extern Function Select  --->
      Driver debug features  --->
[*]   Use short GI support
(wlan%d) Setting wifi interface 1 name
[*]   ENABLE scond interface
(p2p%d) Setting wifi interface 2 name
(pm_stayawake) Setting wifi pm stay awake modules name
(atbm_wlan) Setting wifi module driver name
(atbm_dev_wifi) Setting wifi platform device name
(+)
```

(6) 修改 wifi 接口名称





wifi 接口默认的名称是：wlan0 以及 p2p0.

客户可以根据需要执行修改：

1）客户想使用 wlan0 以及 wlan1，

可直接修改 p2p%d 修改为 wlan%d 即可。

2）客户想使用 wlan 以及 p2p 接口

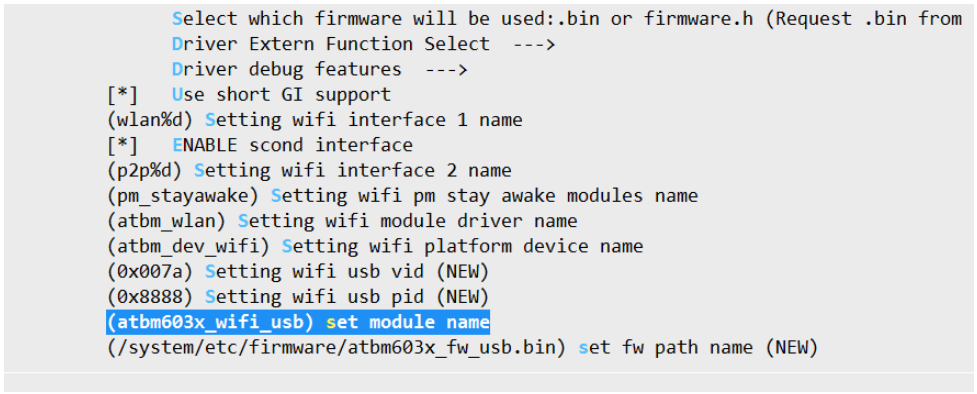
将 wlan%d 修改为 wlan

将 p2p%d 修改为 p2p

注意：

去掉 ENABLE scond interface 配置项，则只要单独的 wlan%d 网口，而没有两个网口。

(7) 修改驱动名称以及挂载结点名称



根据客户需要执行修改，编译出来生成的驱动名称。

以及在系统中挂载驱动 lsmod 看到的驱动名称。

1.2.7.1 注意【重要】

需要注意驱动名称一定需要以如下格式开头：

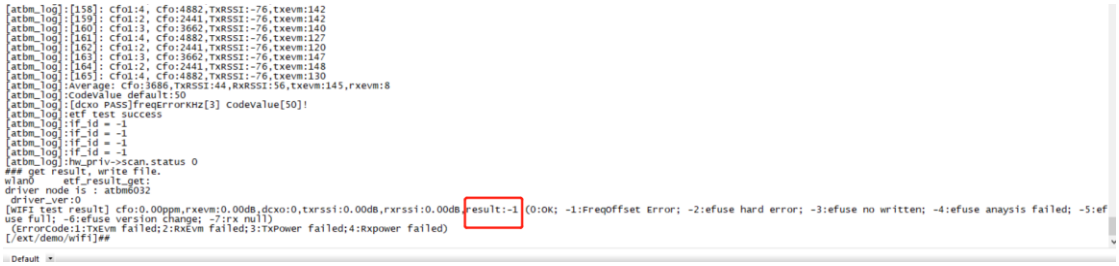
atbm602x 芯片为：atbm602x_xxxxx

atbm603x 芯片为：atbm603x_xxxxx

atbm6012B 芯片为：atbm603x_xxxxx

该命名会影响到 Golden 产测结果的计算。

出问题情况如下：

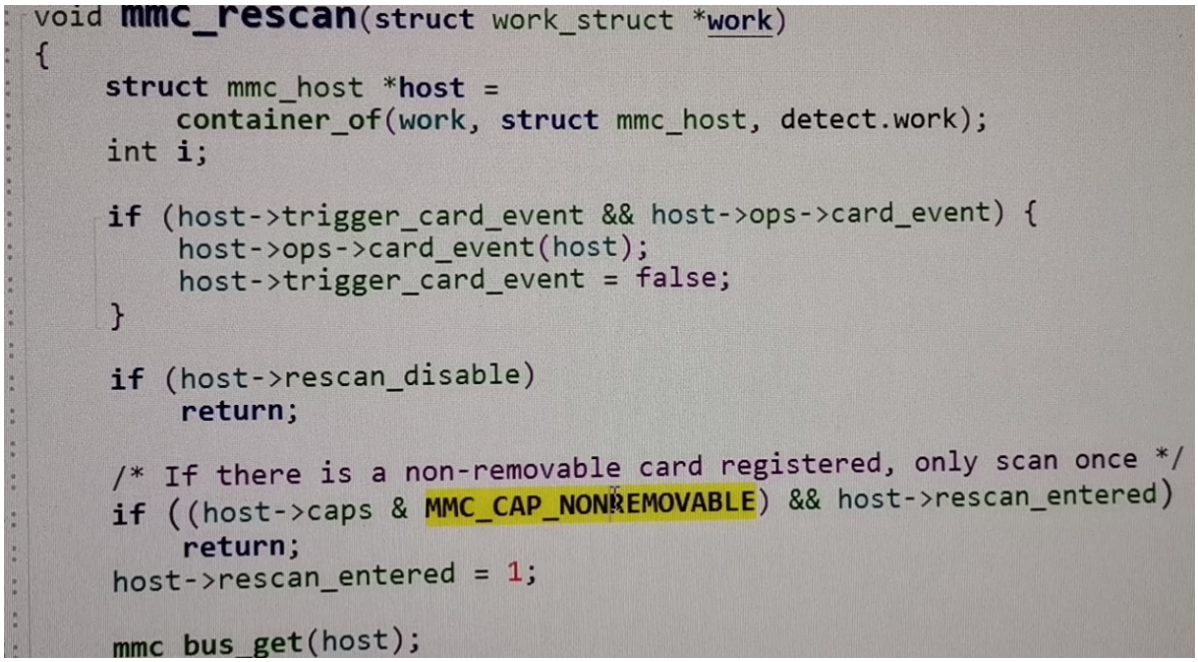


1.3 SDIO WIFI 移植配置说明

sdio 通信有 sdio 中断和 GPIO 中断通信方式。

(1) 注意

这里需要注意下如果 mmc host 进行了如下配置了：



