Synway AST Series

FXM3201P based Asterisk System Installation and Setup Manual

Synway Information Engineering Co., Ltd

www.synway.net

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Preface

If you want to set up an Asterisk system based on the Synway board FXM3201P, read this file for detailed information on installation, configuration and testing.

Chapter 1 introduces the hardware and software that you need to prepare before installing Asterisk.

Chapter 2 presents the way to install CentOS Linux system.

Chapter 3 describes the automatic installation of the Dahdi and SynAST drivers.

Chapter 4 teaches you to install Asterisk step by step.

Chapter 5 gives the instruction on automatic uninstallation of Asterisk, SynAST and Dahdi.

Appendix A tells how to install the Dahdi and SynAST drivers manually.

Appendix B tells how to uninstall Asterisk, SynAST and Dahdi manually.

Appendix C gives the contact way of Synway technical support and sales department.

Although Synway has scrupulously checked through this manual, but cannot guarantee the absence of errors and omissions. We sincerely apologize for any consequent inconvenience brought to you and will be very grateful if you kindly give your advice regarding amendments to this manual.

Chapter 1 Preparation

1.1 Hardware

First you shall prepare the following items: A PC with a new HD (what we use herein is MAXSTOR, ATA/133 HDD 40GB) and a Synway FXM3201P board with two trunk modules (CH1 and CH2) and two station modules (CH3 and CH4).

1.2 Software

Make sure you have these software: CentOS 5.4 (Core: Version 2.6.18-164.el5, gcc: Version 4.1.2), asterisk-1.6.0.10, Dahdi and SynAst-1.4.0.0.

1. Six CD mirror image files of CentOS 5.4, totally about 3.7GB in size, can be downloaded from:

   http://mirrors.163.com/centos/5.4/isos/i386/CentOS-5.4-i386-bin-1of6.iso
   http://mirrors.163.com/centos/5.4/isos/i386/CentOS-5.4-i386-bin-2of6.iso
   http://mirrors.163.com/centos/5.4/isos/i386/CentOS-5.4-i386-bin-3of6.iso
   http://mirrors.163.com/centos/5.4/isos/i386/CentOS-5.4-i386-bin-4of6.iso
   http://mirrors.163.com/centos/5.4/isos/i386/CentOS-5.4-i386-bin-5of6.iso
   http://mirrors.163.com/centos/5.4/isos/i386/CentOS-5.4-i386-bin-6of6.iso
   Burn six CDs respectively with the downloaded mirror image files and leave marks on them.

2. asterisk-1.6.0.10, 22MB in size, can be downloaded from:

   http://downloads.asterisk.org/pub/telephony/asterisk/old-releases/asterisk-1.6.0.10.tar.gz

3. dahdi-linux-complete-2.2.0.2+2.2.0, about 1.8MB in size, can be downloaded from:

   http://downloads.asterisk.org/pub/telephony/dahdi-linux-complete/releases/dahdi-linux-complete-2.2.0.2+2.2.0.tar.gz

4. SynAst-1.4.0.0, about 10 MB in size, can be downloaded from:

   http://www.synway.net/Download/Manual/UserManual/FXM3201P_based_Asterisk_System_Installation_and_Setup_Manual.pdf

Chapter 2 Installation of CentOS Linux

To be simple, we use the whole HD to install with the Linux system herein and select the auto areaing method to avoid any inconvenience that the manual areaing may bring.

To install the CentOS Linux system, follow the steps below.

Step1: Set BIOS to boot from CD-ROM.

Step2: Put the first burned CD with CentOS mirror to CD-ROM and restart the system.

Step3: The 'Start CentOS Installation' menu appears on the PC screen. Click Enter to go into the graphical installation mode.

Step4: The dialog 'Choose a Language' pops up. Select the default 'English' and click Enter or OK.

Step5: In the dialog 'Keyboard Type', select the default 'us' and click Enter or OK.

Step6: In the dialog 'Installation Method', select the default 'Local CDROM' and click Enter or OK.

Step7: In the dialog for CD test, select OK.

Step8: Select 'Test' and the system starts testing CD. It needs a few seconds, please wait.

Step9: When the testing program is finished, click Enter or OK.

Step10: Now the computer enters the CentOS installation interface. Click Next.

Step11: Select 'Install CentOS' and Click Next.

Step12: Select 'Remove all partitions on selected drives and create default layout' and click Next.

Step13: Then you see the question 'Are you sure you want to do this?' Select 'Yes'.

Step14: For Network setting, select the default option and click Next.

Step15: For Time Zone setting, select the default option and click Next.

Step16: Keep clicking Next until you see the page for Root Password setting. Input the root password (Remember the password. It will be used soon).

Step17: Go to 'Desktop'. Select the default 'Gnome' and 'Customize now' at the bottom. Then click Next.

Step18: Select 'Development' and tick all options in the right box. Then click Next.

Step19: Click Next and the system starts installing CentOS 5.4.

Step20: A dialog pops up to prompt that you shall make the remaining five CDs ready.

Select ‘Continue’.

Step21: Then the system will prompt you in order to insert the 2nd, 3rd, 4th, 5th, 6th CDs. Each time you insert a CD, click OK to complete.

Step22: After that, click Reboot.

Step23: Upon reboot, enter the CentOS setup interface and click Forward.

Step24: Click Forward.

Step25: Click Forward.

Step26: Click Create User to establish a user account. Enter user name and password.

Step27: Click Sound Card and select the default option. Then click Forward.

Step28: Click Finish to complete the setup.

Step29: Use the root user name to log on the CentOS system. (Note: The password is just the one input in Step 16).

Step30: Check the core and gcc versions.

cat /proc/version

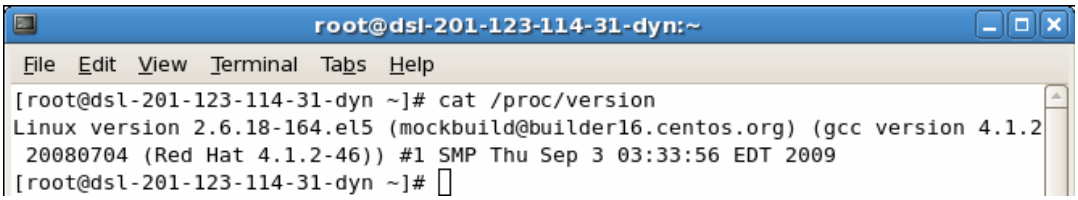

Figure 1 Checking Core and gcc Versions

Note: When the CentOS Linux is installed in some other computers, the step of CD testing may appear in the first place followed by the step to choose language.

Chapter 3 Auto Installation of Dahdi and SynAST

3.1 Preparation

1. After you properly install the Linux system, copy the downloaded SynAst-1.4.0, dahdi-linux-complete-2.2.0.2+2.2.0 and asterisk-1.6.0.10 to the directory /opt by using a USB disk or other methods. See the figure below.

