OpenVox Communication Co.Ltd

D210P/DE210P on DAHDI 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 D210P/DE210P card installed must comply with the country's specific safety regulations.

2. Only service personnel should go to install D210P/DE210P card.

3. Before installing D210P/DE210P card, please unplug the power cord and remove the cover from your PC.

4. For avoiding personal injuries and damages to your machine and D210P/DE210P card, make sure bracket of the card is secured to the PC's chassis ground by fastening the card with a screw.

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-5.5

Kernel version: 2.6.18-194. el5

DAHDI: dahdi-linux-complete-current

Asterisk: asterisk-1.8.5.0

Libpri: libpri-1.4.11.5

Hardware: OpenVox D210P/DE210P

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 standard-based telephony equipment using relatively cost-effective hardware. Asterisk provides Voicemail services with Directory, Call Conferencing, Interactive Voice Response, Call Queuing. It supports for 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).
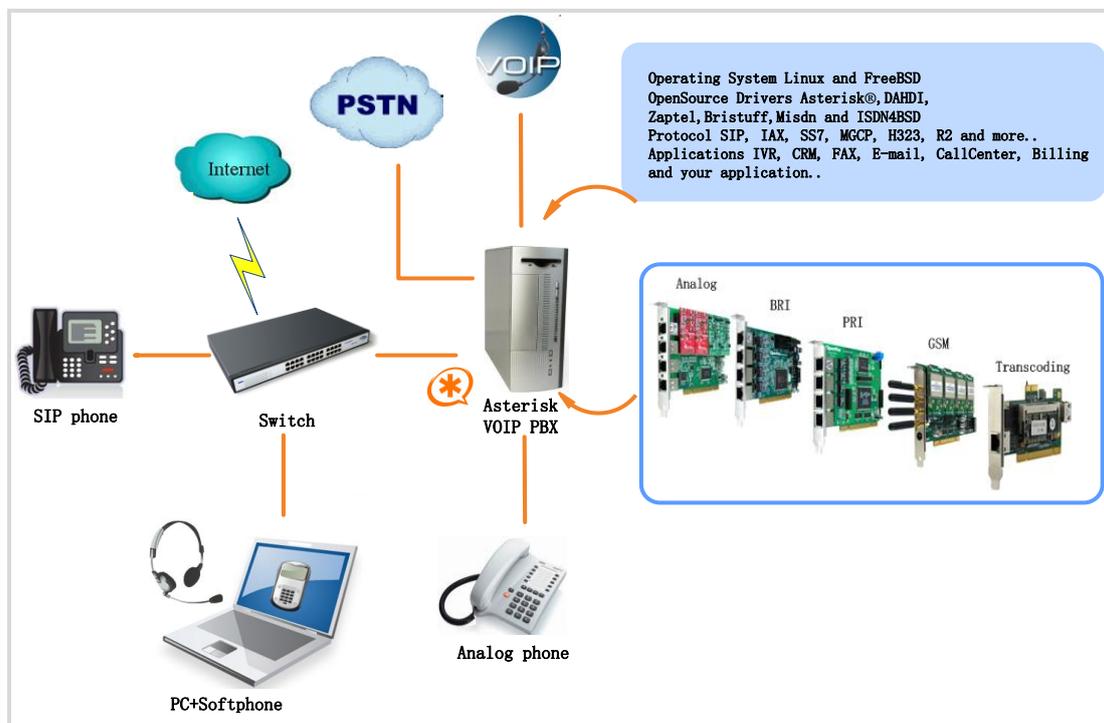
Figure 1 Topology

1.2 What is D210P/DE210P

The DE210P is a D210P with an EC module and they support E1, T1 and J1 mode. It is selectable on a per-card or per-port basis. This feature enables signaling translation between E1 and T1 equipments and allows inexpensive T1 channel banks to connect with E1 circuits.

