

USB 无线网卡工具集使用说明

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简介: USB WiFi kits 由广州友善之臂计算机科技有限公司(简称“友善之臂”)整理开发和维护,它是专门针对嵌入式 Linux 平台下,简单快捷地使用 USB 无线网卡一套命令行工具程序,它基于友善之臂出品的 mini2440 开发平台验证测试,我们的目标是尽量支持市面上大部分的 USB 无线网卡,并在以后把它扩展到更多的 ARM 平台,如 mini6410 等。因为该工具集的编译制作和 Linux 内核版本关系密切,因此我们把它这样命名:

● Usb-wifi-kits-mini2440-linux-2.6.32.2-20100729.tar.gz

其中:

Usb-wifi-kts – 代表本工具集的名称

Mini2440 – 代表开发板平台,以后会增加 mini6410 版本

Linux-2.6.32.2 – 代表适用的内核版本

20100729 – 代表更新日期版本

根据以上信息,你可以在 www.arm9.net 下载自己所需的各个版本,ARM 之家论坛(<http://www.arm9home.net>)也会有相应的更新贴,可以搜索关键字“USB WiFi Kits”查找。

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下面是该工具集的使用方法及所支持的无线网卡类型列表及图片。

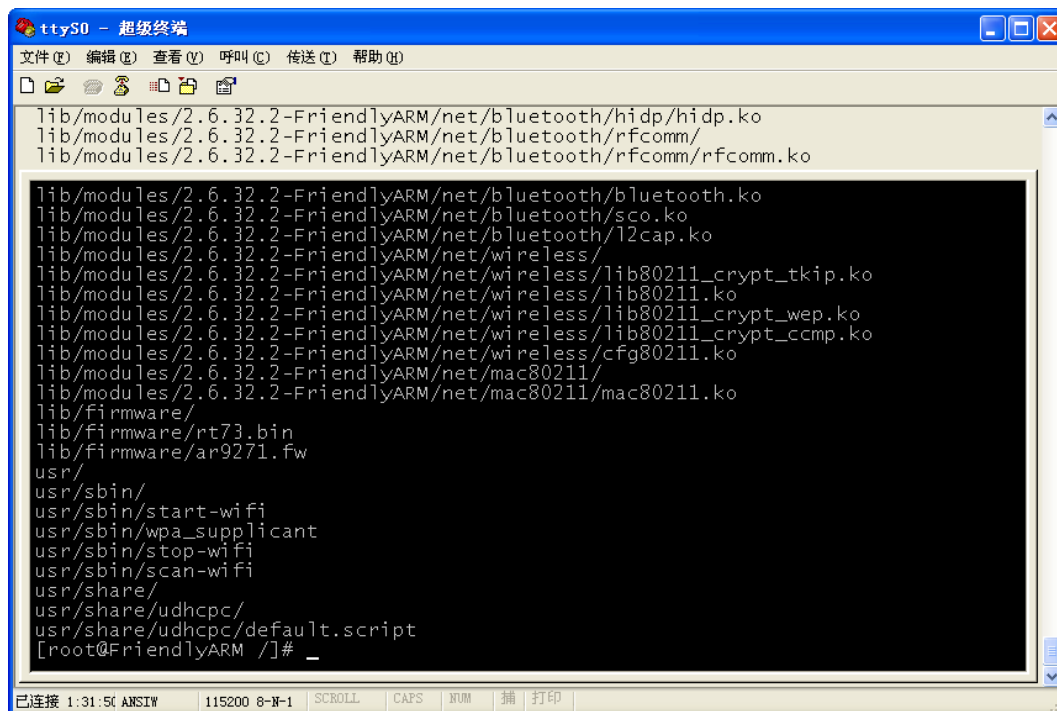
1.获取并安装

友善之臂开发板附带的资料光盘“Linux”目录下有 USB-WiFi-Kits 的压缩包,你也可以在 <http://www.arm9.net> 首页点“下载”找到下载地址。

在目标板根目录下执行:

```
#tar xvzf usb-wifi-kits-mini2440-linux-2.6.32.2-20100729.tar.gz
```

如图



```
lib/modules/2.6.32.2-FriendlyARM/net/bluetooth/hidp/hidp.ko
lib/modules/2.6.32.2-FriendlyARM/net/bluetooth/rfcomm/
lib/modules/2.6.32.2-FriendlyARM/net/bluetooth/rfcomm/rfcomm.ko

lib/modules/2.6.32.2-FriendlyARM/net/bluetooth/bluetooth.ko
lib/modules/2.6.32.2-FriendlyARM/net/bluetooth/sco.ko
lib/modules/2.6.32.2-FriendlyARM/net/bluetooth/l2cap.ko
lib/modules/2.6.32.2-FriendlyARM/net/wireless/
lib/modules/2.6.32.2-FriendlyARM/net/wireless/lib80211_crypt_tkip.ko
lib/modules/2.6.32.2-FriendlyARM/net/wireless/lib80211.ko
lib/modules/2.6.32.2-FriendlyARM/net/wireless/lib80211_crypt_wep.ko
lib/modules/2.6.32.2-FriendlyARM/net/wireless/lib80211_crypt_ccmp.ko
lib/modules/2.6.32.2-FriendlyARM/net/wireless/cfg80211.ko
lib/modules/2.6.32.2-FriendlyARM/net/mac80211/
lib/modules/2.6.32.2-FriendlyARM/net/mac80211/mac80211.ko
lib/firmware/
lib/firmware/rt73.bin
lib/firmware/ar9271.fw
usr/
usr/sbin/
usr/sbin/start-wifi
usr/sbin/wpa_supplicant
usr/sbin/stop-wifi
usr/sbin/scan-wifi
usr/share/
usr/share/udhcpd/
usr/share/udhcpd/default.script
[root@FriendlyARM /]# _
```

