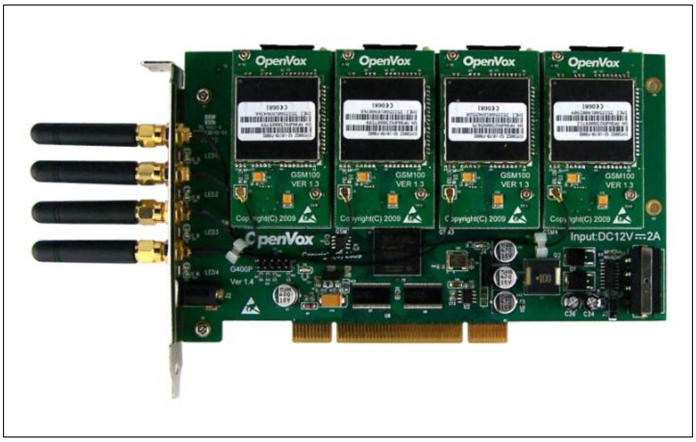
深圳开源通信有限公司

OpenVox-Best Cost Effective Asterisk Cards

OpenVox G400P User Manual



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Chapter 1 Overview

1. What is G400P

G400P is a 4-channel (slot) PCI GSM card and works with GSM network. One slot supports one GSM module with one SIM card. Users can choose the numbers of modules and SIM cards according to their own needs.

It can be implemented with asterisk PBX and GSM network. Through this implantation, Users will able to make an asterisk PBX with flexibility and mobility.

Key Benefits:

- Scalable: Just add additional channels to extend system
- Easy to use: It bases on Bristuff open source solution
- Configurable: Sets GSM network requirements through a setting file
- High quality with low price
- Low power consumption
- Application ready: Use Asterisk® to build your IP-PBX/Voicemail system

Target Applications:

- GSM connectivity for PBX
- Mobile PBX
- GSM VOIP Gateway
- SMS Gateway
- GSM Callback service

Features:

- Support Industry Standard: PCI 2.2
- Both 3.3 V and 5 V PCI slot can be used for G400P
- Quad-Band GSM/GPRS 850/900/1800/1900MHz
- One SIM card per GSM module
- DTMF detection
- GSM data connections
- DIGITAL audio quality
- Normal operation temperature: 0 ℃ to 50 ℃
- 4 LEDs (network state indicators)
- Power consumption(MAX): 30W (4 channels)
- Support external antenna

RoHS compliant

Certificates: CE, FCC

2. What is Asterisk:

The Definition of Asterisk is described as following:
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.

