

[Realtek RF MP Tool Guidelines]

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[1. Features]

The following steps demonstrate Realtek Wireless Adapter Mass Production Linux Tool. This is a simple install guide, We use Linux utility “iwpriv” to get and set I/O control to WLAN driver. Or use realtek proprietary tools “rtwpriv” for Android system.

[2. Software Package] - To check have the Component .tar.gz files.

1. Driver source - rtXXX_linux_MP_vX.X.X.tar.gz
2. Wireless tool Source -(If want to use for Android system) - Android_wireless_tools.tar
3. Documents
 - LinuxDriver_MP_lwpriv_UserGuide.doc

[3. Quick Start Guide]

[3.1. Build Driver module]

Note: Use su/sudo su for root authentication with following command.

1. Unzip Driver source folder -
tar -xvzf rtlXXX_linux_MP_linux_vx.x.x.tar.gz
2. Change to driver source code directory -
cd rtlXXX_linux_MP__linux_vx.x.x
3. To choose interface for 8723A WiFi Driver.
chmod 777 make_drv
./make_drv
input 1 or 2 for 8723AS/8723AU

4. Config compile Setting-

Edit the "Makefile", and modify the line 21 "CONFIG_MP_INCLUDED = n" to "CONFIG_MP_INCLUDED = y"

If your target platform is the platform you're compiling driver, maybe you don't need to change any setting.

Otherwise you need to do some configuration manually, like cross compiler and kernel source tree directory.

ex.

```
ARCH := arm
```

```
CROSS_COMPILE := arm-none-linux-gnueabi-
```

```
KSRC := /usr/src/linux-2.6.34.1
```

5. Do the Compile the driver source code -

```
# make
```

If nothing goes wrong, the driver "8xxx.ko" will be generated.

If there're still some problems or need more detail compile driver guide, please check normal driver package for more reference.

=====

3.2 Build Android wireless tools

=====

3.2.1 rtwpriv for MP APK GUI Tool

The Realtek Android MP apk tool need to use the proprietary rtwpriv tool, please first to execute the adb push the rtwpriv to the android system.

In the RtkWiFiTest_Package_For_Customer package more detailed information on readme.txt.

Q. How to build rtwpriv tool?

A.

[Linux]

Just "make", and you will get executable file "rtwpriv".

[Android - Speradtrum platform]

Step 1. put rtwpriv directory to idh.code/external/.

Step 2. In root directory (idh.code/), run "./mk sp6820gb u adr external/rtwpriv/".

Step 3. The binary is installed on "out/target/product/hsdroid/system/bin/rtwpriv".

3.2.2 iwpriv tool

If you want to use "iwpriv" for Android system, we need to Build iwpriv(wireless tools) for android.

And iwpriv use the "**wireless-extensions**" to ioctl with wlan driver, If your Android kernel disable the wireless extensions,

Please rebuild kernel and enable the kernel config "**wireless-extensions**"

Networking support --->

-*- Wireless --->

[*] WIRELESS_EXT

[*] WEXT_PRIV

If your are use Linux kernel 3.x, maybe you can't to select and enable items on make menuconfig, you can refer the following procedures:

Changed the followings in \linux-3.0.20\net\wireless\Kconfig:

before:

config WIRELESS_EXT

bool

...

config WEXT_PRIV

bool

to:

config WIRELESS_EXT

bool "WIRELESS_EXT"

...

config WEXT_PRIV

bool "WEXT_PRIV"

and selected the followings in "make menuconfig":

Networking support --->

-*- Wireless --->

[*] WIRELESS_EXT

[*] WEXT_PRIV

With these steps, kernel and WLAN driver seem to be compiled successfully.

3.2.2-1 Compile the wireless tools

```
#tar zxvf Android_wireless_tools-iwpriv.tar.gz
```

```
#cp wireless_tools froyo-x86/external/
```

```
root@realtek-desktop:~/Desktop/froyo-x86/external/wireless_tools# ../../build/env
setup.sh
```

```
root@realtek-desktop:~/Desktop/froyo-x86/external/wireless_tools# mm
```

```
.....
```

```
target Non-prelinked: iwpriv (out/target/product/eeepc/symbols/system/bin/iwpriv)
```

```
target Unstripped: iwpriv
```

```
(out/target/product/eeepc/obj/EXECUTABLES/iwpriv_intermediates/iwpriv)
```

```
Install: out/target/product/eeepc/system/sbin/iwpriv
```

```
#cp " out/target/product/eeepc/system/sbin/iwpriv "  to target platform file system
" system/sbin/iwpriv ".
```

[3.3 Manual for MP Use Example]

(Execute the following commands after WLAN interface is normally opened)

If you want to change the input parameter(rate 、 channel 、 txpower 、 bandwidth),please must input advance the command "**iwpriv wlan0 mp_ctx stop**".

