



深圳开源通信有限公司

Open Vox-Best Cost Effective Asterisk Cards

OpenVox A810E/A810P/AE810E/AE810P User Manual



A810P/A810E

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深圳开源通信有限公司

Open Vox-Best Cost Effective Asterisk Cards

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1. Overview

1.1 What is A810P/A810E

A810P/A810E is a modular analog telephony interface product. AE810P/AE810E is A810P/A810E with EC module. It is designed to build IP PBX.

A810P/AE810P or A810E/AE810E must be used with FXO-400 or FXS-400 together to build a workable system. AE810P/AE810E has EC module, which must be used with FXO-400 or FXS-400 together.

Key Benefits:

Low CPU Payload : Firmware accelerate I/O access achieve high stability and highly decreased cpu payload

Scalable: Just add additional cards to extend system

Bus Master: Operation speed up to 132Mbytes/sec

Echo cancellation: Support high quality octasic echo cancellation DSP, each channel independent of 128ms or 1024 taps echo cancellation

RoHS compliant

Certificates: CE, FCC

Misc:

Temperature Operation: 0 to 50°C

Temperature Storage: -40 to 125°C

Humidity: 10 TO 90% NON-CONDENSING

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1.2 What is Asterisk:

The Definition of Asterisk is described as follow:

Asterisk is a complete PBX in software. It runs on Linux, BSD, Windows (emulated) and provides all of the features you would expect from a PBX and more. Asterisk does voice over IP in four protocols, and can interoperate with almost all standards-based telephony equipment using relatively inexpensive hardware.