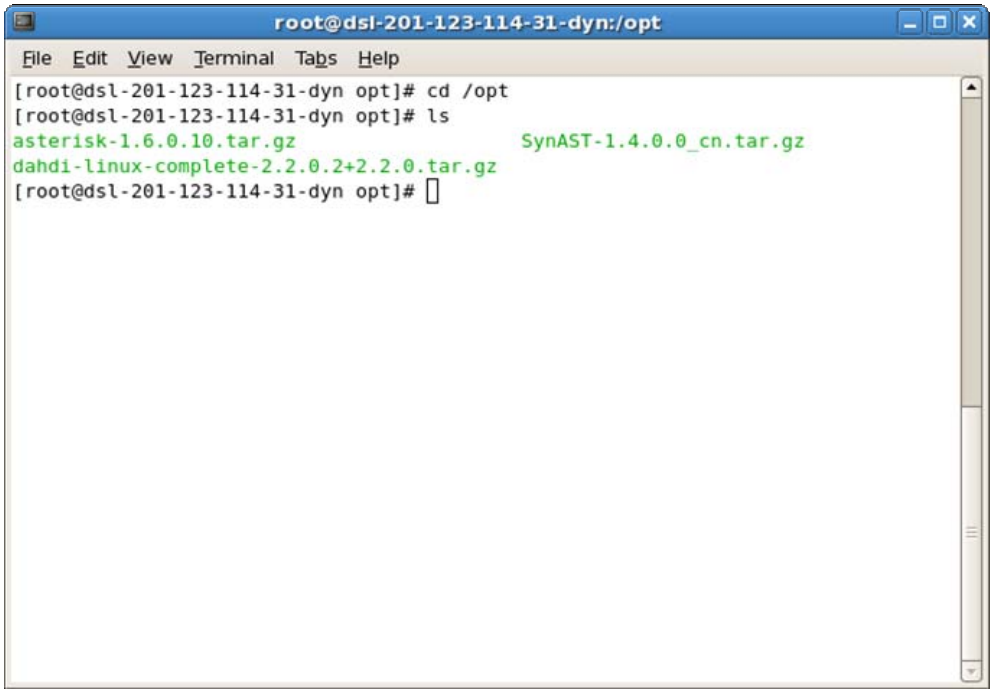

Figure 2 Copying Three Files to /opt

2. Make sure the network connection is available. Although you are not required to install extra network card drivers for CentOS5.4, you need to perform the IP configuration and activate the network. Go System->Administration->Network to set. After configuring IP, click on the Activate button to activate the network.

Note: To install Dahdi, you need to visit the digium website to download something. Not connecting to network may cause installation failure.

3.2 Installation

1. Get installation packages.

To install SynAST and Dahdi drivers, you need two compression packages SynAST-1.4.0.0_cn.tar.gz and dahdi-linux-complete-2.2.0.2+2.2.0.tar.g.

2. Use the following commands to decompress these two packages.

tar –zxvf SynAST-1.4.0.0_cn.tar.gz

tar -zxvf dahdi-linux-complete-2.2.0.2+2.2.0.tar.gz

Then two folders SynAST-1.4.0.0_cn and dahdi-linux-complete-2.2.0.2+2.2.0 will appear.