Please refer the doc "iwpriv_mp_settings_for_different_data_rate.xls " for set data rate.

Insert and enable the MP Mode Driver

```
insmod wlan.ko rtw_mp_init=1
```

3.3.1 [Continuous Tx testing] : "iwpriv wlan0 mp_ctx background"

```
#ifconfig wlan0 up                // Enable Device for MP operation
#iwpriv wlan0 mp_start            // enter MP mode
#iwpriv wlan0 mp_setrfpath 1      //Switch Antenna to WiFi (For Combo IC)
#iwpriv wlan0 mp_channel 1        // set channel to 1 . 2, 3, 4~13 etc.
#iwpriv wlan0 mp_bandwidth 40M=0,shortGI=0 // set 20M mode and long GI,set 40M
is 40M=1.
#iwpriv wlan0 mp_ant_tx a         //Select Antenna A for operation,if
device have 2x2 antennam select antenna "a" or "b" and "ab" for operation.
```

If you want to get and use Efuse Tx power index,please input advance the command "iwpriv wlan0 mp_get_txpower ",and use the return value fill to following orange field.

```
#iwpriv wlan0 mp_txpower patha=44,pathb=44 //set path A and path B Tx power
level,the Range is 0~63.
```

```
#iwpriv wlan0 mp_rate 108          // set OFDM data rate to 54Mbps,ex:
CCK 1M = 2, CCK 5.5M = 11 ;OFDM 6M=12 、 54M = 108;N Rate: MCS0 = 128,MCS1 =
129,MCS 2=130....MCS15 = 143 etc.
#iwpriv wlan0 mp_ctx background    // start continuous Tx
#iwpriv wlan0 mp_ctx stop          //stop continuous Tx
```

If you want to change the input parameter(rate 、 channel 、 txpower 、 bandwidth),please must input advance the command "iwpriv wlan0 mp_ctx stop".

```
#iwpriv wlan0 mp_stop              // exit MP mode
If you want to continue MP test , don't do this command.
#ifconfig wlan0 down              // close WLAN interface
```

3.3.2 [Continuous Packet Tx testing] : "iwpriv wlan0 mp_ctx background,pkt"

```
#ifconfig wlan0 up // Enable Device for MP operation
#iwpriv wlan0 mp_start // enter MP mode
#iwpriv wlan0 mp_setrfpath 1 //Switch Antenna to WiFi (For Combo IC)
#iwpriv wlan0 mp_channel 1 // set channel to 1 . 2, 3, 4~13 etc.
#iwpriv wlan0 mp_bandwidth 40M=0,shortGI=0 // set 20M mode and long GI,set 40M is
40M=1.
#iwpriv wlan0 mp_ant_tx a //Select Antenna A for operation,if
device have 2x2 antennam select antenna "a" or "b" and "ab" for operation.
```

If you want to get and use Efuse Tx power index,please input advance the command "iwpriv wlan0 mp_get_txpower ",and use the return value fill to following orange field.

```
#iwpriv wlan0 mp_txpower patha=44,pathb=44 //set path A and path B Tx power
level,the Range is 0~63.
```

```
#iwpriv wlan0 mp_rate 108 // set OFDM data rate to 54Mbps,ex:
CCK 1M = 2, CCK 5.5M = 11 ;OFDM 6M=12 、 54M = 108;N Rate: MCS0 = 128,MCS1 =
129,MCS 2=130....MCS15 = 143 etc.
#iwpriv wlan0 mp_ctx background,pkt // start continuous Packet Tx
#iwpriv wlan0 mp_ctx stop //stop continuous Packet Tx
```

If you want to change the input parameter(rate 、 channel 、 txpower 、 bandwidth),please must input advance the command "iwpriv wlan0 mp_ctx stop".

```
#iwpriv wlan0 mp_stop // exit MP mode
If you want to continue MP test , don't do this command.
#ifconfig wlan0 down // close WLAN interface
```

