



深圳开源通信有限公司

OpenVox-Best Cost Effective Asterisk Cards

OpenVox A2410P/AE2410P User Manual



A2410P



AE2410P

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深圳开源通信有限公司

OpenVox-Best Cost Effective Asterisk Cards

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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 FX0-400 or FXS-400 together to build a workable system. AE2410P has EC module, which must be used with FX0-400 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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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.

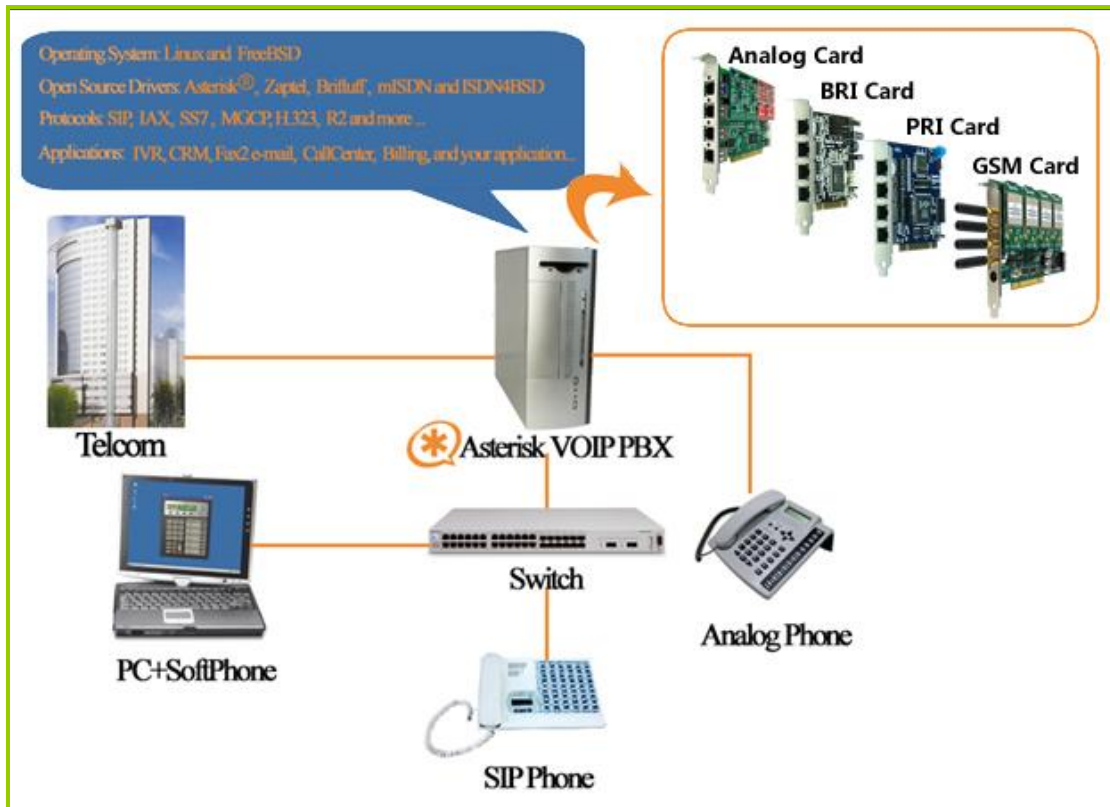


Figure 1: Asterisk_OpenVox Setup

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)