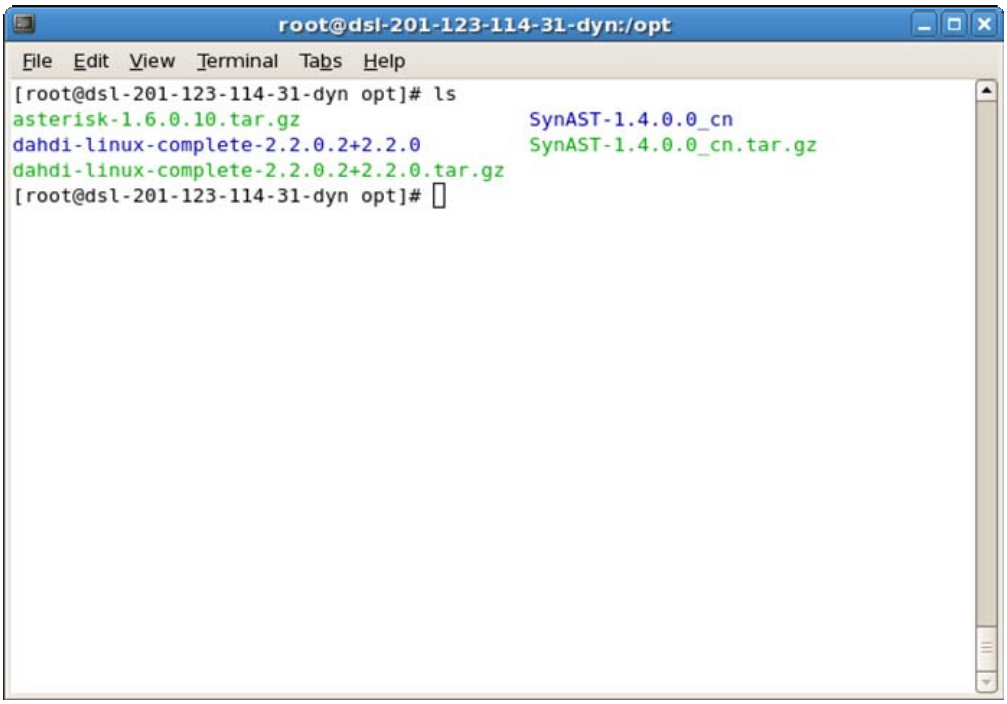

Figure 3 Interface after Dahdi Decompression

3. Enter SynAST-1.4.0.0_cn to start auto installation

cd SynAST-1.4.0.0_cn

ls

cd for_dahdi

ls

./Setup install

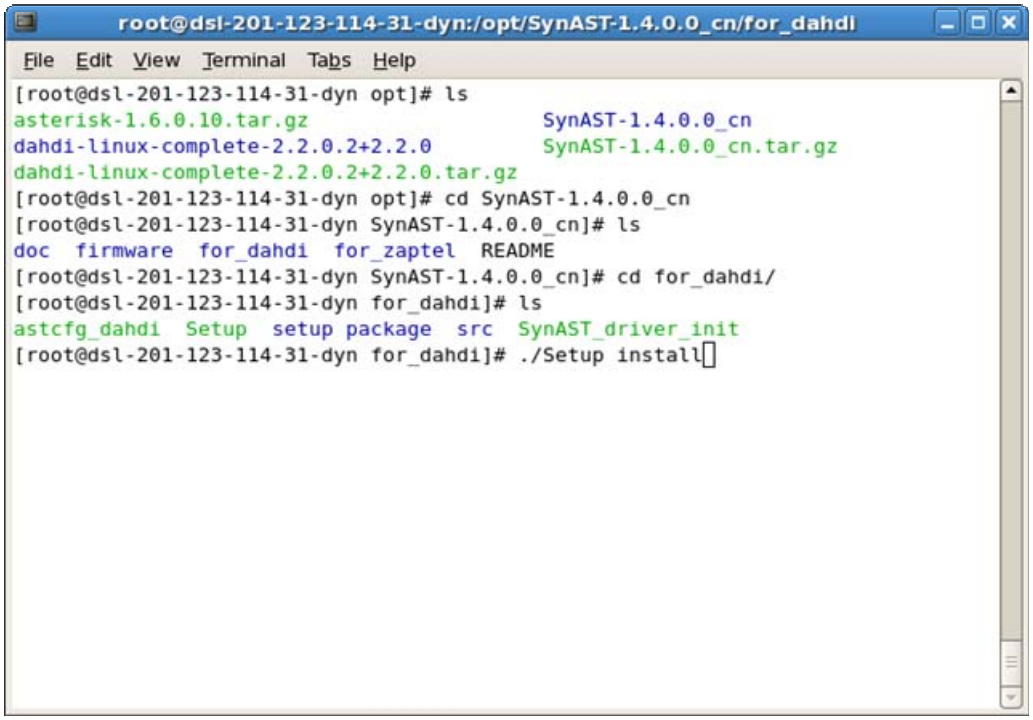

Figure 4 Starting Auto Installation

4. **When you see the question 'Would you like to install SynAST AST package now (y/n)?', input 'y'.**

   Then you see a word **'Please enter working dahdi directory [q] (exit install) :'** . Input the directory to Dahdi. Here it is **/opt/dahdi-linux-complete-2.2.0.2+2.2.0**.

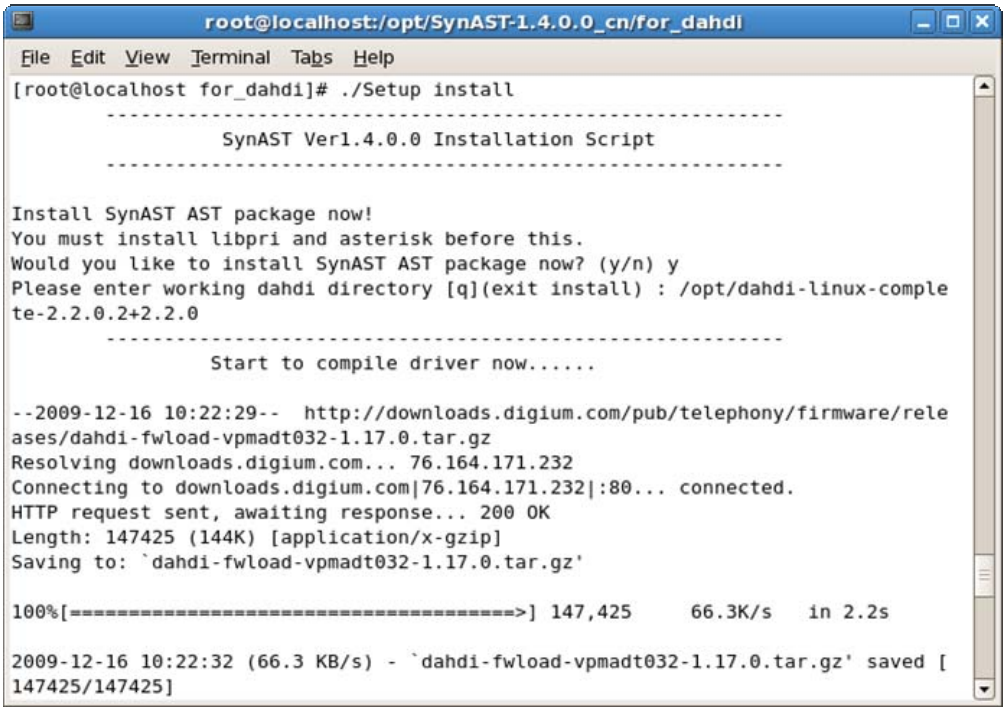

Figure 5 Inputting Directory to Dahdi

5. **Once the statement 'Install Driver Completed' pops up, Dahdi and SynAST drivers**

are successfully installed.

6. **Check if the driver modules are already loaded.**

Enter the command: # **lsmod | grep fxm**. You will see the following results if they are well installed.

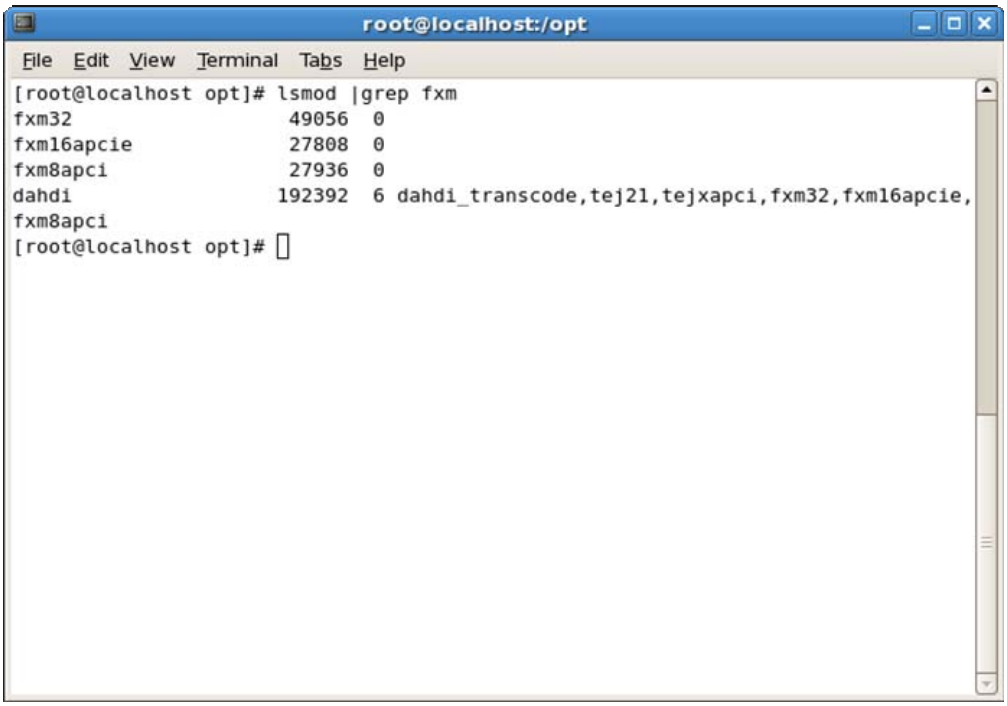

Figure 6 Checking Driver Installation

As long as the line of fxm32 appears, the installation is believed being installed successfully. For example, just the line '**fxm32 49056 0**' in the above figure has proved the proper driver installation.

Chapter 4 Asterisk Installation

4.1 Installation Procedure

Now let's start installing Asterisk. Here you need the installation package asterisk-1.6.0.10.tar.gz which are already copied to the /opt directory.