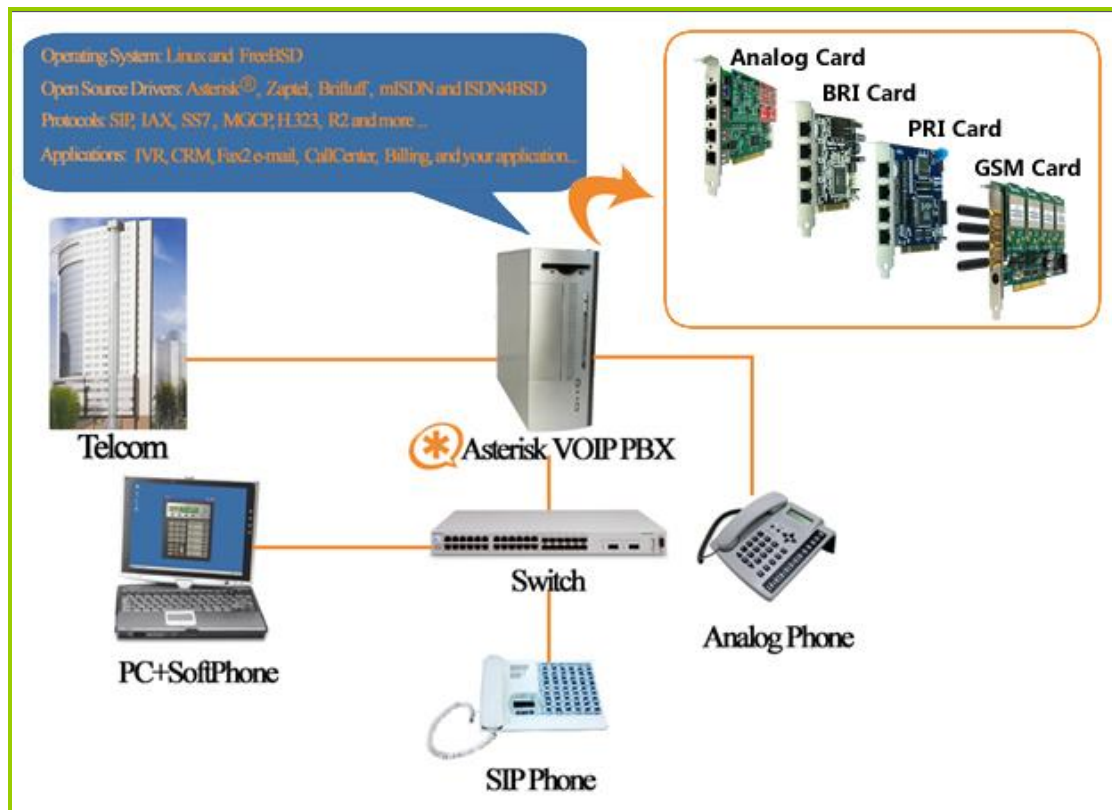


Figure 1: Asterisk_OpenVox Setup

Asterisk provides Voicemail services with Directory, Call Conferencing, Interactive Voice Response, Call Queuing. It has support for three-way calling, caller ID services, ADSI, IAX, SIP, H.323 (as both client and gateway), MGCP (call manager only) and SCCP/Skinny(voip-info.org).

2. Hardware Setting

To set the A810P/AE810P, user MUST go through these steps:

1. Checking power supply: Board must be provided power, please plug the power supply cable into power supply connector. Otherwise, you will not be able to use. (refer figure 2 below)