```
void mmc_rescan(struct work_struct *work)
{
    struct mmc_host *host =
        container_of(work, struct mmc_host, detect.work);
    int i;

    if (host->trigger_card_event && host->ops->card_event) {
        host->ops->card_event(host);
        host->trigger_card_event = false;
    }

    if (host->rescan_disable)
        return;

    /* If there is a non-removable card registered, only scan once */
    if ((host->caps & MMC_CAP_NONREMOVABLE) && host->rescan_entered)
        return;
    host->rescan_entered = 1;

    mmc_bus_get(host);
```

代表 mmc host 不允许 sdio 从设备进行热插拔，调用 mmc rescan 直接返回,不会去扫卡。所以此时驱动直接加载卸载即可。

有一些平台刚上电 sdio 不稳定就需要复位一下 sdio wifi，那么就需要增加复位扫卡的动作。

(2) SDIO 中断方式

说明：

以君正 T31 平台为例。

1.3.2.1 修改驱动根目录的 Makefile

自定义一个 platform

```
#PLATFORM_ROCKCHIP_3229             15
#PLATFORM_ROCKCHIP_3229_ANDROID8    16
#PLATFORM_HS_IPC                    17
#PLATFORM_SIGMASTAR                 18
#PLATFORM_HI3516EV200               19
#PLATFORM_XUNWEI_2G                 20
#PLATFORM_NVT98517                  21
#PLATFORM_INGENICT31                22
#PLATFORM_INGENICT41                23


platform ?= PLATFORM_INGENICT31
#ATBM_BUILD_IN_KERNEL?=
```

增加一个编译配置项，增加内核路径和工具链路径用于单独编译驱动使用

需要注意 ATBM_WIFI_PLATFORM 值为 22，在 Makefile 底下添加一个

```
export
ATBM_WIFI__EXT_CCFLAGS ?= -DATBM_WIFI_PLATFORM=5
endif
ifeq ($(platform),PLATFORM_AMLOGIC_905)
export
ATBM_WIFI__EXT_CCFLAGS ?= -DATBM_WIFI_PLATFORM=8
endif
ifeq ($(platform),PLATFORM_CDLINUX)
export
ATBM_WIFI__EXT_CCFLAGS ?= -DATBM_WIFI_PLATFORM=12
endif
ifeq ($(platform),PLATFORM_AMLOGIC_S805)
export
ATBM_WIFI__EXT_CCFLAGS ?= -DATBM_WIFI_PLATFORM=13
endif
ifeq ($(platform),PLATFORM_INGENICT31)
export
ATBM_WIFI__EXT_CCFLAGS ?= -DATBM_WIFI_PLATFORM=22
endif
ifeq ($(platform),PLATFORM_INGENICT41)
export
ATBM_WIFI__EXT_CCFLAGS ?= -DATBM_WIFI_PLATFORM=23
endif
```

修改 hal_apollo/apollo_plat.h

增加一个平台定义宏值为 22

```
*
*********************************************************
*/
#define PLATFORM_XUNWEI             (1)
#define PLATFORM_SUN6I              (2)
#define PLATFORM_FRIENDLY           (3)
#define PLATFORM_SUN6I_64           (4)
#define PLATFORM_SUN8I              (5)
#define PLATFORM_CDLINUX            (12)
#define PLATFORM_AMLOGIC_S805       (13)
#define PLATFORM_AMLOGIC_905        (8)
#define PLATFORM_INGENICT31         (22)
#define PLATFORM_INGENICT41         (23)

#ifndef  ATBM_WIFI_PLATFORM
#define ATBM_WIFI_PLATFORM          PLATFORM_INGENICT31
#endif

#define APOLLO_1505  0
#define APOLLO_1601  1
#define APOLLO_1606  0
#define APOLLO_C     2
#define APOLLO_D     3
#define APOLLO_E     4
```

1.3.2.2 修改 hal_apollo/atbm_platform.c

如果需要增加复位扫卡动作见后面【1.3.4 复位&扫卡动作】

(3) GPIO 中断方式

说明：

以 amlogic s905 平台为例

1.3.3.1 修改驱动根目录的 Makefile

自定义一个 platform

