



Step by Step Guide

BRI Card Installation

Asterisk

Step by Step Guide

BRI Card Installation
(with Asterisk)

Version 1.0

Table of Contents

Hardware Setup	1
Software Installation	2
Installation of Pre-requisite packages	2
Installation of Libpri package	2
Installation of DAHDI package.....	4
Installation of Asterisk Package.....	5
Software Configuration	6

Hardware Setup

1. Insert the BRI (PCI/PCIe) card in the corresponding slot
2. Check if the installed BRI card is detected using the below command

```
[root@pbx1 ~]# lspci -vvvvv
```

3. Check the output of the given command and ensure if there is a **Cologne chip Unknown device** with subsystem id **b51a**

```

root@pbx1:~
File Edit View Terminal Tabs Help

06:00.0 ISDN controller: Cologne Chip Designs GmbH ISDN network Controller [HFC-4S] (rev 01)
  Subsystem: Cologne Chip Designs GmbH Unknown device b51a
  Control: I/O+ Mem+ BusMaster- SpecCycle- MemWINV- VGASnoop- ParErr- Stepping- SERR- FastB
2B-
  Status: Cap+ 66MHz- UDF- FastB2B- ParErr- DEVSEL=medium >TAbort- <TAbort- <MAbort- >SERR-
<PERR-
  Interrupt: pin A routed to IRQ 185
  Region 0: I/O ports at d000 [size=8]
  Region 1: Memory at fe500000 (32-bit, non-prefetchable) [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-

07:00.0 USB Controller: NEC Corporation Unknown device 0194 (rev 03) (prog-if 30)
  Subsystem: Intel Corporation Unknown device 2003
  Control: I/O- Mem+ BusMaster+ SpecCycle- MemWINV- VGASnoop- ParErr- Stepping- SERR- FastB
2B-
  Status: Cap+ 66MHz- UDF- FastB2B- ParErr- DEVSEL=fast >TAbort- <TAbort- <MAbort- >SERR- <
PERR-
  Latency: 0, Cache Line Size: 64 bytes
  Interrupt: pin A routed to IRQ 11
  Region 0: Memory at fe400000 (64-bit, non-prefetchable) [size=8K]
  Capabilities: [50] Power Management version 3
    Flags: PMEclk- DSI- D1- D2- AuxCurrent=375mA PME(D0+,D1-,D2-,D3hot+,D3cold+)
    Status: D0 PME-Enable- DSel=0 DScale=0 PME-
  Capabilities: [70] Message Signalled Interrupts: 64bit+ Queue=0/3 Enable-
    Address: 0000000000000000 Data: 0000
  Capabilities: [90] MSI-X: Enable- Mask- TabSize=8
  
```

Software Installation

Installation of Pre-requisite packages

1. Install all of Asterisk's dependencies that are required to compile asterisk.
 - a. Run the followings commands to install the required packages needed for compiling DAHDI drivers from source.

For Centos/Redhat

```
[root@pbx1 ~]# yum -y install bison bison-devel ncurses
ncurses-devel zlib zlib-devel openssl openssl-devel gnutls-
devel gcc gcc-c++ libxml2
```

For Debian/Ubuntu

```
[root@pbx1 ~]# apt-get install debconf-utils proftpd-basic
build-essential libxml2-dev ncurses-dev bison flex libnewt-dev
```

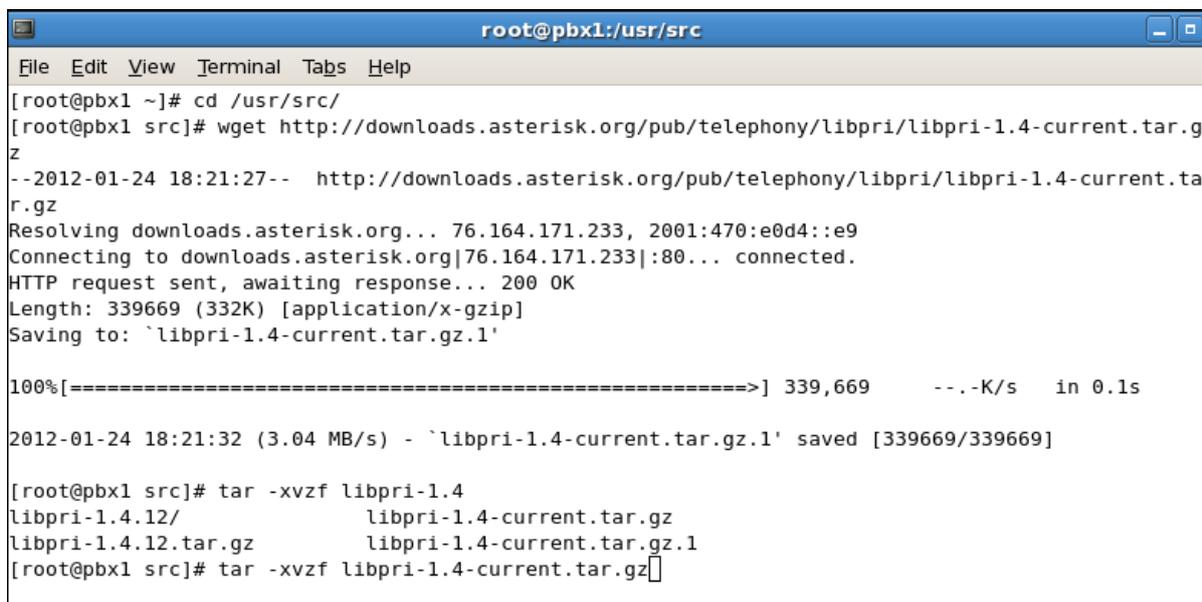
Installation of Libpri package

2. Go to `/usr/src` directory
3. Download the latest version of libpri from the source by running the following command

```
# wget
http://downloads.asterisk.org/pub/telephony/libpri/libpri-1.4-
current.tar.gz
```