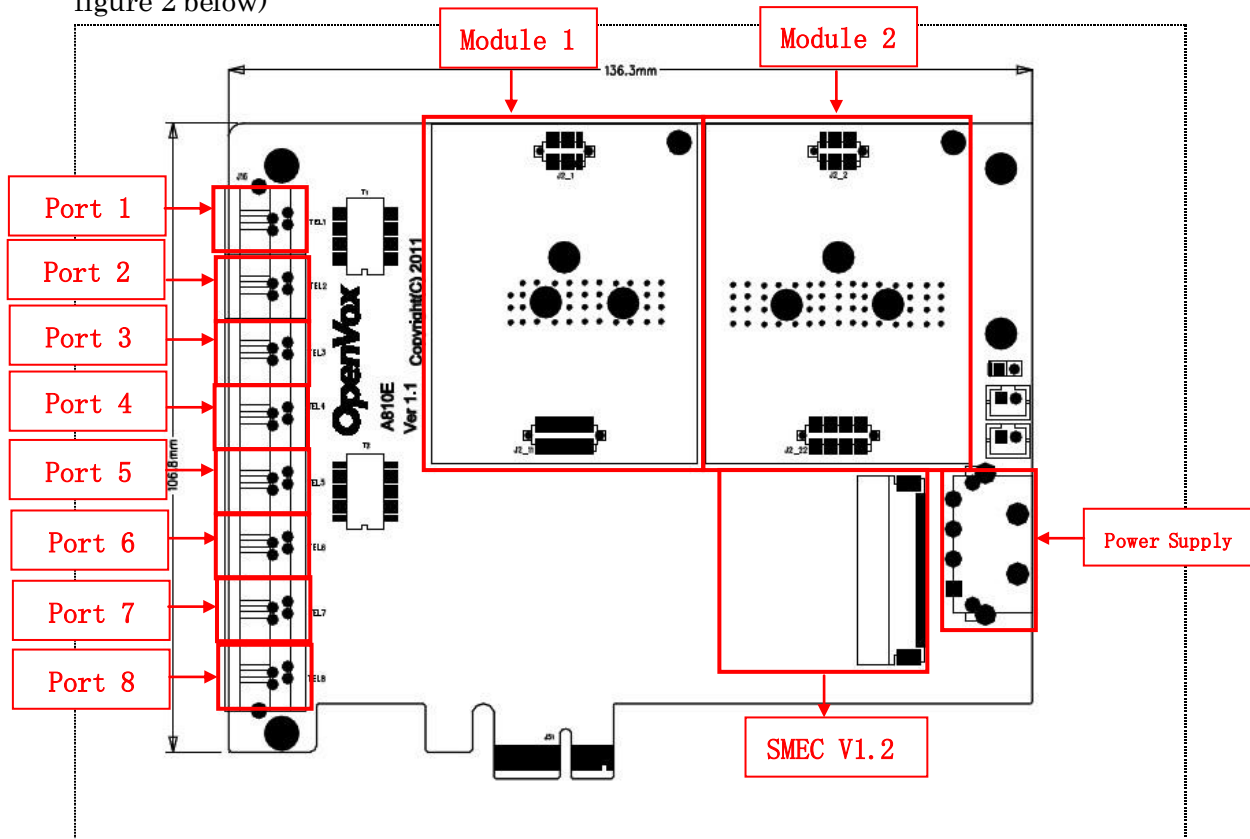


Figure 2: A810E/AE810E Hardware Configuration

3. Software Installation and Configuration

A810P/AE810P supports dahdi software device driver on Linux. To use A810P/AE810P, user must download, edit, install and configure dahdi and asterisk.

3.1 Download asterisk, dahdi, driver and firmware

1. Download asterisk from www.asterisk.org

Right here, take asterisk-1.8.0 for an example:

<http://downloads.asterisk.org/pub/telephony/asterisk/releases/asterisk-1.8.0.tar.gz>

2. There are two methods to download dahdi source.

- 1) Download dahdi from openvox website, which has included driver of A810P/AE810P, user doesn't need to modify any files.

http://downloads.openvox.cn/pub/drivers/dahdi-linux-complete/openvox_dahdi-linux-complete-current.tar.gz (if you select this method, just skip to step 3.3 after you finish this step)

- 2) Download dahdi from asterisk official website: downloads.asterisk.org, then user needs to download the driver patch of A810/AE810 as well. The patch is located here:

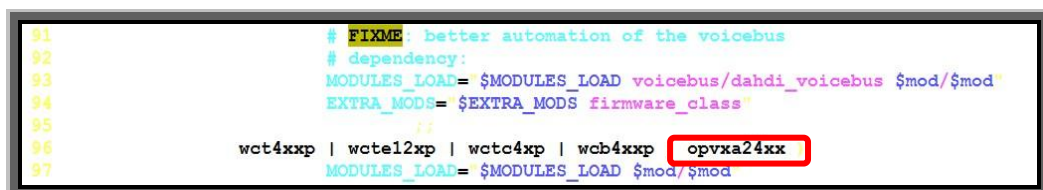
http://downloads.openvox.cn/pub/drivers/dahdi-patches/a2410p/opvxa24xx_dahdi-linux.tar.gz

There is a directory named opvxa24xx after you untar this package, please copy the whole directory to `/usr/src/dahdi-linux-xxx/drivers/dahdi/`. And you have to modify some configure files before you start compiling dahdi.

3.2 Modify the configure files

There are some steps here, make sure you have already modified them before you compile dahdi.

- A. Forward to directory `/usr/src/dahdi-linux-xxx/build_tools`, and modify file `live_dahdi` like this:



```
91 #FIXME better automation of the voicebus
92 # dependency:
93 MODULES_LOAD= $MODULES_LOAD voicebus/dahdi_voicebus $mod/$mod
94 EXTRA_MODS= $EXTRA_MODS firmware_class
95
96 wct4xxp | wctel2xp | wctc4xp | wcb4xxp opvxa24xx
97 MODULES_LOAD= $MODULES_LOAD $mod/$mod
```

Figure 3: live_dahdi screenshot

- B. Forward to directory `/usr/src/dahdi-linux-xxx/drivers/dahdi`, and modify file `Kbuild` like this:

```

9 obj-$(DAHDI_BUILD_ALL)$(CONFIG_DAHDI_WCT4XXP) += wct4xxp/
10 obj-$(DAHDI_BUILD_ALL)$(CONFIG_DAHDI_WCTC4XXP) += wctc4xxp/
11 obj-$(DAHDI_BUILD_ALL)$(CONFIG_DAHDI_WCTDM24XXP) += wctdm24xxp/
12 obj-$(DAHDI_BUILD_ALL)$(CONFIG_DAHDI_OPVXA24XX) += opvxa24xx/