该工具集包含了无线网卡驱动程序，和下面将要使用的三个实用命令程序：

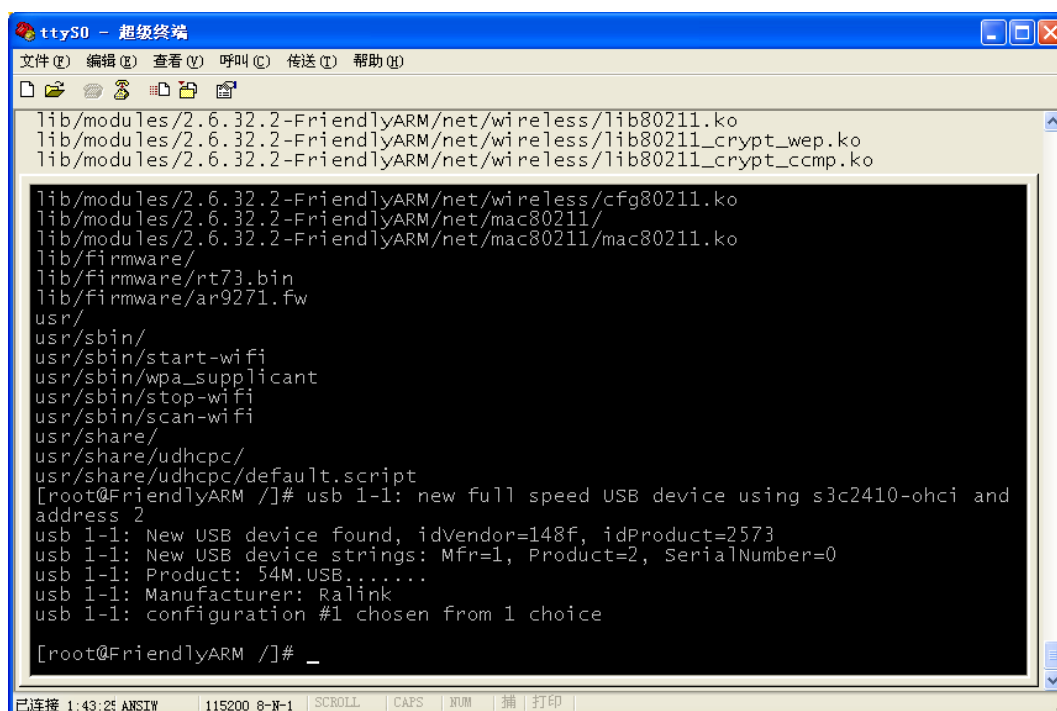
- scan-wifi – 用来扫描附近的无线网络
- start-wifi – 用来开启连接无线网络
- stop-wifi – 停止使用无线网络

这三个程序被安装在开发板的/usr/sbin 目录下。

2.扫描附近的无线网络

说明：以下示例使用 USB 无线网卡型号是：TL-WN321G+

把 USB 无线网卡查到目标板上，会出现如下信息(网卡型号不同，信息也会不同)



```
lib/modules/2.6.32.2-FriendlyARM/net/wireless/lib80211.ko
lib/modules/2.6.32.2-FriendlyARM/net/wireless/lib80211_crypt_wep.ko
lib/modules/2.6.32.2-FriendlyARM/net/wireless/lib80211_crypt_ccmp.ko

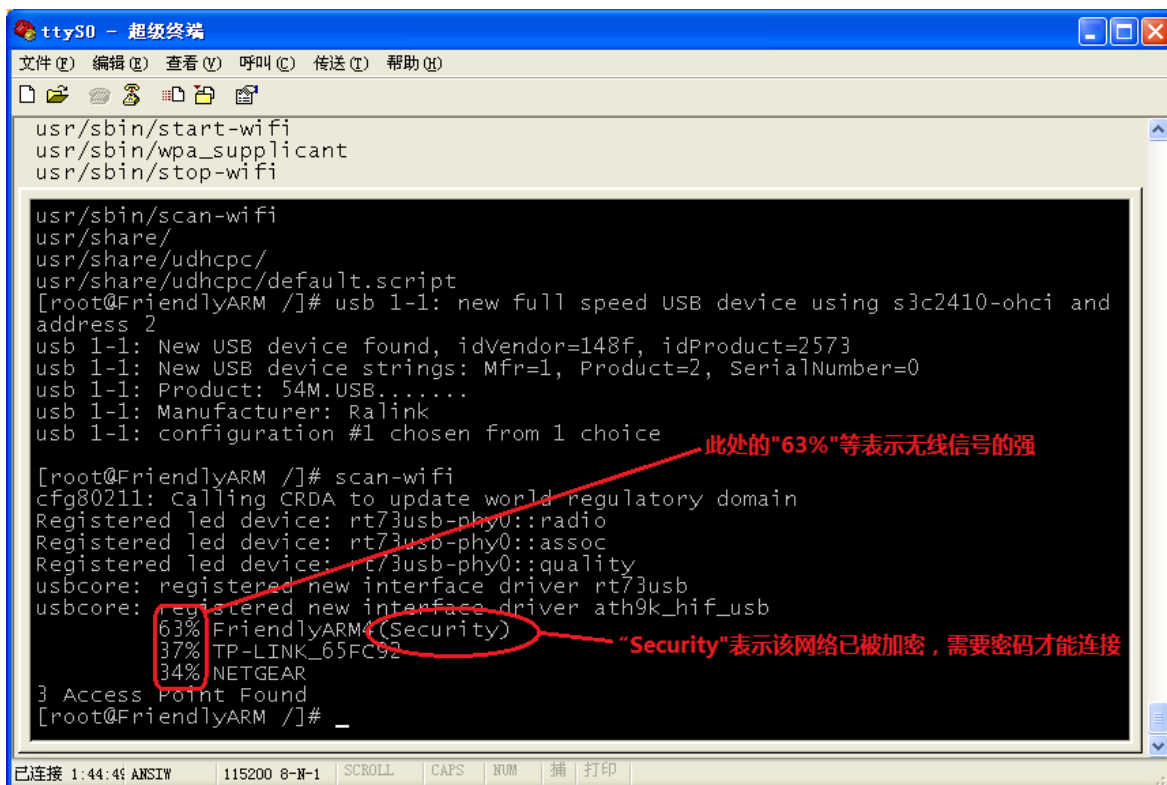
lib/modules/2.6.32.2-FriendlyARM/net/wireless/cfg80211.ko
lib/modules/2.6.32.2-FriendlyARM/net/mac80211/
lib/modules/2.6.32.2-FriendlyARM/net/mac80211/mac80211.ko
lib/firmware/
lib/firmware/rt73.bin
lib/firmware/ar9271.fw
usr/
usr/sbin/
usr/sbin/start-wifi
usr/sbin/wpa_supplicant
usr/sbin/stop-wifi
usr/sbin/scan-wifi
usr/share/
usr/share/udhcpd/
usr/share/udhcpd/default.script
[root@FriendlyARM /]# usb 1-1: new full speed USB device using s3c2410-ohci and
address 2
usb 1-1: New USB device found, idVendor=148f, idProduct=2573
usb 1-1: New USB device strings: Mfr=1, Product=2, SerialNumber=0
usb 1-1: Product: 54M.USB.....
usb 1-1: Manufacturer: Ralink
usb 1-1: configuration #1 chosen from 1 choice

[root@FriendlyARM /]# _
```

