OpenVox Communication Co.Ltd

D130P/DE130P on DAHDI User Manual

Version: 2.2

OpenVox Communication Co.Ltd

Most Advanced Asterisk Cards

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Customer Information

1. This equipment complies with Part 68 of the FCC rules and the requirements adopted by the ACTA. On the bottom of this equipment is a label that contains, among other information, a product identifier in the format US:AAAEQ##TXXXX. If requested, this number must be provided to the telephone company.

2. A plug and jack used to connect this equipment to the premises wiring and telephone network must comply with the applicable FCC Part 68 rules and requirements adopted by the ACTA. A compliant telephone cord and modular plug is provided with this product. It is designed to be connected to a compatible modular jack that is also compliant. See installation instructions for details.

3. If this equipment [US: G4DDWNANDEX30] causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be   required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you

will be advised of your right to file a complaint with the FCC if you believe it is necessary.

4. The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

5. If trouble is experienced with this equipment [US: G4DDWNANDEX30], for repair or warranty information, Service can be facilitated through our office at:
   Address: F/3, Block No.127, Jindi Industrial Zone, Shazui Road, Futian District, Shenzhen, Guangdong 518048, China
   Tel:+86-755-82535461, 82535095, 82535362, Fax:+86-755-83823074
   Business Contact: sales@openvox.com.cn
   Technical Support: support@openvox.com.cn

   If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

6. Please follow instructions for repairing if any; otherwise do not alternate or repair any parts of device except specified.

7. Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.

8. If your home has specially wired alarm equipment connected to the telephone line, ensure the installation of this [US: G4DDWNANDEX30] does not disable your alarm equipment. If you have questions about what will disable alarm equipment, consult your telephone company or a qualified installer.

9. If the telephone company requests information on what equipment is connected to their lines, inform them of:
   a) The ringer equivalence number [NAN]
   b) The USOC jack required [RJ48C]
   c) Facility Interface Codes ("FIC") [04DU9.1SN]
   d) Service Order Codes ("SOC") [6.0N]
   e) The FCC Registration Number [US: G4DDWNANDEX30]

10. The REN is used to determine the number of devices that may be connected to a telephone line. Excessive RENs on a telephone line may result in the devices not ringing in response to an incoming call. In most but not all areas, the sum of

RENs should not exceed five (5.0). To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company. The REN for this product is part of the product identifier that has the format US:AAAEQ##TXXXX. The digits represented by ## are the REN without a decimal point. For this product the FCC Registration number is [US: G4DDWNANDEX30] indicates the REN would be NAN.

IC CS-03 WARNING:

This product meets the applicable Industry Canada technical specifications.

Contents

General Safety Instructions

⚠ CAUTION

1. The computers that have D130P/DE130P card installed must comply with the country's specific safety regulations.

2. Only service personnel should go to install D130P/DE130P card.

3. Before installing D130P/DE130P card, please unplug the power cord and remove the cover from your PC.

4. For avoiding personal injuries and damages to your machine and D130P/DE130P 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 DE130P

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).
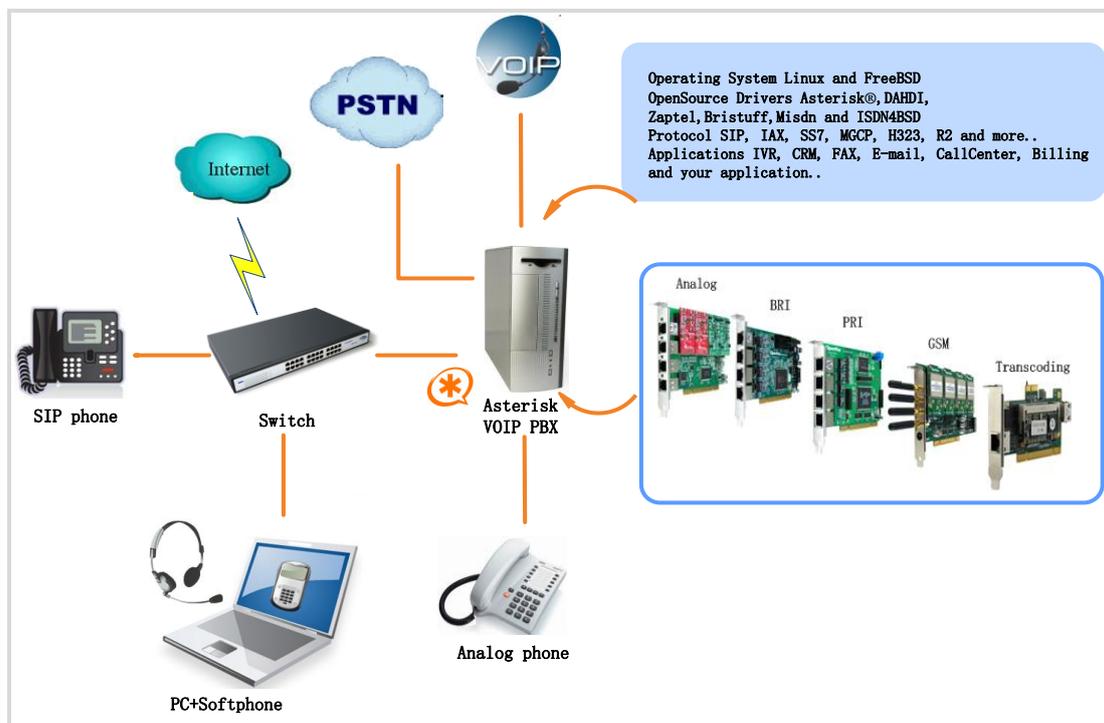
Figure 1 Topology