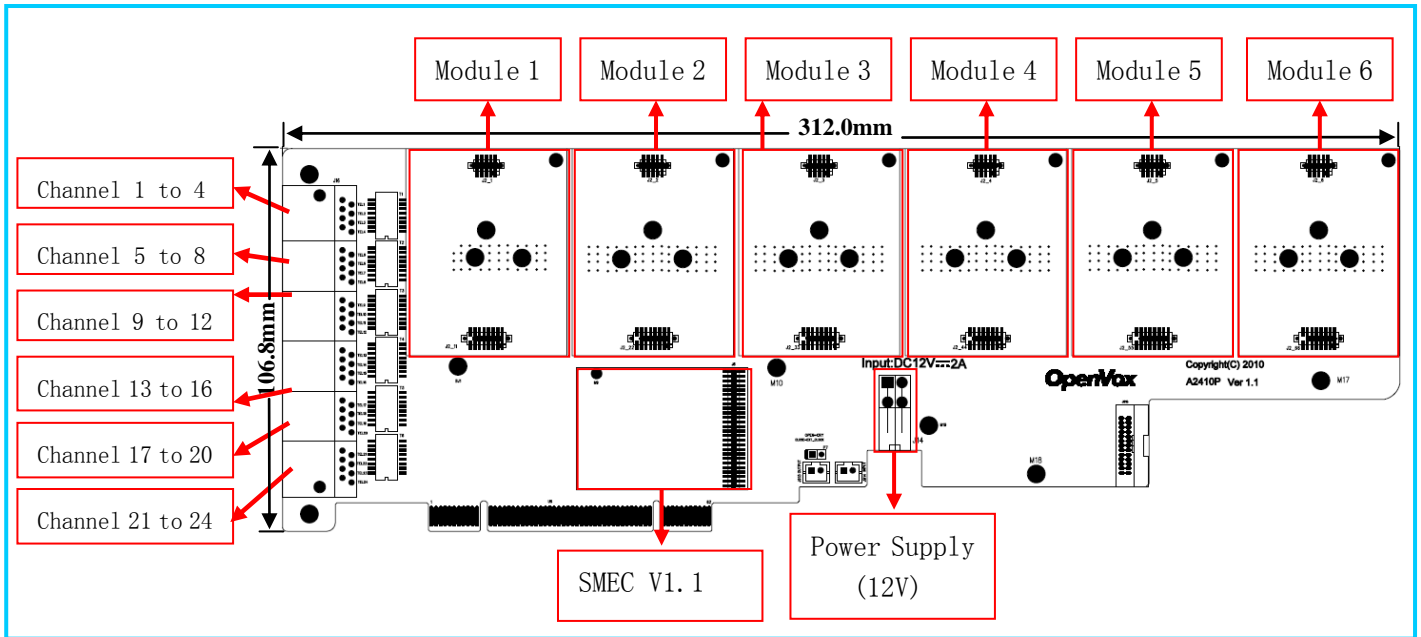


Figure 2: A2410P/AE2410P Hardware Configuration

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.

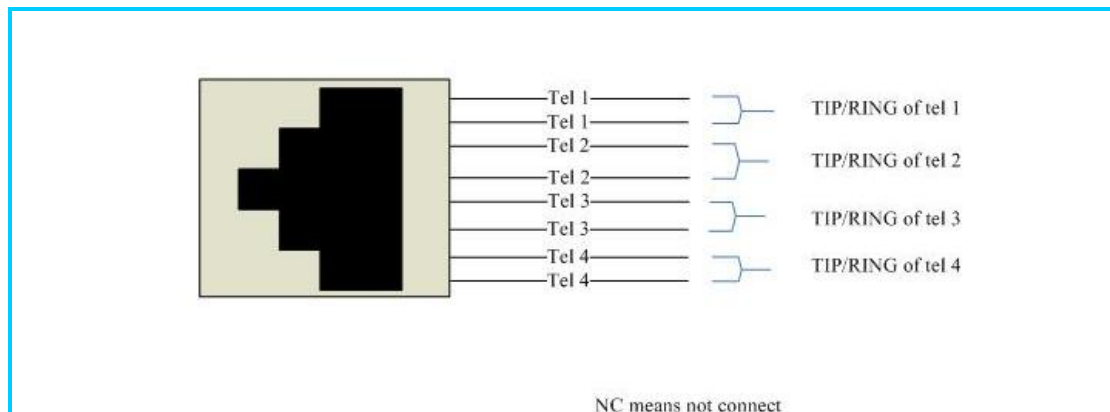


Figure 3: A2410P/AE2410P pin assignment

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 FX0 port and telephone into FXS port.**



Figure 4: A2410P/AE2410P Splitter

3. Software Installation and Configuration

A2410P/AE2410P supports zaptel software device driver on Linux. To use A2410P/AE2410P, user must download, edit, install and configure zaptel and asterisk.

3.1 Download asterisk, zaptel, driver and firmware

1. Asterisk can be downloaded from:

<http://downloads.asterisk.org/pub/telephony/asterisk/releases/>

2. Zaptel can be downloaded from:

1) http://downloads.openvox.cn/pub/drivers/zaptel/openvox_zaptel-1.4.12.1.tar.gz

If user download zaptel from link 1, jump to [3.3](#)

2) <http://downloads.asterisk.org/pub/telephony/>

If user downloads zaptel from link 2, please follow these steps.