1. First decompress **Asterisk** under the directory **/opt**.

   # cd /opt
   # ls
   # tar –zxvf asterisk-1.6.0.10.tar.gz

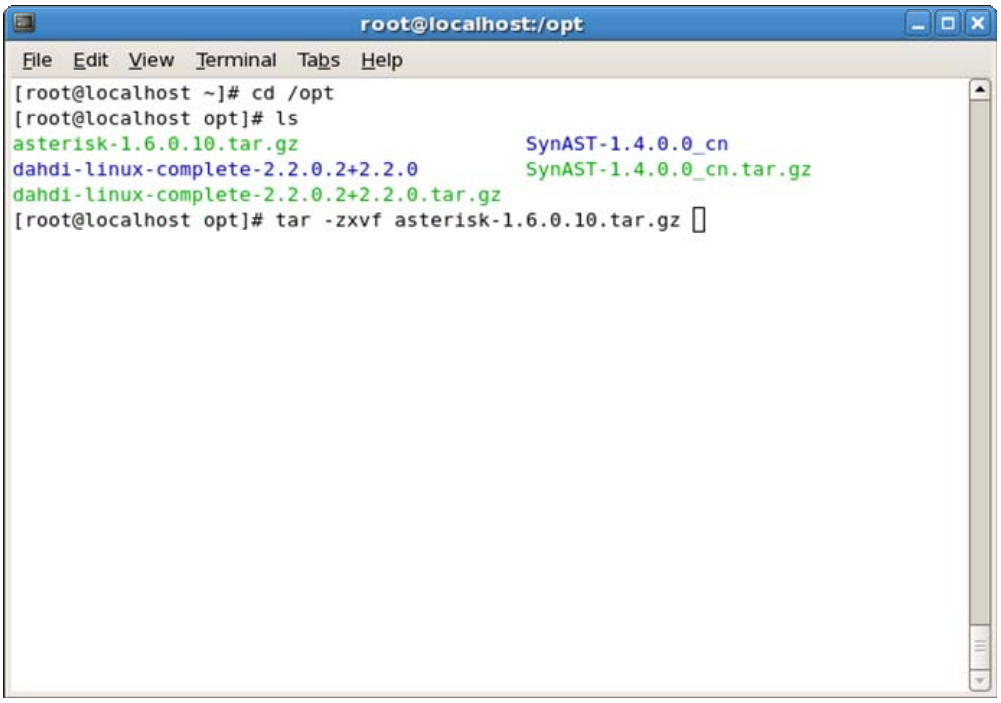

Figure 7 Decompressing Asterisk Package

2. **Go into the decompressed Asterisk folder. Start installing Asterisk by the following steps.**

   # cd asterisk-1.6.0.10 *# Directory to Asterisk source codes*
   # ./configure *# Check the target feature of your installation platform*
   # make *# Compile*
   # make install *# Install Asterisk*
   # make samples *# Install example files*

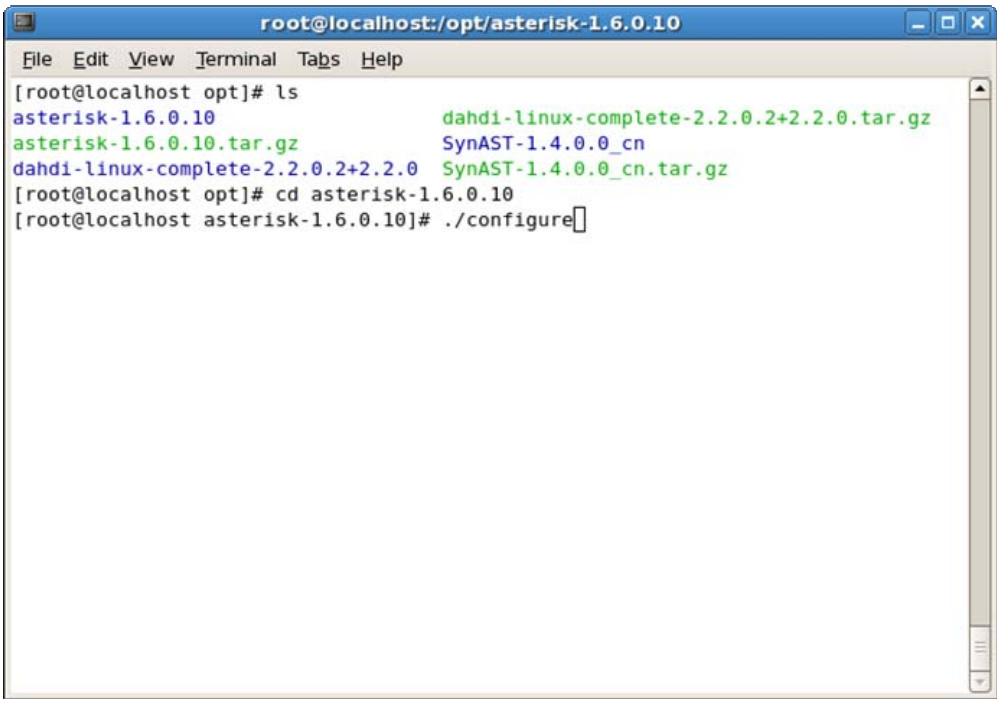

Figure 8 Entering Asterisk Folder to Start Installation

① Input # **./configure** and get the following results.

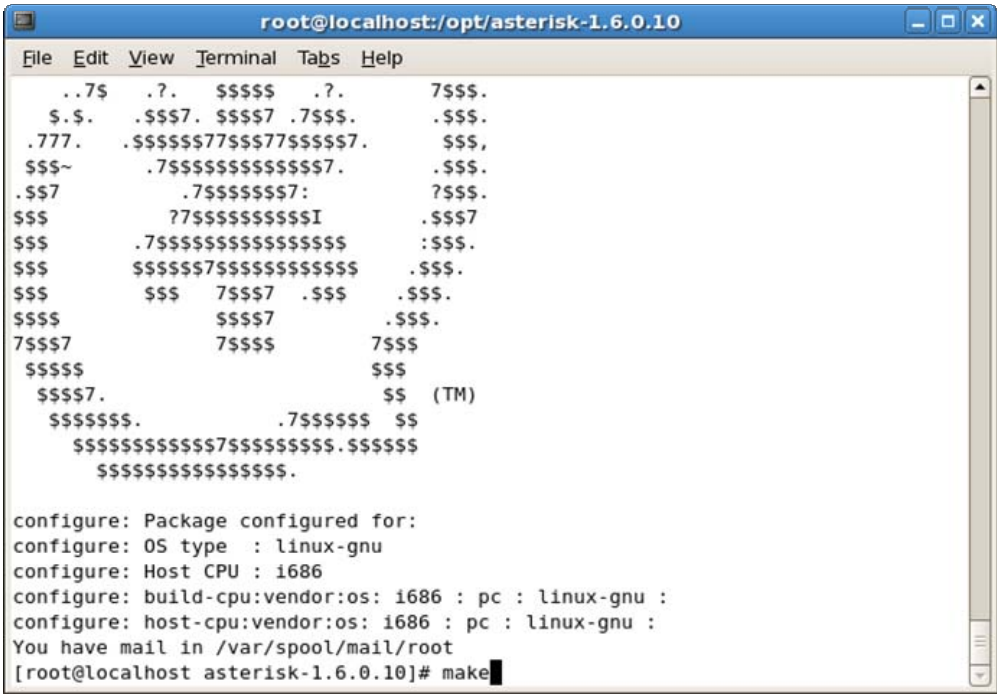

Figure 9 Interface upon Inputting Command configure

② Input # **make** and get the following results.

