CUBIEBOARD
http://cubie.cc
Fucking cool，深刻的嵌入式技术和应用讨论社区

Cubieboard1 Debian Development Manual

RTL8188EUS-Wireless Network Card

Website:http://cubieboard.org/
Support: support@cubietech.com

Version	Author	Modification	Check
V-0.1	A.K	Init version	

Table of Contents

1. Introduction

In order to use the Wireless Internet with Cubieboard1、Cubieboard2 or Cubieboard-dualcard which didn't load any Wifi module, Cubietech recommend one of usb wifi module, RTL8188EUS. This is a stable module used on A10 and A20. The document could be used as the module guidance document, which includes how to use the module connected with WIFI and how to open the wifi hotspot.

2. Hardware requirements

- Cubieboard1 x1
- RTL8188EUS Type B.
- TF Card>=4G,class 10 Suggeted
- Mouse and keyboard、HDMI display or TTL serial line
- The board of DC power supply and WIFI connection verification environment

3. Sortware requirements

- The debian-server release firmware, such as debian-server-cb1-datacard-v1.2.img. Only use to connect the WIFI, more CB1、CB2 linux firmware can support this function. If using to open wifi hotspot, please install the mentioned firmware on this document, or use other firmware to install the AP service according to the document.
- Software packages support, wifi hotspot features need to transplant the hostapd service.

4. Install firmware

This firmware is a fastener, can use the 'dd' linux command or windows win32write tool to install the firmware to TF card.

Firmware download： http://dl.cubieboard.org/modules/RTL8188EUS/image/cb1-debian/

5. Wireless Internet

5.1 Load module

Accessing module, then checking whether the driver is loaded successfully

$ sudo lsmod

find 8188eu driver module

```
root@cubieboard:~# lsmod
Module                  Size  Used by
cpufreq_stats           2700  0
mali                  108533  0
ump                    51692  1 mali
lcd                     3717  0
pwm_sunxi               9110  0
gpio_sunxi              8823  0
8188eu                495596  0
```

If the driver has been loaded, to be sure whether the wireless network has been establishing：

$ sudo ifconfig -a

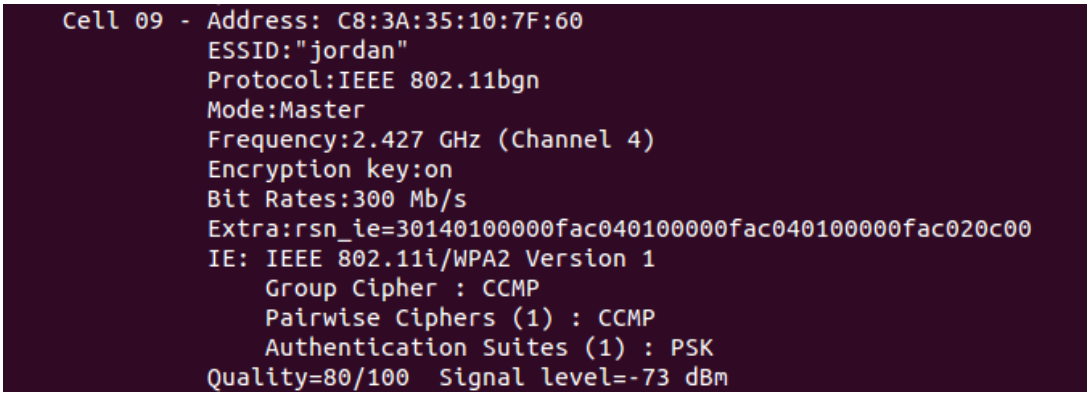
```
wlan3     Link encap:Ethernet  HWaddr 00:e0:4c:a0:44:5e
          BROADCAST MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

5.2 Scanning around the wireless network

$ sudo ifconfig wlan3 up

$ sudo iwlist wlan3 scan

As shown, "Jordan" is a ESSID, which is a wireless network account



5.3 Configure wireless network

Configuring wireless network,the first backuping your eth0 configuration

$ cd /etc/network/

$ sudo cp interfaces interfaces-eth0

Using “vim” to configure wifi

$ vim interfaces

interfaces(5) file used by ifup(8) and ifdown(8)
#auto lo eth0
#allow-hotplug eth0
#iface lo inet loopback
#iface eth0 inet dhcp
auto wlan3
iface wlan3 inet dhcp
pre-up ip link set wlan3 up
pre-up iwconfig wlan3 essid ******
wpa-ssid ******
wpa-psk *********

Save and exit

Service network restart

$ /etc/init.d/networking restart

Check whether the IP will be assigned

$ sudo ifconfig