D210P supports industry standard telephony and data protocols, including Primary Rate ISDN (both N. American and Standard Euro) protocol families for voice, PPP, Cisco, HDLC, and Frame Relay data modes. Both line-side and trunk-side interfaces are supported.

D210P works with Asterisk®, Elastix®, FreeSWITCH™, PBX in a Flash, trixbox®, Yate™ and IPPBX/IVR projects as well as other Open Source and proprietary PBX, Switch, IVR, and VoIP gateway applications.

Target Applications

➢ Voice-over Internet Protocol (VoIP) Services

➢ Complex IVR Trees

➢ "Meet-Me" Bridge Conferencing

➢ Calling Card Platforms

➢ VoIP Gateways (support SIP, H.323, and IAX)

➢ Legacy PBX/IVR Services

➢ Voice/Data Router (replace expensive routers)

➢ PRI/Switch Compatibility - Network or CPE

Chapter 2 Hardware Setup

There are some points that should be paid attention to when setting up D210P/DE210P.

2.1 Span type setup

Each DIP switch controls a span configuration for E1 or T1 mode. Setting DIP1 to ON means SPAN1 will work at E1mode.Setting DIP1 to OFF means SPAN1 will be T1.

2.2 CardID switch setup

If want to install more than one card of D210P/DE210P in a PC, you should take care of the card ID switch. There are two pieces of rules you must obey:

➢ The first card must be set to 0, which is a card that will be initialized (i.e. installing driver) firstly when the system boot up. And the second should be set to 1, and so forth.

➢ At most cases, Linux will initialize PCI devices according to their slot order. The slot nearest to the CPU will be initialized firstly and the far end slot will be initialized at last. That is to say, the card which is nearest to the CPU ID should be set to 0 if there is more than one D210P/DE210P on your machine.

2.3 Slot compatibility

D210P/DE210P is compatible with 32-bit 5.0V PCI slot, 64-bit 3.3V PCI slot or 64-bit 5.0V PCI slot except PCI-E slots; you should confirm your slot type and insert D210P/DE210P into any type of PCI slot as previously described.
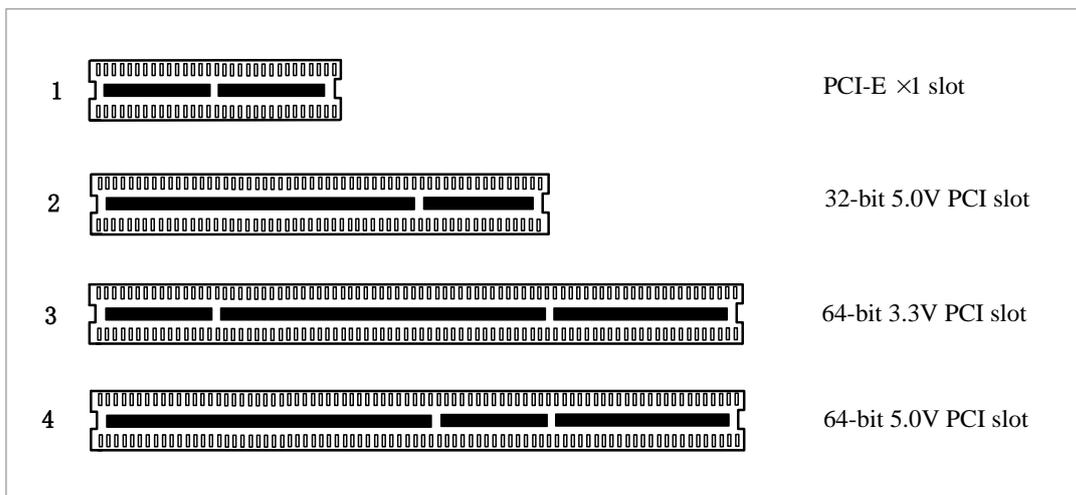
Figure 2 PCI-E and PCI slots

2.4 Timing cable

If you have just one card in the system, all channels on that card have already run under the same clock source, so timing cable is unnecessary. But if there are more than one card, using timing cable has some advantages. Before using the clock line, each card works on its own clock, therefore precision of the clock is limited; each card will send /receive voice data at different speeds. In voice usage, this small issue can be omitted, but in data communication such as Fax/Modem, it will cause

big problems. Data loss will cause communication broken or fax broken.