3.3.3 [Count Packet Tx testing]: "iwpriv wlan0 mp_ctx count=%d,pkt"

```
#ifconfig wlan0 up // Enable Device for MP operation
#iwpriv wlan0 mp_start // enter MP mode
#iwpriv wlan0 mp_setrfpath 1 //Switch Antenna to WiFi (For Combo IC)
#iwpriv wlan0 mp_channel 1 // set channel to 1 . 2, 3, 4~13 etc.
#iwpriv wlan0 mp_bandwidth 40M=0,shortGI=0 // set 20M mode and long GI,set 40M
is 40M=1.
#iwpriv wlan0 mp_ant_tx a //Select Antenna A for operation,if
device have 2x2 antennam select antenna "a" or "b" and "ab" for operation.
```

If you want to get and use Efuse Tx power index,please input advance the command "iwpriv wlan0 mp_get_txpower ",and use the return value fill to following orange field.

```
#iwpriv wlan0 mp_txpower patha=44,pathb=44 //set path A and path B Tx power
level,the Range is 0~63.
```

```
#iwpriv wlan0 mp_rate 108 // set OFDM data rate to 54Mbps,ex:
CCK 1M = 2, CCK 5.5M = 11 ;OFDM 6M=12 、 54M = 108;N Rate: MCS0 = 128,MCS1 =
129,MCS 2=130....MCS15 = 143 etc.
```

```
# iwpriv wlan0 mp_ctx count=%d,pkt // "%d" Number of packets start packet Tx
start continuous Packet Tx
```

```
#iwpriv wlan0 mp_ctx stop //stop continuous Packet Tx
```

If you want to change the input parameter(rate 、 channel 、 txpower 、 bandwidth),please must input advance the command "iwpriv wlan0 mp_ctx stop".

```
#iwpriv wlan0 mp_stop // exit MP mode
```

If you want to continue MP test , don't do this command.

```
#ifconfig wlan0 down // close WLAN interface
```

3.3.4 [Carrier suppression testing]: "iwpriv wlan0 mp_ctx background,cs"

```
#ifconfig wlan0 up // Enable Device for MP operation
#iwpriv wlan0 mp_start // enter MP mode
#iwpriv wlan0 mp_setrfpath 1 //Switch Antenna to WiFi (For Combo IC)
#iwpriv wlan0 mp_channel 1 // set channel to 1 . 2, 3, 4~13 etc.
#iwpriv wlan0 mp_bandwidth 40M=0,shortGI=0 // set 20M mode and long GI,set 40M is
40M=1.
#iwpriv wlan0 mp_ant_tx a //Select Antenna A for operation,if
device have 2x2 antennam select antenna "a" or "b" and "ab" for operation.
```

If you want to get and use Efuse Tx power index,please input advance the command "iwpriv wlan0 mp_get_txpower ",and use the return value fill to following orange field.

```
#iwpriv wlan0 mp_txpower patha=44,pathb=44 //set path A and path B Tx power
level,the Range is 0~63.
```

```
#iwpriv wlan0 mp_rate 22 // set OFDM data rate to 54Mbps,ex:
CCK 1M = 2, CCK 5.5M = 11 ;OFDM 6M=12 、 54M = 108;N Rate: MCS0 = 128,MCS1 =
129,MCS 2=130....MCS15 = 143 etc.
```

```
#iwpriv wlan0 mp_ctx background,cs // start sending carrier suppression signal
```

```
#iwpriv wlan0 mp_ctx stop //stop continuous Packet Tx
```

If you want to change the input parameter(rate 、 channel 、 txpower 、 bandwidth),please must input advance the command "iwpriv wlan0 mp_ctx stop".

```
#iwpriv wlan0 mp_stop // exit MP mode
```

If you want to continue MP test , don't do this command.

```
#ifconfig wlan0 down // close WLAN interface
```

3.3.5 [Single Tone Tx testing]: "iwpriv wlan0 mp_ctx background,stone"

```
#ifconfig wlan0 up // Enable Device for MP operation
#iwpriv wlan0 mp_start // enter MP mode
#iwpriv wlan0 mp_setrfpath 1 //Switch Antenna to WiFi (For Combo IC)
#iwpriv wlan0 mp_channel 1 // set channel to 1 . 2, 3, 4~13 etc.
#iwpriv wlan0 mp_bandwidth 40M=0,shortGI=0 // set 20M mode and long GI,set 40M
is 40M=1.
#iwpriv wlan0 mp_ant_tx a //Select Antenna A for operation,if
device have 2x2 antennam select antenna "a" or "b" and "ab" for operation.
```

