OpenVox Communication Co.Ltd

OpenVox G410E User Manual

Version: 2.2

OpenVox Communication Co.Ltd

OpenVox-Best Cost Effective Asterisk Cards

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Contents

General Safety Instructions

CAUTION

1. The computers that have G410E card installed must comply with the country's specific safety regulations.

2. Only service personnel should install G410E card.

3. Before you install G410E card, please unplug the power cord from the computer and remove the cover from your PC.

4. For avoiding personal injuries and damage to your computer and G410E card, make sure bracket of the card is secured to the PC's chassis ground by fastening the card with screws.

5. Electrical Surges, ESD are very destructive to the equipment. To avoid it, make sure there is a low impedance discharge path from your computer to chassis ground.

6. To reduce the risk of damage or injury, please follow all steps or procedures as instructed.

Test Environments

CentOS-5.6

Kernel version: 2.6.18-238.12.1.el5

chan_extra-1.1.2

WCDMA SIM cards

OpenVox G410E

Chapter 1 Overview

1.1 What is Asterisk

The Definition of Asterisk is described as follows:

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. Asterisk provides Voicemail services with Directory, Call Conferencing, Interactive Voice Response, Call Queuing. It supports three-way calling, caller ID services, ADSI, IAX, SIP, H323 (as both client and gateway), MGCP (call manager only) and SCCP/Skinny (voip-info.org).
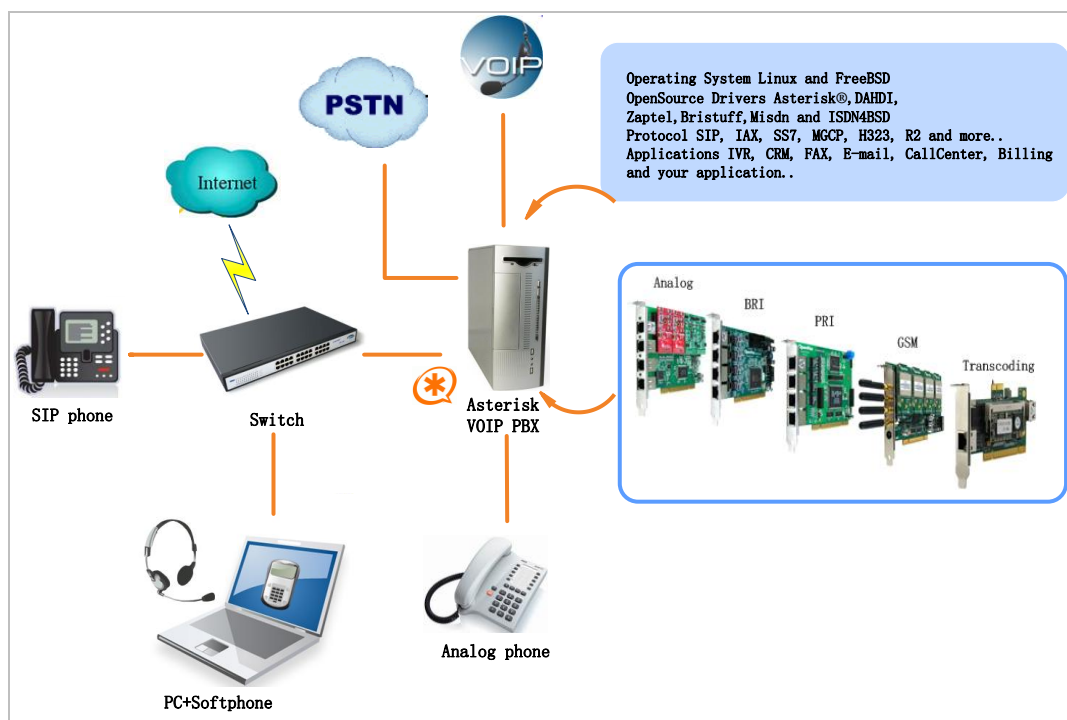

Figure 1 Topology

1.2 What is G410E

The G410E provides scalable connectivity to WCDMA networks for your linux machine. It comes with fully GPLed drivers for the linux 2.4.X and 2.6.X kernels. The OpenVox WCDMA card can be connected to any other OpenVox card to build a real TDM switched PBX.