执行扫描命令，以搜索附近的无线网络：

#scan-wifi

如图



```
usr/sbin/start-wifi
usr/sbin/wpa_supplicant
usr/sbin/stop-wifi

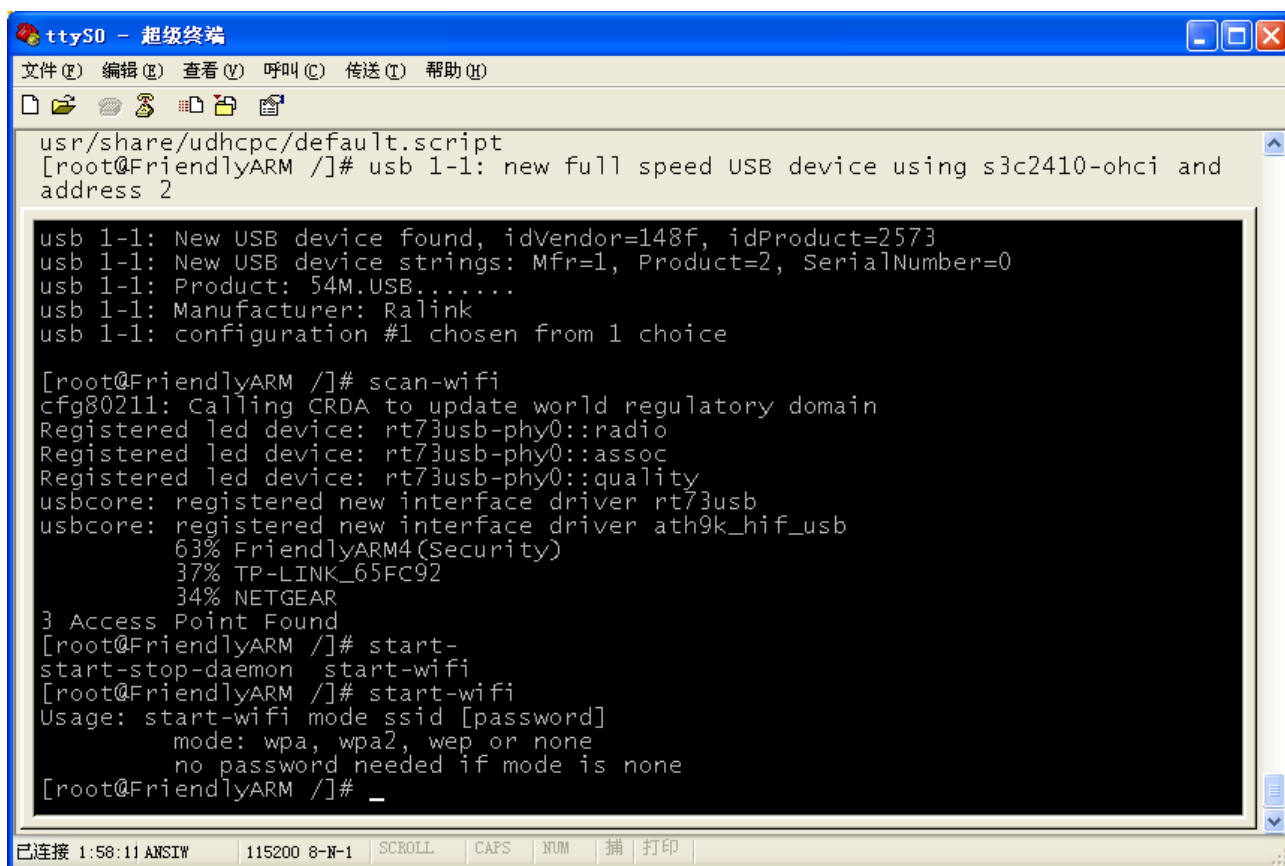
usr/sbin/scan-wifi
usr/share/
usr/share/udhcpc/
usr/share/udhcpc/default.script
[root@FriendlyARM /]# usb 1-1: new full speed USB device using s3c2410-ohci and
address 2
usb 1-1: New USB device found, idVendor=148f, idProduct=2573
usb 1-1: New USB device strings: Mfr=1, Product=2, SerialNumber=0
usb 1-1: Product: 54M.USB.....
usb 1-1: Manufacturer: Ralink
usb 1-1: configuration #1 chosen from 1 choice

[root@FriendlyARM /]# scan-wifi
cfg80211: Calling CRDA to update world regulatory domain
Registered led device: rt73usb-phy0::radio
Registered led device: rt73usb-phy0::assoc
Registered led device: rt73usb-phy0::quality
usbcore: registered new interface driver rt73usb
usbcore: registered new interface driver ath9k_hif_usb
63% FriendlyARM (Security)
37% TP-LINK_65FC92
34% NETGEAR
3 Access Point Found
[root@FriendlyARM /]#
```