```
#PLATFORM_HIS_LINUX_3_4              14
#PLATFORM_ROCKCHIP_3229              15
#PLATFORM_ROCKCHIP_3229_ANDROID8     16
#PLATFORM_HS_IPC                     17
#PLATFORM_SIGMASTAR                  18
#PLATFORM_HI3516EV200                19
#PLATFORM_XUNWEI_2G                  20
#PLATFORM_NVT98517                   21
#PLATFORM_INGENICT31                 22
#PLATFORM_INGENICT41                 23


platform ?= PLATFORM_AMLOGIC_905
#ATBM_BUILD_IN_KERNEL?=

```

增加一个编译配置项，增加内核路径和工具链路径用于单独编译驱动使用

需要注意 ATBM_WIFI_PLATFORM 值为 8

```
ifeq ($(platform),PLATFORM_AMLOGIC_905)
ifeq ($(sys),Android)
#KERDIR:=/wifi_prj/staff/zhouzhanchao/amlogic/release_s905_l/out/target/product/p200/obj/KERNEL_OBJ/
KERDIR:=/wifi_prj/staff/mengxuehong/s905l/S905L/out/target/product/p201_iptv/obj/KERNEL_OBJ/
CROSS_COMPILE:=/ssd-home/mengxuehong/buildTool1/gcc-linaro-aarch64-linux-gnu-4.9-2014.09_linux/bin/aa
else
#KERDIR:=/wifi_prj/staff/panxuqiang/64bi_driver/cqa64_linux_qt5.3.2/lichee/linux-3.10/
endif
export
ATBM_WIFI__EXT_CCFLAGS = -DATBM_WIFI_PLATFORM=8
arch:=arm64
endif
```

在最后的增加一个配置项用于在内核目录直接编译 modules 时候的配置

需要主要 ATBM_WIFI_PLATFORM 值为 8

```
ifeq ($(platform),PLATFORM_AMLOGIC_905)
export
ATBM_WIFI__EXT_CCFLAGS = -DATBM_WIFI_PLATFORM=8
endif
```

1.3.3.2 打开支持 GPIO 中断配置

```
        select which atbm Wi-Fi product  will be used:ATBM602x,ATBM603x,ATBM604x,de
        select which bus will be used (sdio bus)  --->
        Select which firmware will be used:.bin or firmware.h (Include firmware.h)
        Driver Extern Function Select  --->
        Driver debug features  --->
    (mmc0) which mmc will be used
    [ ]   Use GPIO interrupt
    [*]   Use short GI support
    (wlan%d) Setting wifi interface 1 name
    [*]   ENABLE scond interface
    (p2p%d) Setting wifi interface 2 name
    (pm_stayawake) Setting wifi pm stay awake modules name
    (atbm_wlan) Setting wifi module driver name
    (atbm_dev_wifi) Setting wifi platform device name
    -(+)
```

1.3.3.3 修改使用平台的 mmc 口

根据实际使用的 mmc 口进行配置。

一般平台有两个 mmc 口，mmc0 或者是 mmc1。

```
        select which atbm Wi-Fi product  will be used:ATBM602x,ATBM603x,ATBM604x,de
        select which bus will be used (sdio bus)  --->
        Select which firmware will be used:.bin or firmware.h (Include firmware.h)
        Driver Extern Function Select  --->
        Driver debug features  --->
    (mmc0) which mmc will be used
    [ ]   Use GPIO interrupt
    [*]   Use short GI support
    (wlan%d) Setting wifi interface 1 name
    [*]   ENABLE scond interface
    (p2p%d) Setting wifi interface 2 name
    (pm_stayawake) Setting wifi pm stay awake modules name
    (atbm_wlan) Setting wifi module driver name
    (atbm_dev_wifi) Setting wifi platform device name
    -(+)
```

1.3.3.4 修改 hal_apollo/apollo_plat.h

增加一个平台宏定义值为 8

```
#define PLATFORM_XUNWEI             (1)
#define PLATFORM_SUN6I              (2)
#define PLATFORM_FRIENDLY           (3)
#define PLATFORM_SUN6I_64           (4)
#define PLATFORM_CDLINUX            (12)
#define PLATFORM_AMLOGIC_S805       (13)
#define PLATFORM_AMLOGIC_905        (8)
#define PLATFORM_ANYKA_SDIO         (22)
#define PLATFORM_INGENICT31         (23)


#ifndef  ATBM_WIFI_PLATFORM
#define ATBM_WIFI_PLATFORM          PLATFORM_AMLOGIC_905
#endif
```

1.3.3.5 修改 hal_apollo/atbm_platform.c

增加一个编译时候打印的信息

```
#if (ATBM_WIFI_PLATFORM == PLATFORM_AMLOGIC_905)
 #define PLATFORMINF      "amlogic_905"
 #endif
```

如果有不同版本的内核并且有较差异需要增加进来

```
#if ((ATBM_WIFI_PLATFORM == PLATFORM_AMLOGIC_S805) || (ATBM_WIFI_PLATFORM == PLATFORM_AMLOGIC_905))

#if (LINUX_VERSION_CODE < KERNEL_VERSION(3, 14, 0))
extern void wifi_teardown_dt(void);
extern int wifi_setup_dt(void);
#endif
#endif //#if (ATBM_WIFI_PLATFORM == PLATFORM_AMLOGIC_S805)
```

中断相关的声明定义

```
#if(ATBM_WIFI_PLATFORM == PLATFORM_AMLOGIC_905)

#if (LINUX_VERSION_CODE >= KERNEL_VERSION(3, 14, 0))
 extern int wifi_irq_num(void);
 #endif

u32 atbm_wlan_get_oob_irq(void)
 {
     u32 host_oob_irq = 0;