4. Expand the downloaded file

```
[root@srv1 src]# tar -xvzf libpri-1.4-current.tar.gz
```



```

root@pbx1:~/usr/src
File Edit View Terminal Tabs Help
[root@pbx1 ~]# cd /usr/src/
[root@pbx1 src]# wget http://downloads.asterisk.org/pub/telephony/libpri/libpri-1.4-current.tar.gz
--2012-01-24 18:21:27-- http://downloads.asterisk.org/pub/telephony/libpri/libpri-1.4-current.tar.gz
Resolving downloads.asterisk.org... 76.164.171.233, 2001:470:e0d4::e9
Connecting to downloads.asterisk.org|76.164.171.233|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 339669 (332K) [application/x-gzip]
Saving to: `libpri-1.4-current.tar.gz.1'

100%[=====] 339,669  --.-K/s  in 0.1s

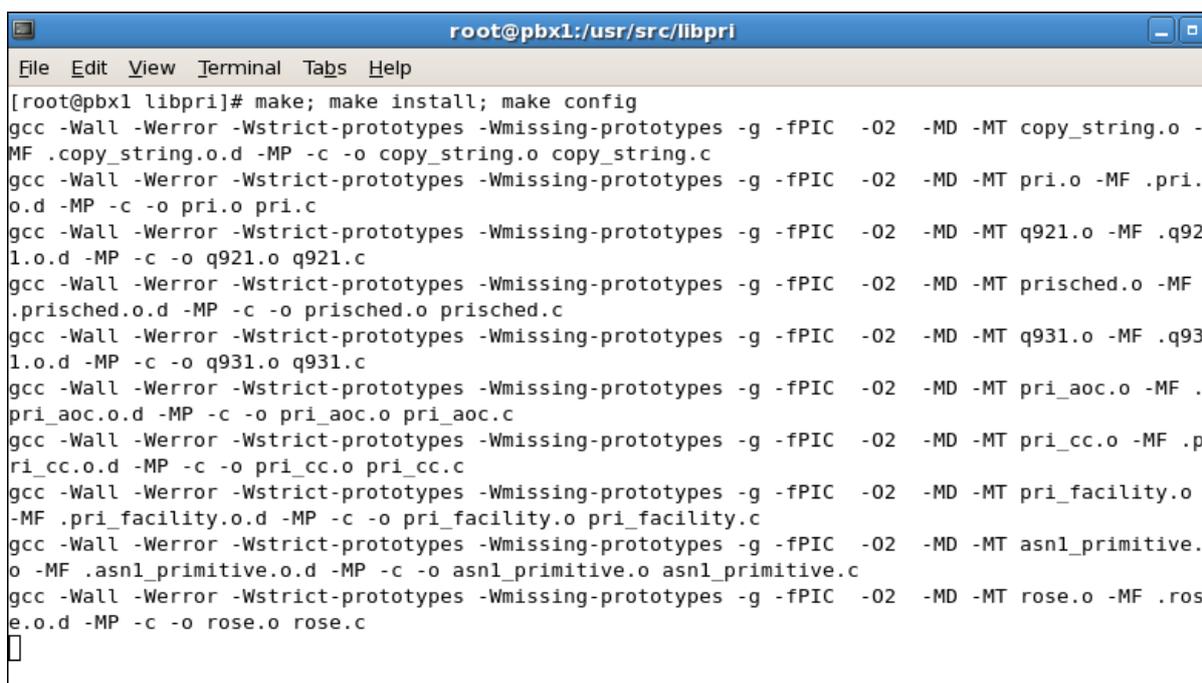
2012-01-24 18:21:32 (3.04 MB/s) - `libpri-1.4-current.tar.gz.1' saved [339669/339669]

[root@pbx1 src]# tar -xvzf libpri-1.4
libpri-1.4.12/          libpri-1.4-current.tar.gz
libpri-1.4.12.tar.gz   libpri-1.4-current.tar.gz.1
[root@pbx1 src]# tar -xvzf libpri-1.4-current.tar.gz

```

5. Go to libpri folder and install the package using following commands as shown in the below screenshot

```
# cd libpri-1.4
# make clean; make ; make install
```



```

root@pbx1:~/usr/src/libpri
File Edit View Terminal Tabs Help
[root@pbx1 libpri]# make; make install; make config
gcc -Wall -Werror -Wstrict-prototypes -Wmissing-prototypes -g -fPIC -O2 -MD -MT copy_string.o -MF .copy_string.o.d -MP -c -o copy_string.o copy_string.c
gcc -Wall -Werror -Wstrict-prototypes -Wmissing-prototypes -g -fPIC -O2 -MD -MT pri.o -MF .pri.o.d -MP -c -o pri.o pri.c
gcc -Wall -Werror -Wstrict-prototypes -Wmissing-prototypes -g -fPIC -O2 -MD -MT q921.o -MF .q921.o.d -MP -c -o q921.o q921.c
gcc -Wall -Werror -Wstrict-prototypes -Wmissing-prototypes -g -fPIC -O2 -MD -MT prished.o -MF .prished.o.d -MP -c -o prished.o prished.c
gcc -Wall -Werror -Wstrict-prototypes -Wmissing-prototypes -g -fPIC -O2 -MD -MT q931.o -MF .q931.o.d -MP -c -o q931.o q931.c
gcc -Wall -Werror -Wstrict-prototypes -Wmissing-prototypes -g -fPIC -O2 -MD -MT pri_aoc.o -MF .pri_aoc.o.d -MP -c -o pri_aoc.o pri_aoc.c
gcc -Wall -Werror -Wstrict-prototypes -Wmissing-prototypes -g -fPIC -O2 -MD -MT pri_cc.o -MF .pri_cc.o.d -MP -c -o pri_cc.o pri_cc.c
gcc -Wall -Werror -Wstrict-prototypes -Wmissing-prototypes -g -fPIC -O2 -MD -MT pri_facility.o -MF .pri_facility.o.d -MP -c -o pri_facility.o pri_facility.c
gcc -Wall -Werror -Wstrict-prototypes -Wmissing-prototypes -g -fPIC -O2 -MD -MT asnl_primitive.o -MF .asnl_primitive.o.d -MP -c -o asnl_primitive.o asnl_primitive.c
gcc -Wall -Werror -Wstrict-prototypes -Wmissing-prototypes -g -fPIC -O2 -MD -MT rose.o -MF .rose.o.d -MP -c -o rose.o rose.c