可见已经搜索到 3 个无线网络，无线网名称前的“63%”表示信号的强弱，带有密码的安全网络会被标以“Security”。

3.连接使用无线网

使用“start-wifi”命令可以自动连接到指定的无线网接入点，根据不同的无线网络特性，会有不同的参数，在命令行输入“start-wifi”可以看到如下提示信息：



```
usr/share/udhcpd/default.script
[root@FriendlyARM /]# usb 1-1: new full speed USB device using s3c2410-ohci and
address 2

usb 1-1: New USB device found, idVendor=148f, idProduct=2573
usb 1-1: New USB device strings: Mfr=1, Product=2, SerialNumber=0
usb 1-1: Product: 54M.USB.....
usb 1-1: Manufacturer: Ralink
usb 1-1: configuration #1 chosen from 1 choice

[root@FriendlyARM /]# scan-wifi
cfg80211: Calling CRDA to update world regulatory domain
Registered led device: rt73usb-phy0::radio
Registered led device: rt73usb-phy0::assoc
Registered led device: rt73usb-phy0::quality
usbcore: registered new interface driver rt73usb
usbcore: registered new interface driver ath9k_hif_usb
63% FriendlyARM4(Security)
37% TP-LINK_65FC92
34% NETGEAR
3 Access Point Found
[root@FriendlyARM /]# start-
start-stop-daemon start-wifi
[root@FriendlyARM /]# start-wifi
Usage: start-wifi mode ssid [password]
mode: wpa, wpa2, wep or none
no password needed if mode is none
[root@FriendlyARM /]# _
```

其中,

mode – 表示无线网加密类型, 可以为“wpa”, “wpa2”, “wep”或“none”, “none”表示没有不需要密码的无线网络。

ssid – 表示要连接的无线网络的名称, 如上面的 “FriendlyARM4”, “NETGEAR”等, 这个一般需根据实际情况而定。

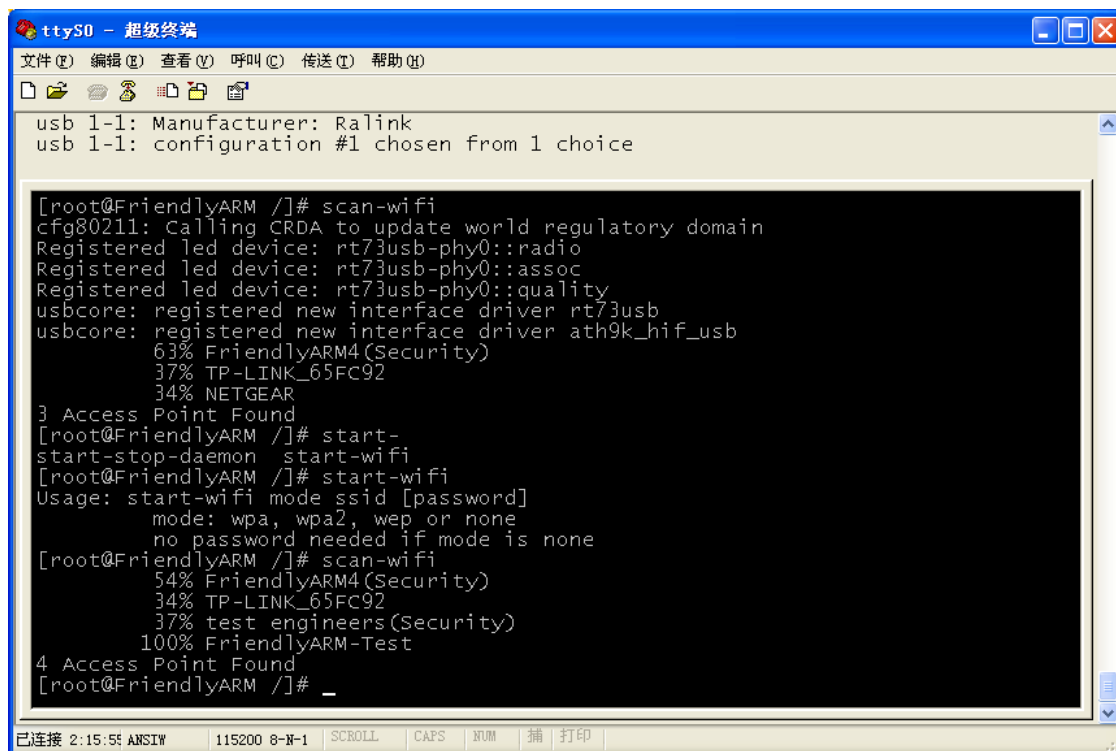
password – 表示加密的无线网所需的密码, 将会以明文方式显示出来。

下面主要针对无安全加密和带安全加密的网络分别示例说明。

3.1 连接无需密码的开放无线网

Step1

首先使用“scan-wifi”扫描查找附近的无线网络, 结果如图, 这里的 “FriendlyARM-Test” 是专门为测试而设立的一个无需密码的开放无线网接入点。