Timing cable will force all cards to work at the same clock source, send

data at the same speed, as a result no data will lost.

If you found J914 (input) and J915 (output) interfaces on the card, it

means the card supports clock line, for details, please refer to **HERE**.

Chapter 3 Software Installation and Configuration

D210P/DE210P supports DAHDI software driver on Linux. To make full use of D210P/DE210P, you should download, compile, install and configure Libpri, DAHDI and Asterisk.

3.1 Download

DAHDI software packages are available on OpenVox official website or Digium. Some patches should be added while the driver source is from Digium, therefore, it is recommended that downloading the DAHDI driver package from OpenVox official website.

Gain DAHDI source package from OpenVox:

http://downloads.openvox.cn/pub/drivers/dahdi-linux-complete/openvox_dahdi-linux-complete-current.tar.gz

Get Asterisk software package from Digium official website:

http://downloads.asterisk.org/pub/telephony/asterisk/releases/asterisk-1.8.5.0.tar.gz

Get Libpri software package from Digium official website:

http://downloads.asterisk.org/pub/telephony/libpri/releases/libpri-1.4.11.5.tar.gz

Execute the following commands under the directory of /usr/src/ in

generally, the former three below are used for downloading these three

packages and the later three are for unzipping them.

```
# wget http://downloads.openvox.cn/pub/drivers/da
hdi-linux-complete/openvox_dahdi-linux-complete-c
urrent.tar.gz
# wget http://downloads.asterisk.org/pub/telephon
y/asterisk/releases/asterisk-1.8.5.0.tar.gz
# wget http://downloads.asterisk.org/pub/telephon
y/libpri/releases/libpri-1.4.11.5.tar.gz
```

```
# tar -xvzf opevox_dahdi-linux-complete-current.
tar.gz
# tar –xvzf asterisk-1.8.5.0.tar.gz
# tar –xzvf libpri-1.4.11.5tar.gz
```

3.2 Installation

1. Hardware detection

```
# lspci –vvvv
```

Check the outcome and confirm your system has recognized

D210P/DE210P. If it has been recognized, **"communication controller"**

will be displayed in the output information like that:

```
01:03.0 Communication controller: Digium, Inc. Wildcard TE210P/TE212P dual-span T1/E1/J1 card
3.3V (rev 02)
        Control: I/O+ Mem+ BusMaster+ SpecCycle- MemWINV- VGASnoop- ParErr- Stepping- SERR-
FastB2B-
        Status: Cap- 66MHz- UDF- FastB2B- ParErr- DEVSEL=medium >TAbort- <TAbort- <MAbort-
>SERR- <PERR-
        Latency: 32
        Interrupt: pin A routed to IRQ 209
        Region 0: Memory at dcdffc00 (32-bit, non-prefetchable) [size=128]
```

Figure 3 Hardware detection

If D210P/DE210P is not recognized by the system, you have to power off

and take out the card, then try to insert it into other PCI slot.

2. Software 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 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
```
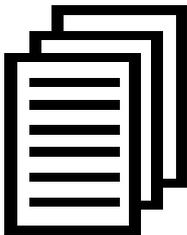
If there is no kernel-devel source in the system, users should run the following command to install the kernel-devel to peer current kernel:

```
# 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.