1.2 What is DE130P/D130P

The D130P/DE130P is an upgrade product of the D115P. It supports T1, E1, and J1 environments and is selectable on a per-card or per-port basis. D130P/DE130P is supposed to be the most advanced single port T1/E1/J1 asterisk® card with superior quality in the open source community. The leading innovation ensures users to adjust the interrupts frequency to reduce the CPU load up to 70% and adjust the interrupt number to avoid interrupt number sharing or conflict. DE130P offers an on-board Octasic® DSP-based echo cancellation module. It supports T1, E1, and J1 environments and is selectable on a per-card or per-port basis. The Octasic® DSP-based EC module enables users to eliminate echo tails up to 128ms or 1024 taps across all 32 channels in E1 mode or 24 channels in T1/J1 modes. Further, this module takes advantage of the Octasic® Voice Quality Enhancement to provide superior sound quality on all calls. D130P/DE130P 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. D130P/DE130P 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.

RoHS compliant Certificates: CE and FCC

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 D130P/DE130P.

2.1 Span type setup

Each DIP switch controls one span configuration for E1 or T1.Setting DIP1 to ON means SPAN1 will be E1.Setting DIP1 to OFF means SPAN1 will be T1.The example sets Span to E1.

2.2 CardID switch setup

If want to install more than one card of D130P/DE130P 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 D130P/DE130P on your machine.

2.3 Slot compatibility

D130P 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 slot; you should confirm your slot type and insert D110P into any type of PCI slot as previously described.

1		PCI-E ×1 slot
2		32-bit 5.0V PCI slot
3		64-bit 3.3V PCI slot
4		64-bit 5.0V PCI slot
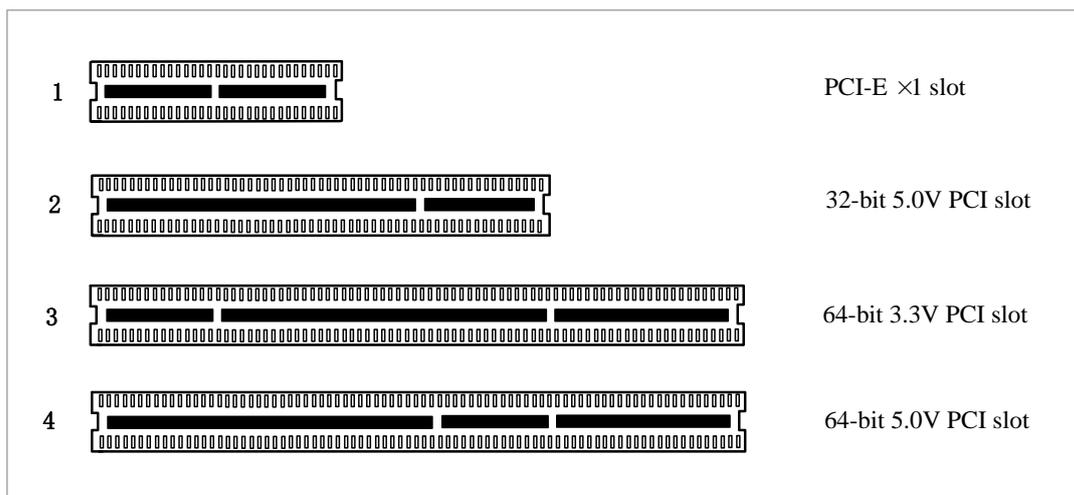
Figure 2 PCI-E and PCI slot