```
root@cubieboard:/etc/network#
root@cubieboard:/etc/network# ifconfig
wlan3     Link encap:Ethernet  HWaddr 00:e0:4c:a0:44:5e
          inet addr:192.168.3.123  Bcast:192.168.3.255  Mask:255.255.255.0
          inet6 addr: fe80::2e0:4cff:fea0:445e/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:15 errors:0 dropped:22 overruns:0 frame:0
          TX packets:22 errors:0 dropped:2 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:3342 (3.2 KiB)  TX bytes:3596 (3.5 KiB)

root@cubieboard:/etc/network#
```

5.4 Test wireless network

$ ping google.com

```
root@cubieboard:/etc/network#
root@cubieboard:/etc/network# ping google.com
PING google.com (173.194.127.37) 56(84) bytes of data.
64 bytes from hkg03s10-in-f5.1e100.net (173.194.127.37): icmp_req=1 ttl=52 time=77.6 ms
64 bytes from hkg03s10-in-f5.1e100.net (173.194.127.37): icmp_req=2 ttl=52 time=20.6 ms
64 bytes from hkg03s10-in-f5.1e100.net (173.194.127.37): icmp_req=3 ttl=52 time=30.9 ms
64 bytes from hkg03s10-in-f5.1e100.net (173.194.127.37): icmp_req=4 ttl=52 time=15.1 ms
64 bytes from hkg03s10-in-f5.1e100.net (173.194.127.37): icmp_req=5 ttl=52 time=361 ms
64 bytes from hkg03s10-in-f5.1e100.net (173.194.127.37): icmp_req=6 ttl=52 time=140 ms
^C
--- google.com ping statistics ---
```

6.WiFi hotspot

WiFi Hotspot is a super easy solution to turn your cubieboard1 into a portable Wi-Fi hotspot, wirelessly sharing your internet to your laptop,notebook, mobile phone, etc. In order to guarantee the Ethernet normal connection, opening the hostapd service and building a hot.

The following are the specific steps.

6.1 Open Ethernet network

Reduction of Ethernet network configuration

$ cd /etc/network/

$ sudo cp interfaces-eth0 interfaces

```
# interfaces(5) file used by ifup(8) and ifdown(8)
auto lo eth0
allow-hotplug eth0
iface lo inet loopback
iface eth0 inet dhcp
#auto wlan0
#iface wlan0 inet dhcp
#pre-up ip link set wlan0 up
#pre-up iwconfig wlan0 essid your-ssid-here
#wpa-ssid your-ssid-here
#wpa-psk your-passwd-here
```

reboot Cubieboard ,and check whether the work of Ethernet

$ sudo ifconfig

the default network is eth0

```
root@cubieboard:~#
root@cubieboard:~# ifconfig
eth0      Link encap:Ethernet  HWaddr 02:97:09:c2:8b:92
          inet addr:192.168.1.171  Bcast:192.168.1.255  Mask:255.255.255.0
          inet6 addr: fe80::97:9ff:fec2:8b92/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:480 errors:0 dropped:0 overruns:0 frame:0
          TX packets:40 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:91726 (89.5 KiB)  TX bytes:3884 (3.7 KiB)
          Interrupt:55 Base address:0xb000

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

6.2 View wireless network

When the access of different module, wireless network name will be different, generally is wlan2, my hand is wlan3.

