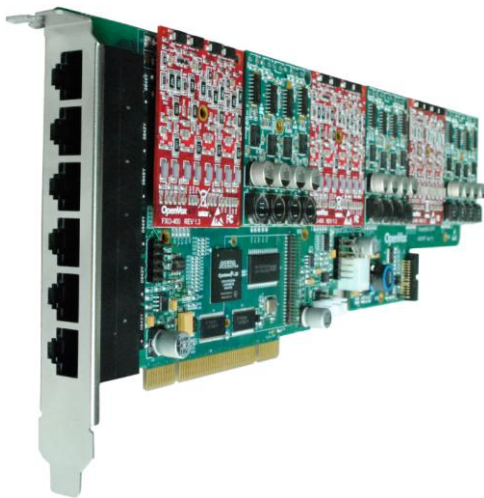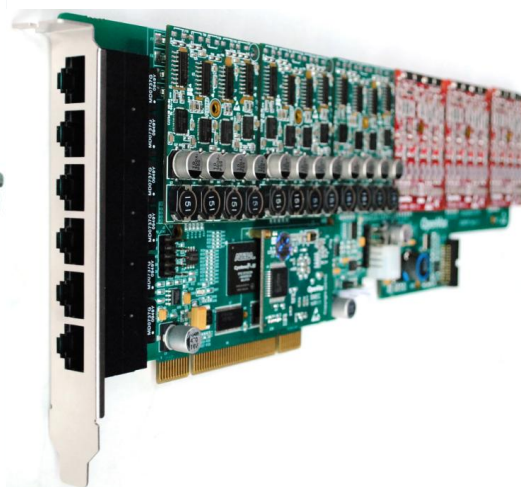深圳开源通信有限公司

OpenVox-Best Cost Effective Asterisk Cards

OpenVox A2410P/AE2410P on Elastix 1.6
User Manual

A2410P   AE2410P

Date:26/09/2010

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深圳开源通信有限公司

OpenVox-Best Cost Effective Asterisk Cards

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Table of Contents

1. Overview

1.1 What is A2410P/AE2410P

A2410P is a modular analog telephony interface product. AE2410P is A2410P with EC module. It is designed to build IP PBX.

A2410P/AE2410P must be used with FXO-400 or FXS-400 together to build a workable system. AE2410P 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
Voltage: 3.3V
Board Power Dissipation： 6.89W

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Asterisk® is a registered trademark of Digium, Inc.

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.
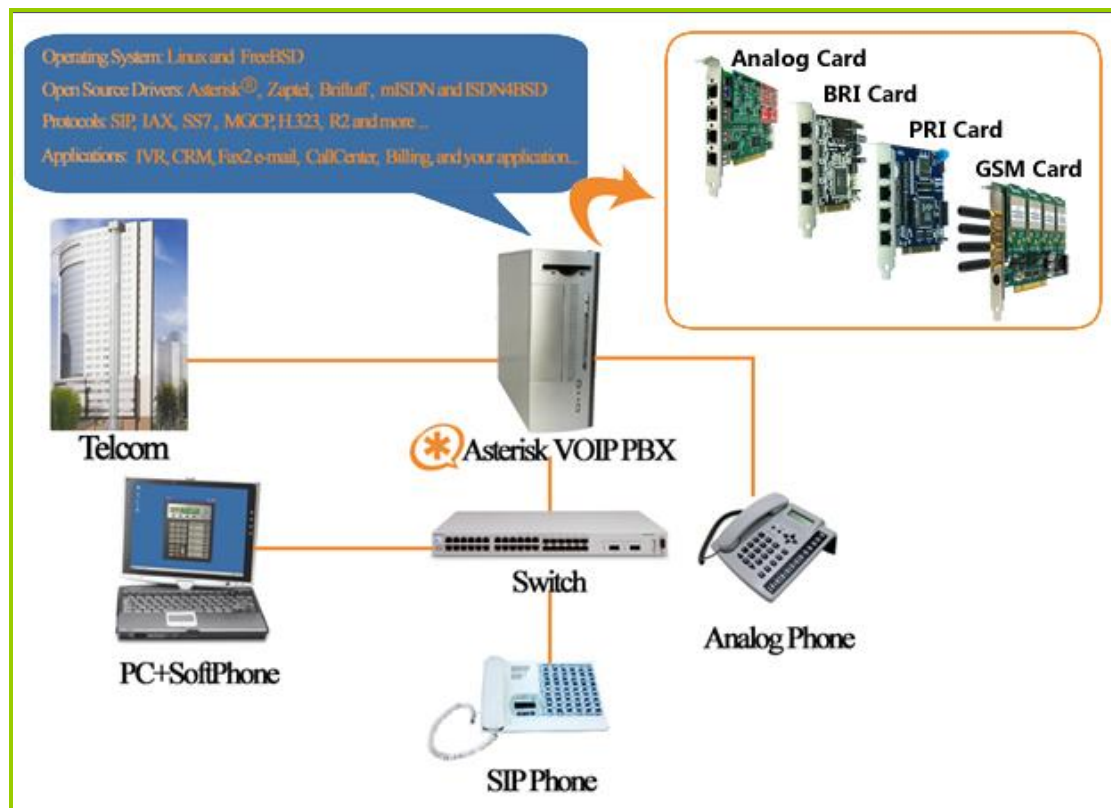