```

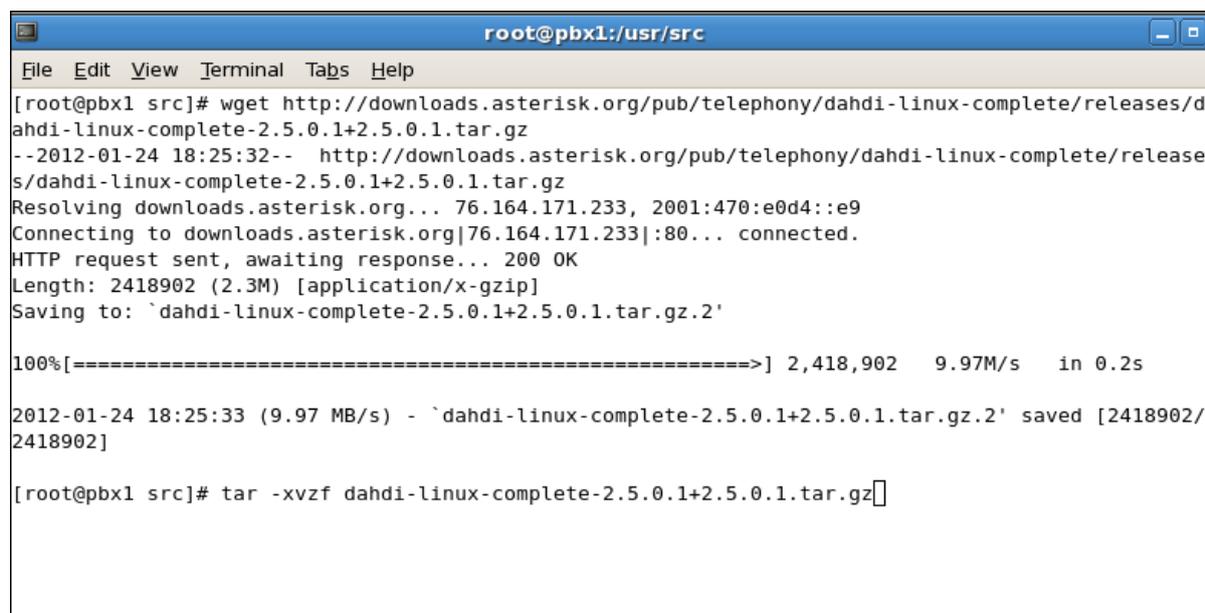
Next, we'll install DAHDI. DAHDI is the set of linux kernel modules and also a set of tools for interfacing with TDM cards. More importantly, DAHDI provides timing to several asterisk components, such as the MeetMe application as well as Music on Hold. If you don't have a proper timing source installed, you'll notice lots of stuttering pauses in any kind of audio playback (Music on Hold, IVR prompts, voicemail greetings) from asterisk. If you don't have any TDM hardware installed in your server, DAHDI also provides a "dummy" driver that will provide a timing source to asterisk.

Installation of DAHDI package

- Download the DAHDI driver with tools, which are available at <http://www.allo.com/isdn-bri-card.html> under 'Drivers and Manuals'.

```
#wget http://www.allo.com/firmware/bri-card/allo-dahdi-drivers/dahdi-linux-complete-2.5.0.1+2.5.0.1.tar.gz
```

- Expand the downloaded file and enter into that directory as shown in the below screenshot.



```
root@pbx1:/usr/src
File Edit View Terminal Tabs Help
[root@pbx1 src]# wget http://downloads.asterisk.org/pub/telephony/dahdi-linux-complete/releases/dahdi-linux-complete-2.5.0.1+2.5.0.1.tar.gz
--2012-01-24 18:25:32-- http://downloads.asterisk.org/pub/telephony/dahdi-linux-complete/releases/dahdi-linux-complete-2.5.0.1+2.5.0.1.tar.gz
Resolving downloads.asterisk.org... 76.164.171.233, 2001:470:e0d4::e9
Connecting to downloads.asterisk.org|76.164.171.233|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 2418902 (2.3M) [application/x-gzip]
Saving to: `dahdi-linux-complete-2.5.0.1+2.5.0.1.tar.gz.2'

100%[=====>] 2,418,902  9.97M/s  in 0.2s

2012-01-24 18:25:33 (9.97 MB/s) - `dahdi-linux-complete-2.5.0.1+2.5.0.1.tar.gz.2' saved [2418902/2418902]

[root@pbx1 src]# tar -xvzf dahdi-linux-complete-2.5.0.1+2.5.0.1.tar.gz
```

Install dahdi driver as show in the below screenshot



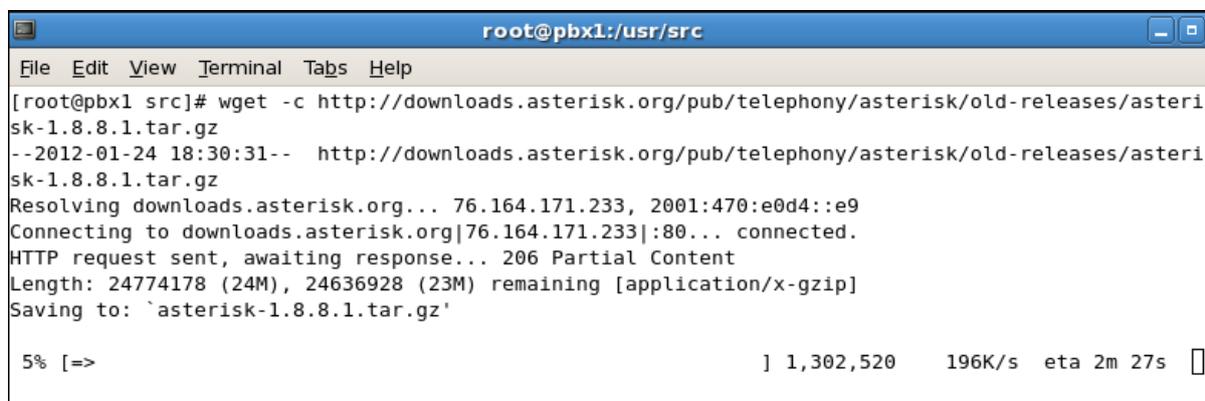
```
[root@pbx1 dahdi-linux-complete-2.5.0.1+2.5.0.1]# make ; make install; make config
make -C linux all
make[1]: Entering directory `/usr/src/dahdi-linux-complete-2.5.0.1+2.5.0.1/linux'
make -C drivers/dahdi/firmware firmware-loaders
make[2]: Entering directory `/usr/src/dahdi-linux-complete-2.5.0.1+2.5.0.1/linux/drivers/dahdi/firmware'
make[2]: Leaving directory `/usr/src/dahdi-linux-complete-2.5.0.1+2.5.0.1/linux/drivers/dahdi/firmware'
make -C /lib/modules/2.6.18-274.3.1.el5/build SUBDIRS=/usr/src/dahdi-linux-complete-2.5.0.1+2.5.0.1/linux/drivers/dahdi DAHDI_INCLUDE=/usr/src/dahdi-linux-complete-2.5.0.1+2.5.0.1/linux/include DAHDI_MODULES_EXTRA=" " HOTPLUG_FIRMWARE=yes modules DAHDI_BUILD_ALL=m
make[2]: Entering directory `/usr/src/kernels/2.6.18-274.3.1.el5-i686'