G410E enables full flexibility to traditional telephony systems to go WCDMA network. It also allows systems integrators to transform highly priced fixed to mobile voice traffic into a much cheaper mobile to mobile call management, with considerable savings.

G410E works with Asterisk®, Elastix®,PBX in a Flash, trixbox® and IPPBX/IVR projects as well as other Open Source and proprietary PBX, Switch, IVR, and VoIP gateway applications.

Target applications

➢ WCDMA connectivity for PBX

➢ Mobile PBX

➢ WCDMA VOIP Gateway

➢ SMS Gateway

➢ WCDMA Callback service

Sample application

As the following figure conveys, SIP phone and soft phone are able to communicate with mobile phones via G410E which acts as a WCDMA connection for PBX.
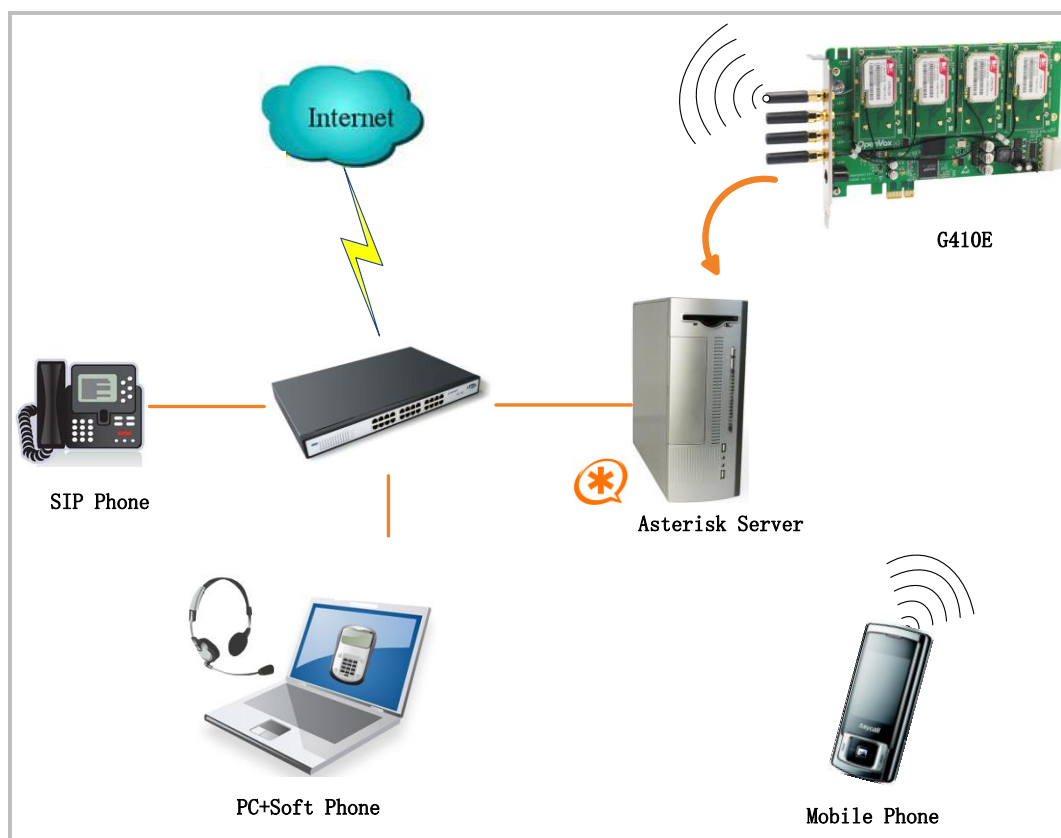

