深圳开源通信有限公司

OpenVox-Best Cost Effective Asterisk Cards

OpenVox BE400P/BE400E/BE200P/BE200E

User Manual for mISDN

BE400P   BE400E   BE200P

There isn't picture of BE200E temporarily. It's in progress.

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OpenVox

深圳开源通信有限公司

OpenVox-Best Cost Effective Asterisk Cards

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Chapter 1 Overview

1. What is BE400P/BE400E/BE200P/BE200E

The BE400P/BE400E are a bundling of OpenVox B400P (4.0 above version)/B400E(1.3 above version) product and one EC4008 module, which supports 8 channels 128ms/1024 taps echo cancellation.

The BE200P/BE200E are a bundling of OpenVox B200P (4.0 above version)/B200E(1.3 above version) product and one EC4004 module, which supports 4 channels 128ms/1024 taps echo cancellation.

BE400P/BE200P is a PCI 2.2 compliant card supporting 2 or 4 BRI S/T interface, while BE400E/BE200E is a PCI-E interface. NT/TE mode can be independently configured on each of 2 or 4 ports.

BE400P/BE400E/BE200P/BE200E can be implemented for building Open Source Asterisk based systems such as ISDN PBX and VoIP gateway.

Target Applications:
High Performance ISDN PC Cards
ISDN PABX for BRI
VoIP Gateways
ISDN LAN Routers for BRI
ISDN Least Cost Routers for BRI
ISDN Test Equipment for BRI

Main Features:
Four integrated S/T interfaces
ITU-T I.430 and TBR 3 certified and S/T ISDN supporting in TE and NT mode
128ms tail/channel (on all channel densities)
Support G.165 and G.168 standards
Support 4 or 8 channel echo cancellation
Integrated PCI bus interface (Spec.2.2) for 3.3V and 5V signal environments
DTMF detection on all B-channels
Multiparty audio conferences bridge
Onboard power feeding
PCM bus connectors daisy chaining
Each of 2 or 4 ports can be independently configured for TE or NE mode
Full software and hardware compatible with Junghanns.NET ISDN and mISDN driver
Application ready: u se Asterisk to build your IP-PBX/Voicemail system

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RoHS compliant
Certificates: CE, FCC

Misc:(for B400E)
1) Temperature Operation: 0 to 50° C
2) Temperature Storage: - 40 to 125° C
3) Humidity:10 TO 90% NON-CONDENSING
4) Voltage:3.3V/38V(NT ONLY)
5) Power Dissipation Max:0.93W/8.8W

Misc:(for B400P)
1) Temperature Operation: 0 to 50° C
2) Temperature Storage: - 40 to 125° C
3) Humidity:10 TO 90% NON-CONDENSING
4) Voltage:3.3V/5V/38V(NT ONLY)
5) Power Dissipation Max:0.7W/1.16W/8.8W

Misc:(for B200E)
1) Temperature Operation: 0 to 50° C
2) Temperature Storage: - 40 to 125° C
3) Humidity:10 TO 90% NON-CONDENSING
4) Voltage:3.3V/38V(NT ONLY)
5) Power Dissipation Max:0.67W/4.4W

Misc:(for B200P)
1) Temperature Operation: 0 to 50° C
2) Temperature Storage: - 40 to 125° C
3) Humidity:10 TO 90% NON-CONDENSING
4) Voltage:3.3V/5V/38V(NT ONLY)
5) Power Dissipation Max:0.44W/0.66W/4.4W

Misc:(for EC4004)
1) Temperature Operation: 0 to 85° C
2) Voltage:3.3V
3) Power Dissipation Max:0.3W

Misc:(for EC4008)
1) Temperature Operation: 0 to 85° C
2) Voltage:3.3V
3) Power Dissipation Max:0.6W