Among Libpri, DAHDI and Asterisk, let's install Libpri firstly. Please execute those commands under the directory of /usr/src/ in generally:

```
# cd libpri-XX

# make

# make install
```

Change to the directory of dahdi-linux-complete-XX (XX represents DAHDI version), then perform commands one by one to install DAHDI.

```
# cd /usr/src/dahdi-linux-complete-XX

# make

# make install

# make config
```

Caution: If there is something wrong after **"make"**, please refer to **HERE**. In the url link, the moderator introduces you a method how to patch. After patching, save your changes and exit. Then run **"make"** again, if successfully done, it is time for you to install Asterisk.

Please operate those commands to install Asterisk.

```
# cd asterisk-XX

# ./configure

# make

# make install

# make samples
```

"make samples" will install the standard sample configuration file in the directory /etc/asterisk. As a freshman, you should perform make samples, that is to say, it is unnecessary to perform make samples every time. Because once performed, it will cover the old sample configuration files you have installed.

3.3 Configuration

1. Driver loading

After compiling and installing DAHDI and Asterisk, please load the driver by running:

```
# modprobe dahdi

# modprobe wct4xxp

# dahdi_genconf
```

If there is any error, please trace the cause. Until all errors are clear up, you could execute **"dahdi_genconf"** again, and then go to the next step. By running **"dahdi_genconf"**, it will generate /etc/dahdi/system.conf and etc/asterisk/dahdi-channels.conf automatically. Checking whether the generated files information agrees with your hardware setup, if not, you should modify to your specific requirements. Do not forget to confirm dahdi-channels.conf is included in chan_dahdi.conf, if not, run command:

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

A part of system.conf which is one of the basic channel configuration files is displayed.

```
# Span 1: TE2/0/1 "T2XXP (PCI) Card 0 Span 1" (MASTER)
span=1,1,0,ccs,hdb3,crc4
# termtype: te
bchan=1-15,17-31
dchan=16
#echocanceller=mg2,1-15,17-31

# Span 2: TE2/0/2 "T2XXP (PCI) Card 0 Span 2"
span=2,2,0,ccs,hdb3,crc4
# termtype: te
bchan=32-46,48-62
dchan=47
#echocanceller=mg2,32-46,48-62

# Global data

loadzone        = us
defaultzone     = us
```

Figure 4 A part of system.conf

2. Country mode modification

In order to match your country pattern, you need to change parameters

loadzone and defaultzone to your country. For example, your system is in

CHINA, you would like them change to:

loadzone = cn

defaultzone = cn

Some zonedata is available in the file

../dahdi-XX/tools/zonedata.c, you can refer to it to match

your country mode. Meanwhile, you also need to modify

another parameter which is in file

/etc/asterisk/indications.conf.

country=cn

A part of file /etc/asterisk/dahdi-channels.conf is showed as below.

(Modification, if it is not agree with the hardware setup)

```
; Span 1: TE2/0/1 "T2XXP (PCI) Card 0 Span 1" (MASTER)
group=0,11
context=from-internal
switchtype = euroisdn
signalling = pri_net
channel => 1-15,17-31
context = default
group = 63
```

Figure 5 A part of dahdi-channels.conf

After modifying the country mode, please execute the following command:

dahdi_cfg –vvvvvv

The command is used for reading and loading parameters in the configuration file system.conf and writing to the hardware. A part of outputs are showed in the following figure.

```
SPAN 1: CCS/HDB3 Build-out: 0 db (CSU)/0-133 feet (DSX-1)
SPAN 2: CCS/HDB3 Build-out: 0 db (CSU)/0-133 feet (DSX-1)

62 channels to configure.
Setting echocan for channel 1 to none
Setting echocan for channel 2 to none
Setting echocan for channel 3 to none
Setting echocan for channel 4 to none
Setting echocan for channel 5 to none
Setting echocan for channel 6 to none
Setting echocan for channel 7 to none
Setting echocan for channel 8 to none
Setting echocan for channel 9 to none
Setting echocan for channel 10 to none
Setting echocan for channel 11 to none
Setting echocan for channel 12 to none
Setting echocan for channel 13 to none
Setting echocan for channel 14 to none
Setting echocan for channel 15 to none
Setting echocan for channel 16 to none
……
……
Setting echocan for channel 58 to none
Setting echocan for channel 59 to none
Setting echocan for channel 60 to none
Setting echocan for channel 61 to none
Setting echocan for channel 62 to none
```