Figure 2 Sample application

Key benefits

➢ IMEI and PIN modification

➢ SMS batch receiving/sending, AT command availability

➢ Support USSD

➢ Scalable: Extending the system by adding more modules

➢ Easy to use: It bases on chan_extra open source solution

➢ Configurable: Setting WCDMA network requirements through configuration files

➢ High quality with low price

➢ Low power consumption

➢ Application: Use Asterisk$^{®}$ to build your IP-PBX/Voicemail system

➢ RoHS compliant

➢ Certificates: CE, FCC

Features

➢ WCMDA 850/900/1900/2100 MHz

➢ Owns an electrical circuit switch to ensure the WCDMA modules are power-off when the system reboots

➢ Be compatible with Industry Standard: PCI-E ×1, ×2, ×4, ×8, ×16

➢ Quad-Band WCDMA/GPRS 850/ 900/1800/1900 MHz

➢ Supports LEDs indicating network status

➢ DIGITAL audio quality(echo cancel)

➢ 1 SIM card per WCDMA channel

➢ Supports external antenna

➢ WCDMA data connections

➢ DTMF detection

Chapter 2 Hardware Setup

There are some points should be paid attention to setup G410E.

2.1 Power supply

Please take particular attention to power supply connection. There are

two alternatives allow users to select a power supply.

1. Using 12V external DC, you should adjust the jumper J3 to 1;

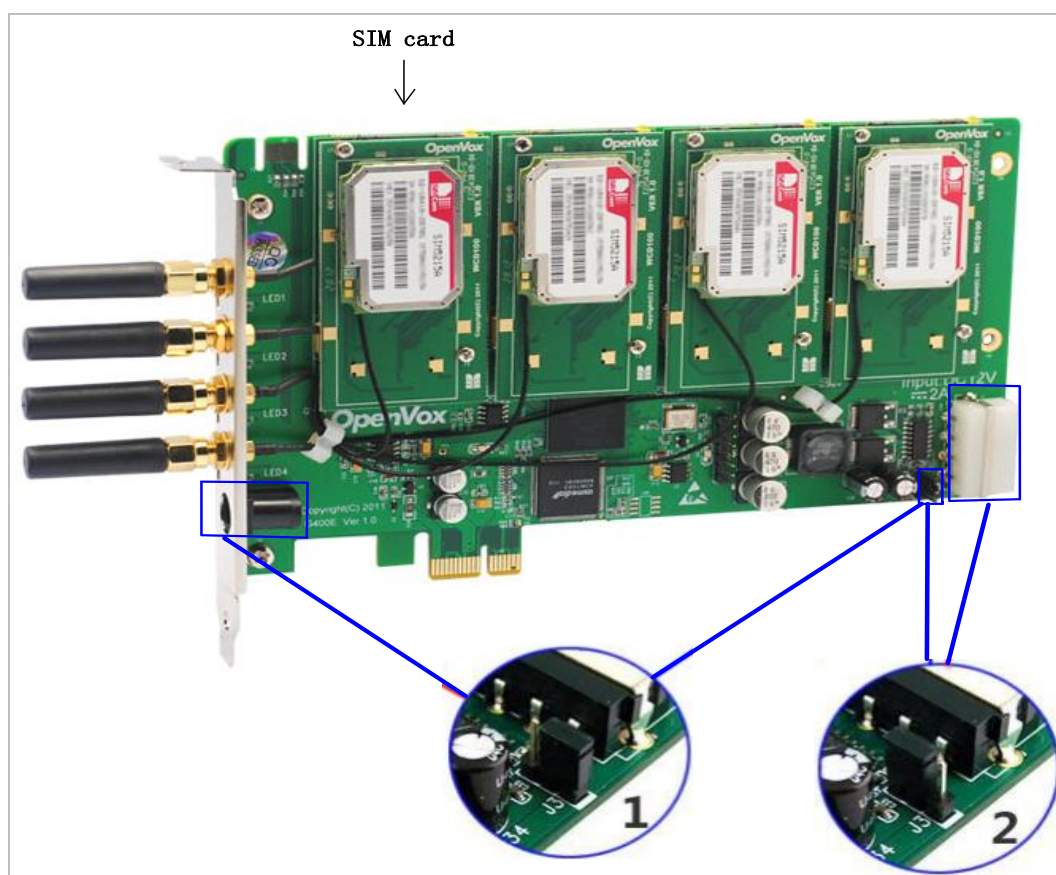**2.** Using Molex connector by setting the jumper J3 to 2 as figure 3.