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.
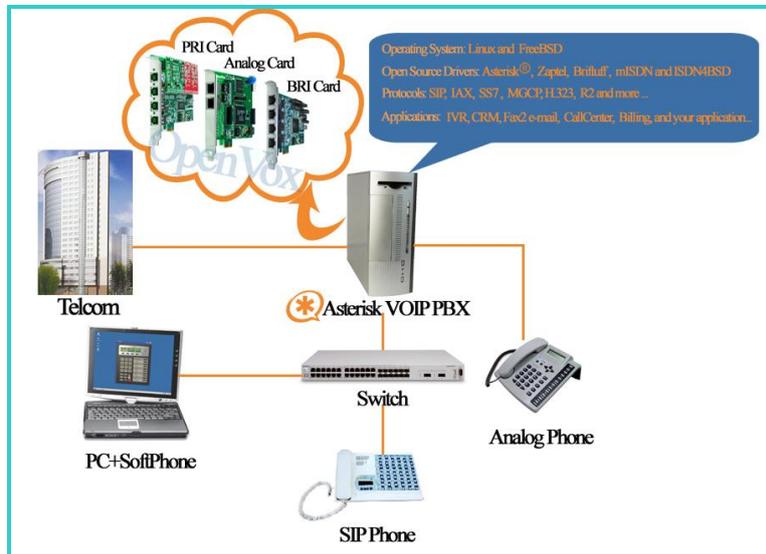
Figure 1: Asterisk Setup

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).

Chapter 2 Card Installation and Configuration

Below take BE400P for example, the Installation and Configuration is the same for BE400E/BE200P/BE200E.

1. **Hardware Installation and Setup**
   1) Configure the Jumper Settings
      Please refer jumper setting for details. To install BE400P, user should follow the steps.
      A. Setting Card ID Switch
         If user wants to install more than one cards of BE400P in one pc, you should take care of the card id switch. It has three rules, which user must follow:
         1. The card id of the first card must be set to 0, and the second card should be set to 1, and so on. Default is set to 0.
         2. The First Card is a card that will be initialized (i.e installing driver) first when system is booting.
         3. At most of cases, Linux will initialize PCI devices according to PCI slot order. The slot is nearest to the CPU will be initialized first; the slot at the far end from CPU will be initialized at last. That is to say, if user has more than one cards of BE400P in pc, the one is nearest to CPU should be set to card id 0.

      B. Adjusting Termination of S/T Interface (100 ohm)
         1. If a port will work on NT mode, user should set jumper to CONNECT (ON).
         2. If a port will work on TE mode, Theoretically it should be to OPEN(OFF), but user might connect to some non-standard isdn terminal equipments that do not have terminal resistors, for such equipments, you should set it to CONNECT(ON).

      C. Power Feeding Connector
         These jumpers control whether the card will feed power to the external isdn terminal. User should adjust accordingly.

         ✧ If the port will work on TE mode, user MUST set the jumper to OPEN(OFF)
         ✧ If this port will work on NT mode, the ISDN terminal requires ISDN power supply, user should set the jumper to CONNECT(ON). *ISDN terminal does not require ISDN power supply, user should set the jumper to OPEN(OFF).*

      D. Power Feeding Input
         If one of the four power feeding connectors is CONNECT(ON), user should

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connect a D-type connecter from pc power supply to this jack, the D-type connecter is used to provide power to your CDROM ahd 3.5" HDD.

E.   Power Supply Selection
Some newest model PCs do not provide +5V on the PCI slots, at those cases, use has to set the jumper to 3.3v.

F.   PCM IN/PCM OUT
This feature will be used to connect two BRI cards.

2) Power off PC, remembering unplug the AC power cable
3) Insert BE400P into a 3.3v or 5.0v PCI slot
4) Plug the hard disk power supply cable(D style) to power feeding input jack if need providing power to external equipment, please refer jumper setting section for the detail
5) Plug back the AC power cable, and power on PC

2. Software Installation and Setup

There are few steps to install the driver.

1) Checking the BE400P hardware by command: **lspci -vvvvvvvvv**

```
01:01.0 ISDN controller: Cologne Chip Designs GmbH ISDN network Controller [HFC-4S]
(rev 01)
        Subsystem: Cologne Chip Designs GmbH HFC-4S [OpenVox B200P / B400P]
        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-
        Interrupt: pin A routed to IRQ 217
        Region 0: I/O ports at c800 [size=8]
        Region 1: Memory at dcdff000 (32-bit, non-prefetchable) [disabled] [size=4K]
        Capabilities: [40] Power Management version 2
            Flags:       PMEClk-      DSI+      D1+      D2+      AuxCurrent=0mA
PME(D0+,D1+,D2+,D3hot+,D3cold-)
            Status: D0 PME-Enable- DSel=0 DScale=0 PME+
```