```

If there is any problem with the driver patch used for installation, please contact support@allo.com

Installation of Asterisk Package

- Download the Asterisk 1.8 latest release version from <http://downloads.asterisk.org/pub/telephony/asterisk/old-releases/>



```

root@pbx1:/usr/src
File Edit View Terminal Tabs Help
[root@pbx1 src]# wget -c http://downloads.asterisk.org/pub/telephony/asterisk/old-releases/asterisk-1.8.8.1.tar.gz
--2012-01-24 18:30:31-- http://downloads.asterisk.org/pub/telephony/asterisk/old-releases/asterisk-1.8.8.1.tar.gz
Resolving downloads.asterisk.org... 76.164.171.233, 2001:470:e0d4::e9
Connecting to downloads.asterisk.org[76.164.171.233]:80... connected.
HTTP request sent, awaiting response... 206 Partial Content
Length: 24774178 (24M), 24636928 (23M) remaining [application/x-gzip]
Saving to: `asterisk-1.8.8.1.tar.gz'

5% [=>                               ] 1,302,520   196K/s   eta 2m 27s

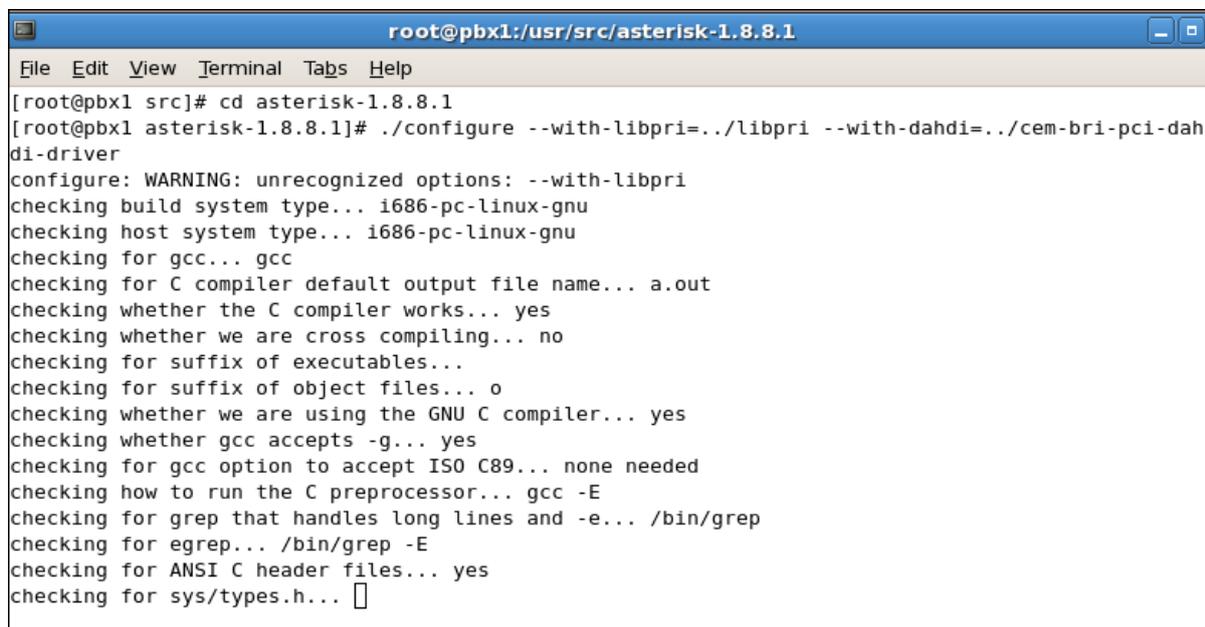
```

- Expand the downloaded asterisk file as shown below

```
[root@pbx1 src]# tar xvzf asterisk-1.8.8.1.tar.gz
```

Go to asterisk folder and compile the packages as shown in the screenshot

```
[root@srv1 asterisk-1.8.8.1]# ./configure --with-libpri=../libpri --with-dahdi=../cem-bri-pci-dahdi-driver
```