Figure 3 Power supply method

2.2 Slot compatibility

G410E is compatible with PCI-E ×1 slot (slot 1) and ×2, ×4, ×8, ×16, while it is not fit for PCI slot (slot2, slot3, slot 4). You should confirm your slot type, and then insert G410E into a PCI-E slot. PCI and PCI-E slot are showed as following:

Figure 4 slots
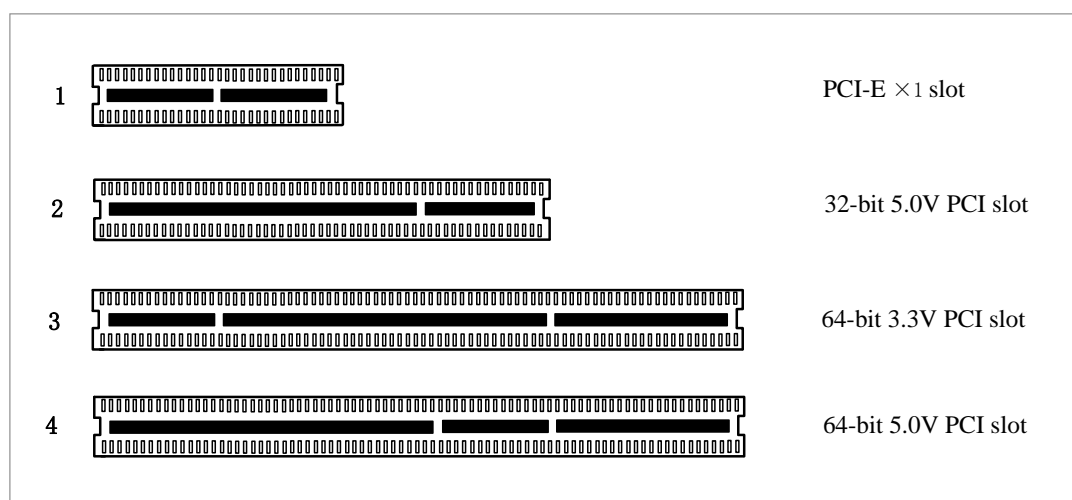
2.3 Indication LEDs

There are 4 LEDs on the board. Each one indicates the working status of each SIM card. The details explainations are as followings:

➢ LED off: SIM card does not work

➢ 64ms On/800ms: SIM card does not find the network(64ms On/800ms means the LED is light on 64ms then go out 800ms)

➢ 64ms On/3000ms:SIM card finds the network

➢ 64ms On/300ms: GPRS communication

In addition, there are two LEDs located at the bottom of the board which are D8 and D9, under normal circumstances, they are lit when powered and D9 flashes more quickly than D8.

2.4 WCDMA modules and SIM cards

One WCDMA module supports one SIM card and one antenna, please plug a SIM card into the back of a WCDMA module and activate it. For more details, please refer to figure 3.