$ sudo ifconfig wlan3 up

If the open failed, please input other wlanx again, until you find the wlanx wireless network

$ sudo config

```
wlan3     Link encap:Ethernet  HWaddr 00:e0:4c:a0:44:5e
          BROADCAST MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

6.3 Install package

The necessary software package has been installed on firmware , you can run the script to open the hotspot service. The following steps is a repetition of the build process which is convenient to build the wifi hotspot in the other system.

6.3.1 Hostapd

hostapd is a user space daemon for access point and authentication servers. It implements IEEE 802.11 access point management, IEEE 802.1X/WPA/WPA2/EAP Authenticators, RADIUS client, EAP server, and RADIUS authentication server. The current version supports Linux (Host AP, madwifi, mac80211-based drivers) and FreeBSD (net80211). If you want to know more information about hostapd, please visit http://w1.fi/hostapd/ . This document used hostapd-v1.1, the transplantation steps is convenient to build the hot spot in the other system.

install package :

$ wget https://github.com/jenssegers/RTL8188-hostapd/archive/v1.1.tar.gz

$ tar -zxvf v1.1.tar.gz

$ cd RTL8188-hostapd-1.1/hostapd

$ sudo make

$ sudo make install

set environment variables :

$ vim /etc/default/hostapd

add :

DAEMON_CONF="/etc/hostapd/hostapd.conf"

hostapd.conf : This code is an important configuration files, including the basic configuration of the hot spot.

6.3.2 DNSmasq

DNSmasq is a compact and convenient tool used to configure DNS and DHCP, suitabling for small networks. It provides the DNS function and the option of DHCP function. Can be installed directly from the Debian source :

$ sudo apt-get install dnsmasq

$vim /etc/dnsmasq.conf

add :

```
#Name:Default
#Type:DNSMASQ
interface=wlan3
dhcp-range=192.168.0.2,192.168.0.255,12h;
server=/www.google.com/8.8.8.8
```

Save and exit

6.4 start service

$ sudo /etc/init.d/hostapd start

$ sudo /etc/init.d/dnsmasq start

6.5 Configure the forwarding and firewall rules

$ sudo sysctl net.ipv4.ip_forward=1

$ sudo iptables -t nat -A POSTROUTING -o eth0 -j MASQUERADE

$ sudo ifconfig wlan3 192.168.0.1 netmask 255.255.255.0

6.6 Configure Wifi hotspot

The need software package is already preloaded in firmwave. If the wireless network is wlan2, please running the script to open hotspot.

$ cd /home/cubie/work/rtl8188eus

$ ./start-ap.sh

If the wireless network isn't the wlan2, please follow the steps to modify the existing wireless network

6.6.1 Modify hostapd.conf

This code includes the current wireless network name, wifi hotspot name and wifi hotspot password.

$ vim /etc/hostapd/hostapd.conf

```
interface=wlan3
driver=rtl871xdrv
ssid=cubieboard1-ap
channel=1
wmm_enabled=0
```

```
wpa=2
wpa_passphrase=cubieboard
wpa_key_mgmt=WPA-PSK
wpa_pairwise=TKIP
rsn_pairwise=CCMP
auth_algs=1
macaddr_acl=0
```

Save and exit

6.6.2 Modify dnsmasq.conf

$vim /etc/dnsmasq.conf

Add the following configuration at the end, Ctrl+G can jump to the end of the file

The wireless network is modified as the current wireless network

```
#Name:Default
#Type:DNSMASQ
interface=wlan3
dhcp-range=192.168.0.2,192.168.0.255,12h;
server=/www.google.com/8.8.8.8
```

Save and exit

6.6.3 Modify the startup script

The wireless network is modified as the current wireless network

$ cd /home/cubie/work/rtl8188eus

$ vim start-ap.sh

```
#!/bin/bash
sysctl net.ipv4.ip_forward=1
iptables -t nat -A POSTROUTING -o eth0 -j MASQUERADE
ifconfig wlan3 192.168.0.1 netmask 255.255.255.0
```

Save and exit

6.6.4 Start WiFi hotspot

$ sudo chmod +x start-ap.sh

$ sudo ./start-ap.sh

6.7 Test WiFi hotspot

The default wifi hotspot name is cubieboard1-ap,password is cubieboard