Figure 1: Asterisk_OpenVox Setup

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 A2410P/AE2410P, 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. (refer figure 2)
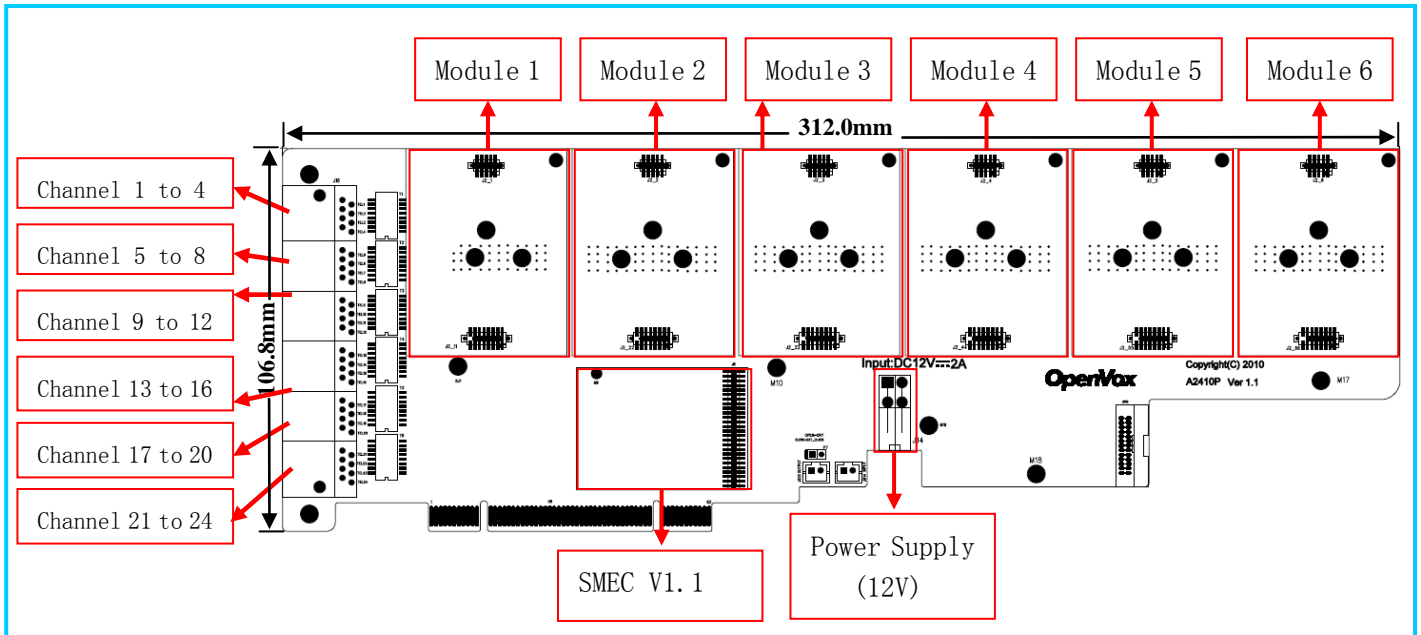
Figure 2: A2410P/AE2410P Hardware Configuration

