

AirPlay

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在Acadia或RPi或WRTnode上实现AirPlay播放歌曲的功能，使其能够产生音频流。

实现目的

- 1 掌握Acadia或RPi或WRTnode和PC建立音频交互的方式；

实验器材

硬件

- Acadia或RPi或WRTnode板一块；
- 5V/1A电源一个；
- microUSB线一根；
- USB-TTL串口线一根（FT232RL芯片或PL2303芯片）。

以下为自备（可选）器材：

- PC（Windows/Mac OS/Linux）一台；
- 声卡一个；
- 以太网线一根（可能还需要路由器等）。

软件

- PC上的USB-TTL串口线配套的驱动程序；
- PC上的串口终端软件，如minicom、picocom、putty等；
- PC上的SSH软件，如putty等。

实验步骤

- 1、更新系统软件源信息

apt-get update

```
pi@raspberrypi:~$ sudo apt-get update
Get:1 http://raspberrypi.collabora.com wheezy Release.gpg [836 B]
Get:2 http://raspberrypi.collabora.com wheezy Release [7,514 B]
Get:3 http://raspberrypi.collabora.com wheezy/rpi armhf Packages [2,214 B]
Get:4 http://mirrordirector.raspbian.org wheezy Release.gpg [490 B]
Get:5 http://mirrordirector.raspbian.org wheezy Release [14.4 kB]
Ign http://raspberrypi.collabora.com wheezy/rpi Translation-en_GB
Ign http://raspberrypi.collabora.com wheezy/rpi Translation-en
Get:6 http://archive.raspberrypi.org wheezy Release.gpg [490 B]
Get:7 http://mirrordirector.raspbian.org wheezy/main armhf Packages [6,902 kB]
Get:8 http://archive.raspberrypi.org wheezy Release [10.2 kB]
Get:9 http://archive.raspberrypi.org wheezy/main armhf Packages [108 kB]
Ign http://archive.raspberrypi.org wheezy/main Translation-en_GB
Ign http://archive.raspberrypi.org wheezy/main Translation-en
Get:10 http://mirrordirector.raspbian.org wheezy/contrib armhf Packages [23.6 kB]
Get:11 http://mirrordirector.raspbian.org wheezy/non-free armhf Packages [49.3 kB]
Get:12 http://mirrordirector.raspbian.org wheezy/rpi armhf Packages [592 B]
Ign http://mirrordirector.raspbian.org wheezy/contrib Translation-en_GB
Ign http://mirrordirector.raspbian.org wheezy/contrib Translation-en
Ign http://mirrordirector.raspbian.org wheezy/main Translation-en_GB
Ign http://mirrordirector.raspbian.org wheezy/main Translation-en
Ign http://mirrordirector.raspbian.org wheezy/non-free Translation-en_GB
Ign http://mirrordirector.raspbian.org wheezy/non-free Translation-en
Ign http://mirrordirector.raspbian.org wheezy/rpi Translation-en_GB
Ign http://mirrordirector.raspbian.org wheezy/rpi Translation-en
Fetched 7,120 kB in 5min 44s (20.6 kB/s)
Reading package lists... Done
```