```

Figure 4: Kbuild screenshot

C. Forward to directory /usr/src/dahdi-linux-xxx/drivers/dahdi, and insert the following info in the red circle into the file Kconfig near line 156.

```

126 config DAHDI_OPVXA24XX
127     tristate "OpenVox 24 ports analog card Support"
128     depends on DAHDI && PCI
129     default DAHDI
130     ---help---
131     This driver provides support for the following OpenVox
132     Wildcard products:
133     * A2410P (PCI)
134     * A1610P (PCI)
135     * A810P (PCI)
136     To compile this driver as a module, choose M here: the
137     module will be called opvxa24xx.
138     If unsure, say Y.
139
140 config DAHDI_VOICEBUS

```

Figure 5: Kconfig screenshot

D. Forward to directory /usr/src/dahdi-tools-xxx/xpp/perl_modles/Dahdi/Hardware, and add the following info to the file PCI.pm.

```

56 # from opvxa24xx
57
58 '1b74:1610' => { DRIVER => 'opvxa24xx', DESCRIPTION => 'OpenVox A1610P' },
59 '1b74:0810' => { DRIVER => 'opvxa24xx', DESCRIPTION => 'OpenVox A810P' },

```

Figure 6: PCI.pm screenshot

E. Forward to directory /usr/src/dahdi-tools-xxx/xpp/perl_modules/Dahid, and modify file Chans.pm like this:

```

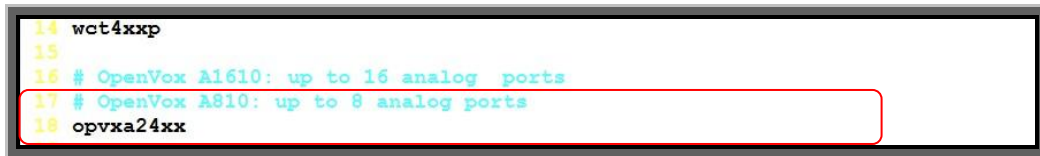
195 sub probe_type($) {
196     my $self = shift;
197     my $fqm = $self->fqm;
198     my $num = $self->num;
199     my $type;
200
201     if ($fqm =~ m:WCTDM|WRTDM|OPVXA1200|OPVXA24XX/;) {
202         my $maybe;
203     }

```

Figure 7: Chans.pm screenshot

F. Forward to directory /usr/src/dahdi-tools-xxx, and add the following info to file

modules.sample.

A screenshot of a terminal window showing the content of the modules.sample file. The lines are numbered 14 to 18. Line 14 is 'wct4xxp', line 15 is blank, line 16 is '# OpenVox A1610: up to 16 analog ports', line 17 is '# OpenVox A810: up to 8 analog ports', and line 18 is 'opvxa24xx'. A red box highlights the entire content from line 14 to 18.

```
14 wct4xxp
15
16 # OpenVox A1610: up to 16 analog ports
17 # OpenVox A810: up to 8 analog ports
18 opvxa24xx
```

Figure 8: modules.sample screenshot

G. Forward to directory /usr/src/dahdi-tools-xxx, and modify blacklist.sample like this:

A screenshot of a terminal window showing the content of the blacklist.sample file. The lines are numbered 12 to 14. Line 12 is 'blacklist opvxa24xx', line 13 is 'blacklist wctc4xxp', and line 14 is 'blacklist wcb4xxp'. A red box highlights the first line, 'blacklist opvxa24xx'.

```
12 blacklist opvxa24xx
13 blacklist wctc4xxp
14 blacklist wcb4xxp
```

Figure 9: blacklist.sample screenshot

Note: If you select CentOS 5.6 you have to patch dahdi, please see [here](#) for the patch.

3.3 Installation

Before installing dahdi and asterisk, please make sure that some supporting packages have been installed.