The screenshot shows a terminal window titled "ttyS0 - 超级终端". The menu bar includes "文件(F)", "编辑(E)", "查看(V)", "呼叫(C)", "传送(T)", and "帮助(H)". The terminal output shows the following commands and results:

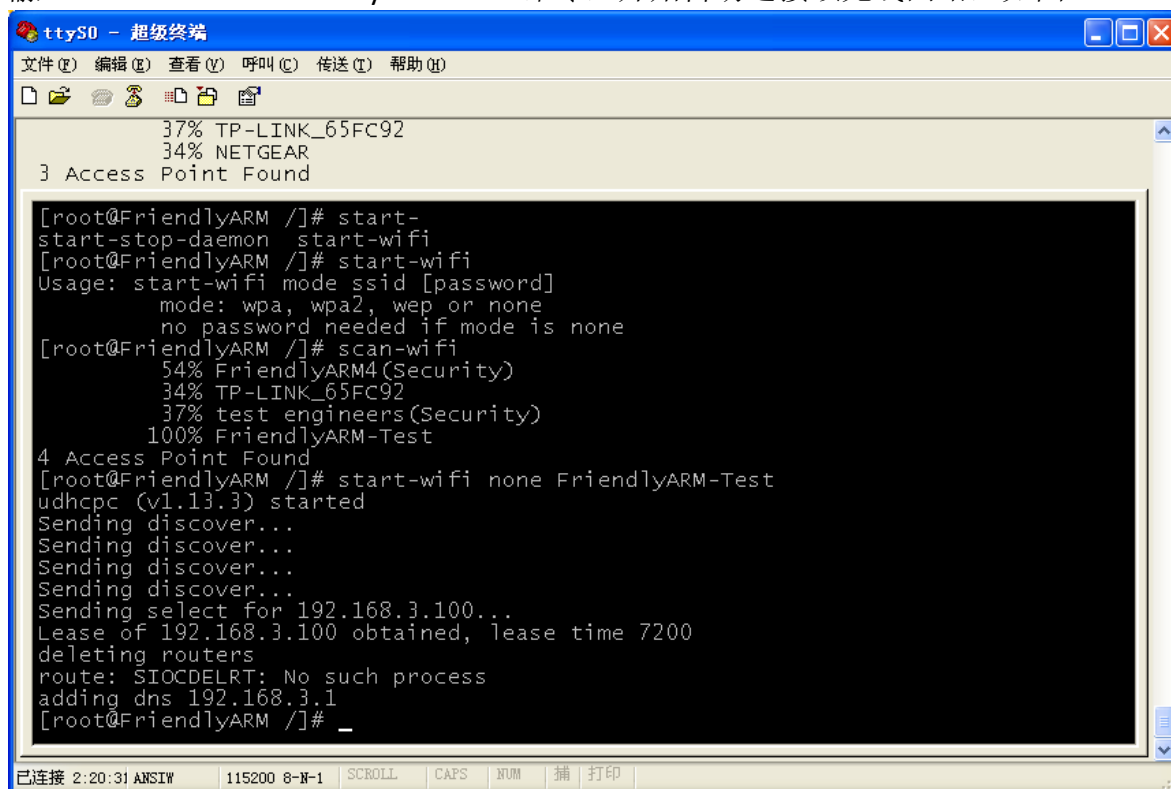
```
usb 1-1: Manufacturer: Ralink
usb 1-1: configuration #1 chosen from 1 choice

[root@FriendlyARM /]# scan-wifi
cfg80211: Calling CRDA to update world regulatory domain
Registered led device: rt73usb-phy0::radio
Registered led device: rt73usb-phy0::assoc
Registered led device: rt73usb-phy0::quality
usbcore: registered new interface driver rt73usb
usbcore: registered new interface driver ath9k_hif_usb
63% FriendlyARM4(Security)
37% TP-LINK_65FC92
34% NETGEAR
3 Access Point Found
[root@FriendlyARM /]# start-
start-stop-daemon start-wifi
[root@FriendlyARM /]# start-wifi
Usage: start-wifi mode ssid [password]
mode: wpa, wpa2, wep or none
no password needed if mode is none
[root@FriendlyARM /]# scan-wifi
54% FriendlyARM4(Security)
34% TP-LINK_65FC92
37% test engineers(Security)
100% FriendlyARM-Test
4 Access Point Found
[root@FriendlyARM /]# _
```

The status bar at the bottom shows "已连接 2:15:55 ANSIW", "115200 8-N-1", and buttons for "SCROLL", "CAPS", "NUM", "捕", and "打印".

Step2

输入“start-wifi none FriendlyARM-Test”命令，开始自动连接该无线网络，如图。



The screenshot shows the same terminal window as before, but with the following additional commands and output:

```
[root@FriendlyARM /]# start-
start-stop-daemon start-wifi
[root@FriendlyARM /]# start-wifi
Usage: start-wifi mode ssid [password]
mode: wpa, wpa2, wep or none
no password needed if mode is none
[root@FriendlyARM /]# scan-wifi
54% FriendlyARM4(Security)
34% TP-LINK_65FC92
37% test engineers(Security)
100% FriendlyARM-Test
4 Access Point Found
[root@FriendlyARM /]# start-wifi none FriendlyARM-Test
udhcpc (v1.13.3) started
Sending discover...
Sending discover...
Sending discover...
Sending discover...
Sending select for 192.168.3.100...
Lease of 192.168.3.100 obtained, lease time 7200
deleting routers
route: SIOCDELRT: No such process
adding dns 192.168.3.1
[root@FriendlyARM /]# _
```

The status bar at the bottom shows "已连接 2:20:31 ANSIW", "115200 8-N-1", and buttons for "SCROLL", "CAPS", "NUM", "捕", and "打印".