lspci

2) Checking the supporting packages
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 other 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 is not installed, please install those packages 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++
```

3) Downloading, unzipping and compiling driver
   A. Download mISDN-1.1.9.1 and mISDNuser-1.1.9.1 from:
      http://www.misdn.org/downloads/releases/mISDN-1_1_9.1.tar.gz
      http://www.misdn.org/downloads/releases/mISDNuser-1_1_9.1.tar.gz

      Download b200P_b400P_ec.tar.gz
      http://downloads.openvox.cn/pub/drivers/mISDN/b200p_b400p_ec.tar.gz

      ```
      cd /usr/src
      cp b200p_b400p_ec/opvxec-i686/*
      /usr/src/mISDN-1_1_9.1/drivers/isdn/hardware/mISDN/
      cp b200p_b400p_ec/mISDN-1_1_9.1.patch /usr/src/
      patch -p0 < mISDN-1_1_9.1.patch
      ```

   B. Download asterisk from:
      http://downloads.asterisk.org/pub/telephony/asterisk/releases/asterisk-1.8.0.tar.gz
      here, we are using asterisk 1.8.0

   C. Make links with kernel source:
      ```
      ln -s /usr/src/kernels/ 2.6.18-194.el5/ /usr/src/linux-2.6
      ```
      Here, under /usr/src there is kernel source, user must create link

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linux-2.6 under /usr/src/. There are many files under /usr/src/, please check:

D. Compiling mISDN, mISDNuser and asterisk
cd /usr/src/mISDN-1_1_9.1
make
make install

cd /usr/src/mISDNuser-1_1_9.1
make
make install

cd /usr/src/asterisk-1.8.XX
./configure
make menuselect

Now you should enable chan_misdn in the Channel Driver Section and reinstall asterisk with "make install".

After that procedure you should have the current mISDN releases installed and the current chan_misdn with asterisk.

4) Modifying and loading modules for mISDN
   A. Loading mISDN driver
      The system will able to detect the BE400P card.
      Now, user can run following commands under /usr/sbin:
      ./mISDN scan // detect Cards
      ./mISDN config // set configuration files
      ./mISDN start // start the drivers.

   B. Checking EC module
      Then run the command dmesg, if user can see the following information, it shows that hardware Echo Canceller module has been loaded successfully.

```
OPVXEC:before download fw, OPVXEC revision register : 0x5266
OPVXEC:now start download pram firmware...
OPVXEC:now start download dram firmware...
OPVXEC:Download the firmware successfully!!!
OPVXEC:after download fw ,OPVXEC revision register : 0x5207
OPVXEC:FWCAP: nPCM: 8  nALM: 2  nSIG: 4  nCOD: 4
OPVXEC:FWCAP: nNLEC: 4 nWLEC: 4 nAGC: 4  nFAX: 4
OPVXEC:FWCAP: nUTG: 8  UTG/CH: 2 nMFTD: 4
```

dmesg: checking EC module

5) Configuration

vi /etc/mISDN.conf, and check the mISDN.conf, it looks like the following. Here, port 1,2,3 are set to TE mode, port 4 is NT mode. User need to modify NT manually.

```
<mISDNconf>
        <module poll="128" debug="0" timer="no">hfcmulti</module>
        <module debug="0" options="0">mISDN_dsp</module>
        <devnode user="root" group="root" mode="644">mISDN</devnode>
        <card type="BN4S0">
                <port mode="te" link="ptmp">1</port>
                <port mode="te" link="ptmp">2</port>
                <port mode="te" link="ptmp">3</port>
                <port mode="nt" link="ptmp">4</port>
        </card>
</mISDNconf>
```

---

mISDN.conf

vi /etc/asterisk/misdn.conf, comment out the configure ports lines. And add the inbound and outbound in the bottom.

Please note two parameters, set debug=4 to check EC status, and set echocancel=yes to enable echo cancellation.

```
;[intern]
; define your ports, e.g. 1,2 (depends on mISDN-driver loading order)
;ports=1,2
; context where to go to when incoming Call on one of the above ports
;context=Intern

;[internPP]
;
; adding the postfix 'ptp' to a port number is obsolete now, chan_misdn
; parses /etc/misdn-init.conf and sets the ptp mode to the corresponding
; configs. For backwards compatibility you can still set ptp here.
;
;ports=3

;[first_extern]
; again port defs
;ports=4
; again a context for incoming calls
;context=Extern1
; msns for te ports, listen on those numbers on the above ports, and
```

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```
; indicate the incoming calls to asterisk
; here you can give a comma separated list or simply an '*' for
; any msn.
;msns=*

; here an example with given msns
;[second_extern]
;ports=5
;context=Extern2
;callerid="Asterisk" <1234>
;msns=102,144,101,104

[inbound]
ports=1,2,3
context=from-isdn
[outbound]
ports=4
context=from-internal
```

misdn.conf

vi /etc/asterisk/extensions.conf, the dialplan shows as the following :

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

[from-isdn]
exten=>s,1,Answer()
exten=>s,n,Playback(demo-instruct)
exten=>s,n,Hangup()
```
dialplan

6) Call test

Execute: asterisk – vvvvvvvgc

Execute: misdn show stacks

The status will be UP which connects ISDN line or ISDN phone.