Note that if there is no kernel source in the system, user should install it. User can run **yum** again: *yum install kernel-devel*.

It is time to check for the availability of some supporting packages:

rpm -q bison

rpm -q bison-devel

rpm -q ncurses

rpm -q ncurses-devel

rpm -q zlib

rpm -q zlib-devel

rpm -q openssl

rpm -q openssl-devel

rpm -q gnutls-devel

rpm -q gcc // make sure the version is higher than 4.0

rpm -q gcc-c++

rpm -q libxml2

If any of those packages are not installed, please install them by using **yum**.

yum install bison

yum install bison-devel

yum install ncurses

yum install ncurses-devel

```

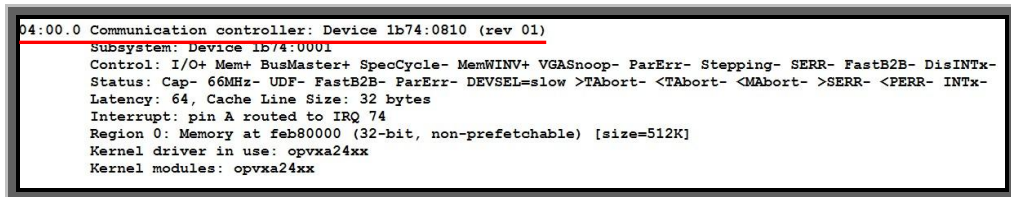
yum install zlib
yum install zlib-devel
yum install openssl
yum install openssl-devel
yum install gnutls-devel
yum install gcc
yum install gcc-c++
yum install libxml2

```

User can install the driver via the following steps (assuming user has the source code of dahdi device driver installed in /usr/src/dahdi-2.2.XX directory):

1. Checking the A810P/AE810P hardware by command: *lspci -vvvvv*

From the following, user can see that there is a device called communication controller interface be found.



```

04:00.0 Communication controller: Device 1b74:0810 (rev 01)
Subsystem: Device 1b74:0001
Control: I/O+ Mem+ BusMaster+ SpecCycle- MemWINV+ VGASnoop- ParErr- Stepping- SERR- FastB2B- DisINTx-
Status: Cap- 66MHz- UDF- FastB2B- ParErr- DEVSEL=slow >TAbort- <TAbort- <MAbort- >SERR- <PERR- INTx-
Latency: 64, Cache Line Size: 32 bytes
Interrupt: pin A routed to IRQ 74
Region 0: Memory at feb80000 (32-bit, non-prefetchable) [size=512K]
Kernel driver in use: opvxa24xx
Kernel modules: opvxa24xx

```

Figure 10: hardware detect

2. Compiling and installing dahdi

1) a. If user uses dahdi-linux-complete-xxx.tar.gz, execute these commands:

```

cd /usr/src/
tar -xvzf dahdi-linux-complete-xxx.tar.gz
cd dahdi-linux-complete-xxx
make
make install
make config

```

b. If user uses dahdi-linux-xxx.tar.gz and dahdi-tools-xxx.tar.gz, execute these commands: (make sure you have already finished step 3.2 before you carry out the following commands).

```

cd /usr/src
tar -xvzf dahdi-linux-xxx.tar.gz
cd dahdi-linux-xxx,
make
make install

```

```

cd /usr/src/
tar -xvzf dahdi-tools-xxx.tar.gz
cd dahdi-tools-xxx,
./configure

```

```
make  
make install  
make config
```

- 2) Installing asterisk

```
cd /usr/src/  
tar -xvzf asterisk-xxx.tar.gz  
cd asterisk-xxx  
configure  
make  
make install  
make samples
```

3.4 Configure

1. Loading modules for opvxa24xx:

```
modprobe dahdi  
modprobe opvxa24xx opermode=YOUR COUNTRY //the driver name is the same  
as //opvxa24xx
```

openvox_dahdi-linux-complete 2.2.0 or higher versions allows user to adjust how long to initiate once IRQ. User is able to adjust time to initiate IRQ by the following way:

```
modprobe opvxa24xx opermode=YOUR COUNTRY ms_per_irq=2
```

`ms_per_irq=2` means every 2 millisecond initiate once IRQ.