apt-get upgrade

```
pi@raspberrypi:~$ sudo apt-get upgrade
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages will be upgraded:
  cups-bsd cups-client cups-common e2fslibs e2fsprogs file gnupg gpgv
  libapache2-mod-php5 libarchive12 libavcodec53 libavutil51 libc-bin
  libc-dev-bin libc6 libc6-dev libcomerr2 libcups2 libcupsimage2 libgcrypt11
  libgnutls26 libicu48 libmagic1 libnss3 libruby1.9.1 libsmblclient libss2
  libssh2-1 libssl1.0.0 libwbclient0 libxfont1 locales multiarch-support
  openssl php5 php5-cli php5-common php5-mysql ruby1.9.1 samba-common
  smbclient sudo xdg-utils
43 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
Need to get 47.8 MB of archives.
After this operation, 566 kB disk space will be freed.
Do you want to continue [Y/n]? y
0% [Waiting for headers]

0% [Waiting for headers]

Get:1 http://mirrordirector.raspbian.org/raspbian/ wheezy/main libc-dev-bin armhf 2.13-38+rp12+deb7u8 [223 kB]
Get:2 http://mirrordirector.raspbian.org/raspbian/ wheezy/main libc6-dev armhf 2.13-38+rp12+deb7u8 [2,428 kB]
Get:3 http://mirrordirector.raspbian.org/raspbian/ wheezy/main e2fslibs armhf 1.42.5-1.1+deb7u1 [186 kB]
Get:4 http://mirrordirector.raspbian.org/raspbian/ wheezy/main e2fsprogs armhf 1.42.5-1.1+deb7u1 [984 kB]
Get:5 http://mirrordirector.raspbian.org/raspbian/ wheezy/main libcomerr2 armhf 1.42.5-1.1+deb7u1 [55.0 kB]
Get:6 http://mirrordirector.raspbian.org/raspbian/ wheezy/main libss2 armhf 1.42.5-1.1+deb7u1 [59.3 kB]
Get:7 http://mirrordirector.raspbian.org/raspbian/ wheezy/main libgcrypt11 armhf 1.5.0-5+deb7u3 [301 kB]
Get:8 http://mirrordirector.raspbian.org/raspbian/ wheezy/main libgnutls26 armhf 2.12.20-8+deb7u3 [602 kB]
Get:9 http://mirrordirector.raspbian.org/raspbian/ wheezy/main file armhf 5.11-2+deb7u8 [1201 kB]
Get:10 http://mirrordirector.raspbian.org/raspbian/ wheezy/main libmagic1 armhf 5.11-2+deb7u8 [1201 kB]
Get:11 http://mirrordirector.raspbian.org/raspbian/ wheezy/main libarchive12 armhf 3.0.4-3+deb7u1 [282 kB]
Get:12 http://mirrordirector.raspbian.org/raspbian/ wheezy/main libcupsimage2 armhf 1.5.3-5+deb7u5 [132 kB]
Get:13 http://mirrordirector.raspbian.org/raspbian/ wheezy/main cups-common all 1.5.3-5+deb7u5 [904 kB]
Get:14 http://mirrordirector.raspbian.org/raspbian/ wheezy/main cups-bsd armhf 1.5.3-5+deb7u5 [46.1 kB]
Get:15 http://mirrordirector.raspbian.org/raspbian/ wheezy/main cups-client armhf 1.5.3-5+deb7u5 [175 kB]
Get:16 http://mirrordirector.raspbian.org/raspbian/ wheezy/main libcups2 armhf 1.5.3-5+deb7u5 [238 kB]
Get:17 http://mirrordirector.raspbian.org/raspbian/ wheezy/main libicu48 armhf 4.8.1-1-12+deb7u2 [4,521 kB]
Get:18 http://mirrordirector.raspbian.org/raspbian/ wheezy/main libnss3 armhf 2:3.14.5-1+deb7u4 [848 kB]
Get:19 http://mirrordirector.raspbian.org/raspbian/ wheezy/main libwbclient0 armhf 2:3.6.6-4+deb7u5 [92.0 kB]
Get:20 http://mirrordirector.raspbian.org/raspbian/ wheezy/main libsmblclient armhf 2:3.6.6-4+deb7u5 [1,262 kB]
Get:21 http://mirrordirector.raspbian.org/raspbian/ wheezy/main libssh2-1 armhf 1.4.2-1.1+deb7u1 [125 kB]
Get:22 http://mirrordirector.raspbian.org/raspbian/ wheezy/main php5-cli armhf 5.4.39-0+deb7u1 [2,467 kB]
Get:23 http://mirrordirector.raspbian.org/raspbian/ wheezy/main libavutil51 armhf 6:0.8.17-1+rp11 [102 kB]
Get:24 http://mirrordirector.raspbian.org/raspbian/ wheezy/main libavcodec53 armhf 6:0.8.17-1+rp11 [2,306 kB]
Get:25 http://mirrordirector.raspbian.org/raspbian/ wheezy/main php5 all 5.4.39-0+deb7u1 [1,024 B]
Get:26 http://mirrordirector.raspbian.org/raspbian/ wheezy/main libapache2-mod-php5 armhf 5.4.39-0+deb7u1 [2,478 kB]
Get:27 http://mirrordirector.raspbian.org/raspbian/ wheezy/main php5-mysql armhf 5.4.39-0+deb7u1 [69.2 kB]
Get:28 http://mirrordirector.raspbian.org/raspbian/ wheezy/main php5-common armhf 5.4.39-0+deb7u1 [618 kB]
Get:29 http://mirrordirector.raspbian.org/raspbian/ wheezy/main smbclient armhf 2:3.6.6-4+deb7u5 [4,491 kB]
Get:30 http://mirrordirector.raspbian.org/raspbian/ wheezy/main samba-common all 2:3.6.6-4+deb7u5 [214 kB]
Get:31 http://mirrordirector.raspbian.org/raspbian/ wheezy/main gpgv armhf 1.4.12-7+deb7u7 [208 kB]
Get:32 http://mirrordirector.raspbian.org/raspbian/ wheezy/main xdg-utils all 1.4.12-7+deb7u7 [1,985 kB]
Get:33 http://mirrordirector.raspbian.org/raspbian/ wheezy/main ruby1.9.1 armhf 1.9.3.194-8.1+deb7u3 [209 kB]
Get:34 http://mirrordirector.raspbian.org/raspbian/ wheezy/main libruby1.9.1 armhf 1.9.3.194-8.1+deb7u3 [4,178 kB]
Get:35 http://mirrordirector.raspbian.org/raspbian/ wheezy/main libxfont1 armhf 1:1.4.5-5 [148 kB]
Get:36 http://mirrordirector.raspbian.org/raspbian/ wheezy/main sudo armhf 1.8.5p2-1+nmu2 [838 kB]
Get:37 http://mirrordirector.raspbian.org/raspbian/ wheezy/main xdg-utils all 1.4.12-7+deb7u7 [1,985 kB]
Get:38 http://mirrordirector.raspbian.org/raspbian/ wheezy/main libc-bin armhf 2.13-38+rp12+deb7u8 [1,206 kB]
Get:39 http://mirrordirector.raspbian.org/raspbian/ wheezy/main libc6 armhf 2.13-38+rp12+deb7u8 [4,104 kB]
79% [39 libc6 1,743 kB/4,104 kB 42%] 46.7 kB/s 3min 33s
Meta-z for help | 115200 B/s | NOR | Minicom 2.7 | VT102 | OffLine | tty.usbserial
```