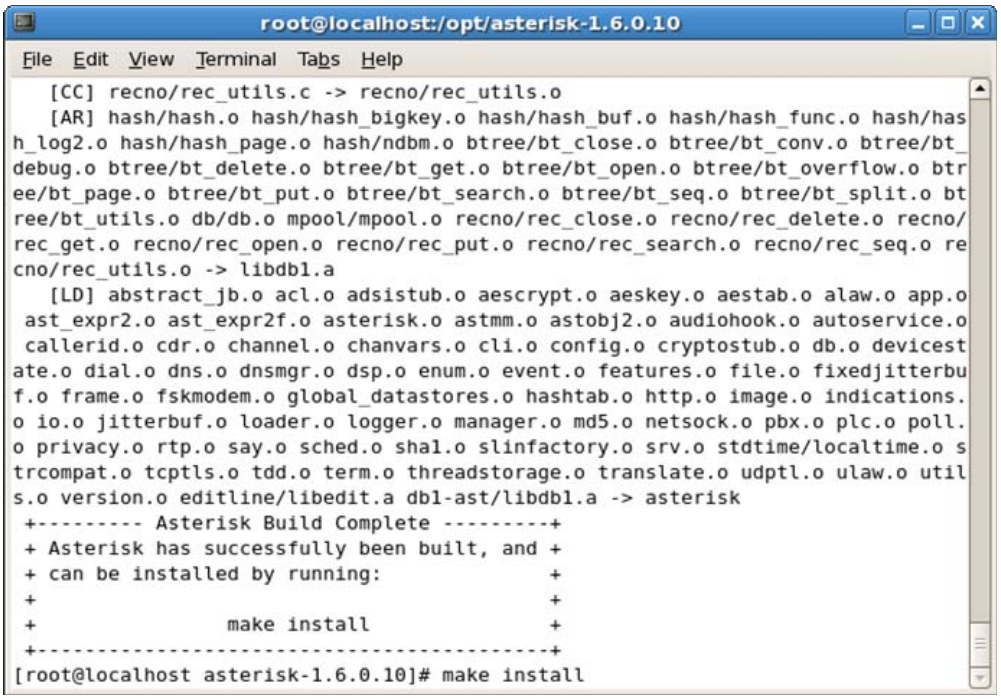

Figure 10 Interface upon Inputting Command make

③ Input # **make install** and get the following results.

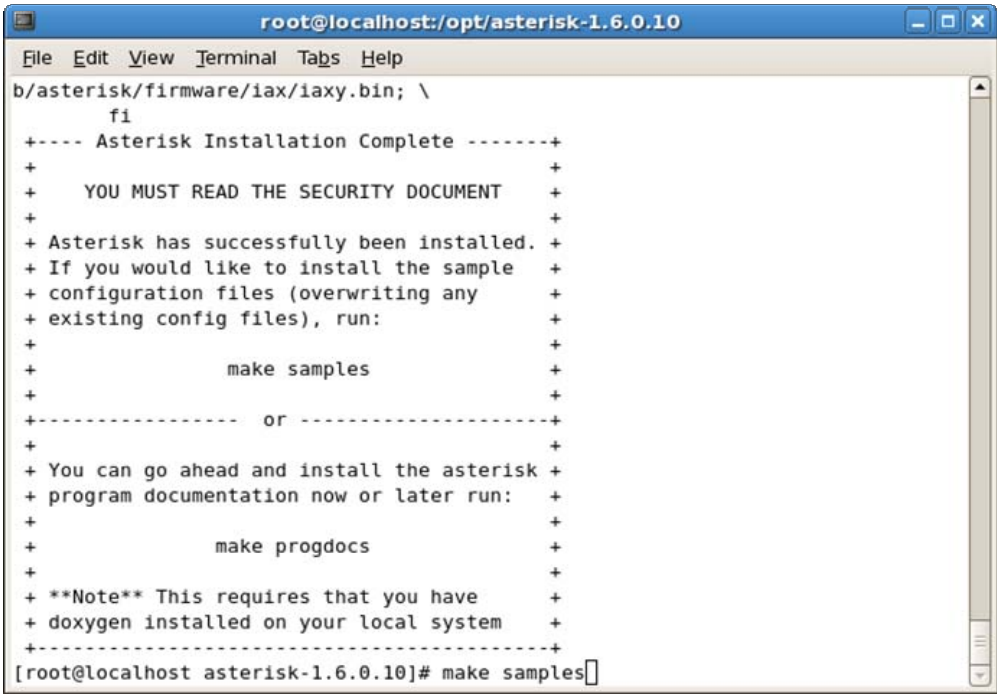

Figure 11 Interface upon Inputting Command make install

④ Input # **make samples** and get the following results.

Note: Once this command is entered, example files will override the old configuration files. Users who have modified configuration files and have the system run normally with the passed modifications should pay attention to this note.

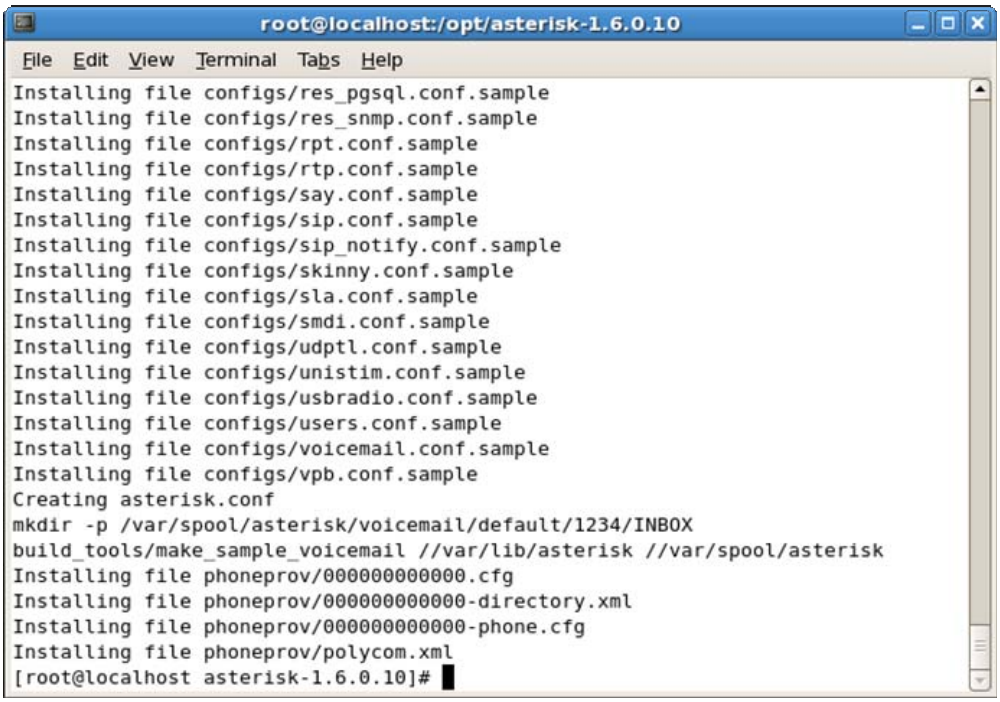

Figure 12 Interface upon Inputting Command make samples

3. **Start Asterisk to see if it has been installed properly.**

   # asterisk –vvvc

   Normally you would see the following interface.