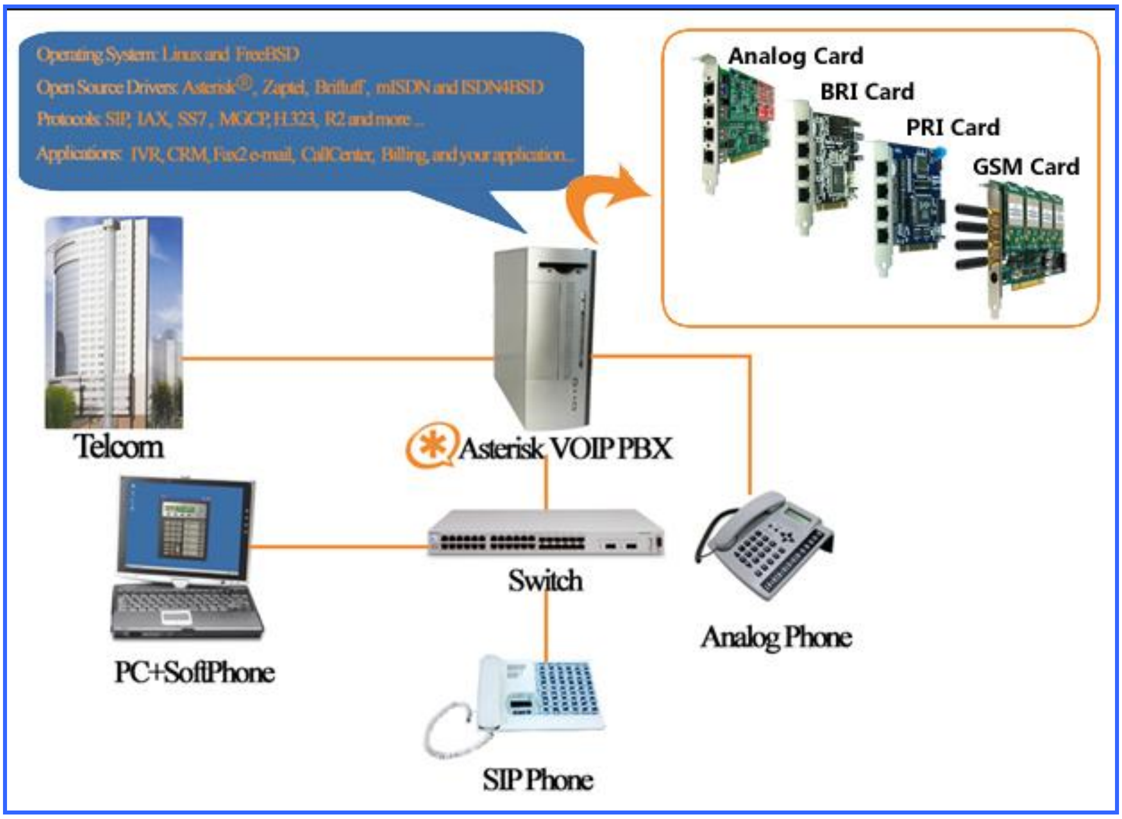
Operating System: Linux and FreeBSD
Open Source Drivers: Asterisk®, Zaptel, Brilluff, mISDN and ISDN4BSD
Protocols: SIP, IAX, SS7, MGCP, H.323, R2 and more…
Applications: IVR, CRM, Fax2 e-mail, CallCenter, Billing, and your application…
Analog Card
BRI Card
PRI Card
GSM Card
Telcom
Asterisk VOIP PBX
Switch
Analog Phone
PC+SoftPhone
SIP Phone

Figure 1: Asterisk with OpenVox's Cards

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). OpenVox G400P adds an alternative for that scenario; users can add G400P to connect asterisk though GSM network.

Chapter 2 Hardware and Software Installation and Configuration

1. Hardware Installation and Setup

Before install G400P, please check the few things:

1) G400P equips four antenna connectors which servant four SIM channels. To make G400P work, you MUST provide the 12V power supply. There are two alternatives to provide power supply. Please refer chapter 3 for setting.

2) G400P works with PCI 2.2 industry standard. Please select a right PCI slot for G400P.

3) Make sure that SIM cards are active.

After checking, users can switch on the system and start installing the software.

2. Software Installation and Setup

Before installing bristuff, 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
rpm -q gcc-c++
```

If any of those packages are not installed 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++
```

Once those packages are installed without any problem, user can go though these steps:

1) Checking G400P hardware by command: **lspci –vvvvv**

```
================G400P card information===========================
02:0c.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 217
            Region 0: Memory at feae0000 (32-bit, non-prefetchable) [size=64K]
==============================================================
```

If G400P can not be detected by the system, you have to take out the card and try to insert into other slot.

2) Downloading, compiling, installing and configuring the Bristuff:

1. Go to OpenVox official website to download the driver, the url link is:
   http://downloads.openvox.cn/pub/drivers/zaptel/g400p/
   Unzip the tar file to /usr/src, here bristuff-0.3.0-PRE-1y-u-o-0.1 is used as an example.
2. Under bristuff-0.3.0-PRE-1y-u-o-0.1, run command: *./install.sh, just press enter key to install the packages.* Make sure all steps are done correctly without any errors.