稍等片刻，可以看到目标板已经自动分配到了 IP 地址：192.168.3.100，使用 ping 命令测试一下该网络连接，如图。

```
ttyS0 - 超级终端
文件(F) 编辑(E) 查看(V) 呼叫(C) 传送(T) 帮助(H)
37% test engineers(Security)
100% FriendlyARM-Test
4 Access Point Found

[root@FriendlyARM /]# start-wifi none FriendlyARM-Test
udhcpd (v1.13.3) started
Sending discover...
Sending discover...
Sending discover...
Sending discover...
Sending select for 192.168.3.100...
Lease of 192.168.3.100 obtained, lease time 7200
deleting routers
route: SIOCDELRT: No such process
adding dns 192.168.3.1
[root@FriendlyARM /]# ping 192.168.3.1
PING 192.168.3.1 (192.168.3.1): 56 data bytes
64 bytes from 192.168.3.1: seq=0 ttl=64 time=24.194 ms
64 bytes from 192.168.3.1: seq=1 ttl=64 time=21.053 ms
64 bytes from 192.168.3.1: seq=2 ttl=64 time=20.289 ms
64 bytes from 192.168.3.1: seq=3 ttl=64 time=20.235 ms
64 bytes from 192.168.3.1: seq=4 ttl=64 time=21.180 ms
64 bytes from 192.168.3.1: seq=5 ttl=64 time=20.631 ms
AC
--- 192.168.3.1 ping statistics ---
6 packets transmitted, 6 packets received, 0% packet loss
round-trip min/avg/max = 20.235/21.263/24.194 ms
[root@FriendlyARM /]# _
```

此时也可以在 PC 浏览器上输入开发板的 ip 地址：192.168.3.100，查看开发板中的 web 服务器，如图。



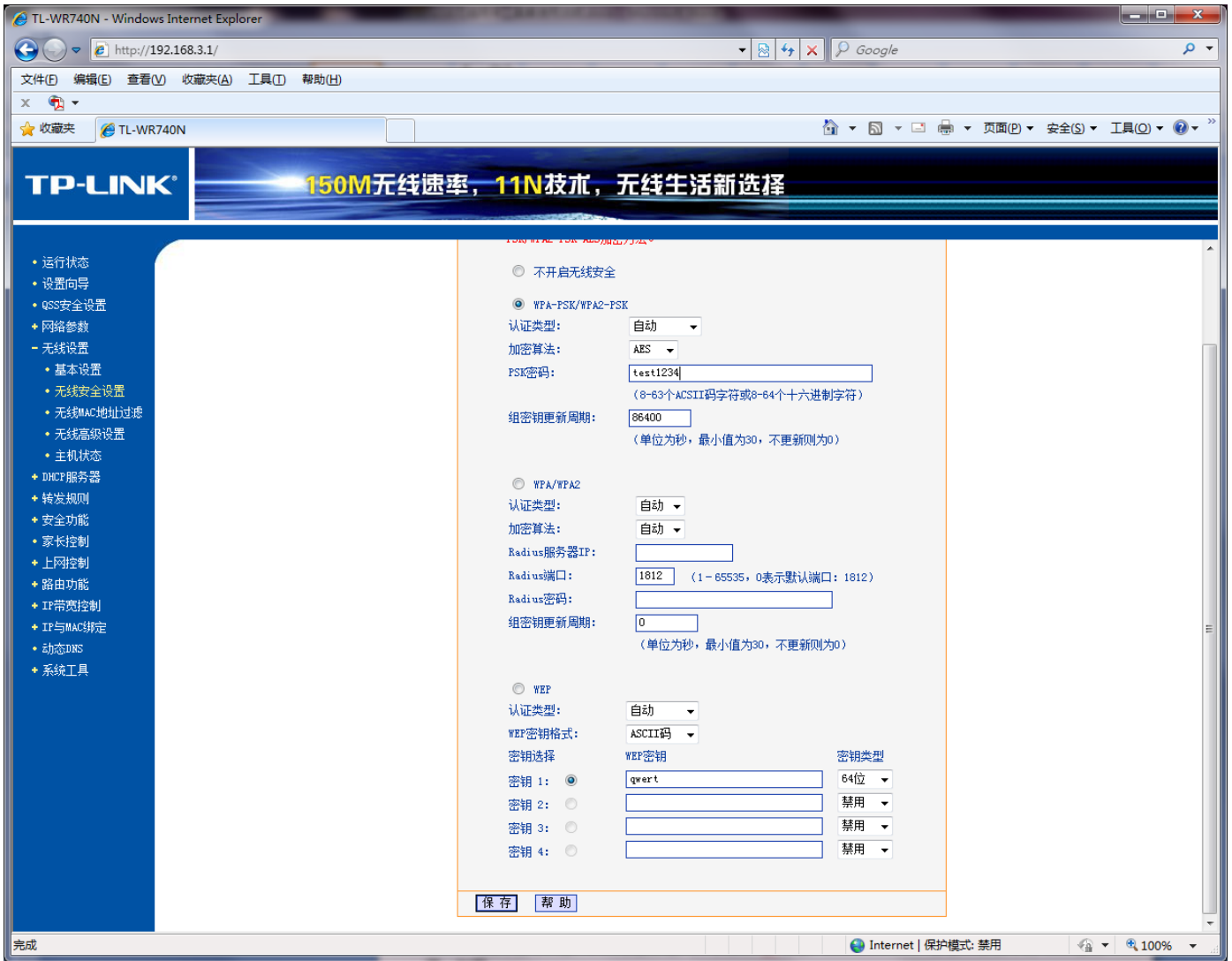
3.2 连接需要密码的安全无线网

连接使用带密码的无线网络的步骤和以上类似，只不过连接的时候需要事先知道无线网的加

密类型和密码,如果你不知道加密类型,只能在“wpa”,“wpa2”,“wep”这三个中猜选了,具体步骤如下:

Step1

设置无线路由的安全模式,这里使用的无线路由器型号为: TL-WR740N, 打开设置页面, 如图



可以看到, 此处有三种加密模式:

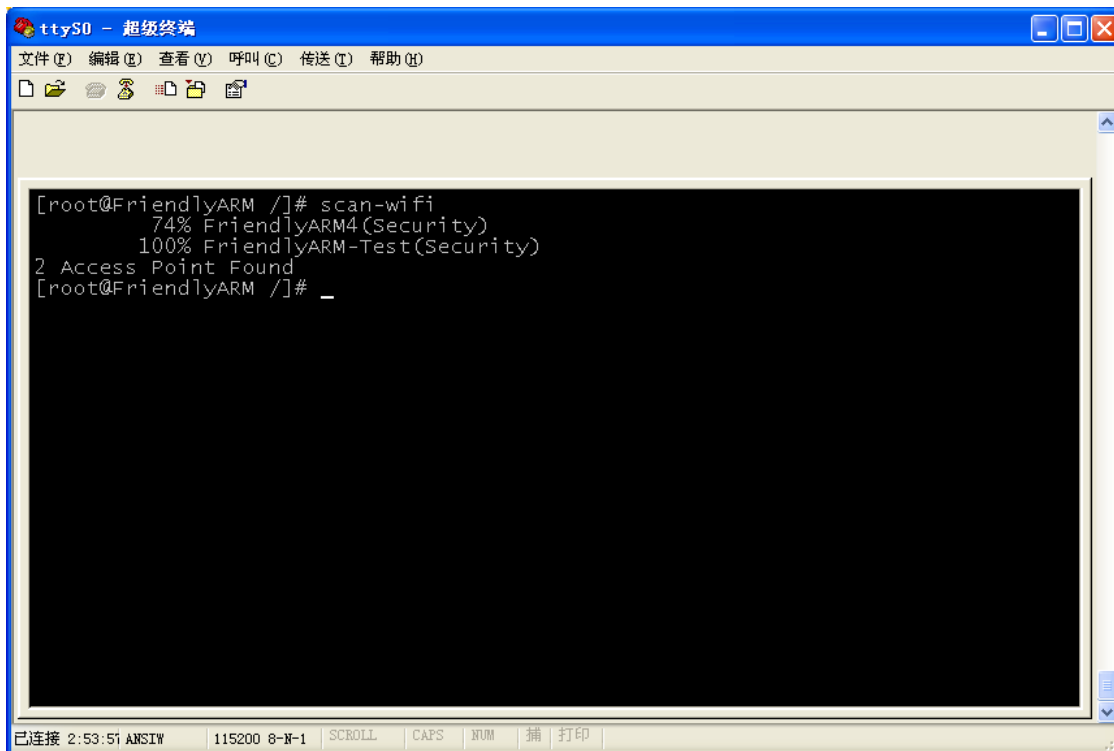
- WPA-PSK/WPA2-PSK
- WPA/WPA2
- WEP

我们选择的是第一种“WPA”, 它是为个人而设的一种常见安全加密模式, 在此设定密码为“test1234”, 点保存, 并重启启动路由器。

说明: 关于如何设置无线路由器, 我们在此并不作详细的介绍说明, 大部分这种设备都有配套的使用说明书, 并且每个厂家会有所不同, 请根据实际情况自行设定。

Step2

使用“scan-wifi”扫描查找附近的无线网络, 结果如图, 这里的“FriendlyARM-Test”是专门为测试而设立的一个无需密码的开放无线网接入点, 可见, 它是被加密的无线网络。



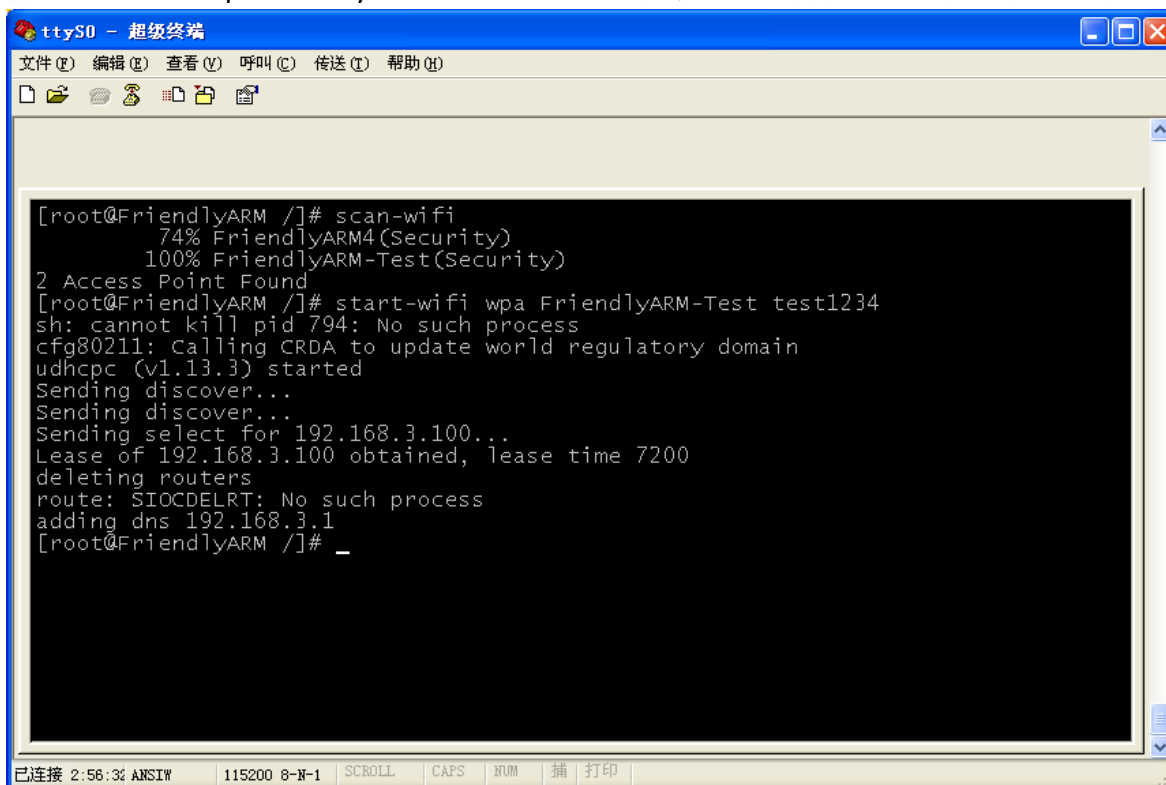
The screenshot shows a terminal window titled "ttyS0 - 超级终端". The command prompt is "[root@FriendlyARM /]#". The user has entered "scan-wifi", and the output is as follows:

```
[root@FriendlyARM /]# scan-wifi
74% FriendlyARM4(Security)
100% FriendlyARM-Test(Security)
2 Access Point Found
[root@FriendlyARM /]# _
```