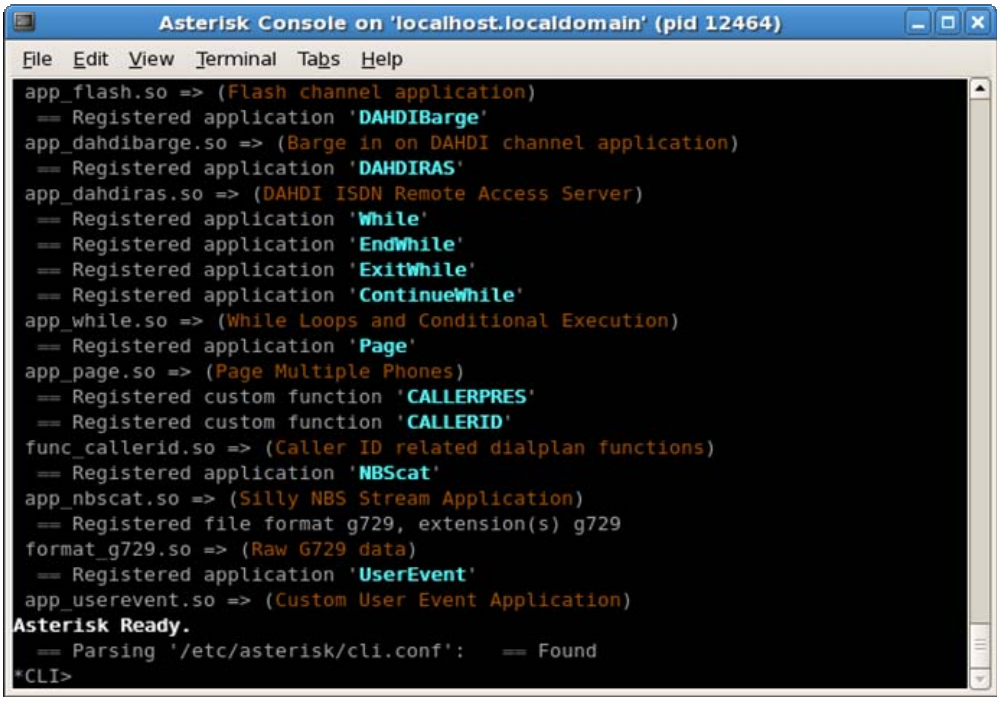

Figure 13 Asterisk Start Interface

Input the command CLI>stop now to exit Asterisk.