#if (LINUX_VERSION_CODE < KERNEL_VERSION(3, 14, 0))
     host_oob_irq = INT_GPIO_4;
#else
     host_oob_irq = wifi_irq_num();
 #endif
     atbm_printk_platform("host_oob_irq: %d \r\n", host_oob_irq);

     return host_oob_irq;
 }
 #endif
```

struct atbm_platform_data platform_data 结构中进行中断号初始化

```
#if(ATBM_WIFI_PLATFORM == PLATFORM_AMLOGIC_905)
    .irq_gpio    = 100,
    .power_gpio = 0,
#endif
```

在 atbm_plat_request_gpio_irq 函数中增加 GPIO 中断的初始化

```
#if(ATBM_WIFI_PLATFORM == PLATFORM_AMLOGIC_905)
    bgf_irq = atbm_wlan_get_oob_irq();
    atbm_printk_platform("atbm_plat_request_gpio_irq \n");
    /* Request the IRQ */
    ret =  request_threaded_irq(bgf_irq, atbm_gpio_hardirq,
                    atbm_gpio_irq,
                    IORESOURCE_IRQ | IORESOURCE_IRQ_HIGHEDGE | IORESOURCE_IRQ_SHAREABLE,
                    "atbm_wlan_irq", self);

    if (WARN_ON(ret))
        goto ↓err;
```

在 atbm_plat_free_gpio_irq 函数增加 GPIO 中断的反初始化

```
#if(ATBM_WIFI_PLATFORM == PLATFORM_AMLOGIC_905)
    disable_irq(atbm_bgf_irq);
    free_irq(atbm_bgf_irq,self);
#elif (ATBM_WIFI_PLATFORM == PLATFORM_AMLOGIC_S805)
    //do nothing
    disable_irq(atbm_bgf_irq);
    free_irq(atbm_bgf_irq,self);
#else
    disable_irq_wake(atbm_bgf_irq);
    free_irq(atbm_bgf_irq,self);
    gpio_free(pdata->irq_gpio);
#endif
```

(4) 复位&扫卡动作

1.3.4.1 注册

这里主要是在 hal_apollo/atbm_platform.c 里面的 struct atbm_platform_data 结构体的两个函数实现：

```
struct atbm_platform_data platform_data = {
#ifdef SDIO_BUS
    .mmc_id         = CONFIG_ATBM_SDIO_MMC_ID,
    .clk_ctrl       = NULL,
    .power_ctrl     = atbm_power_ctrl,
    .insert_ctrl    = atbm_insert_crtl,
#if(ATBM_WIFI_PLATFORM == PLATFORM_XUNWEI)
    .irq_gpio    = EXYNOS4_GPX2(4),
    .power_gpio = EXYNOS4_GPC1(1),
#endif
#if(ATBM_WIFI_PLATFORM == PLATFORM_AMLOGIC_S805)

    .irq_gpio    = INT_GPIO_4,
    .power_gpio = 0,
#endif
#if(ATBM_WIFI_PLATFORM == PLATFORM_AMLOGIC_905)
    .irq_gpio    = 100,
    .power_gpio = 0,
#endif
#if(ATBM_WIFI_PLATFORM == PLATFORM_FRIENDLY)
```

增加平台的扫卡函数以及控制 wifi 复位的 GPIO 号。

```
#if (ATBM_WIFI_PLATFORM == PLATFORM_INGENICT31)
#define PLATFORMINF "ingenict31"
extern int jzmmc_manual_detect(int index, int on);
static int WL_REG_EN = 32+25;
#endif
```

1.3.4.2 复位

在 hal_apollo/atbm_platform.c 里面 atbm_power_ctrl --> atbm_platform_power_ctrl 函数中增加对 wifi 的复位操作

```
#if (ATBM_WIFI_PLATFORM == PLATFORM_INGENICT31)
{
    if(enabled){
        atbm_printk_platform("[%s] reset altobeam wifi !\n",__func__);

        gpio_request(WL_REG_EN, "sdio_wifi_power_on");

        atbm_printk_platform("PLATFORM_INGENICT31 SDIO WIFI_RESET 0 \n");
        gpio_direction_output(WL_REG_EN, 0);
        msleep(300);
        atbm_printk_platform("PLATFORM_INGENICT31 SDIO WIFI_RESET 1 \n");
        gpio_direction_output(WL_REG_EN, 1);
        msleep(100);
    }
}
#endif//(ATBM_WIFI_PLATFORM == PLATFORM_INGENICT31)
```

1.3.4.3 扫卡

1) 如果平台有提供扫卡函数那么直接调用即可

在 hal_apollo/atbm_platform.c 里面 atbm_insert_crtl --> atbm_platform_insert_crtl 函数增加扫卡的动作

```
#if (ATBM_WIFI_PLATFORM == PLATFORM_INGENICT31)
{

    mdelay(100);
    jzmmc_manual_detect(1, enabled);
    atbm_printk_platform("============platform insert crtl====== enable=%d\n", enabled);

}
```

2) 如果平台没有提供对外的 mmc rescan 函数那么需要自己实现一个

在 hal_apollo/apollo_sdio.c 的 atbm_sdio_init 函数里面已经实现

```
#if ((ATBM_WIFI_PLATFORM != 10) && (ATBM_WIFI_PLATFORM != PLATFORM_AMLOGIC_S805)\
    && (ATBM_WIFI_PLATFORM != PLATFORM_AMLOGIC_905))

    ret = atbm_sdio_on(pdata);
    if (ret)
        goto err_on;
#endif
    atbm_wtd_init();
    return 0;