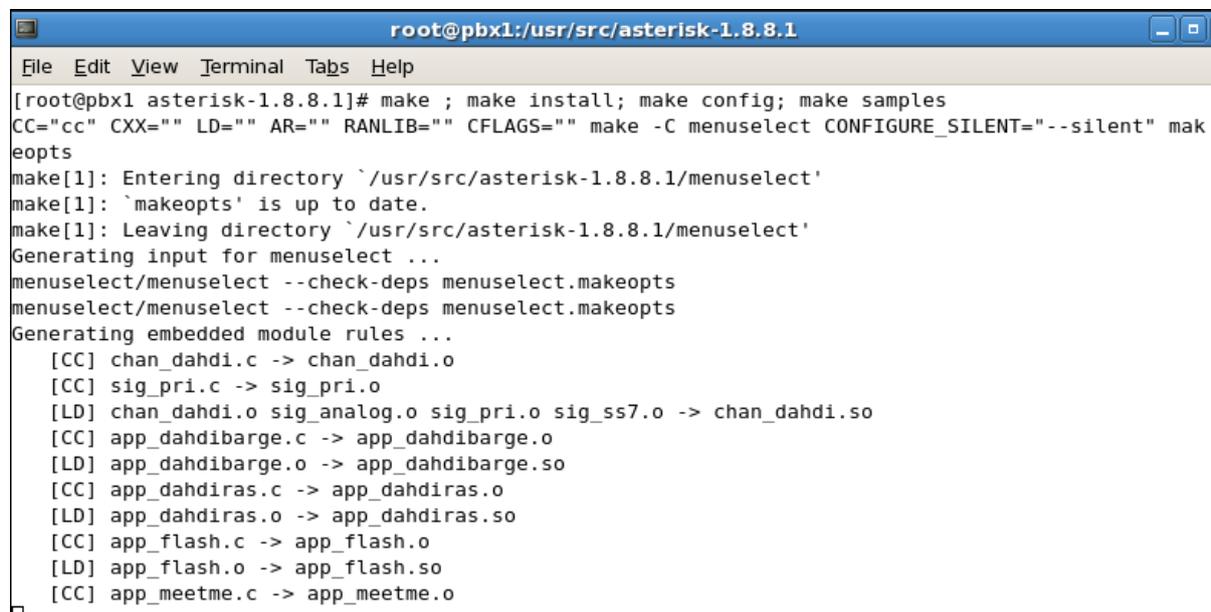
```

root@pbx1:/usr/src/asterisk-1.8.8.1
File Edit View Terminal Tabs Help
[root@pbx1 src]# cd asterisk-1.8.8.1
[root@pbx1 asterisk-1.8.8.1]# ./configure --with-libpri=../libpri --with-dahdi=../cem-bri-pci-dahdi-driver
configure: WARNING: unrecognized options: --with-libpri
checking build system type... i686-pc-linux-gnu
checking host system type... i686-pc-linux-gnu
checking for gcc... gcc
checking for C compiler default output file name... a.out
checking whether the C compiler works... yes
checking whether we are cross compiling... no
checking for suffix of executables...
checking for suffix of object files... o
checking whether we are using the GNU C compiler... yes
checking whether gcc accepts -g... yes
checking for gcc option to accept ISO C89... none needed
checking how to run the C preprocessor... gcc -E
checking for grep that handles long lines and -e... /bin/grep
checking for egrep... /bin/grep -E
checking for ANSI C header files... yes
checking for sys/types.h...

```

10. Install the package by running the following command

```
[root@pbx1 asterisk-1.8.8.1]# make ; make install; make
config; make samples
```



```

root@pbx1:/usr/src/asterisk-1.8.8.1
File Edit View Terminal Tabs Help
[root@pbx1 asterisk-1.8.8.1]# make ; make install; make config; make samples
CC="cc" CXX="" LD="" AR="" RANLIB="" CFLAGS="" make -C menuselect CONFIGURE_SILENT="--silent" mak
eopts
make[1]: Entering directory `/usr/src/asterisk-1.8.8.1/menuselect'
make[1]: `makeopts' is up to date.
make[1]: Leaving directory `/usr/src/asterisk-1.8.8.1/menuselect'
Generating input for menuselect ...
menuselect/menuselect --check-deps menuselect.makeopts
menuselect/menuselect --check-deps menuselect.makeopts
Generating embedded module rules ...
  [CC] chan_dahdi.c -> chan_dahdi.o
  [CC] sig_pri.c -> sig_pri.o
  [LD] chan_dahdi.o sig_analog.o sig_pri.o sig_ss7.o -> chan_dahdi.so
  [CC] app_dahdibarge.c -> app_dahdibarge.o
  [LD] app_dahdibarge.o -> app_dahdibarge.so
  [CC] app_dahdiras.c -> app_dahdiras.o
  [LD] app_dahdiras.o -> app_dahdiras.so
  [CC] app_flash.c -> app_flash.o
  [LD] app_flash.o -> app_flash.so
  [CC] app_meetme.c -> app_meetme.o

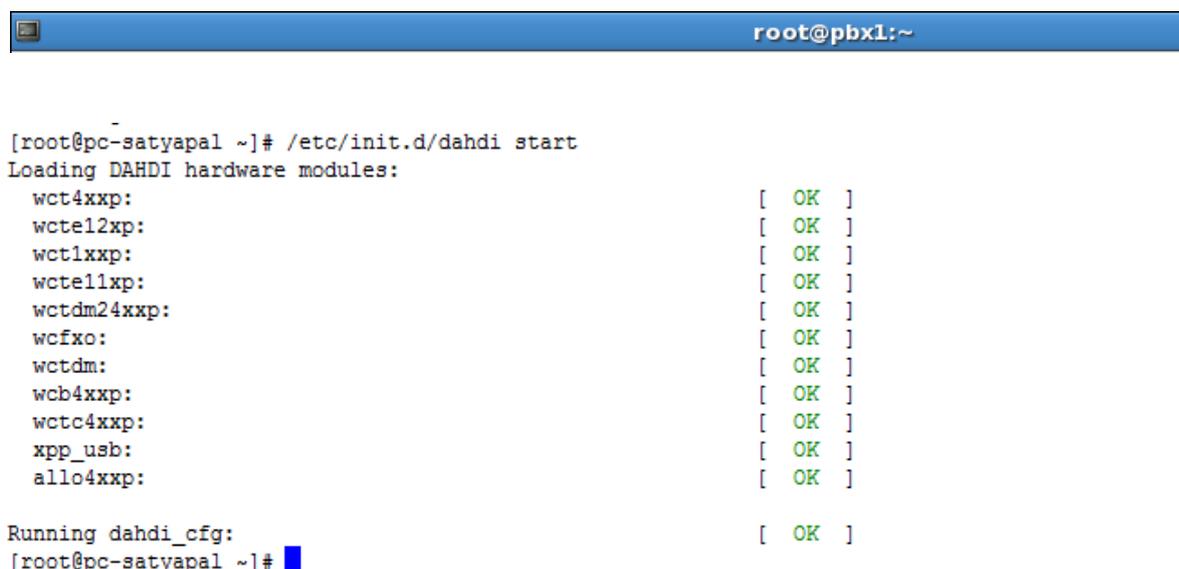
```

Now you have successfully compiled and installed Libpri, DAHDI and Asterisk.