3. Download A2410P/AE2410P driver from:

http://downloads.openvox.cn/pub/drivers/zaptel/patches/a2410p_ae2410p/opvxa24xx_zaptel.tar.gz

copy the tar file to /zaptel-xx/kernel/

4. If user uses AE2410P, user should download firmware from:

<http://downloads.openvox.cn/pub/firmwares/opvx-zaptel-fw-oct6114-032-1.07.01.tar.gz>

```
tar -zxvf opvx-zaptel-fw-oct6114-032-1.07.01.tar.gz
```

```
cp zaptel-fw-oct6114-032.bin /lib/firmware/
```

```
mkdir /usr/lib/hotplug/firmware
```

```
mv zaptel-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/zaptel-xx/Makefile

add opvxa24xx shown in red

```
TOPDIR_MODULES:=pciradio tor2 torisa wcfxo wctlxxp wctdm wctellxp wcusb zaptel ztd-eth  
ztd-loc ztdummy ztdynamic zttranscode  
SUBDIR_MODULES:=wct4xxp wctc4xxp xpp wctdm24xxp wctel2xp opvxa24xx
```

Figure 5: Makefile

2. Add opvxa24xx in /usr/src/zaptel-xx/zaptel.sysconfig

```
#MODULES="$MODULES ztdummy" # Zaptel Timing Only Interface

MODULES="$MODULES xpp_usb" # Xorcom Astribank Device

MODULES="$MODULES opvxa24xx" # OpenVox A2410P - Modular FXS/FXO interface (1-24 ports)
```

Figure 6: zaptel.sysconfig

3. Add opvxa24xx in /usr/src/zaptel-xx/kernel/xpp/Utils/genzaptelconf

```
# The rest of the lines are per-channel lines
sed -e 1,2d $procfile | \
while read line
do
    # in case this is a real channel.
    chan_num=`echo $line |awk '{print $1}'`
    case "$line" in
    *WCTDM/* | *\ WRTDM/* | *OPVXA1200/* | *OPVXA24XX/*)
        # TDM400P/2400P and similar cards (Sangoma A200, OpenVox A1200)
        # this can be either FXS or FXO
```

Figure 7: genzaptelconf

3.3 Installation

Before installing zaptel 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 them. 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 // confirm GCC-4.0 above
rpm -q gcc-c++
```

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 // install GCC-4.0 above
yum install gcc-c++
```

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

1. Checking the A2410P/AE2410P hardware by command: `lspci -vvvv`

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]
```

Figure 8: hardware detect

2. Compiling

- 1) Install zaptel, execute the commands:

```
cd /usr/src/zaptel-XX
./configure
make
make install
make config
```

- 2) Installing asterisk

```
cd /usr/src/asterisk-XX
./configure
make
make install
make samples
```

3.4 Configure

1. Loading modules for opvxa24xx:

```
modprobe zaptel
modprobe opvxa24xx opermode=YOUR_COUNTRY
genzaptelconf -sdvM
ztcfg -vvvv
```

Then run **dmesg**

If user uses AE2410P, from figure 9, 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
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)
```

Figure 9: EC detection

2. Checking the configure files

The command **genzaptelconf -sdvM** will automatically generate the `zaptel.conf` under `/etc` and `zapata-channels.conf` under `/etc/asterisk`. Please check the setting of `zaptel.conf`, it looks like the following:

```
# Autogenerated by /usr/sbin/genzaptelconf -- do not hand edit
# Zaptel Configuration File
#
# This file is parsed by the Zaptel Configurator, ztcfg
#

# It must be in the module loading order

# Span 1: ZTDUMMY/1 "ZTDUMMY/1 (source: RTC) 1" (MASTER)

# Span 2: OPVXA24XX/0 "OpenVox A2410 Board 1"
fxsks=1
fxsks=2
fxsks=3
fxsks=4
fxoks=5
fxoks=6
fxoks=7
fxoks=8
fxsks=9
fxsks=10
fxsks=11
fxsks=12
fxoks=13
fxoks=14
fxoks=15
fxoks=16
fxsks=17
fxsks=18
fxsks=19
fxsks=20
fxoks=21
fxoks=22
fxoks=23
fxoks=24