4. **Use the auto configuration tool to configure Asterisk.**

   # astcfg_dahdi asterisk

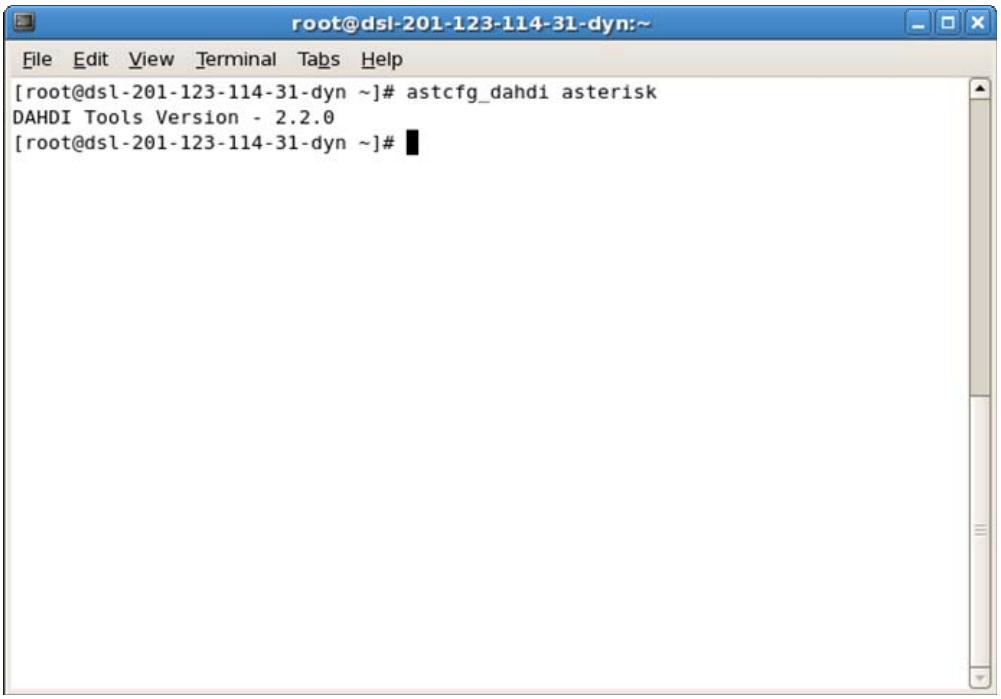

Figure 14 Asterisk Auto Configuration

5. Check the configuration result.

 # dahdi_cfg –vv

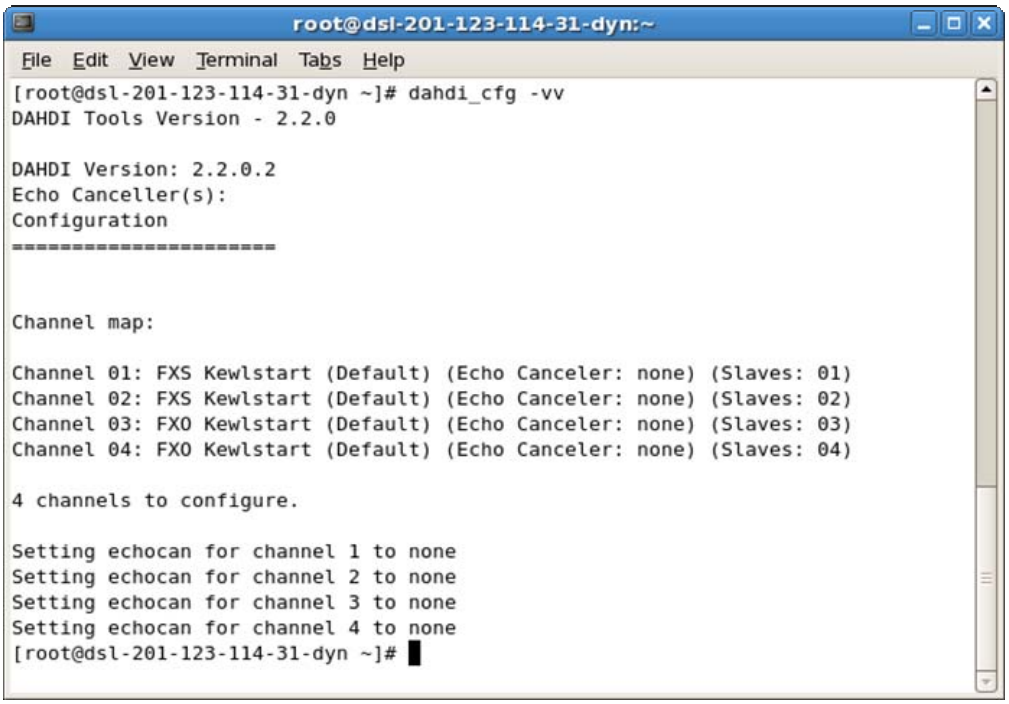

Figure 15 Checking Auto Configuration Result

Note: Here as this system ever has failure in auto configuration and shows 0 channel is configured, we have to restart the operating system and use the auto configuration tool to configure it again. If you meet the same problem, you can handle it in the same way.

Note: FXS (station) and FXO (trunk) shown in Figure 15 represent signalings used by channel, but not the type of channel. In fact, the actual channel type is just opposed to the signaling type shown above. Therefore, Channel 1 and Channel 2 are trunk channels while Channel 3 and Channel 4 are station channels.

'Ports are defined in the configuration by the signaling they use, as opposed to the physical type of port they are. For instance, a physical FXO port will be defined in the configuration with FXS signaling, and an FXS port will be defined with FXO signaling. This can be confusing until you understand the reasons for it. FX_ cards are named not according to what they are, but rather according to what is connected to them. An FXS card, therefore, is a card that connects to a station. Since that is so, you can see that in order to do its job, an FXS card must behave like a central office and use FXO signaling. Similarly, an FXO card connects to a central office (CO), which means it will need to behave like a station and use FXS signaling. The modem in your computer is a classic example of an FXO device.'

Note: The above text is cited from 'Asterisk: The Future of Telephony, Second Edition' (ISBN: 0596510489). You may refer to it for details.

6. **Restart Asterisk upon proper configuration.**

 # asterisk –vvvc *# Start Asterisk*

Note: Skip this step if your system failed to perform auto configuration in the previous step and has made a success by restarting the operating system and taking auto configuration of Asterisk again. As the system will load Asterisk automatically upon restart, what you shall do is just input the command # asterisk –r to connect the Asterisk server.

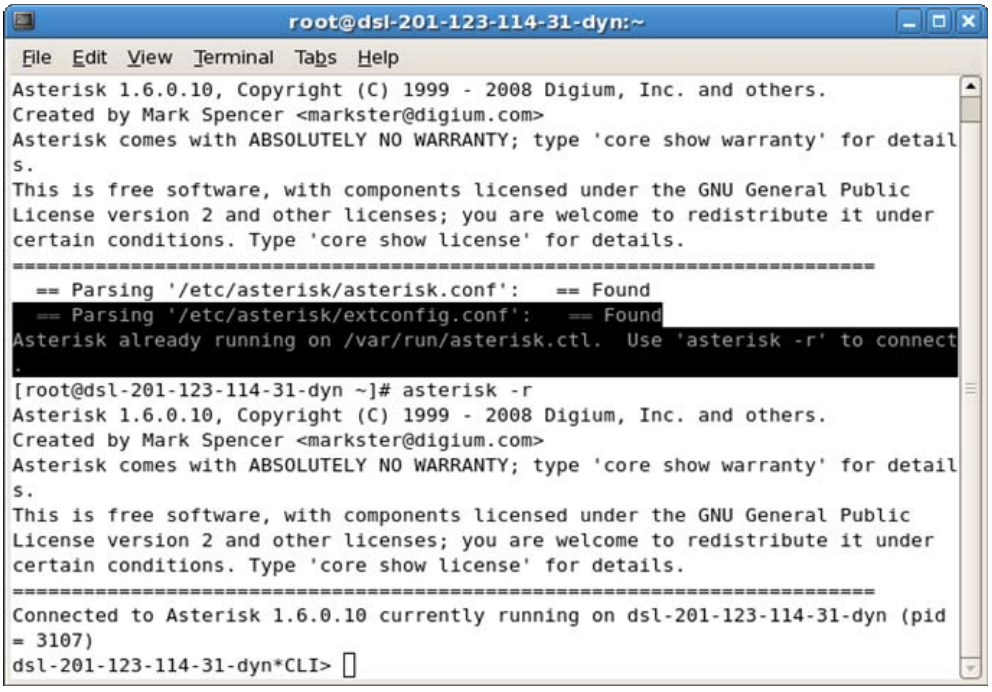

Figure 16 Connecting Asterisk Server

4.2 Channel Status Check

 # dahdi show channels

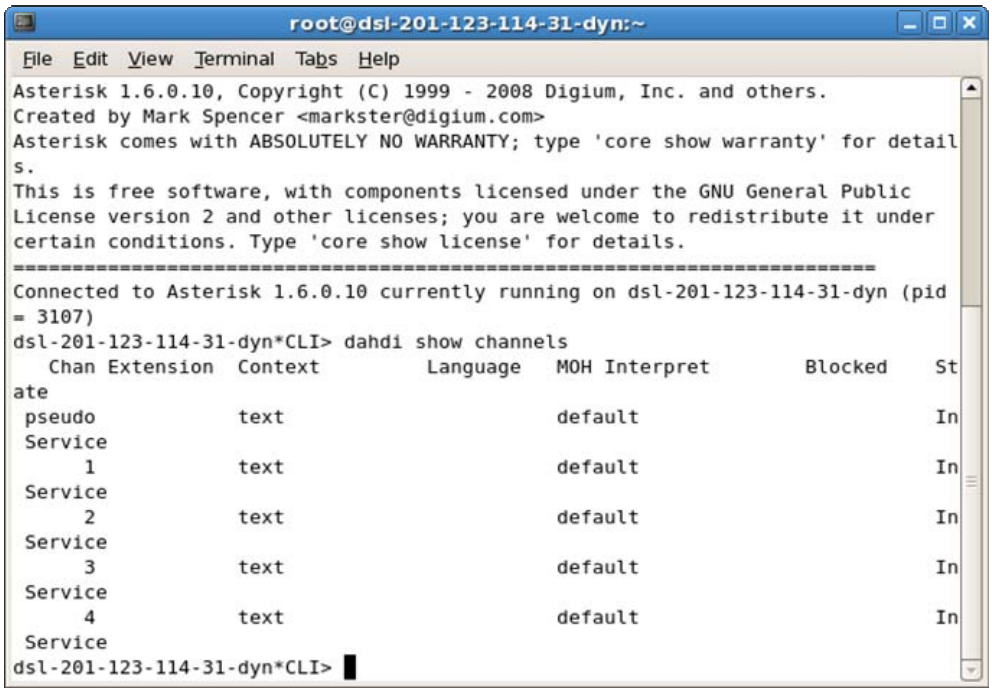

Figure 17 Checking Channel Status

You can see from Figure 17 that there are four channels and the number of channels is consistent with that shown by the command 'dahdi_cfg –vv'. It means channels are well configured and the configuration files are properly loaded by Asterisk.