#if ((ATBM_WIFI_PLATFORM != 10) && (ATBM_WIFI_PLATFORM != PLATFORM_AMLOGIC_S805)\
    && (ATBM_WIFI_PLATFORM != PLATFORM_AMLOGIC_905))

err_on:
    if (pdata->power_ctrl)
        pdata->power_ctrl(pdata, false);
#endif
err_power:
    if (pdata->clk_ctrl)
        pdata->clk_ctrl(pdata, false);
err_clk:
    sdio_unregister_driver(&sdio_driver);
err_reg:
    return ret;
```

```
#if ((ATBM_WIFI_PLATFORM != 10) && (ATBM_WIFI_PLATFORM != PLATFORM_AMLOGIC_S805) \
    && (ATBM_WIFI_PLATFORM != PLATFORM_AMLOGIC_905))

static int atbm_sdio_on(const struct atbm_platform_data *pdata)
{
    int ret = 0;
    if (pdata->insert_ctrl)
        ret = pdata->insert_ctrl(pdata, true);
    msleep(200);
    atbm_detect_card(pdata);
    return ret;
}
#endif //#if ((ATBM_WIFI_PLATFORM != 10) && (ATBM_WIFI_PLATFORM != PLATFORM_AMLOGIC_S805))
```

1.4 编译

有直接编译和带参数编译两种方式

(1) 直接编译

```
make;make strip
```

(2) 带参数编译

在 WIFI 驱动 22684 版本以后的驱动可以通过这种编译方式：

```
make platform=PLATFORM_SIGMASTAR KERDIR=/usr/lchome/yuzhihuang/Mstar/IPC_I3/linux3.18_i3/ CROSS_COMPILE=/usr/lchome/yuzhihuang/Mstar/IPC_I3/arm-linux-gnueabihf-4.8.3-201404/bin/arm-linux-gnueabihf- sys=Linux arch=arm

make platform=PLATFORM_SIGMASTAR KERDIR=/usr/lchome/yuzhihuang/Mstar/IPC_I3/linux3.18_i3/ CROSS_COMPILE=/usr/lchome/yuzhihuang/Mstar/IPC_I3/arm-linux-gnueabihf-4.8.3-201404/bin/arm-linux-gnueabihf- sys=Linux arch=arm  strip
```

2 驱动放置在内核中的编译方法

2.1 将驱动放置在内核中

进入内核目录下的 drivers/net/wireless/子目录修改 Makefile 和 Kconfig 文件

```
文件(F) 编辑(E) 查看(V) 搜索(S) 终端(T) 帮助(H)
fugui@ubuntu200:/wifi_prj/staff/fugui/platform/iTop4412_Kernel_3.0$ cd drivers/net/wireless/
fugui@ubuntu200:/wifi_prj/staff/fugui/platform/iTop4412_Kernel_3.0/drivers/net/wireless$
```

a) 修改 Makefile

```
obj-$(CONFIG_HOSTAP)            += hostap/
obj-$(CONFIG_B43)               += b43/
obj-$(CONFIG_B43LEGACY)         += b43legacy/
obj-$(CONFIG_ZD1211RW)          += zd1211rw/
obj-$(CONFIG_RTL8180)           += rtl818x/
obj-$(CONFIG_RTL8187)           += rtl818x/
obj-$(CONFIG_RTLWIFI)           += rtlwifi/
obj-$(CONFIG_ATBM_WIRELESS)     += atbm_wifi_40M/

# 16-bit wireless PCMCIA client drivers
obj-$(CONFIG_PCMCIA_RAYCS)      += ray_cs.o
obj-$(CONFIG_PCMCIA_WL3501)     += wl3501_cs.o
```

b) 修改 Kconfig

```
source "drivers/net/wireless/rt2x00/Kconfig"
source "drivers/net/wireless/rtlwifi/Kconfig"
source "drivers/net/wireless/wl1251/Kconfig"
source "drivers/net/wireless/wl12xx/Kconfig"
source "drivers/net/wireless/zd1211rw/Kconfig"
source "drivers/net/wireless/mwifiex/Kconfig"
source "drivers/net/wireless/atbm_wifi_40M/Kconfig"

menuconfig MTK_WIRELESS_SOLUTION
        bool "MTK wireless chip configuration"
        help
          "enable/disable and config MTK wireless solution"

if MTK_WIRELESS_SOLUTION
source "drivers/net/wireless/combo_mt66xx/Kconfig"
source "drivers/net/wireless/mt5931/Kconfig"
endif # MTK_WIRELESS_SOLUTION
endif # WLAN
```

修改完 Makefile 和 Kconfig 文件后回到内核顶层目录

将 atbm_wifi_40M 的驱动源码目录复制到内核目录下的 drivers/net/wirelesee/

c) 修改 atbm_wifi_40M 中的 Makefile,指定相关平台选择，默认指定为 platform_other,

PS：注意#PLATFORM_OTHER 20 ，这个值用户自定义，不要和已定义的冲突即可