If you want to get and use Efuse Tx power index,please input advance the command "iwpriv wlan0 mp_get_txpower ",and use the return value fill to following orange field.

```
#iwpriv wlan0 mp_txpower patha=44,pathb=44 //set path A and path B Tx power
level,the Range is 0~63.
```

```
#iwpriv wlan0 mp_rate 108 // set OFDM data rate to 54Mbps,ex:
CCK 1M = 2, CCK 5.5M = 11 ;OFDM 6M=12 、 54M = 108;N Rate: MCS0 = 128,MCS1 =
129,MCS 2=130....MCS15 = 143 etc.
```

```
#iwpriv wlan0 mp_ctx background,stone # start sending single tone signal
```

```
#iwpriv wlan0 mp_ctx stop //stop continuous Packet Tx
```

If you want to change the input parameter(rate 、 channel 、 txpower 、 bandwidth),please must input advance the command "iwpriv wlan0 mp_ctx stop".

```
#iwpriv wlan0 mp_stop // exit MP mode
```

If you want to continue MP test , don't do this command.

```
#ifconfig wlan0 down // close WLAN interface
```

3.3.6 [Air Rx testing]: "iwpriv wlan0 mp_arx start"

```
#ifconfig wlan0 up                // Enable Device for MP operation
#iwpriv wlan0 mp_start            // Enter MP mode
#iwpriv wlan0 mp_setrfpath 1      // Switch Antenna to WiFi (For Combo IC)
#iwpriv wlan0 mp_channel 1        // Set channel to 1 . 2, 3, 4~13 etc.
#iwpriv wlan0 mp_bandwidth 40M=0,shortGI=0 // Set 20M mode and long GI or set to
40M is 40M=1.
#iwpriv wlan0 mp_ant_rx a         // Select antenna A for operation,if device
have 2x2 antennam select antenna "a" or "b" and "ab" for operation.
#iwpriv wlan0 mp_arx start        // start air Rx teseting.
#iwpriv wlan0 mp_query            // get the statistics.
#iwpriv wlan0 mp_arx stop or #iwpriv wlan0 mp_reset_stats // Stop air Rx test and show
the Statistics / Reset Counter.
#iwpriv wlan0 mp_stop             // exit MP mode
#ifconfig wlan0 down              // close WLAN interface
```

3.3.6 [Enable/Disable Tx Power Tracking]: "iwpriv wlan0 mp_pwrctldm start/stop"

```
#iwpriv wlan0 mp_pwrctldm start    #Enable the power tracking for Tx.
#iwpriv wlan0 mp_pwrctldm stop     #Disable the power tracking for Tx.
```

[4. Efuse Read/Write Use Example]

use example:

[4.1 WiFi efuse_get]

```
#iwpriv wlan0 efuse_get realmap          // read form driver for all efuse logic map.
#iwpriv wlan0 efuse_get realraw          // read form all HW Efuse phy map.
#iwpriv wlan0 efuse_get mac              // read mac address  ( Direct to use the cmd
for raed mac address from the efuse content )

#iwpriv wlan0 efuse_get rmap,16,6        // fix offset :cmd,offset,byteCounts ( Specified a
start of the efuse's logic address 0x16 offset and set the number of bytes for read
the efuse content)

#iwpriv wlan0 efuse_get wlrfrmap,16,6    // fix offset :cmd,offset,byteCounts
( Specified a start of the efuse's logic 0x16 address offset and set the number of
bytes for read the fake WiFi efuse content)

#iwpriv wlan0 efuse_get wlrfkmap         // read form WiFi fake for all efuse logic map.
```

[4.2 WiFi efuse_set]

```
#iwpriv wlan0 efuse_set wmap,16,00e04c871234 // cmd,offset,Data bytes[hex]
( Specified a offset address for write 6 bytes data "0x00,0xe0,0x4c,0x87,0x12,0x34"
to the 0x16 start of the efuse logic address )

#iwpriv wlan0 efuse_set mac,00e04c871234 // cmd,Data bytes[hex] (Use set
mac cmd to write 6 bytes data "0x00,0xe0,0x4c,0x87,0x12,0x34" to the efuse
content)

#iwpriv wlan0 efuse_set wlwfake,16,00e04c871234 // cmd,offset,Data bytes[hex]
( Specified a offset address for write 6 bytes data "0x00,0xe0,0x4c,0x87,0x12,0x34"
to the 0x16 start of the Fake efuse content address )

#iwpriv wlan0 efuse_set wldumpfake // Dump WiFi HW efuse to Fake WiFi
efuse Map.
```

```
#iwpriv wlan0 efuse_set wlfk2map          // Wirte WiFi Fake all efuse map to  
HW WiFi efuse Map.
```