The valid values of `ms_per_irq` are 1,2,4,8,16, the default value is 1.

dahdi-linux-complete-2.4.0 or higher version supports this function.

Execute ***dmesg*** command to check if you have made the EC module worked.

If user uses AE810P/AE810E, from figure 11 below, user will be able to see EC module has been detected by the system.

```
dahdi: Telephony Interface Registered on major 196
dahdi: Version: 2.4.0
OpenVox A810P version: 1.3
Module 0: Installed -- AUTO FXO (FCC mode)
Module 1: Installed -- AUTO FXO (FCC mode)
Module 2: Installed -- AUTO FXO (FCC mode)
Module 3: Installed -- AUTO FXO (FCC mode)
Module 4: Installed -- AUTO FXS/DPO
Module 5: Installed -- AUTO FXS/DPO
Module 6: Installed -- AUTO FXS/DPO
Module 7: Installed -- AUTO FXS/DPO
OpenVox VPM: echo cancellation supports 32 channels
OpenVox VPM: echo cancellation for 32 channels
OpenVox VPM: hardware DTMF disabled.
OpenVox VPM: Present and operational servicing 1 span(s)
Found an OpenVox A810P: Version 1.3 (8 modules)
```

Figure 11: EC detection

2. Checking the configure files

Run the command `vi /etc/dahdi/genconf_parameters` to disable the `softecho` parameter.

If users use AE810P, please set `echo_can` to `none` as following:

```
echo_can          none
```

If users use A810P, just ignore that step above.

Then run these commands:

```
dahdi_genconf
```

```
dahdi_cfg -vvvv
```

The output might be the same as the following:

```
[root@localhost /]# dahdi_cfg -vvv
DAHDI Tools Version - 2.4.0

DAHDI Version: 2.4.0
Echo Canceller(s): MG2
Configuration
=====

Channel map:

Channel 01: FXS Kewlstart (Default) (Echo Canceler: mg2) (Slaves: 01)
Channel 02: FXS Kewlstart (Default) (Echo Canceler: mg2) (Slaves: 02)
Channel 03: FXS Kewlstart (Default) (Echo Canceler: mg2) (Slaves: 03)
Channel 04: FXS Kewlstart (Default) (Echo Canceler: mg2) (Slaves: 04)
Channel 05: FXO Kewlstart (Default) (Echo Canceler: mg2) (Slaves: 05)
Channel 06: FXO Kewlstart (Default) (Echo Canceler: mg2) (Slaves: 06)
Channel 07: FXO Kewlstart (Default) (Echo Canceler: mg2) (Slaves: 07)
Channel 08: FXO Kewlstart (Default) (Echo Canceler: mg2) (Slaves: 08)

8 channels to configure.

Setting echocan for channel 1 to mg2
Setting echocan for channel 2 to mg2
Setting echocan for channel 3 to mg2
Setting echocan for channel 4 to mg2
Setting echocan for channel 5 to mg2
Setting echocan for channel 6 to mg2
Setting echocan for channel 7 to mg2
Setting echocan for channel 8 to mg2
```

Figure 12: dahdi_cfg -vvvv screenshot

The command **dahdi_genconf** will automatically generate the system.conf under directory /etc/dahdi and dahdi-channels.conf under /etc/asterisk. Please check the setting of system.conf, it looks like the following:

```
1 ## Autogenerated by /usr/sbin/dahdi_genconf on Tue May 31 13:53:49 2011
2 # If you edit this file and execute /usr/sbin/dahdi_genconf again,
3 # your manual changes will be LOST.
4 # Dahdi Configuration File
5 #
6 # This file is parsed by the Dahdi Configurator, dahdi_cfg
7 #
8 # Span 1: OPVXA24XX/24 "OpenVox A810 Board 25" (MASTER)
9 fxsk=1
10 echocanceller=mg2,1
11 fxsk=2
12 echocanceller=mg2,2
13 fxsk=3
14 echocanceller=mg2,3
15 fxsk=4
16 echocanceller=mg2,4
17 fxok=5
18 echocanceller=mg2,5
19 fxok=6
20 echocanceller=mg2,6
21 fxok=7
22 echocanceller=mg2,7
23 fxok=8
24 echocanceller=mg2,8
25
26 # Global data
27
28 loadzone      = us
29 defaultzone   = us
```