2、修改音频源输出

AirPlay默认有HDMI输出，更改为默认音频输出

```
amixer cset numid=3 1
```

```
pi@raspberrypi:~$ amixer cset numid=3 1
numid=3,iface=MIXER,name='PCM Playback Route'
  ; type=INTEGER,access=rw-----,values=1,min=0,max=2,step=0
  : values=1
pi@raspberrypi:~$
```

3、安装shairport依赖包

```
apt-get install git libao-dev libssl-dev libcrypto-openssl-rsa-
perl libio-socket-inet6-perl libwww-perl avahi-utils libmodule-
build-perl
```

```
root@raspberrypi:/home/pi# apt-get install git libao-dev libssl-dev libcrypto-ope
nssl-rsa-perl libio-socket-inet6-perl libwww-perl avahi-utils libmodule-build-pe
rl
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following extra packages will be installed:
  avahi-daemon bind9-host geoip-database git-man libalgorithm-c3-perl
  libao-common libao4 libavahi-core7 libbind9-80 libclass-c3-perl
  libclass-c3-xs-perl libcrypto-openssl-bignum-perl libcurl3-gnutls
  libdata-optlist-perl libdata-section-perl libdns88 libencode-locale-perl
```

4、安装Perl NET-SDP包

因为iOS系统需要这个包的支持，所以我们输入以下命令：

```
git clone https://github.com/njh/perl-net-sdp.git perl-net-sdp
```

```
root@raspberrypi:/home/pi# git clone https://github.com/njh/perl-net-sdp.git per
l-net-sdp
Cloning into 'perl-net-sdp'...
remote: Counting objects: 193, done.
remote: Compressing objects: 100% (91/91), done.
remote: Total 193 (delta 83), reused 193 (delta 83)
Receiving objects: 100% (193/193), 40.45 KiB | 7 KiB/s, done.
Resolving deltas: 100% (83/83), done.
root@raspberrypi:/home/pi# cd perl-net-sdp
root@raspberrypi:/home/pi/perl-net-sdp# perl Build.PL
```

```
cd perl-net-sdp
perl Build.PL
./Build
./Build test
./Build install
```

```

root@raspberrypi:/home/pi/perl-net-sdp# perl Build.PL
WARNING: the following files are missing in your kit:
    Makefile.PL
    META.yml
Please inform the author.

Created MYMETA.yml and MYMETA.json
Creating new 'Build' script for 'Net-SDP' version '0.07'
root@raspberrypi:/home/pi/perl-net-sdp# ./Build
Building Net-SDP
root@raspberrypi:/home/pi/perl-net-sdp# ./Build test
t/00use.t ..... ok
t/10generate.t .. ok
t/10parse.t ..... ok
t/20repeat.t .... ok
t/30asstring.t .. ok
All tests successful.
Files=5, Tests=69, 4 wallclock secs ( 0.81 usr 0.05 sys + 3.07 cusr 0.13 csys = 4.06 CPU)
Result: PASS
root@raspberrypi:/home/pi/perl-net-sdp# ./Build install
Building Net-SDP
Installing /usr/local/man/man1/sdp2rat.1p
Installing /usr/local/share/perl/5.14.2/Net/SDP.pm
Installing /usr/local/share/perl/5.14.2/Net/SDP/Media.pm
Installing /usr/local/share/perl/5.14.2/Net/SDP/Time.pm
Installing /usr/local/man/man3/Net::SDP::Media.3pm
Installing /usr/local/man/man3/Net::SDP.3pm
Installing /usr/local/man/man3/Net::SDP::Time.3pm
Installing /usr/local/bin/sdp2rat
root@raspberrypi:/home/pi/perl-net-sdp#