Software Configuration

1. Please add the line "allo4xxp" at the end of the file in > /etc/dahdi/modules and start loading the driver by running

```
[root@srv1 asterisk-1.8.8.1]# /etc/init.d/dahdi start
```



```

root@pbx1:~
[root@pc-satyapal ~]# /etc/init.d/dahdi start
Loading DAHDI hardware modules:
wct4xxp:           [ OK ]
wctel2xp:         [ OK ]
wct1xxp:         [ OK ]
wctel1xp:         [ OK ]
wctdm24xxp:      [ OK ]
wcfxo:           [ OK ]
wctdm:           [ OK ]
wcb4xxp:         [ OK ]
wctc4xxp:        [ OK ]
xpp_usb:         [ OK ]
allo4xxp:        [ OK ]

Running dahdi_cfg: [ OK ]
[root@pc-satyapal ~]#

```

2. Generate config files using the following command

```
[root@pbx1 ~]# dahdi_genconf -vvvvv
```



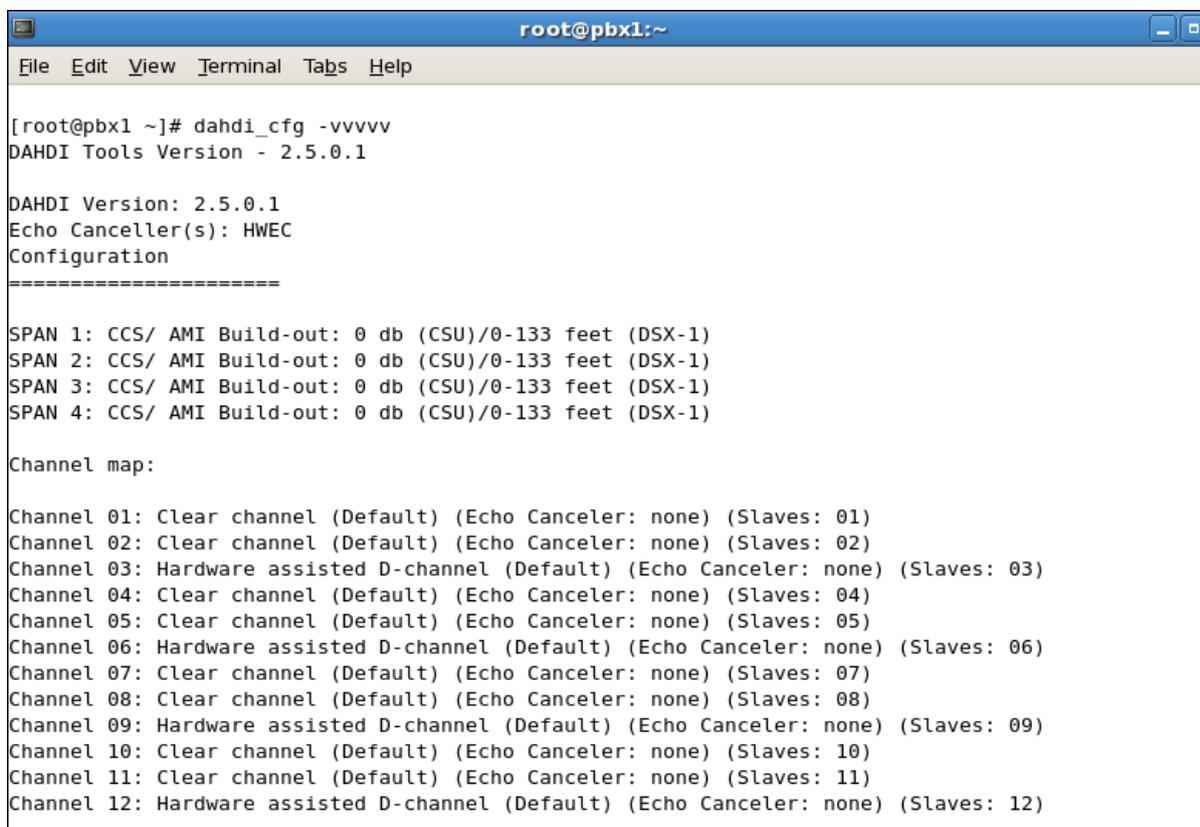
```

root@pbx1:~
File Edit View Terminal Tabs Help
[root@pbx1 ~]# dahdi_genconf -vvvv
Default parameters from /etc/dahdi/genconf_parameters
Generating /etc/dahdi/system.conf
Generating /etc/asterisk/dahdi-channels.conf
[root@pbx1 ~]#

```

3. Check the output configured channels using the following commands. It will list the configure channels.

```
[root@pbx1 ~]# dahdi_cfg -vvvv
```



```

root@pbx1:~
File Edit View Terminal Tabs Help
[root@pbx1 ~]# dahdi_cfg -vvvvv
DAHDI Tools Version - 2.5.0.1

DAHDI Version: 2.5.0.1
Echo Canceller(s): HWEC
Configuration
=====

SPAN 1: CCS/ AMI Build-out: 0 db (CSU)/0-133 feet (DSX-1)
SPAN 2: CCS/ AMI Build-out: 0 db (CSU)/0-133 feet (DSX-1)
SPAN 3: CCS/ AMI Build-out: 0 db (CSU)/0-133 feet (DSX-1)
SPAN 4: CCS/ AMI Build-out: 0 db (CSU)/0-133 feet (DSX-1)

Channel map:

Channel 01: Clear channel (Default) (Echo Canceler: none) (Slaves: 01)
Channel 02: Clear channel (Default) (Echo Canceler: none) (Slaves: 02)
Channel 03: Hardware assisted D-channel (Default) (Echo Canceler: none) (Slaves: 03)
Channel 04: Clear channel (Default) (Echo Canceler: none) (Slaves: 04)
Channel 05: Clear channel (Default) (Echo Canceler: none) (Slaves: 05)
Channel 06: Hardware assisted D-channel (Default) (Echo Canceler: none) (Slaves: 06)
Channel 07: Clear channel (Default) (Echo Canceler: none) (Slaves: 07)
Channel 08: Clear channel (Default) (Echo Canceler: none) (Slaves: 08)
Channel 09: Hardware assisted D-channel (Default) (Echo Canceler: none) (Slaves: 09)
Channel 10: Clear channel (Default) (Echo Canceler: none) (Slaves: 10)
Channel 11: Clear channel (Default) (Echo Canceler: none) (Slaves: 11)
Channel 12: Hardware assisted D-channel (Default) (Echo Canceler: none) (Slaves: 12)