Figure 13: system.conf

In order to match your country pattern, you will need to change the parameters **load zone** and **default zone** to your country. For example, your system is in **CHINA**, then, you will change their value like this:

```
loadzone      = cn
defaultzone   = cn
```

Meanwhile, you also need to modify another parameter: **country** in file `/etc/asterisk/indications.conf`

```
[general]
country=us          ; default location
```

Figure 14: indications.conf

After loading dahdi and opvxa24xx driver, user should check the `chan_dahdi.conf` and `dahdi-channels.conf` under `/etc/asterisk`. Please make sure `dahdi-channels.conf` has been included into `chan_dahdi.conf`. If not, run the command:

```
echo "#include dahdi-channels.conf" >> /etc/asterisk/chan_dahdi.conf
```

Make sure that the context in `dahdi-channels.conf` should exist in `extensions.conf`. File `dahdi-channels.conf` should look like as the following:

FXO ports use FXS signaling, the configure file looks like this:

```
1 ; Autogenerated by /usr/sbin/dahdi_genconf on Tue May 31 13:53:49 2011
2 ; If you edit this file and execute /usr/sbin/dahdi_genconf again,
3 ; your manual changes will be LOST.
4 ; Dahdi Channels Configurations (chan_dahdi.conf)
5 ;
6 ; This is not intended to be a complete chan_dahdi.conf. Rather, it is intended
7 ; to be #include-d by /etc/chan_dahdi.conf that will include the global settings
8 ;
9 ;
10 ; Span 1: OPVXA24XX/24 "OpenVox A810 Board 25" (MASTER)
11 ;; line="1 OPVXA24XX/24/0"
12 signalling=fxs_ks
13 callerid=asreceived
14 group=0
15 context=from-pstn
16 channel => 1
17 callerid=
18 group=
19 context=default
20
21 ;; line="2 OPVXA24XX/24/1"
22 signalling=fxs_ks
23 callerid=asreceived
24 group=0
25 context=from-pstn
26 channel => 2
27 callerid=
28 group=
29 context=default
30
```

FXS ports use FXO signalling, the configure file looks like this:

```
51 ;; line="5 OPVXA24XX/24/4"
52 signalling=fxo_ks
53 callerid="Channel 5" <4005>
54 mailbox=4005
55 group=5
56 context=from-internal
57 channel => 5
58 callerid=
59 mailbox=
60 group=
61 context=default
62
63 ;; line="6 OPVXA24XX/24/5"
64 signalling=fxo_ks
65 callerid="Channel 6" <4006>
66 mailbox=4006
67 group=5
68 context=from-internal
69 channel => 6
70 callerid=
71 mailbox=
72 group=
73 context=default
74
```

Figure 15: dahdi-channels.conf

3. Starting asterisk and test calls

Checking the dahdi channel loading from asterisk console:

asterisk -vvvvvvvgc

Entering asterisk console, run command: ***dahdi show channels***. If dahdi channels can be shown, which means the dahdi channels have been loaded into asterisk.


```
*CLI> dahdi show channels
```

Chan	Extension	Context	Language	MOH Interpret	Blocked	State
pseudo		default		default		In Service
1		from-pstn		default		In Service
2		from-pstn		default		In Service
3		from-pstn		default		In Service
4		from-pstn		default		In Service
5		from-internal		default		In Service
6		from-internal		default		In Service
7		from-internal		default		In Service
8		from-internal		default		In Service