2. Checking cabling/pin assignment: There are six modules on A2410P/AE2410P, each module (FXS400/FXO400) corresponds one RJ45 interface (refer figure 2). There are eight pins on each RJ45 interface. A2410P/AE2410P uses the two pins of it as a pair, connecting to two-wire telephone line, so each RJ45 interface can split into four telephone lines. Please see figure 3 for the setting of A2410P/AE2410P.

Figure 3: A2410P/AE2410P pin assignment

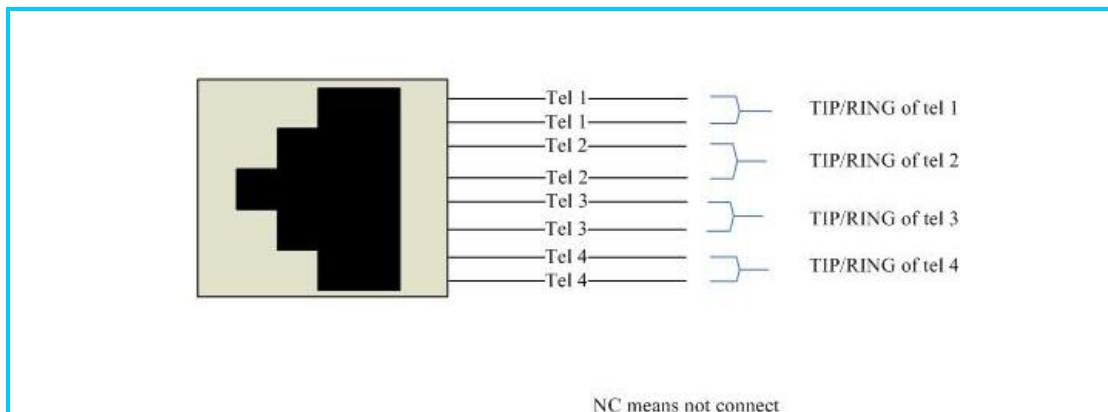3. Splitting the RJ45 to RJ11: User has to use a splitter (refer figure 4) to split RJ45 interface to four RJ11 normal telephone line. **And please connect PSTN line into FXO port and telephone into FXS port.**

Figure 4: A2410P/AE2410P Splitter

3. Software Installation and Configuration

After install Elastix 1.6 successfully, to use A2410P/AE2410P on Elastix 1.6, user must download dahdi the same version as on Elastix 1.6, and recompile dahdi. Take Elastix 1.6.0 for example, dahdi version on Elastix 1.6.0 is 2.2.0.2, so user must download dahdi 2.2.0.2 and recompile dahdi.

3.1 Download dahdi and driver

1) Checking the A2410P/AE2410P hardware by command: lspci -vvvvv
   From the following, user can see that there is a device called communication controller interface be found.

```
01:01.0 Communication controller: Unknown device 1b74:2410 (rev 01)
        Subsystem: Unknown device 1b74:0001
        Control: I/O+ Mem+ BusMaster+ SpecCycle- MemWINV+ VGASnoop- ParErr- Stepping- SERR-
FastB2B-
        Status: Cap- 66MHz- UDF- FastB2B- ParErr- DEVSEL=slow >TAbort- <TAbort-
<MAbort- >SERR- <PERR-
        Latency: 64, Cache Line Size: 16 bytes
        Interrupt: pin A routed to IRQ 50
        Region 0: Memory at dcd00000 (32-bit, non-prefetchable) [size=1M]
```