# Global data

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

Figure 10: zaptel.conf

Edit /etc/asterisk/indications.conf

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

Figure 11: indications.conf

After loading zaptel and opvxa24xx driver, user should check the zapata.conf and zapata-channels.conf under /etc/asterisk. Please make sure

zapata-channels.conf has been included into zapata.conf. If not, run the command:

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

Make sure that the context in zapata-channels.conf should exist in extensions.conf. File zapata-channels.conf should look like the following: FXO ports use FXS signaling, the configure file looks like this:

```
; Autogenerated by /usr/sbin/genzaptelconf -- do not hand edit
; Zaptel Channels Configurations (zapata.conf)
;
; This is not intended to be a complete zapata.conf. Rather, it is intended
; to be #include-d by /etc/zapata.conf that will include the global settings
;

; Span 1: ZTDUMMY/1 "ZTDUMMY/1 (source: RTC) 1" (MASTER)

; Span 2: OPVXA24XX/0 "OpenVox A2410 Board 1"
;;; line="1 OPVXA24XX/0/0 RED"
signalling=fxs_ks
callerid=asreceived
group=0
context=from-pstn
channel => 1
context=default

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

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

```
;;; line="5 OPVXA24XX/4"
signalling=fxo_ks
callerid="Channel 5" <6005>
mailbox=6005
group=5
context=from-internal
channel => 5
callerid=
mailbox=
group=
context=default

;;; line="6 OPVXA24XX/0/5"
signalling=fxo_ks
callerid="Channel 6" <6006>
mailbox=6006
group=5
context=from-internal
channel => 6
```

```

callerid=
mailbox=
group=
context=default
    
```

Figure 12: zapata-channels.conf

3. Starting asterisk and test calls

Checking the zaptel channel loading from asterisk console:

asterisk -vvvvvvvgc

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

```

*CLI> zap show channels
Chan Extension Context Language MOH Interpret
Pseudeo default default
  1 from-pstn default
  2 from-pstn default
  3 from-pstn default
  4 from-pstn default
  5 from-internal default
  6 from-internal default
  7 from-internal default
  8 from-internal default
  9 from-pstn default
 10 from-pstn default
 11 from-pstn default
 12 from-pstn default
 13 from-internal default
 14 from-internal default
 15 from-internal default
 16 from-internal default
 17 from-pstn default
 18 from-pstn default
 19 from-pstn default
 20 from-pstn default
 21 from-internal default
 22 from-internal default
 23 from-internal default
 24 from-internal default
    
```

Figure 13: zap show channels

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

```

-- Starting simple switch on 'Zap/4-1'
-- Executing [s@from-pstn:1] Answer("Zap/4-1", "") in new stack
  -- Executing [s@from-pstn:2] Background("Zap/4-1", "demo-congrats") in new stack
  -- <ZAP/4-1> Playing 'demo-congrats.gsm' (language 'en')
  -- Executing [s@from-pstn:3] Hangup("Zap/4-1", "") in new stack
== Spawn extension (from-pstn, s, 3) exited non-zero on 'Zap/4-1'
Hungup 'Zap/4-1'
    
```

Figure 14: inbound call

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

```
-- Starting simple switch on 'Zap/5-1'
  -- Executing [910000@from-internal:1] Dial("Zap/5-1", "zap/4/910000") in
new stack
  -- Called 4/910000
  -- Zap/4-1 answered Zap/5-1
  -- Native bridging Zap/5-1 and Zap/4-1
  -- Hungup 'Zap/4-1'
== Spawn extension (from-internal, 910000, 1) exited non-zero on 'Zap/5-1'
  -- Hungup 'Zap/5-1'
```

Figure 15: outbound call

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> zap show channel 4
Channel: 4
File Descriptor: 16
Span: 2
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: Zap/4-1
Real: Zap/4-1
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: 5
Actual Confinfo: Num/5, Mode/0x0009
Actual Confmute: No
Hookstate (FXS only): Offhook
```

Figure 16: channel status

Notes:

Test environments are:

CentOS-5.5

Kernel version: 2.6.18-194.el5

Zaptel: zaptel-1.4.12

Asterisk: 1.4.20

Hardware: OpenVox A2410P/AE2410P

4. References

www.openvox.cn

www.digium.com

www.asterisk.org

www.voip-info.org

www.asteriskguru.com