Figure 16: dahdi show channels

When user makes an inbound call, CLI will show as the following:

```
*CLI> -- Starting simple switch on 'DAHDI/1-1'
-- Executing [s@from-pstn:1] Answer("DAHDI/1-1", "") in new stack
-- Executing [s@from-pstn:2] NoOp("DAHDI/1-1", "" <982535362>") in new stack
-- Executing [s@from-pstn:3] Dial("DAHDI/1-1", "dahdi/5") in new stack
-- Called 5
-- DAHDI/5-1 is ringing
-- DAHDI/5-1 is ringing
-- DAHDI/5-1 answered DAHDI/1-1
-- Native bridging DAHDI/1-1 and DAHDI/5-1
-- Hanging up on 'DAHDI/5-1'
-- Hungup 'DAHDI/5-1'
== Spawn extension (from-pstn, s, 3) exited non-zero on 'DAHDI/1-1'
-- Hanging up on 'DAHDI/1-1'
-- Hungup 'DAHDI/1-1'
```

Figure 17: inbound call

When user makes an outbound call, CLI will show as the following:

```
localhost*CLI> -- Executing [982535462@from-internal:1] Dial("DAHDI/5-1", "dahdi/1/982535462") in new stack
-- Executing [982535462@from-internal:1] Dial("DAHDI/5-1", "dahdi/1/982535462") in new stack
localhost*CLI> -- Called 1/982535462
-- Called 1/982535462
localhost*CLI> Dialing T982535462w on 1
-- DAHDI/1-1 answered DAHDI/5-1
-- DAHDI/1-1 answered DAHDI/5-1
-- Native bridging DAHDI/5-1 and DAHDI/1-1
-- Native bridging DAHDI/5-1 and DAHDI/1-1
localhost*CLI> -- Hanging up on 'DAHDI/1-1'
-- Hungup 'DAHDI/1-1'
```

Figure 18: outbound call

The status of channel looks like the following. If user uses AE810P, EC Status of active channel should be ON; otherwise it would be OFF.


```
*CLI> dahdi show channel 1
Channel: 1
File Descriptor: 8
Span: 1
Extension:
Dialing: no
Context: from-pstn
Caller ID:
Calling TON: 0
Caller ID name:
Mailbox: none
Destroy: 0
InAlarm: 0
Signalling Type: FXS Kewlstart
Radio: 0
Owner: DAHDI/1-1
Real: DAHDI/1-1
Callwait: <None>
Threeway: <None>
Confno: -1
Propagated Conference: -1
Real in conference: 0
DSP: yes
Busy Detection: no
TDD: no
Relax DTMF: no
Dialing/CallwaitCAS: 0/0
Default law: ulaw
Fax Handled: no
Pulse phone: no
Gains (RX/TX): 0.00/0.00
Dynamic Range Compression (RX/TX): 0.00/0.00
DND: no
Echo Cancellation:
    128 taps
    currently ON
Wait for dialtone: 0ms
Master Channel: 5
Actual Confinfo: Num/5, Mode/0x0009
Actual Confmute: No
Hookstate (FXS only): Offhook
```

Figure 19: channel status

Notes:

User can use command `cat /proc/interrupts` to confirm A810P/AE810P has independent IRQ. If A810P/AE810P shares IRQ with other device. To avoid IRQ conflict, A810P/AE810P enable user to adjust pin number when update firmware, please refer this manual for more details.

http://downloads.openvox.cn/pub/misc/opvx-update_user_manual_en.pdf

Test environments are:

CentOS-5.6

Kernel version: 2.6.18-238.el5

Dahdi: dahdi-linux-complete-2.4.0+2.4.0

Asterisk: 1.8.0

Hardware: OpenVox A810P/AE810P

4. References

www.openvox.cn

www.digium.com

www.asterisk.org

www.voip-info.org

www.asteriskguru.com