3. Edit the zaptel.conf like this:

```
==========/etc/zaptel.conf===================
loadzone=nl
defaultzone=nl
alaw=1,3,5,7
span=1,1,3,ccs,ami
span=2,2,3,ccs,ami
span=3,3,3,ccs,ami
span=4,4,3,ccs,ami
bchan=1,3,5,7
dchan=2,4,6,8
============/etc/zaptel.conf=================
```

4. Edit the zapata.conf like this:

```
========/etc/asterisk/zapata.conf=====================
[channels]
txgain = 0.0
rxgain = 0.0
signalling = gsm
context = from-gsm
echocancel=no
relaxdtmf=yes
; slot A
channel => 1
; slot B
channel=> 3
; slot C
channel => 5
; slot D
channel => 7
=========/etc/asterisk/zapata.conf================
```

5. Edit the dial-plan like this:

```
========/etc/asterisk/extensions.conf==============
[from-gsm]  // call your SIM number will forward to a test number. 10000 for telecom service in china.
exten=> s, 1, Answer();
exten=> s, n, Dial(SIP/500); // call to SIP user 500

[from-internal]  // from sip dial to the service number
exten => 100,1,Dial(zap/1/10000) ; call to China telcom service number from channel 1
exten => 100,2,Hangup

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

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

exten => 400,1,Dial(zap/7/10000)
exten => 400,2,Hangup
==========/etc/asterisk/extensions.conf===========
```

Until here, you have set all necessary files, please load the driver and asterisk in the way:

```
1) modprobe zaptel    // load zaptel driver
2) modprobe opvxg4xx    // load G400P driver
3) ztcfg –vvvvvv    // start channels
4) run: demsg          // check the loading status
```

```
=========dmesg information============
Zapata Telephony Interface Registered on major 196
Zaptel Version: 1.2.27
Zaptel Echo Canceller: MG2
opvxg4xx: no version for "zt_receive" found: kernel tainted.
ACPI: PCI Interrupt 0000:02:0c.0[A] -> GSI 20 (level, low) -> IRQ 217
opvxg4xx: OpenVox G400P card configured at IRQ 217 io mem f8be0000 HZ 1000
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... done.
opvxg4xx: 1 OpenVox G4XX card(s) in this box, 4 GSM spans total.
==============dmesg information=================
```

```
5) asterisk -vvvgc    // make sure the gsm is up and connected with network.
```

asterisk console will show some messages:

```
============================================
Asterisk Ready.
*CLI>     -- GSM Span 4 registered to network!
    -- GSM Span 1 registered to network!
    -- GSM Span 2 registered to network!
    -- GSM Span 3 registered to network!
=============================================
```

6) test a outbound call：

```
=============================================
*CLI> 2009-07-02 15:01:21 DEBUG[3175]: chan_sip.c:7590 check_user_full: Setting NAT on RTP to 524288
2009-07-02 15:01:21 DEBUG[3175]: chan_sip.c:1449 __sip_ack: Stopping retransmission on 'NDRhYjdjYmUxOTkxMThlZTg4NzJlYmQwOWJkZmU2Njg.' of Response 1: Match Found
2009-07-02 15:01:21 DEBUG[3175]: chan_sip.c:7590 check_user_full: Setting NAT on RTP to 524288
2009-07-02 15:01:21 DEBUG[3175]: chan_sip.c:11069 handle_request_invite: Checking SIP call limits for device 100
2009-07-02 15:01:21 DEBUG[3175]: chan_sip.c:6490 build_route: build_route: Contact hop:
```

```
<sip:100@192.168.2.179:32356>
    -- Executing Dial("SIP/100-09908bf0", "zap/1/10000") in new stack
    -- Called 1/10000
2009-07-02 15:01:21 DEBUG[3199]: chan_sip.c:3167 sip_rtp_read: Oooh, format changed to 4
2009-07-02 15:01:29 DEBUG[3175]: chan_sip.c:1449 __sip_ack: Stopping retransmission on 'NDRhYjdjYmUxOTkxMThlZTg4NzJlYmQwOWJkZmU2Njg.' of Response 2: Match Found
2009-07-02 15:01:29 DEBUG[3199]: chan_zap.c:2739 zt_hangup: Hangup: channel: 1 index = 0, normal = 20, callwait = -1, thirdcall = -1
2009-07-02 15:01:29 DEBUG[3199]: chan_zap.c:3259 zt_setoption: Set option TDD MODE, value: OFF(0) on Zap/1-1
2009-07-02 15:01:29 DEBUG[3199]: chan_zap.c:1726 update_conf: Updated conferencing on 1, with 0 conference users
    -- Hungup 'Zap/1-1'
```