2) Check the version of dahdi
   modinfo /lib/modules/`uname -r`/dahdi/dahdi.ko

3) Download dahdi from:
   http://downloads.asterisk.org/pub/telephony/dahdi-linux-complete/releases/dahdi-linux-complete-2.2.0.2+2.2.0.tar.gz
   download the file to /usr/src
   cd /usr/src
   tar -zxvf dahdi-linux-complete-2.2.0.2+2.2.0

4) Download A2410P/AE2410P driver from:
   http://downloads.openvox.cn/pub/drivers/dahdi-patches/a2410p/opvxa24xx_dahdi-linux.tar.gz
   copy the tar file to /usr/src/dahdi-xx/linux/drivers/dahdi/

5) If user uses AE2410P, user should download firmware from:
   http://downloads.openvox.cn/pub/firmwares/opvx-dahdi-fw-oct6114-032-1.07.01.tar.gz
   tar -zxvf opvx-dahdi-fw-oct6114-032-1.07.01.tar.gz

```
cp dahdi-fw-oct6114-032.bin /lib/firmware/
mkdir /usr/lib/hotplug/firmware/
mv dahdi-fw-oct6114-032.bin /usr/lib/hotplug/firmware/
```

3.2 Edit the configure file

To edit the configure file, user must follow these steps:

1. Add opvxa24xx in /usr/src/dahdi-xx/linux/build_tools/live_dahdi

   add opvxa24xx shown in red

   ```
   MODULES_LOAD="$MODULES_LOAD xpp/xpp_usb"
           ;;
       wctdm24xxp | wct4xxp | wcte12xp | wctc4xp | opvxa24xx)
           MODULES_LOAD="$MODULES_LOAD $mod/$mod"
   ```

2. Add opvxa24xx in /usr/src/dahdi-xx/linux/drivers/dahdi/Kbuild

   ```
   obj-$(DAHDI_BUILD_ALL)$(CONFIG_DAHDI_WCT4XXP)      += wct4xxp/
   obj-$(DAHDI_BUILD_ALL)$(CONFIG_DAHDI_WCT4XXP)      += opvxa24xx/
   obj-$(DAHDI_BUILD_ALL)$(CONFIG_DAHDI_WCTC4XXP)     += wctc4xxp/
   ```

3. Add opvxa24xx in /usr/src/dahdi-xx/linux/drivers/dahdi/Kconfig

   ```
   config DAHDI_WCT4XXP
   tristate "Digium Wildcard dual- and quad-T1/E1/J1 Support"
   depends on DAHDI && PCI
   default DAHDI
   ---help---
     This driver provides support for the following Digium
     Wildcard products:

     * TE205/206/207/210/211/212P (PCI/PCI-X)
     * TE220 (PCI-E)
     * TE405/406/407/410/411/412P (PCI/PCI-X)
     * TE420 (PCI-E)

     To compile this driver as a module, choose M here: the
     module will be called wct4xxp.

     If unsure, say Y.

   config DAHDI_OPVXA24XX
   tristate "OpenVox 24 ports analog card Support"
   depends on DAHDI && PCI
   default DAHDI
   ---help---
     This driver provides support for the following OpenVox
     Wildcard products:
     * A2410P (PCI)
   ```

To compile this driver as a module, choose M here: the
module will be called opvxa24xx.

If unsure, say Y.