2.5 Hardware setup procedure

➤ Power off your PC, remember unplug the AC power cable

➤ Place SIM cards for WCDMA modules

➤ Insert G410E into a PCI-E slot

➤ Select a power supply way as previously stated

➤ Fix the board by a screw

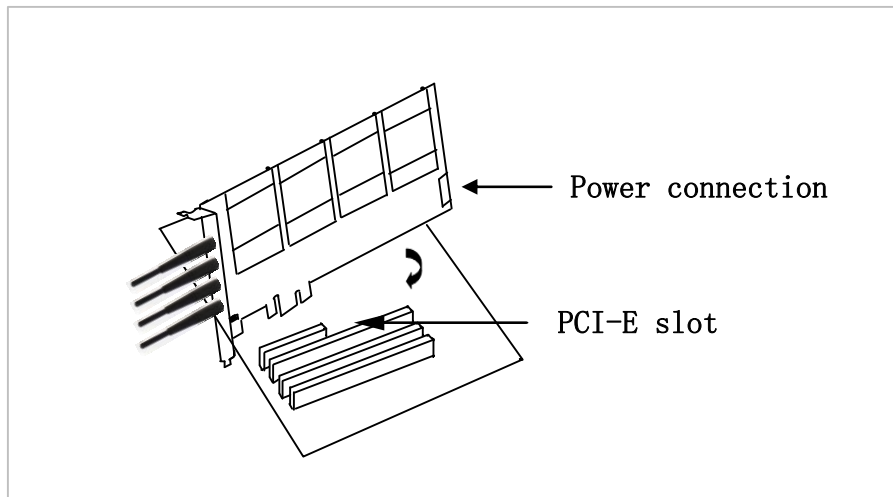➤ Power on your PC

Figure 5 Hardware setup

Caution: During the above processes, an ESD wrist strap is needed. Once power is on, you must not attempt to install or take down the board. After hardware setup, it is time to install software.

Chapter 3 Software Installation and Configuration

3.1 Hardware detection

Detect hardware by executing command:

```
# lspci -vvvv
```

Check the outcome and confirm your system has recognized G410E. If it has been recognized, the output information will be showed like that:

```
01:04.0 Class ff00: Unknown device 1b74:0100 (rev 01)
        Subsystem: Unknown device 1b74:0104
        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-
        Interrupt: pin A routed to IRQ 66
        Region 0: Memory at dedf0000 (32-bit, non-prefetchable)
[size=64K]
```

**Figure 6 Hardware detection**

If G410E is not recognized by the system, you have to power off and take out of the card, then try to insert it into another PCI-E slot.

3.2 Dependencies installation

Some dependencies are crucial, if any of them is absent, the software installation process would not go through successfully. Let's run "yum install XX" (XX stands for the dependency's name) to check the

availability of some dependencies.

```
# 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

# yum install libxml2-devel
```
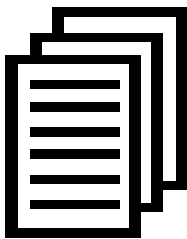
If there is no kernel-devel source in the system, users should run the following command to install the kernel-devel to peer current kernel:

```
# yum install kernel-devel-`uname -r`
```

While if there is no matched kernel-devel found, you should download matched RPM package to install it, or execute the following command to

update to the latest and stable kernel version:

```
# yum install kernel kernel-devel
```

After installed, please reboot your machine to apply the new kernel and install the dependencies. If the dependency has been installed, system indicates that nothing to do which means you could go to next one directly. Otherwise, the system will keep on installing it.

3.3 chan_extra, DAHDI and Asterisk installation

Go to OpenVox official website to download chan_extra, the url link is:

http://www.chan-extra.org/download/releases/

Download chan_extra to the directory /usr/src/ in generally, and then unzip it.

```
# wget http://www.chan-extra.org/download/release
s/chan_extra-1.XX.tar.gz
# tar –xvzf chan_extra-1.XX.tar.gz
```

Change to the directory **chan_extra-1.XX** (XX stands for chan_extra version), then perform the specific command to install it.

```
# cd /usr/src/chan_extra-1.XX
# ./install.sh
```

After running the above commands, the script will check wether the dependencies have been installed, if not, you should type **"y"** to accept to install all the necessary dependencies until the system detects all of them are **"OK"**, then press **"enter"** key to operate the next step.

```
########################################################################
#                  OpenVox Extra Installation Script               #
#                              v1.1.2                              #
#                  OpenVox Communication Co.,Ltd                   #
#        Copyright (c) 2009-2011 OpenVox. All Rights Reserved.     #
########################################################################

Checking for C development tools ...                      [ OK ]
Checking for C++ developement tools ...                   [ OK ]
Checking for Make utility ...                             [ OK ]
Checking for ncurses library ...                          [ OK ]
Checking for ncurses-devel library ...                    [ OK ]
Checking for Perl developement tools ...                  [ OK ]
Checking for Patch ...                                    [ OK ]
Checking for bison...                                     [ OK ]
Checking for bison-devel...                               [ OK ]
Checking for openssl...                                   [ OK ]
Checking for openssl-devel...                             [ OK ]
Checking for gnutls-devel...                              [ OK ]
Checking for zlib...                                      [ OK ]
Checking for zlib-devel...                                [ OK ]
Checking for kernel development packages...               [ OK ]
Checking for libxml2-devel...                             [ OK ]

Press [Enter] to continue...
```