Chapter 3 Hardware Setting

User should take particular attention to power supply. There are two alternatives to allow users to select a power supply. Please refer figure 2. If user wants to use 12 V external DC, user should adjust the jumper J3 to ***1***; otherwise, set the jumper J3 to ***2*** to use molex connector.

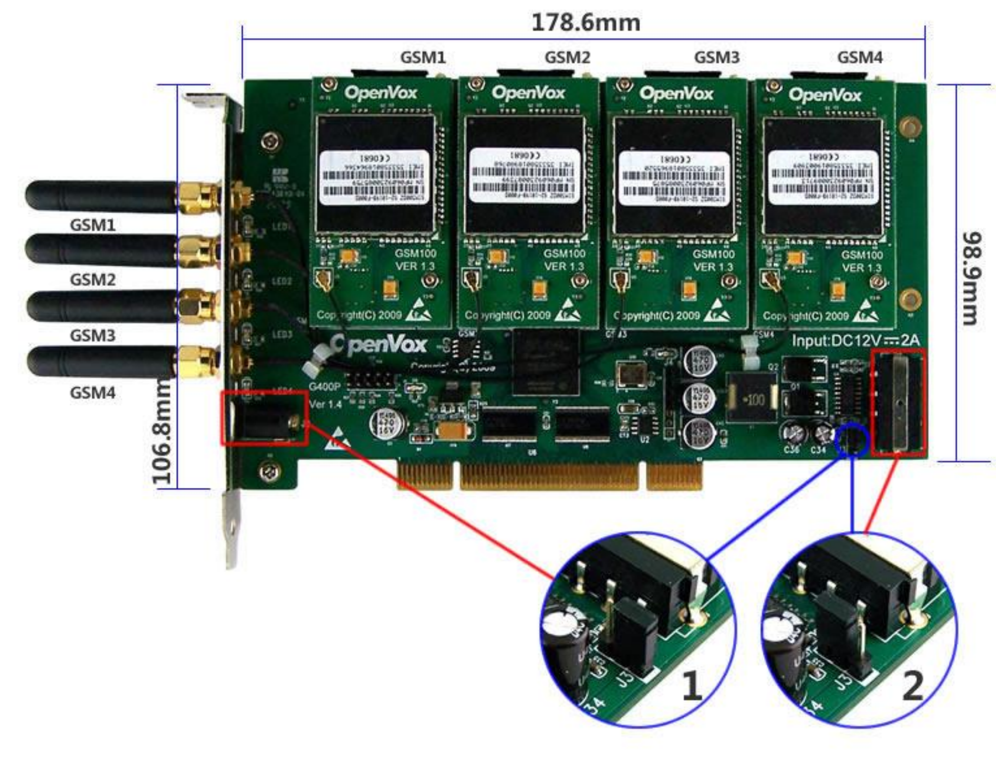

Figure 2

Introduction of main chipset:

The core chipset in G400P is SIM300DZ. Designed for global market, SIM300DZ is tri-band GSM/GPRS engine that works on frequencies, GSM 900 MHz, DCS 1800 MHz and PCS1900 MHz.

With a tiny configuration of 33mm x 33mm x 3 mm, SIM300DZ can fit almost all the space requirement in your application, such as smart phone, PDA phone, Car Phone, Wireless PSTN, and other mobile device.