4. Add opvxa24xx in
   /usr/src/dahdi-xx/tools/xpp/perl_modules/Dahdi/Hardware/PCI.pm

```
# from opvxa24xx
'1b74:2410'      => { DRIVER => 'opvxa24xx', DESCRIPTION => 'OpenVox A2410P' },

# from wctdm24xxp
'd161:2400'      => { DRIVER => 'wctdm24xxp', DESCRIPTION => 'Wildcard TDM2400P' },
'd161:0800'      => { DRIVER => 'wctdm24xxp', DESCRIPTION => 'Wildcard TDM800P' },
```

5. Add opvxa24xx in /usr/src/dahdi-xx/tools/xpp/perl_modules/Dahdi/Chans.pm

```
my $dahdi_cfg = $ENV{DAHDI_CFG} || '/usr/sbin/dahdi_cfg';
sub probe_type($) {
 my $self = shift;
 my $fqn = $self->fqn;
 my $num = $self->num;
 my $type;

 if($fqn =~ m:WCTDM/|WRTDM/|OPVXA1200/|OPVXA24XX/:) {
     my %maybe;

     undef %maybe;
     foreach my $sig (qw(fxo fxs)) {
         my $cmd = "echo ${sig}ks=$num | $dahdi_cfg -c /dev/fd/0";

         $maybe{$sig} = system("$cmd >/dev/null 2>&1") == 0;
     }
```

6. Add opvxa24xx in /usr/src/dahdi-xx/tools/modules.sample

```
# Digium TE205P/TE207P/TE210P/TE212P: PCI dual-port T1/E1/J1
# Digium TE405P/TE407P/TE410P/TE412P: PCI quad-port T1/E1/J1
# Digium TE220: PCI-Express dual-port T1/E1/J1
# Digium TE420: PCI-Express quad-port T1/E1/J1
wct4xxp
# OpenVox A2410P: up to 24 analog ports
opvxa24xx
```

7. Add opvxa24xx in /usr/src/dahdi-xx/tools/blacklist.sample

```
blacklist wctdm
blacklist opvxa24xx
```

```
blacklist wctc4xxp
blacklist wcb4xxp
```

3.3 Installation

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):

Compiling
execute the commands:
cd /usr/src/dahdi-linux-complete-XX
./configure
make
make install
make config

3.4 Configure

1. Loading modules for opvxa24xx:
modprobe dahdi
modprobe opvxa24xx opermode=YOUR COUNTRY
dahdi_genconf
dahdi_cfg -vvvv
Then run **dmesg**
If user uses AE2410P, from the following, user can find EC module has been detected.

```
OpenVox A2410P version: 1.0
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
Module 8: Installed -- AUTO FXO (FCC mode)
Module 9: Installed -- AUTO FXO (FCC mode)
Module 10: Installed -- AUTO FXO (FCC mode)
Module 11: Installed -- AUTO FXO (FCC mode)
Module 12: Installed -- AUTO FXS/DPO
Module 13: Installed -- AUTO FXS/DPO
Module 14: Installed -- AUTO FXS/DPO
Module 15: Installed -- AUTO FXS/DPO
Module 16: Installed -- AUTO FXO (FCC mode)
Module 17: Installed -- AUTO FXO (FCC mode)
Module 18: Installed -- AUTO FXO (FCC mode)
Module 19: Installed -- AUTO FXO (FCC mode)
Module 20: Installed -- AUTO FXS/DPO
Module 21: Installed -- AUTO FXS/DPO
```

```
Module 22: Installed -- AUTO FXS/DPO
Module 23: Installed -- AUTO FXS/DPO
VPM450: echo cancellation supports 32 channels
VPM450: echo cancellation for 32 channels
VPM450: hardware DTMF disabled.
VPM450: Present and operational servicing 1 span(s)
```

2. Checking the configure files

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

```
# Autogenerated by /usr/sbin/dahdi_genconf on Thu Jul 22 00:56:58 2010
# If you edit this file and execute /usr/sbin/dahdi_genconf again,
# your manual changes will be LOST.
# Dahdi Configuration File
#
# This file is parsed by the Dahdi Configurator, dahdi_cfg
#
# Span 1: OPVXA24XX/24 "OpenVox A2410 Board 25" (MASTER)
fxsks=1
fxsks=2
fxsks=3
fxsks=4
fxoks=5
fxoks=6
fxoks=7
fxoks=8
.                         part of the file
.
.

# Global data

loadzone        = us      ;Please change to your country
defaultzone     = us      ;Please change to your country
```