```
Makefile
28 #PLATFORM_OTHER                20
29 export
30 platform ?= PLATFORM_OTHER      选择平台
31 #Android
32 #Linux
33 sys ?= Linux
34 #arch:arm or arm64
35 arch ?= arm                     选择系统及架构
36 #export
37 #ATBM_WIFI__EXT_CCFLAGS = -DATBM_WIFI_PLATFORM=$(platform)
38
39 ifeq ($(CUSTOMER_SUPPORT_USED),y)
40 MAKEFILE_SUB ?= Makefile.build.customer
41 else
42 MAKEFILE_SUB ?= Makefile.build
43 endif
44
45 ifeq ($(KERNELRELEASE),)
46
47 ifeq ($(platform),PLATFORM_HS_IPC)
48 KERDIR:=/wifi_prj/staff/zhouzhanchao/ankai_hs_ipc/kernel/kernel_testXMFlash/kernel/
49 CROSS_COMPILE:=/wifi_prj/staff/zhouzhanchao/ankai_hs_ipc/bin/arm-2009q3/bin/arm-none-linux-gnueabi-
50 ATBM_WIFI__EXT_CCFLAGS = -DATBM_WIFI_PLATFORM=17
51 arch = arm
```

在同文件在底下，需要修改 PLATFORM_OTHER 的值

```
331 ATBM_WIFI__EXT_CCFLAGS = -DATBM_WIFI_PLATFORM=12
332 endif
333 ifeq ($(platform),PLATFORM_AMLOGIC_S805)
334 export
335 ATBM_WIFI__EXT_CCFLAGS = -DATBM_WIFI_PLATFORM=13
336 endif
337 ifeq ($(platform),PLATFORM_ROCKCHIP_3229)
338 export
339 ATBM_WIFI__EXT_CCFLAGS = -DATBM_WIFI_PLATFORM=10
340 endif
341 ifeq ($(platform),PLATFORM_XIONGMAI)
342 export
343 ATBM_WIFI__EXT_CCFLAGS = -DATBM_WIFI_PLATFORM=21
344 endif
345 ifeq ($(platform),PLATFORM_OTHER)
346 export
347 ATBM_WIFI__EXT_CCFLAGS = -DATBM_WIFI_PLATFORM=20
348 endif
349 export
350 include $(src)/Makefile.build.kernel
351 endif
```

d) 通过 make menuconfig 配置 atbm_wifi 驱动支持的相关配置

➔ 请参考文档的【一.2)】：配置驱动。

e) 通过平台相关编译方式编译得到 atbm 的驱动 ko 文件。

f) 编译出来的驱动有点大 需要 strip 缩小体积

Arm-linux-xxx-strip --strip-debug atbm_wifixxx.ko

3 出错调试信息&解决

3.1 编译出错

在编译驱动时，有可能出现编译限制等级较为严格导致出错。

```
  ^
  CC [M]  drivers/net/wireless/atbm_HS_svn950/hal_apollo/pm.o
drivers/net/wireless/atbm_HS_svn950/hal_apollo/atbm_platform.c:90:9: note: #pragma message: xunwei
 #pragma message(PLATFORMINF)
         ^
drivers/net/wireless/atbm_HS_svn950/hal_apollo/atbm_platform.c:403:2: error: implicit declaration of function 'EXYNOS4_GPX2' [-Werror=implicit-function-declaration]
  .irq_gpio = EXYNOS4_GPX2(4),
  ^
drivers/net/wireless/atbm_HS_svn950/hal_apollo/atbm_platform.c:403:2: error: initializer element is not constant
drivers/net/wireless/atbm_HS_svn950/hal_apollo/atbm_platform.c:403:2: error: (near initialization for 'platform_data.irq_gpio')
drivers/net/wireless/atbm_HS_svn950/hal_apollo/atbm_platform.c:404:2: error: implicit declaration of function 'EXYNOS4_GPC1' [-Werror=implicit-function-declaration]
  .power_gpio = EXYNOS4_GPC1(1),
  ^
drivers/net/wireless/atbm_HS_svn950/hal_apollo/atbm_platform.c:404:2: error: initializer element is not constant
drivers/net/wireless/atbm_HS_svn950/hal_apollo/atbm_platform.c:404:2: error: (near initialization for 'platform_data.power_gpio')
cc1: some warnings being treated as errors
make[5]: *** [drivers/net/wireless/atbm_HS_svn950/hal_apollo/atbm_platform.o] Error 1
make[5]: *** Waiting for unfinished jobs....
drivers/net/wireless/atbm_HS_svn950/hal_apollo/hwio_usb.c: In function 'atbm_before_load_firmware':
```

修改 kernel/Makefile

```
KBUILD_CFLAGS   += $(call cc-option,-Wno-stringop-truncation)
KBUILD_CFLAGS   += $(call cc-option,-Wno-sizeof-pointer-memaccess)
KBUILD_CFLAGS   += $(call cc-option,-Wno-array-bounds)
KBUILD_CFLAGS   += $(call cc-option,-Wno-packed-not-aligned)

# disable warnings in gcc 7.2.1
#KBUILD_CFLAGS   += $(call cc-option,-Wno-switch-unreachable)
#KBUILD_CFLAGS   += $(call cc-option,-Wno-misleading-indentation)

# use the deterministic mode of AR if available
KBUILD_ARFLAGS := $(call ar-option,D)

#KBUILD_CFLAGS   += -Werror

include scripts/Makefile.kasan
include scripts/Makefile.extrawarn
include scripts/Makefile.ubsan

# Add any arch overrides and user supplied CPPFLAGS, AFLAGS and CFLAGS as
# last assignments
KBUILD_CPPFLAGS += $(ARCH_CPPFLAGS) $(KCPPFLAGS)
KBUILD_AFLAGS   += $(ARCH_AFLAGS)   $(KAFLAGS)
KBUILD_CFLAGS   += $(ARCH_CFLAGS)   $(KCFLAGS)