Figure 7 Depedencies detection

G410E software installation is indicated by some wizard options, you should select the right option by your specific case. Now let's introduce how to install the driver by source code.

```
###################################################################
#                 OpenVox Extra Installation Script               #
#                            v1.1.2                               #
#                 OpenVox Communication Co.,Ltd                   #
#      Copyright (c) 2009-2011 OpenVox. All Rights Reserved.      #
###################################################################

           1) Source code install
           2) Trixbox-dahdi install
           3) Elastix-dahdi install
           q) quit

 Please enter your selection (1..3 or q) ->
```

Figure 8 Installation ways selection

It is time to select the installation way after dependencies detection.

->1) Source code install

(CentOS in addition to Elastix and trixbox, please choose "Source code install" option by typing "1". After a few seconds or minutes, you will come to next option that the way you want to install DAHDI)

```
Looking for dahdi-linux-complete directory in /usr/src ...

1 : /usr/src/dahdi-linux-complete-2.3.0.1+2.3.0
------------------------------------------
n    : Download and install dahdi-linux-complete-2.3.0.1+2.3.0.tar.gz
[Default installation]
m    : Enter dahdi-linux-complete dir path manually
d    : Download the latest version of dahdi-linux-complete
q    : Skip the step
(ctrl-c to Exit)
Please select working dahdi-linux-complete directory [1-1, n, m, d, q]:
```

Figure 9 DAHDI installation ways selection

-->1: /usr/src/dahdi-linux-complete-XXX

(This option means the available DAHDI version which allows you to

type the corresponding number to install. Here the default version
dahdi-linux-complete-2.3.0.1+2.3.0 which are included in the
installation package. If there are any other versions, the system will
automatically look for and show the outcome.)

-->n: dahdi-linux-complete-2.3.0.1+2.3.0.tar.gz
[default]

(If you want the system to download and install the default version
dahdi-linux-complete-2.3.0.1+2.3.0 automatically, you should type
"n")

-->m: Enter dahdi_linux_complete dir path
manually

(This option allows you to type the full path of DAHDI source if you
have installed DAHDI. Also you can type the specific DAHDI
version, the script will download the version you want of DAHDI to
/usr/src/, then you will see a new option as following if you type
dahdi-linux-complete-XXX(please type the version number instead of
XXX))

-->d: Download the latest dahdi_linux_complete

(This option will download and install the latest

dahdi_linux_complete version originally. While the latest version of

dahdi_linux_complete is not support now, so it is recommended not to

choose this option)

-->q: skip the step

(Skipping DAHDI installation directly)

After selecting the way you want to install DAHDI, the system will

install it automatically until other options appear to install Asterisk.

Asterisk installation is similar with DAHDI:

```
Looking for Asterisk directory in /usr/src ...

1 : /usr/src/asterisk-1.6.2.11
-----------------------------------------
n    : Download and install asterisk-1.6.2.11.tar.gz [Default
installation]
m    : Enter Asterisk dir path manually
d1.6 : Download the latest version of Asterisk 1.6.2
q    : Skip the step
(ctl-c to Exit)
Please select working Asterisk directory [1-1, n, m, d, q]:
```

Figure 10 asterisk installation means selection

-->1: /usr/src/asterisk-XXXX

(This option means the available Asterisk version which allows you to

type the corresponding number to install. Besides the default version,

there may be other versions your system has installed.)