The hardware package of 48 pins:

1） Nine GND PINS and 2 VBAT pins
2） One pin is programmable as General Purpose I/O .This gives you the flexibility to develop customized applications
3） Serial port and Debug port can help you easily develop your applications. But they can not work at the same time.
4） Two audio channels include two microphone inputs and two speaker outputs. This can be easily configured by AT command.

With the charge circuit integrated inside the SIM300DZ, it is very suitable for the battery power application.

The SIM300DZ provides RF antenna interface. And customer’s antenna should be located in the customer’s mainboard and connect to module’s antenna pad through micro strip line or other type RF traces whose impendence must be controlled in 50Ω.

The SIM300DZ is designed with power saving technique, the current consumption is as low as 2.5mA in SLEEP mode (BS-PA-MFRMS=5).

The SIM300DZ is integrated with the TCP/IP protocol，Extended TCP/IP AT commands are developed for customers to use the TCP/IP protocol easily, which is useful for those data transfer applications.

Information of external antenna:

Model: KHD-M8
Size: D40x295mm
Frequency 824~894 MHz / 1710~1990 MHz
880~960 MHz / 1710~1990 MHz,
1920~2170MHz
V.S.W.R(5m) 2.0 : 1
Band Width ±5MHz
Impendence 50 ohm
Typical Gain 2 dBi
Cable RG174 3m / 5m or others
Connector SMA / MCX or others
Working Temp -40℃~+85℃

Test tools:

1) Centos-5.3 with kernel- 2.6.18-128.el5
2) bristuff-0.3.0-PRE-1y-u-o-0.1
3) GSM SIM cards
4) OpenVox G400P

Status of LEDs of cards:

1) LED off: SIM cards do not work.
2) 64ms On/800ms: SIM cards do not find the network.
3) 64ms On/3000ms:SIM cards find the network
4) 64ms On/300ms: GPRS communication

Chapter 4 References

GSM frequency band reference:

	1900MHz	1800 MHz	900 MHz	850 MHz
America	Antigua, Argentina Bahamas Barbados Belize Bermuda British Virgin Islands Bolivia Canada Chile Colombia Dominican Republic El Salvador Honduras Guatemala Jamaica Mexico Nicaragua Paraguay Peru Puerto Rico Trinidad and Tobago United States Uruguay U.S.Virgin Islands	Barbados Brazil Dominican Republic Costa Rica Grenada Jamaica Paraguay Trinidad Tobago Uruguay	Antigua Barbados Brazil British Virgin Islands Cuba Dominican Republic El Salvador Falkland Islands French Guiana Grenada Guatemala Jamaica St. Pierre and Miquelon Islands Suriname Venezuela	Anguilla Antigua Argentina Bolivia Brazil Canada Colombia Dominican Republic Ecuador El Salvador Grenada Guatemala Haiti Honduras Montserrat Nicaragua Panama Paraguay Peru Trinidad Tobago United States Uruguay Turks Caicos Islands Venezuela

Europe		Austria Belgium Bulgaria Cyprus Czech Republic Denmark Estonia Finland France Germany Greece Hungary Ireland Italy Liechtenstein Lithuania Luxembourg Malta Netherlands Poland Portugal Romania Slovakia Slovenia Spain Sweden Turkey Ukraine United Kingdom	Austria Belgium Bulgaria Cyprus Czech Republic Denmark Estonia Finland France Germany Greece Hungary Ireland Italy Liechtenstein Lithuania Luxembourg Malta Netherlands Poland Portugal Romania Slovakia Slovenia Spain Sweden Turkey Ukraine United Kingdom	
Middle East		Israel Algeria Libya Saudi Arabia Sudan Iran	Israel Algeria Libya Saudi Arabia Sudan Lebanon Iran	
Asia		Japan Korea China	Japan Korea China	

www.openvox.com.cn
www.digium.com
www.asterisk.org
www.voip-info.org
www.asteriskguru.com
http://en.wikipedia.org/wiki/Quad_band
http://en.wikipedia.org/wiki/GSM_frequency_bands
http://en.wikipedia.org/wiki/Cellular_frequencies