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

D130P/DE130P supports DAHDI software driver on Linux. To make full use of D130P, 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

general, the former two below are used for downloading these two

packages and the later two 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 opensox_dahdi-linux-complete-current.
tar.gz
# tar –xvzf asterisk-1.8.5.0.tar.gz
# tar –zxvf libpri-1.4.11.5tar.gz
```

3.2 Installation

1. Hardware detection

```
# lspci –vvvv
```

Check the outcome and confirm your system has recognized

D130P/DE130P. If it has been recognized, communication controller will

be displayed in the output information like that:

```
20:00.0 Class ff00: Unknown device 1b74:d130 (rev 01)
        Subsystem: Unknown device 0005:0000
        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
        Interrupt: pin A routed to IRQ 16
        Region 0: Memory at 91c00000 (32-bit, non-prefetchable)
[size=32K]
```

Figure 3 Hardware detection

If DE130P 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
```
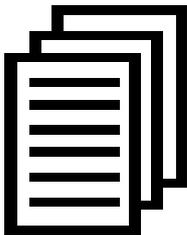
If there is no kernel-devel source in the system, users should run the following command to install the kernel-devel to peer current kernel:

```
# 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
```

Then 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-1.8.5.0

# ./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 opvxd115

# 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: D115/D130/0/1 "D115/D130 (E1|T1) 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

# 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: D115/D130/0/1 "D115/D130 (E1|T1) Card 0 Span 1" (MASTER)
group=0,11
context=from-pstn
switchtype = euroisdn
signalling = pri_cpe
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.

```
[root@localhost ~]# dahdi_cfg -v
DAHDI Tools Version - 2.6.1

DAHDI Version: 2.6.1
Echo Canceller(s):
Configuration
======================

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

31 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 17 to none
Setting echocan for channel 18 to none
Setting echocan for channel 19 to none
Setting echocan for channel 20 to none
Setting echocan for channel 21 to none
Setting echocan for channel 22 to none
Setting echocan for channel 23 to none
Setting echocan for channel 24 to none
Setting echocan for channel 25 to none
Setting echocan for channel 26 to none
Setting echocan for channel 27 to none
Setting echocan for channel 28 to none
Setting echocan for channel 29 to none
Setting echocan for channel 30 to none
Setting echocan for channel 31 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
        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
        24      from-pstn               default        In Service
        25      from-pstn               default        In Service
        26      from-pstn               default        In Service
        27      from-pstn               default        In Service
        28      from-pstn               default        In Service
        29      from-pstn               default        In Service
        30      from-pstn               default        In Service
        31      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() // answer the inbound call
exten => s,n,Playback(cc_welcome) //please message
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 DE130P has independent interrupt. If it shares interrupt with other device, it may cause some problems even cannot work normally. While DE130P allows users to modify interrupt pin during firmware upgrade for avoiding conflict. Or you can see if the EC module is working as follows:

dmesg | grep VPM

```
[root@localhost ~]# dmesg | grep VPM
VPM450: echo cancellation for 32 channels
opvxd115 0000:20:00.0: VPM450: hardware DTMF disabled.
opvxd115 0000:20:00.0: VPM450: Present and operational
servicing 1 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: D130P   92g

           EC2032   10g

Size: 2U Form Factor: 12×6.4×1.8

• **Interfaces**

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

• **Environment**

Temperature Operation: 0 ~50℃

Temperature Storage: D130P   -65 to 125℃

                        EC2032   -40 to 75℃

Humidity: 10 ~90% NON-CONDENSING

• **Power consumption**

Voltage: 3.3V, 5V

• **Hardware and software requirements**

RAM 128 + MB

Linux kernel 2.4.X or 2.6.X

CPU 800+ MHZ

Appendix B Jumper and Switch Settings

Shorten the jumper will open clock line otherwise will not

If there is only one card in PCI slot,CardID switch should be set to 0,otherwise set to different values of each card by order.

It connects with clock lines.The left is output pin and the right is input. If you want to use clock lines, please refer to that link:
http://bbs.openvox.cn/viewthread.php?tid=874&extra=page%3D1

Span 1

OpenVox

D430P/D230P/D130P_S

Ver 1.0

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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.