```
*CLI> misdn show stacks
BEGIN STACK_LIST:
  * Port  1 Type TE Prot.PMP L2Link DOWN L1Link:UP   Blocked:0  Debug:0
  * Port  2 Type TE Prot. PMP L2Link DOWN L1Link:DOWN Blocked:0  Debug:0
  * Port  3 Type TE Prot. PMP L2Link DOWN L1Link:DOWN Blocked:0  Debug:0
  * Port  4 Type NT Prot. PMP L2Link DOWN L1Link:DOWN Blocked:0  Debug:0
```
misdn show stacks

localhost*CLI>   == Using SIP RTP CoS mark 5

  == Using SIP RTP CoS mark 5

localhost*CLI>   -- Executing [10000@from-internal:1] Dial("SIP/100-00000001", "misdn/1/10000") in new stack

    -- Executing [10000@from-internal:1] Dial("SIP/100-00000001", "misdn/1/10000") in new stack

localhost*CLI>   -- Called 1/10000

    -- Called 1/10000

localhost*CLI>   -- mISDN/1-u3 is proceeding passing it to SIP/100-00000001

    -- mISDN/1-u3 is proceeding passing it to SIP/100-00000001

localhost*CLI>   -- mISDN/1-u3 is ringing

    -- mISDN/1-u3 is ringing

localhost*CLI>   -- mISDN/1-u3 answered SIP/100-00000001

    -- mISDN/1-u3 answered SIP/100-00000001

localhost*CLI>   == Spawn extension (from-internal, 10000, 1) exited non-zero on 'SIP/100-00000001'

  == Spawn extension (from-internal, 10000, 1) exited non-zero on 'SIP/100-00000001'

---

outgoing calls

---

localhost*CLI>   == Starting mISDN/2-u4 at from-isdn,,1 failed so falling back to exten 's'

  == Starting mISDN/2-u4 at from-isdn,,1 failed so falling back to exten 's'

localhost*CLI>   -- Executing [s@from-isdn:1] Answer("mISDN/2-u4", "") in new stack

    -- Executing [s@from-isdn:1] Answer("mISDN/2-u4", "") in new stack

localhost*CLI> enc_ie_connected_pn: ERROR: type(-1) is out of range.

    -- Executing [s@from-isdn:2] Playback("mISDN/2-u4", "demo-instruct") in new stack

    -- Executing [s@from-isdn:2] Playback("mISDN/2-u4", "demo-instruct") in new stack

localhost*CLI>   -- <mISDN/2-u4> Playing 'demo-instruct.gsm' (language 'en')

    -- <mISDN/2-u4> Playing 'demo-instruct.gsm' (language 'en')

localhost*CLI>   == Spawn extension (from-isdn, s, 2) exited non-zero on 'mISDN/2-u4'

  == Spawn extension (from-isdn, s, 2) exited non-zero on 'mISDN/2-u4'

Incoming calls

User can check the EC status of active channel by the following way.

```
localhost*CLI> misdn toggle echocancel mISDN/2-u8
P[ 1] ec_enable
Toggling EchoCancel on mISDN/2-u8
localhost*CLI> P[ 1] Sending Control ECHOCAN_ON taps:128
P[ 1] Taps is 128
P[ 1] ec_enable
P[ 1] Sending Control ECHOCAN_ON taps:128
P[ 1] Taps is 128
```

EC status

Notes:
Test environments:
OS: Centos 5.5
Kernel version: 2.6.18-194.e15
Asterisk version: Asterisk-1.8.0
mISDN version: mISDN-1_1_9.1
Hardware：OpenVox B400P Ver 4.0 EC Ver 1.0

LED :
1) LEDs will turn into red and blink if the drivers are loaded.
2) When calls coming, the LED will be turned into green status for very short while
3) If ISDN plugs into the port, the LED will not blink, but in red color.

References:
http://www.openvox.com.cn
http://www.misdn.org/index.php/Main_Page
http://www.asterisk.org
http://www.voip-info.org

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