If config the Driver to use File Map,you can use the following cmd to read current Drv logic map.

```
#iwpriv wlan0 efuse_get drvmap          // read form current driver of efuse logic map.
```

[4.4 BT Efuse Function]

[--> 4.4.1 BT Get Function <--]

```
#iwpriv wlan0 efuse_get btffmap          // read form HW BT of front efuse logic map.  
#iwpriv wlan0 efuse_get btbmap          // read form HW BT of back efuse logic map.  
#iwpriv wlan0 efuse_get btrmap,16,6     // fix offset :cmd,offset,byteCounts  
( Specified BT start of the efuse's address and set the number of bytes for raed  
from the BT efuse content)
```

```
#iwpriv wlan0 efuse_get btffake          // read form fake BT of front efuse logic map.  
#iwpriv wlan0 efuse_get btbfake          // read form fake BT of back efuse logic map.
```

[--> 4.4.2 BT Set Function <--]

```
#iwpriv wlan0 efuse_set btwmap,16,00e04c871234      // cmd,offset,Data bytes[hex]  
( Specified a offset address for write 6 bytes data "0x00,0xe0,0x4c,0x87,0x12,0x34"  
to the 0x16 start of the efuse content address )
```

```
#iwpriv wlan0 efuse_set btwfake,16,00e04c871234     // cmd,offset,Data bytes[hex]  
( Specified a offset address for write 6 bytes data "0x00,0xe0,0x4c,0x87,0x12,0x34"  
to the 0x16 start of the Fake efuse content address )
```

```
#iwpriv wlan0 efuse_set btdumpfake          // Dump BT HW efuse to Fake BT efuse Map.  
#iwpriv wlan0 efuse_set btfk2map          // Wirte BT Fake efuse to HW BT efuse Map.
```

=====
[Efuse's spec].

If you want a clearer definition of reference, you can refer to the Efuse's spec
"AN_RTL8XXX_EEPROM_SPEC_Vxxxxxx.pdf"

=====

5. Crystal Calibration: iwpriv wlan0 mp_phypara xcap=26

MP use CMD to fine tuning the Crystal Cap value, and CMD is " iwpriv wlan0 mp_phypara xcap=%d".

We can continue to adjust for get target value, then use the Efuse CMD write to HW efuse, "**iwpriv wlan0 efuse_set wmap,b9,20**"

8188EU example:

The "0xB9" is Crystal Calibration Efuse offset address,you can refer the IC Efuse spec document.

B9h Crystal Calibration XTAL_K Value

Bit[5:0], Xi=Xo Range 0~3F h.

Bit[7:6]: reserved

FF h = 00 h

Default 20h

```
#insmod wlan.ko
#ifconfig wlan0 up
#iwpriv wlan0 mp_start
#iwpriv wlan0 mp_setrfpath 0
#iwpriv wlan0 mp_ant_tx a
#iwpriv wlan0 mp_channel 7
#iwpriv wlan0 mp_txpower patha=42
#iwpriv wlan0 mp_phypara xcap=32
#iwpriv wlan0 mp_ctx background,stone
#iwpriv wlan0 mp_phypara xcap=26
#iwpriv wlan0 mp_phypara xcap=24
```

Crystal Calibration Success! Find Crystal Index = 24

iwpriv wlan0 efuse_set wmap,b9,18

CRYSTAL_CAL_STOP

```
#rtwpriv wlan0 mp_ctx stop
```

6. Read Thermometer : iwpriv wlan0 mp_ther

1. read Thermometer :

#iwpriv wlan0 mp_ther

return a value

2. write the HW thermal value to HW efuse

#iwpriv wlan0 mp_ther write

7. Enter To BT Test Link Mode

#ifconfig wlan0 up	//enable wlan interface
#iwpriv wlan0 mp_start	//enter mp mode
#iwpriv wlan0 mp_setrfpath 0	//Switch Antenna to BT
#iwpriv wlan0 mp_setbt dlfw	//Download BT path FW
#iwpriv wlan0 mp_setbt testmode,01	//01 => enter to BT 2.0 TestMode, 02 => BT4.0 Direct Test mode, 03 => Connect Test Mode,00 => RF TxRx Test mode(non-link mode)
#iwpriv wlan0 mp_setbt setgen,01	// leave BT TestMode, Reset HCI
#iwpriv wlan0 mp_setbt down	//rollback to Wifi MP test.
#iwpriv wlan0 mp_setrfpath 1	//Switch Antenna to WiFi