   Edit /etc/asterisk/indications.conf

```
country = us      ;Please change to your country
```

   File dahdi-channels.conf should look like the following:
   FXO ports use FXS signaling, the configure file looks like this:

```
; Autogenerated by /usr/sbin/dahdi_genconf on Thu Jul 22 00:56:58 2010
; If you edit this file and execute /usr/sbin/dahdi_genconf again,
; your manual changes will be LOST.
; Dahdi Channels Configurations (chan_dahdi.conf)
;
; This is not intended to be a complete chan_dahdi.conf. Rather, it is intended
; to be #include-d by /etc/chan_dahdi.conf that will include the global settings
;
; Span 1: OPVXA24XX/24 "OpenVox A2410 Board 25" (MASTER)
;;; line="1 OPVXA24XX/24/0"
signalling=fxs_ks
callerid=asreceived
group=0
context=from-pstn
channel => 1
callerid=
group=
context=default

;;; line="2 OPVXA24XX/24/1"
signalling=fxs_ks
callerid=asreceived
group=0
context=from-pstn
channel => 2
callerid=
group=
context=default
```

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

```
;;; line="5 OPVXA24XX/24/4"
signalling=fxo_ks
callerid="Channel 5" <4005>
mailbox=4005
group=5
context=from-internal
channel => 5
callerid=
mailbox=
group=
context=default

;;; line="6 OPVXA24XX/24/5"
signalling=fxo_ks
callerid="Channel 6" <4006>
mailbox=4006
group=5
context=from-internal
channel => 6
callerid=
mailbox=
group=
context=default
```

3. Starting asterisk

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
 Pseudeo         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
        9        from-pstn               default                    In service
       10        from-pstn               default                    In service
       11        from-pstn               default                    In service
       12        from-pstn               default                    In service
       13        from-internal           default                    In service
       14        from-internal           default                    In service
       15        from-internal           default                    In service
       16        from-internal           default                    In service
       17        from-pstn               default                    In service
       18        from-pstn               default                    In service
       19        from-pstn               default                    In service
       20        from-pstn               default                    In service
       21        from-internal           default                    In service
       22        from-internal           default                    In service
       23        from-internal           default                    In service
       24        from-internal           default                    In service
```

The status of channel looks like the following. **If user uses AE2410P, EC Status of active channel should be ON; otherwise it would be OFF.**

```
*CLI> dahdi show channel 3

Channel: 3

File Descriptor: 17

Span: 1

Extension:

Dialing: no

Context: from-pstn

Caller ID:

Calling TON: 0

Caller ID name:

Destroy: 0

InAlarm: 0
```

Signalling Type: FXS Kewlstart

Radio: 0

Owner: DAHDI/3-1

Real: DAHDI/3-1

Callwait: <None>

Threeway: <None>

Confno: -1

Propagated Conference: -1

Real in conference: 0

DSP: yes

Relax DTMF: no

Dialing/CallwaitCAS: 0/0

Default law: ulaw

Fax Handled: no

Pulse phone: no

Echo Cancellation: 128 taps, currently ON

Master Channel: 6

Actual Confinfo: Num/6, Mode/0x0009

Actual Confmute: No

Hookstate (FXS only): Offhook

4. Configure on Elastix webpage

4.1 Log into Elastix Webpage

Please open your browser and enter the PBX IP address, then input Username: admin; Password: palosanto, then click on Submit button in the following screen.

4.2 Create Extensions

Add two extensions, then user can plug two phones to FXS, after that the two phones can call each other.

1) Click PBX button in the following illustration:

2) Click on Extensions bar in the following illustration:

From the drop down selection box, select Generic Zap Device since we are going to create zap extension, then click on submit button. Please refer to the following illustration:

3) Set up User Extension: 111 (that's the extension number I gave for reception); Display Name: 111 in the following illustration:

4) Input a channel number for your extension, please refer to the following illustration.

5) Then click on submit button.

6) Click the "Apply Configuration Changes Here" bar in the top of the screen.

7) If you use AE2410P,please refer to the following steps,otherwise jump to 8).

   a. Click on 111<111> button on the up right corner of the page, please refer to the following illustration:

   b. Set up echocancelwhenbridged :yes in the following instruction.

   c. Then click on submit button.

   d. Click the "Apply Configuration Changes Here" bar in the top of the screen.

8) Please repeat the above steps to add another extension 222 on channel 6. After these, we can dial each other between 111 and 222.

4.3 Add Incoming Route

   Add an incoming route, it will help you get incoming calls.
1) Click on "Inbound Routes" bar.
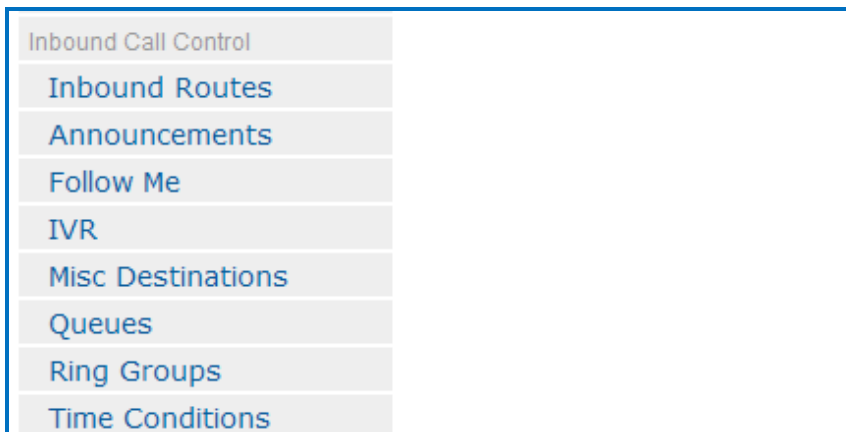