```

4. The following is an example `system.conf` file for BRI as shown in figure

```
[root@pbx1 ~]# vi /etc/dahdi/system.conf
```

```
# Autogenerated by /usr/sbin/dahdi_genconf on Fri Aug 10 11:28:22 2012
# If you edit this file and execute /usr/sbin/dahdi_genconf again,
# your manual changes will be LOST.
# Dahdi Configuration File
#
# This file is parsed by the Dahdi Configurator, dahdi_cfg
#
# Span 1: B4/0/1 "ALLO4XXP (PCI) Card 0 Span 1" (MASTER) AMI/CCS RED
span=1,1,0,ccs,ami
# termtype: te
bchan=1-2
hardhdlc=3
echocanceller=mg2,1-2

# Span 2: B4/0/2 "ALLO4XXP (PCI) Card 0 Span 2" AMI/CCS RED
span=2,2,0,ccs,ami
# termtype: te
bchan=4-5
hardhdlc=6
echocanceller=mg2,4-5

# Span 3: B4/0/3 "ALLO4XXP (PCI) Card 0 Span 3" AMI/CCS RED
span=3,3,0,ccs,ami
# termtype: te
bchan=7-8
hardhdlc=9
echocanceller=mg2,7-8

# Span 4: B4/0/4 "ALLO4XXP (PCI) Card 0 Span 4" AMI/CCS RED
span=4,4,0,ccs,ami
# termtype: te
bchan=10-11
hardhdlc=12
echocanceller=mg2,10-11

# Global data
loadzone      = us
defaultzone   = us
```

5. Configure the interface to Asterisk using dahdi

- a. We need to verify that asterisk installed correctly. We do this by manually starting asterisk from the command line. If everything starts up and there's not too many errors or warnings, we're good to go
- b. You will need to modify the `chan_dahdi.conf` file which is located in the `/etc/asterisk` directory in order to configure the essential features of your card. This file is the configuration layer between DAHDI and Asterisk. Include the generated conf file `dahdi-channels.conf` in `chan_dahdi.conf` file

```
[root@pbx1 ~]# echo "#include dahdi-channels.conf" >>
/etc/asterisk/chan_dahdi.conf
```

Here is an example of `dahdi-channels.conf` file

```
; This is not intended to be a complete chan_dahdi.conf. Rather, it is intended
; to be #include-d by /etc/chan_dahdi.conf that will include the global settings
;

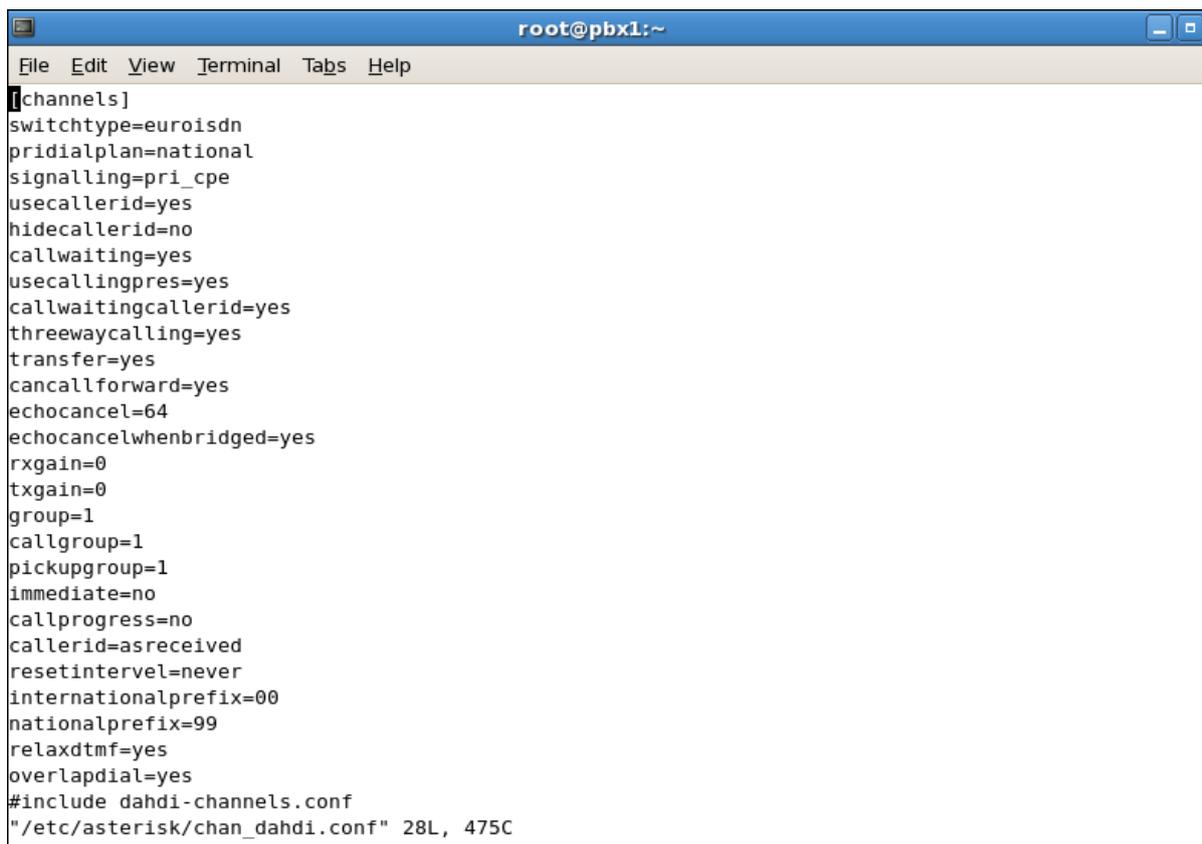
; Span 1: B4/0/1 "ALLO4XXP (PCI) Card 0 Span 1" (MASTER) AMI/CCS RED
group=0,11
context=from-pstn
switchtype = euroisdn
signalling = bri_cpe_ptmp
channel => 1-2
context = default
group = 63

; Span 2: B4/0/2 "ALLO4XXP (PCI) Card 0 Span 2" AMI/CCS RED
group=0,12
context=from-pstn
switchtype = euroisdn
signalling = bri_cpe_ptmp
channel => 4-5
context = default
group = 63

; Span 3: B4/0/3 "ALLO4XXP (PCI) Card 0 Span 3" AMI/CCS RED
group=0,13
context=from-pstn
switchtype = euroisdn
signalling = bri_cpe_ptmp
channel => 7-8
context = default
group = 63

; Span 4: B4/0/4 "ALLO4XXP (PCI) Card 0 Span 4" AMI/CCS RED
group=0,14
context=from-pstn
switchtype = euroisdn
signalling = bri_cpe_ptmp
channel => 10-11
context = default
group = 63
```