```

5、安装shairport (AirPlay仿真器)

返回上层目录后

```
git clone https://github.com/hendrikw82/shairport.git
```

```

root@raspberrypi:/home/pi/perl-net-sdp# cd ../t
Cloning into 'shairport'...git clone https://github.com/hendrikw82/shairport.git
remote: Counting objects: 697, done.
remote: Total 697 (delta 0), reused 0 (delta 0), pack-reused 697
Receiving objects: 100% (697/697), 204.42 KiB | 26 KiB/s, done.
Resolving deltas: 100% (390/390), done.
root@raspberrypi:/home/pi#

```

```
cd shairport
```

```
make
```

```

root@raspberrypi:/home/pi# cd shairport
root@raspberrypi:/home/pi/shairport# make
cc -O2 -Wall -c alac.c -o alac.o
cc -O2 -Wall -DHAIRTUNES_STANDALONE haitunes.c alac.o -o haitunes -lm -lpthread -lssl -lcrypto -lao
cc -O2 -Wall -c socketlib.c -o socketlib.o
cc -O2 -Wall -c shairport.c -o shairport.o
cc -O2 -Wall -c haitunes.c -o haitunes.o
cc -O2 -Wall socketlib.o shairport.o alac.o haitunes.o -o shairport -lm -lpthread -lssl -lcrypto -lao
root@raspberrypi:/home/pi/shairport#

```

6、开启AirPort服务

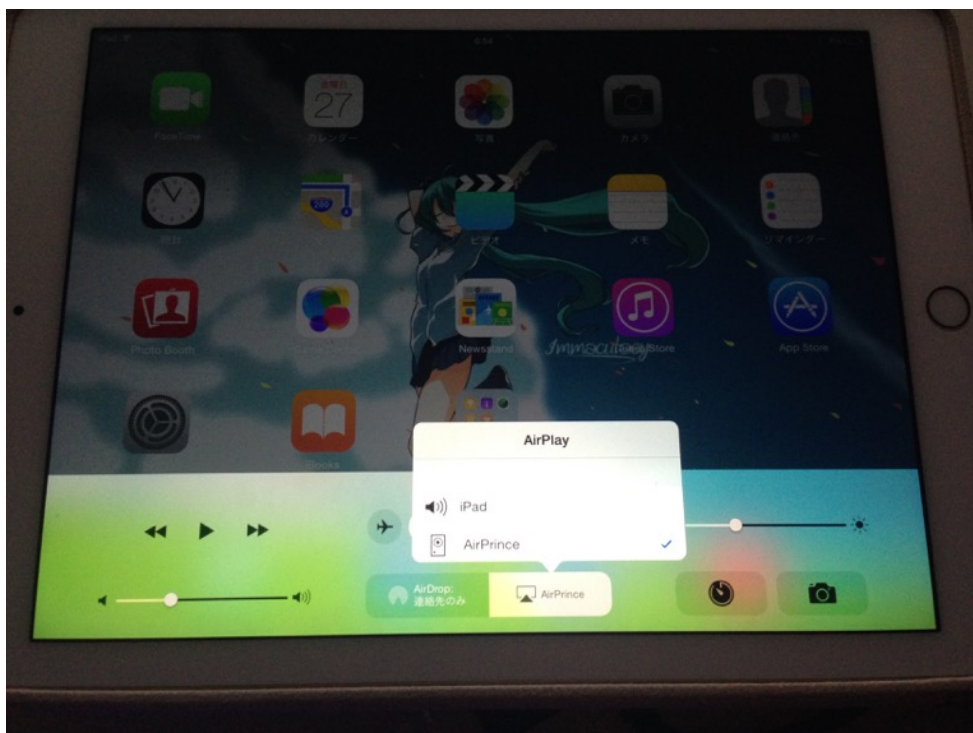
```
./shairport.pl -a AirPrince
```

```

root@raspberrypi:/home/pi/shairport# ./shairport.pl -a AirPrince
Established under name '7B1BED9AEA17@AirPrince'
Audio StreamJ1yidG7NdG7w8uuAIJ9EtA==ALSA lib pcm.c:2217:(snd_pcm_open_noupdate) Unknown PCM cards.pcm.front
requesting resend on 3 packets (port 56590)

```


然后在iPad上选择自己的AirPort。



树莓派插上耳机就能听歌