2) Input incoming1 in the textbox of Description as the following screen:

3) Click the Extensions textbox, choose an extension number from the drop down selection box. Then click submit. Please refer to the following illustration:

4) Click the "Apply Configuration Changes Here" bar in the top of the screen.
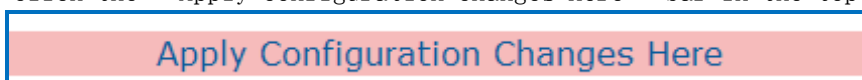
4.4 Create Trunk

To dial out, you have to create trunk.

1) Click on Trunks bar as the following illustration:
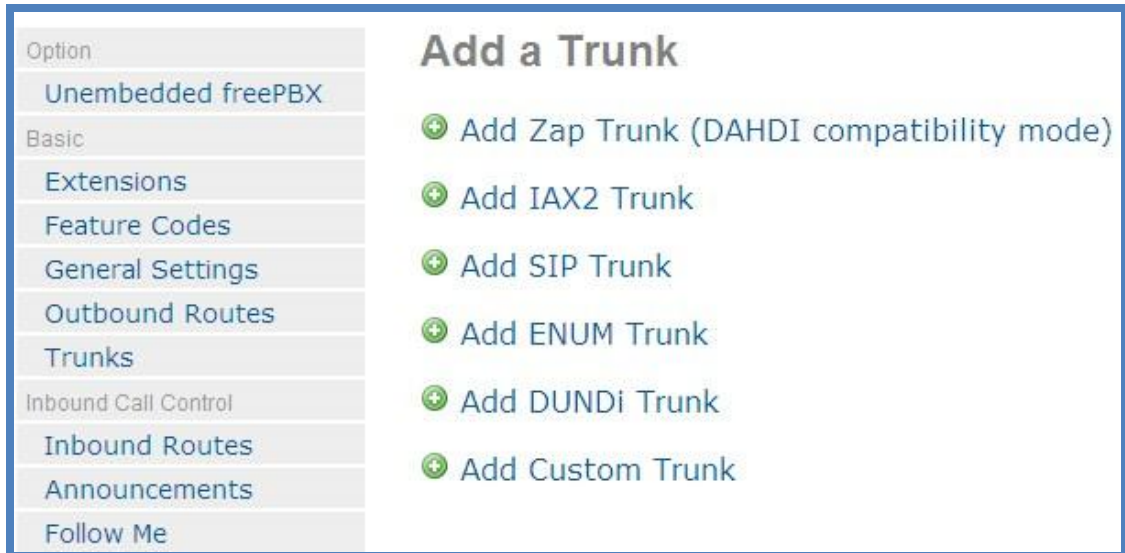
2) Click on Trunk ZAP/g0 button on the up right corner of the page, please refer to the following illustration:
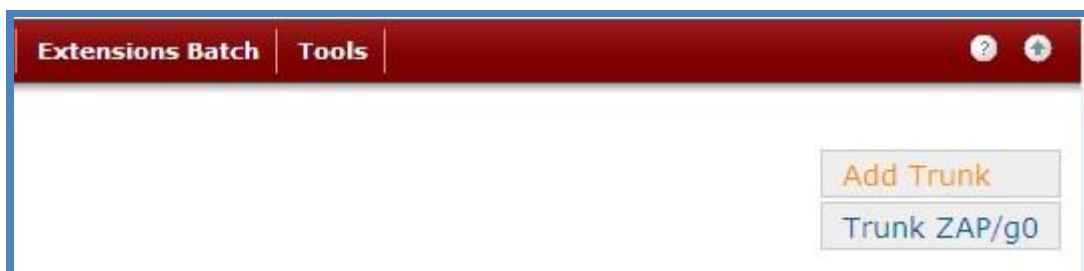
3) Input trunk1 in the textbox of Outbound Caller ID, please refer to the following illustration:

4) Click on Submit Changes button in the following screen:

Outgoing Settings

Zap Identifier (trunk name): g0

Submit Changes

5) Click the "Apply Configuration Changes Here" bar in the top of the screen.

Apply Configuration Changes Here
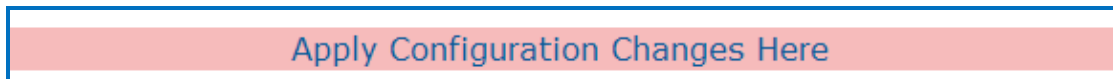
4.5 Set up Outbound Route

Through outbound routes, user can dial out.

1) Please click on the Outbound Routes as the following illustration:

Option
    Unembedded freePBX
Basic
    Extensions
    Feature Codes
    General Settings
    Outbound Routes
    Trunks

Add Route

Route Name:
Route Password:
PIN Set: None
Emergency Dialing:
Intra Company Route:
Music On Hold? default

2) Please click "09_outside button", keep the default parameters in the following screen. Please refer to the following illustration:
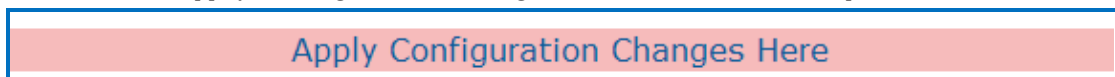
Here we use the default Dial Pattern 9|., so we have to add prefix 9, when we dial out. For example, if you want to call 123456, then you have to press 9123456 on your phone.

3) Click the "Apply Configuration Changes Here" bar in the top of the screen.

Notes:

Test environments are:

Elastix 1.6

Kernel version: 2.6.18-164.el5

Dahdi: dahdi-linux-complete-2.2.0.2+2.2.0

Asterisk: 1.4.26.1

Hardware: OpenVox A2410P/AE2410P

3. References

www.openvox.cn
www.digium.com
www.asterisk.org
www.voip-info.org
www.asteriskguru.com