Another example of a typical `chan_dahdi.conf` file

A screenshot of a terminal window titled "root@pbx1:~". The window displays the configuration for the "channels" section of a Dahdi channel driver. The configuration includes various options such as switchtype, signaling, callerid, callwaiting, and transfer settings. At the bottom, it includes a reference to another configuration file and the file's size and line count.

```
root@pbx1:~  
File Edit View Terminal Tabs Help  
[channels]  
switchtype=euroisdn  
pridialplan=national  
signalling=pri_cpe  
usecallerid=yes  
hidecallerid=no  
callwaiting=yes  
usecallingpres=yes  
callwaitingcallerid=yes  
threewaycalling=yes  
transfer=yes  
cancallforward=yes  
echocancel=64  
echocancelwhenbridged=yes  
rxgain=0  
txgain=0  
group=1  
callgroup=1  
pickupgroup=1  
immediate=no  
callprogress=no  
callerid=asreceived  
resetinterval=never  
internationalprefix=00  
nationalprefix=99  
relaxdtmf=yes  
overlapdial=yes  
#include dahdi-channels.conf  
"/etc/asterisk/chan_dahdi.conf" 28L, 475C
```

6. Start the asterik and connect the Asterisk CLI

```
[root@pbx1 ~]# /etc/init.d/asterisk start
```

7. Check the status of configured DAHDI channels in asterisk console

```

root@pbx1:~
File Edit View Terminal Tabs Help
pc-satyapal*CLI> dahdi show status
Description                               Alarms  IRQ    bpviol  CRC    Fra Codi Options  LBO
ALLO4XXP (PCI) Card 0 Span 1              RED     0      0       0     CCS AMI           0 db (CSU)/0-133 feet (DSX-1)
ALLO4XXP (PCI) Card 0 Span 2              RED     0      0       0     CCS AMI           0 db (CSU)/0-133 feet (DSX-1)
ALLO4XXP (PCI) Card 0 Span 3              OK      0      0       0     CCS AMI           0 db (CSU)/0-133 feet (DSX-1)
ALLO4XXP (PCI) Card 0 Span 4              RED     0      0       0     CCS AMI           0 db (CSU)/0-133 feet (DSX-1)
pc-satyapal*CLI>

```

8. At this point we are ready to write a Dial Plan in `/etc/asterisk/extensions.conf`.

Here is an example of writing a Dial Plan syntax to make a outbound and inbound calls.

```

root@pbx1:~
File Edit View Terminal Tabs Help
; one function. Remember that function names are UPPER CASE.

[from-pstn]
exten => _X.,1,Dial(SIP/100)
exten => _X.,n,Hangup()

[from-internal]
exten => _X.,1,Dial(dahdi/1/${EXTEN})
exten => _X.,n,Hangup()
exten => s,1,Answer
exten => s,2,Playtones(dial)
;use DigitTimeout previous to Asterisk 1.2
exten => s,3,Set(TIMEOUT(digit)=5)
exten => s,4,WaitExten(60)
;exten => s,5,Dial(dahdi/1/${EXTEN})
;exten => 1000,1,Dial(SIP/${EXTEN})

[from-internal1]
exten => _X.,1,Dial(dahdi/1/${EXTEN})
exten => _X.,n,Hangup()

;exten => 100,1,Dial(dahdi/7/100)

;exten => 100,2,Dial(SIP/100)

[from-internal2]
exten => _X.,1,Dial(dahdi/13/${EXTEN})

```

Now the system is ready to make calls.

Here is an example output of outbound call which is using DAHDI channel 1.

```
root@pbx1:~  
File Edit View Terminal Tabs Help  
-- Starting simple switch on 'DAHDI/i4/-1'  
-- Accepting overlap call from '' to '<unspecified>' on channel 0/2, span 4  
-- Executing [7259691221@from-internal:1] Dial("DAHDI/i4/-1", "dahdi/1/7259691221") in new stack  
-- Requested transfer capability: 0x00 - SPEECH  
-- Called dahdi/1/7259691221  
-- DAHDI/i1/7259691221-1 is proceeding passing it to DAHDI/i4/-1  
-- DAHDI/i1/7259691221-1 is ringing  
-- DAHDI/i1/7259691221-1 is making progress passing it to DAHDI/i4/-1  
-- DAHDI/i1/7259691221-1 answered DAHDI/i4/-1  
-- Native bridging DAHDI/i4/-1 and DAHDI/i1/7259691221-1  
-- Span 1: Channel 0/1 got hangup request, cause 16  
-- Hungup 'DAHDI/i1/7259691221-1'  
== Spawn extension (from-internal, 7259691221, 1) exited non-zero on 'DAHDI/i4/-1'  
-- Hungup 'DAHDI/i4/-1'  
pbx1*CLI> █
```