`-->n: asterisk-1.6.2.11.tar.gz [Default]`

(The system will download and install asterisk-1.6.2.11 which is

included in the installation package automatically if selecting this

option)

`-->m: Enter Asterisk directory path manually`

(Choosing this option allows you to type the full path of Asterisk

source if you have installed Asterisk. Also you can type the full

version name of Asterisk, the script will download the version of

asterisk to /usr/src/.)

`-->d1.6: Download the Latest Asterisk 1.6.2`

(This option will download and install the latest version of

asterisk-1.6.2, but the version of Asterisk has been updated to 1.8, so

it is not recommended you to choose this option)

`-->q: skip the step`

(Skipping Asterisk installation directly)

More information about the chan-extra installation, you can see the log

file: chan-extra-XXXX/log/

Caution: If there is something wrong when compile DAHDI, please refer to **HERE**. With this link, the moderator introduces you a method how to patch. After patching and recompiling, if successfully done, you are going to install Asterisk.

3.4 Driver loading and Asterisk initiation

Until now, you have set all necessary files, please load the driver and Asterisk in the following way:

```
# service dahdi start

# depmod -a

# dahdi_genconf

# dahdi_cfg –vvvv

# dmesg
```

The following figure shows dmesg outputs information

```
ACPI: PCI Interrupt 0000:02:02.0[A] -> GSI 22 (level,
low) -> IRQ 225
Found an OpenVox G400E: Version 1.0
opvxg4xx: slot 0 is Installed
opvxg4xx: slot 1 is Installed
opvxg4xx: slot 2 is Installed
opvxg4xx: slot 3 is Installed
opvxg4xx: Powering up all spans...
```

Figure 11 dmesg outputs information

Start Asterisk by executing command:

```
# asterisk -vvvvvvvvvgc
```

If Asterisk is already activate, run "asterisk –r" instead. In the CLI, please run the following command:

```
localhost*CLI> WCDMA show spans


 GSM span1: Provisioned, Up, Active
 GSM span2: Provisioned, Up, Active
 GSM span3: Provisioned, Up, Active
 GSM span4: Provisioned, Up, Active
```

Figure 12 channels' status

If the SIM cards have setup and Asterisk loaded successfully, WCDMA spans will show up and active.

3.5 Dialplan edit

Add dial plan in the file extension.conf. Users must make sure that the context "from-WCDMA" and "from-internal" are in extensions.conf, here a simple example is given:

```
# vim /etc/asterisk/extension.conf
```

```
[from-gsm]
exten => s, 1, Answer()
exten => s, n, Dial(SIP/500)

[from-internal]
exten => 100,1,Dial(extra/1/10000)
exten => 100,2,Hangup

exten => 200,1,Dial(extra/3/10000)
exten => 200,2,Hangup

exten => 300,1,Dial(extra/5/10000)
exten => 300,2,Hangup

exten => 400,1,Dial(extra/7/10000)
exten => 400,2,Hangup
```

Figure 13 dial plan show

The above dial plan realizes that calls from WCDMA network, Asterisk will connect it to SIP phone 500 which has registered previously. Once dial 100, Asterisk will connect to 10000 through the first channel and similar functions with the last three calls. After edition, please run "asterisk -r" again, and then execute "reload" in the CLI. All above complete successfully, you are able to make calls.

Chapter 4 References

www.openvox.cn

www.digium.com

www.asterisk.org

www.voip-info.org

www.asteriskguru.com

Tips

Any questions during installation please consult in our forum or look up for answers from the following websites:

Forum

Wiki

Appendix A Specifications

• **Weight and size**

Weight: 209g

Size: 17.9 ×11.1 × 1.8 cm (7.05×4.37×0.71inch)

• **Interfaces**

PCIe:Be compatible with PCI-E ×1, ×2, ×4, ×8, ×16

Power Supply Connect: 12V 4-pin connector

• **Environment**

Temperature: 0 ~ 50 ℃ (Operation)

                 - 40 ~ 125 ℃ (Storage)

Humidity: 10 ~ 90% NON-CONDENSING

• **Hardware and software requirements**

RAM 128 + MB

CPU +1000 MHZ

Linux kernel 2.4.X or 2.6.X