The status bar at the bottom indicates "已连接 2:53:51 ANSIW", "115200 8-N-1", and various keyboard shortcuts like "SCROLL", "CAPS", "NUM", "捕", and "打印".

Step3

输入“start-wifi wpa FriendlyARM-Test test1234”命令，开始自动连接该无线网络，如图。



The screenshot shows the same terminal window after the user has entered "start-wifi wpa FriendlyARM-Test test1234". The output is as follows:

```
[root@FriendlyARM /]# scan-wifi
74% FriendlyARM4(Security)
100% FriendlyARM-Test(Security)
2 Access Point Found
[root@FriendlyARM /]# start-wifi wpa FriendlyARM-Test test1234
sh: cannot kill pid 794: No such process
cfg80211: Calling CRDA to update world regulatory domain
udhcpc (v1.13.3) started
Sending discover...
Sending discover...
Sending select for 192.168.3.100...
Lease of 192.168.3.100 obtained, lease time 7200
deleting routers
route: SIOCDELRT: No such process
adding dns 192.168.3.1
[root@FriendlyARM /]# _
```

The status bar at the bottom indicates "已连接 2:56:36 ANSIW", "115200 8-N-1", and the same keyboard shortcuts as the previous screenshot.

稍等片刻，可以看到目标板已经自动分配到了 IP 地址：192.168.3.100，使用 ping 命令测试一下该网络连接，如图。


```
ttyS0 - 超级终端
文件(F) 编辑(E) 查看(V) 呼叫(C) 传送(T) 帮助(H)

[ root@FriendlyARM /]# scan-wifi
74% FriendlyARM4(Security)
100% FriendlyARM-Test(Security)
2 Access Point Found
[ root@FriendlyARM /]# start-wifi wpa FriendlyARM-Test test1234
sh: cannot kill pid 794: No such process
cfg80211: Calling CRDA to update world regulatory domain
udhcpd (v1.13.3) started
Sending discover...
Sending discover...
Sending select for 192.168.3.100...
Lease of 192.168.3.100 obtained, lease time 7200
deleting routers
route: SIOCDELRT: No such process
adding dns 192.168.3.1
[ root@FriendlyARM /]# ping 192.168.3.1
PING 192.168.3.1 (192.168.3.1): 56 data bytes
64 bytes from 192.168.3.1: seq=0 ttl=64 time=31.870 ms
64 bytes from 192.168.3.1: seq=1 ttl=64 time=76.107 ms
64 bytes from 192.168.3.1: seq=4 ttl=64 time=42.121 ms

已连接 2:59:04 ANSIW 115200 8-N-1 SCROLL CAPS NUM 捕 打印
```

此时也可以在 PC 浏览器上输入开发板的 ip 地址：192.168.3.100，查看开发板中的 web 服务器，如图。






4. 断开 USB 无线网

要断开发板上的 USB WiFi 连接，可以使用在命令行输入 “stop-wifi” 命令，在此就不再截图说明了。

附录: mini2440 Linux 系统支持的 USB 无线网卡列表

品牌: TP-LINK		
型号名称	产品图片	备注
TL-WN321G+	 A white USB wireless network card with a small antenna. The text on the card reads "54Mbps", "TL-WN321G+", and "TP-LINK". A red watermark "www.arm9.net" is visible across the image.	
TL-WN322G+	 A white USB wireless network card with a small antenna. The text on the card reads "54Mbps", "TL-WN322G+", and "TP-LINK". A red watermark "www.arm9.net" is visible across the image.	
TL-WN422G+	 A white USB wireless network card with a larger antenna. The text on the card reads "54Mbps", "TL-WN422G+", and "TP-LINK". A red watermark "www.arm9.net" is visible across the image.	

TL-WN721N	 <p>A white USB wireless adapter with a silver USB connector. The label on the device reads "150Mbps", "TL-WN721N", and "TP-LINK". A red watermark "www.arm9.net" is overlaid on the image.</p>	
TL-WN722N	 <p>A white USB wireless adapter with a silver USB connector and a long, thin antenna. The label on the device reads "150Mbps", "TL-WN722N", and "TP-LINK". A red watermark "www.arm9.net" is overlaid on the image.</p>	
品牌: QCOM		
LR802UKG	 <p>A green USB wireless adapter with a silver USB connector and a long, thin antenna. The label on the device reads "QCOM", "LR802UKG", and "150Mbps". A red watermark "www.arm9.net" is overlaid on the image.</p>	