Figure 6 Channel map

3. Asterisk initiation

`# asterisk –vvvvvvvgc`

If Asterisk is already activate, run **"asterisk –r"** instead. In the CLI,

please run the following command:

`localhost*CLI> dahdi show channels`

```
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-pstn                default           In Service
6       from-pstn                default           In Service
7       from-pstn                default           In Service
8       from-pstn                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-pstn                default           In Service
14      from-pstn                default           In Service
15      from-pstn                default           In Service
16      from-pstn                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-pstn                default           In Service
22      from-pstn                default           In Service
23      from-pstn                default           In Service
……      ……                       ……                ……
57      from-pstn                default           In Service
58      from-pstn                default           In Service
59      from-pstn                default           In Service
60      from-pstn                default           In Service
61      from-pstn                default           In Service
62      from-pstn                default           In Service
```

Figure 7 channels show

If dahdi channels are found, it means they have been loaded into Asterisk. You are going to edit dialplan by your requirements.

4. Dialplan edit

Users must make sure that the context **"from-pstn"** and **"from-internal"** are in extensions.conf, here a simple example is given:

vim /etc/asterisk/extensions.conf

```
[from-pstn]
exten => s,1,Answer()
exten => s,n,Playback(cc_welcome)
exten => s,n,Hangup()

[from-internal]
exten => _X.,1,Dial(dahdi/g0/${EXTEN})
exten => _X.,n,Hangup
```

Figure 8 dial plan

Additional function

Users should run command **"cat /proc/interrupts"** to check D210P/DE210P has independent interrupt. If it shares interrupt with other device, it may cause some problems even cannot work normally. Or you can see if the EC module is working as follows:

```
[root@localhost ~]# dmesg | grep VPM
VPM450: echo cancellation for 64 channels
wct4xxp 0000:01:03.0: VPM450: hardware DTMF disabled.
wct4xxp 0000:01:03.0: VPM450: Present and operational
servicing 2 span(s)
```

Figure 9 EC module show

Chapter 4 Reference

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: D210P   87g

             EC100   19g

Size: DE210P   12.9*10.3*2(cm)

             EC100   7.6*4.2*1.1(cm)

• Interfaces

RJ48 connector

PCI Bus: 3.3V or 5V bus slot, PCI 2.2 or above

Two T1/E1/J1 ports with PCI interface for high performance voice and

data applications

• Environments

Storage temperature: D210P   -65 ~ 125 ℃

                            EC100   -40 ~ 75 ℃

Operation temperature: 0 ~ 50 ℃

Humidity: 10 ~ 90% NON-CONDENSING

• Power consumption

Voltage: 3.3V, 5V

Power: 2.3W Minimum, 3.5W Maximum at 3.3 V or 5 V

• **Hardware and software requirements**

RAM 128 + MB

Linux kernel 2.4.X or 2.6.X

CPU 800+ MHZ

Appendix B Hardware settings

If there is only one card in PCI slot,CardID switch should be set to 0,And adding a card the switch value should be add "1". For example, there are two cards, it is need to set the first card's switch value to 0 and the second set to 1

Span 1

Span 2

Mode Switch
DIP1:ON:Digium Compatible Model-use wct4xxp directly
        OFF:OpenVox dedicate model-use openvox driver
DIP2: ON:Force PCI Burst On,this model will omit noburst parameter in wct4xxp,always keep using PCI Burst model
        OFF:PCI Burst controlled by driver.Burst controlled by noburst parameter in wct4xxp(default is off)

Each DIP Switch controls one span configuration for E1 or T1 mode.Setting DIP1 to ON means span1 will be E1.Setting DIP1 to OFF means span1 will be T1.