# Use --build-id when available.
LDFLAGS_BUILD_ID = $(patsubst -Wl$(comma)%,%,\
                             $(call cc-ldoption, -Wl$(comma)--build-id,)
KBUILD_LDFLAGS_MODULE += $(LDFLAGS_BUILD_ID)
```

如果注释上面的宏还不行的话，就需要按照下面的一个个修改。

```
                -include $(srctree)/include/linux/kconfig.h

KBUILD_CPPFLAGS := -D__KERNEL__

KBUILD_CFLAGS   := -Wall -Wundef -Wstrict-prototypes -Wno-trigraphs \
                -fno-strict-aliasing -fno-common \
                -Wno-format-security \
                -fno-delete-null-pointer-checks
#-Werror-implicit-function-declaration
KBUILD_CFLAGS_KERNEL :=
```

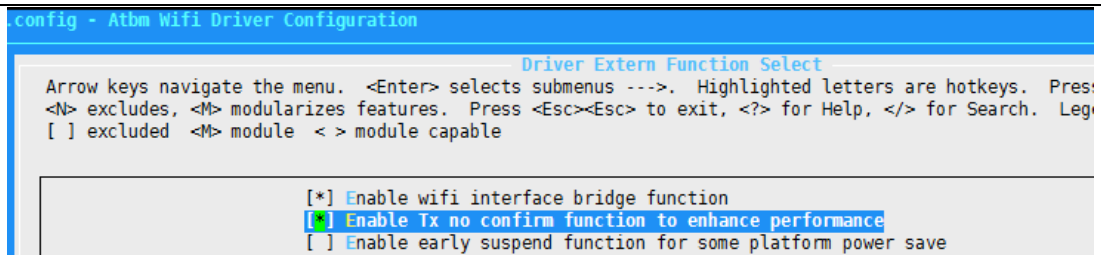
类似警告导致 error 的问题，类似修改。

3.2 加载出错

(1) NO_CONFIRM 宏没配置对导致出错

```
:CAPABILITIES_SHARE_CRYSTAL        [0]
:CAPABILITIES_HW_CHECKSUM          [0]
:CAPABILITIES_SINGLE_CHANNEL_MULRX [1]
:CAPABILITIES_CFO_DCXO_CORRECTION  [0]
:LMAC SET CAPABILITIES_NO_CONFIRM <ERROR>
-[ cut here ]------------
at bfd62b14 [verbose debug info unavailable]
ror: Oops - BUG: 0 [#1] PREEMPT SMP THUMB2
```

解决办法需要在一开始配置驱动时候打开对应的宏，如果打开了就给关闭。



3.3 扫描 AP 个数少

(1) 扫描状态返回-110

Log 如下图,这种可能是内核做了微小的修改以后没有再重新编译驱动以后导致的。

一般是修改 CONFIG_HZ 这个参数的值。

```
V380-linux# iwlist p2p0 scan | grep SSID
[   43.167634] [atbm_log]:atbm_hw_scan:if_id(1)
[   43.171134] [atbm_log]:atbm_hw_scan:scan, delay suspend
[   43.178162] [atbm_log]:scan start band(0),(14)
[   43.757991] [atbm_log]:Timeout waiting for scan complete notification.
[   43.763360] [atbm_log]:wsm_stop_scan_confirm 0 wait_complete 1
[   43.771316] [atbm_log]:atbm_scan_work:end(1)
[   43.774466] [atbm_log]:if_id = -1
[   43.774533] [atbm_log]:if_id = -1
[   43.774580] [atbm_log]:if_id = -1
[   43.777490] [atbm_log]:hw_priv->scan.status -110
                    ESSID:"B"
                    ESSID:"macro-video"
                    ESSID:"HUAWEI-10EC3B_Wi-Fi5"
                    ESSID:"YanFa-06090"
                    ESSID:"HUAWEI-10EC3B"
                    ESSID:""
                    ESSID:"YLGJ"
                    ESSID:"360A"
                    ESSID:""
                    ESSID:"Xiaomi_F2D4"
                    ESSID:"360_123"
                    ESSID:"gongcheng"
                    ESSID:"wifi"
                    ESSID:"ceshi02"
                    ESSID:"B_Wi-Fi5"
                    ESSID:"DIRECT-273F1225"
                    ESSID:"MV15106437"
V380-linux# [8373bf5a9d5b35b15c6f46963d89c75d]
```

(2) 扫描状态正常但是扫描的 AP 数量少，并且发现前几个信道的 ap 很少或者没有

出现这种问题先查一下 cfg80211 的配置，在内核的 net/wireless/scan.c 查看如下参数配置：

```
#define IEEE80211_SCAN_RESULT_EXPIRE (15 * HZ)
```

正常 IEEE80211_SCAN_RESULT_EXPIRE 配置为 15 * HZ 或者 30 * HZ,太短会导致扫描到的 ap 个数少

3.4 添加详细的反汇编信息方法

需要在 Makefile.build.kernel 里面添加上-g 编译参数

```
#################################################################################
#               Makefile For Kernel
#################################################################################

NOSTDINC_FLAGS := -I$(src)/include/ \
        -include $(src)/include/linux/compat-2.6.h \
        -DCOMPAT_STATIC


KBUILD_CFLAGS += -Wno-error \
        -Wno-error=vla \
        -Wno-error=unused-function -g
```

这样子编译出来的驱动，执行：

```
objdump -S atbm603x_wifi.ko > atbm603x_wifi.s
```

信息就会很详细

```
Disassembly of section .text:

00000000 <atbm_timer_handle>:
#if (LINUX_VERSION_CODE >= KERNEL_VERSION(4, 14, 0))
static inline void atbm_timer_handle(struct timer_list *in_timer)
#else
static inline void atbm_timer_handle(unsigned long data)
#endif
{
       0:       e1a0c00d        mov     ip, sp
       4:       e92dd800        push    {fp, ip, lr, pc}
       8:       e24cb004        sub     fp, ip, #4
#if (LINUX_VERSION_CODE >= KERNEL_VERSION(4, 14, 0))
        struct atbm_timer_list *atbm_timer = from_timer(atbm_timer, in_timer, timer);
#else
        struct atbm_timer_list *atbm_timer = (struct atbm_timer_list *)data;
#endif
        BUG_ON(atbm_timer->function == NULL);
       c:       e590301c        ldr     r3, [r0, #28]
      10:       e3530000        cmp     r3, #0
      14:       0a000002        beq     24 <atbm_timer_handle+0x24>
        atbm_timer->function(atbm_timer->data);
      18:       e5900020        ldr     r0, [r0, #32]
      1c:       e12fff33        blx     r3
      20:       e89da800        ldm     sp, {fp, sp, pc}
      24:       e7f001f2        .word   0xe7f001f2

00000028 <ieee80211_tasklet_handler>:
              BSS_CHANGED_ERP_PREAMBLE |
              BSS_CHANGED_ERP_SLOT;
}

static void ieee80211_tasklet_handler(unsigned long data)
```

如果编译的时候没有添加-g 参数或者驱动经过了 strip 那么执行：

```
objdump -S atbm603x_wifi.ko > atbm603x_wifi.s
```

可读性就比较差。

```
Disassembly of section .text:

00000000 <atbm_timer_handle>:
       0:       e1a0c00d        mov     ip, sp
       4:       e92dd800        push    {fp, ip, lr, pc}
       8:       e24cb004        sub     fp, ip, #4
       c:       e590301c        ldr     r3, [r0, #28]
      10:       e3530000        cmp     r3, #0
      14:       0a000002        beq     24 <atbm_timer_handle+0x24>
      18:       e5900020        ldr     r0, [r0, #32]
      1c:       e12fff33        blx     r3
      20:       e89da800        ldm     sp, {fp, sp, pc}
      24:       e7f001f2        .word   0xe7f001f2

00000028 <ieee80211_tasklet_handler>:
      28:       e1a0c00d        mov     ip, sp
      2c:       e92ddff0        push    {r4, r5, r6, r7, r8, r9, sl, fp, ip, lr, pc}
      30:       e24cb004        sub     fp, ip, #4
      34:       e24dd024        sub     sp, sp, #36     ; 0x24
      38:       e3a03000        mov     r3, #0
      3c:       e24b5038        sub     r5, fp, #56     ; 0x38
      40:       e1a07000        mov     r7, r0
      44:       e50b3030        str     r3, [fp, #-48]  ; 0xfffffffd0
      48:       e50b5038        str     r5, [fp, #-56]  ; 0xfffffffc8
      4c:       e50b5034        str     r5, [fp, #-52]  ; 0xfffffffcc
      50:       e10f0000        mrs     r0, CPSR
      54:       e3802080        orr     r2, r0, #128    ; 0x80
      58:       e121f002        msr     CPSR_c, r2
      5c:       e3a02001        mov     r2, #1
      60:       e50b3044        str     r3, [fp, #-68]  ; 0xffffffbc
      64:       e1a06003        mov     r6, r3
      68:       e2873e1a        add     r3, r7, #416    ; 0x1a0
      6c:       e50b3048        str     r3, [fp, #-72]  ; 0xffffffb8
```

3.5 编译的时候显示详细的编译信息

```
make V=1
```

3.6 编译报时钟错误

原因可能是系统时间太老了，需要重启下电脑！

```
yzh@yzh-VirtualBox:~/sigmastar_i7/kernel$ make infinity7_ssc023a_s01a_nandflash_defconfig
make: Warning: File 'makefile' has modification time 54663274 s in the future
Check Kconfigs for no newline at the end...
Extract CHIP NAME (infinity7) to '.sstar_chip.txt'
make[1]: Entering directory '/home/yzh/sigmastar_i7/kernel'
make[1]: Warning: File 'arch/arm64/Makefile' has modification time 54663275 s in the future
make[2]: Warning: File 'scripts/Makefile.host' has modification time 54663302 s in the future
  HOSTCC  scripts/basic/fixdep
make[2]: 警告：检测到时钟错误。您的创建可能是不完整的。
make[2]: Warning: File 'scripts/Makefile.host' has modification time 54663302 s in the future
  HOSTCC  scripts/kconfig/conf.o
  HOSTCC  scripts/kconfig/confdata.o
  HOSTCC  scripts/kconfig/expr.o
  LEX     scripts/kconfig/lexer.lex.c
/bin/sh: 1: flex: not found
scripts/Makefile.host:9: recipe for target 'scripts/kconfig/lexer.lex.c' failed
make[2]: *** [scripts/kconfig/lexer.lex.c] Error 127
Makefile:632: recipe for target 'infinity7_ssc023a_s01a_nandflash_defconfig' failed
make[1]: *** [infinity7_ssc023a_s01a_nandflash_defconfig] Error 2
make[1]: Leaving directory '/home/yzh/sigmastar_i7/kernel'
makefile:25: recipe for target 'infinity7_ssc023a_s01a_nandflash_defconfig' failed
make: *** [infinity7_ssc023a_s01a_nandflash_defconfig] Error 2
yzh@yzh-VirtualBox:~/sigmastar_i7/kernel$
```

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