4.3 Dial Plan Configuration

To configure dial plan is just to modify the /etc/asterisk/extensions.conf file

1. First, back up the old file /etc/asterisk/extensions.conf

   # mv /etc/asterisk/extensions.conf /etc/asterisk/extensions_bk.conf

2. Second, create the new file /etc/asterisk/extensions.conf

   #vim /etc/asterisk/extensions.conf

3. Then add relative content according to the following conditions.

   a) Trunk to station

   [text]

   exten => s,1,Answer(); *# Call from trunk, auto pickup*

   exten => s,2,Dial(DAHDI/3,50); *# Station channel 3 rings, 50 seconds overtime*

   exten => s,3,Hangup(); *# No answer after 50 seconds, auto hangup*

b) Station to trunk

[text]

exten => 3000,1,Dial(DAHDI/1/8354,50); *# Dial 3000 from station, Trunk Channel 1 auto dials 8354. Also you may change it to other PSTN number like 110.*

exten => 3001,1,Dial(DAHDI/2/8354,50); *# Dial 3001 from station, Trunk Channel 2 auto dials 8354. Also you may change it to other PSTN number like 110.*

c) Station to station

[text]

exten => 100,1,Dial(DAHDI/3); *# Station Channel 4 dials 100. Station Channel 3 rings.*

exten => 101,1,Dial(DAHDI/4); *# Station Channel 3 dials 101. Station Channel 4 rings.*

d) To integrate all the above functions, write as follows.

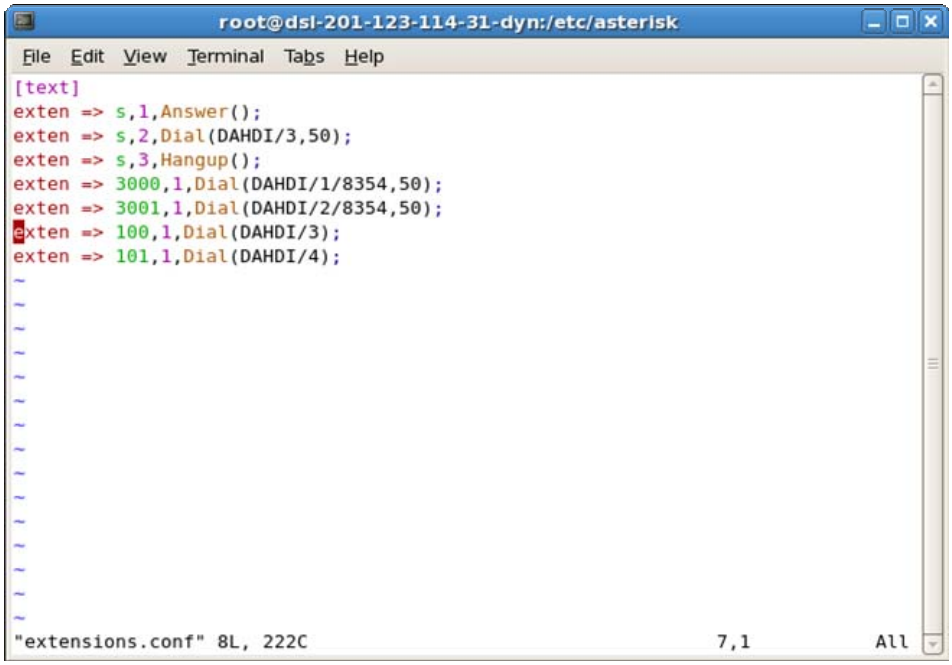

Figure 18 Content of Dial Plan

[text]

exten => s,1,Answer(); *# Call from trunk, auto pickup*

exten => s,2,Dial(DAHDI/3,50); *# Station channel 3 rings, 50 seconds overtime*

exten => s,3,Hangup(); *# No answer after 50 seconds, auto hangup*

exten => 3000,1,Dial(DAHDI/1/8354,50); *# Dial 3000 from station, Trunk Channel 1 auto dials 8354. Also you may change it to other PSTN number like 110.*

exten => 3001,1,Dial(DAHDI/2/8354,50); *# Dial 3001 from station, Trunk Channel 2 auto dials 8354. Also you may change it to other PSTN number like 110.*

exten => 100,1,Dial(DAHDI/3); *# Station Channel 4 dials 100. Station Channel 3*

rings.

exten => 101,1,Dial(DAHDI/4); *# Station Channel 3 dials 101. Station Channel 4 rings.*

4. Save the file extensions.conf and exit. Restart the Asterisk server.

   Switch to the Asterisk interface and input the following commands:

   CLI> stop now *# Stop Asterisk*

   # asterisk –vvvc *# Start Asterisk*

   To learn how to write the dial plan, refer to the following website.

   http://www.voip-info.org/wiki/view/Asterisk+config+extensions.conf

4.4 Testing Examples

1. Creating a hardware environment

On the FXM3201P board, Channel 1 and Channel 2 are analog trunk channels and connect with two PSTN trunks; Channel 3 and Channel 4 are station channels and connect with two ordinary phones A and B.

2. Testing calls from station to station

Pick up the station phone A that is connected with Channel 3 and dial 101 upon hearing dial tones. Then the station phone B that is connected with Channel 4 rings. Pick up B to talk.

Pick up the station phone B that is connected with Channel 4 and dial 100 upon hearing dial tones. Then the station phone A that is connected with Channel 3 rings. Pick up A to talk.

3. Testing calls from station to trunk

Pick up Station A or B and dial 3000 upon hearing dial tones. Then the trunk channel 1 auto dials the number 8354. If you want it to dial other number, modify the statement **exten => 3000,1,Dial(DAHDI/1/8354,50)** in the file /etc/asterisk/extensions.conf, replacing 8354 with the number you want.

Pick up Station A or B and dial 3001 upon hearing dial tones. Then the trunk channel 2 auto dials the number 8354. If you want it to dial other number, modify the statement **exten => 3001,1,Dial(DAHDI/2/8354,50)** in the file /etc/asterisk/extensions.conf, replacing 8354 with the number you want.

4. Testing calls from trunk to station

Find a PSTN phone and make a call from it to the trunk channel 1 on FXM3201P. Here we dial 8353. However, you can determine the dial number according to the number your trunk channel 1 is configured to connect. The trunk channel 1 will transfer the call to the station channel 3 automatically once the call is connected. Then the station phone A rings. Pick up A to talk.

Note: Here represents only the dial plan transferring calls from trunk channel 1 to station channel 3. If you want other methods to dial from trunk to station, you can modify the dial plan on your demand.

Chapter 5 Auto Uninstall of Asterisk, SynAST and Dahdi

1. Stop Asterisk

While Asterisk is running, switch it to Asterisk terminal and execute the following command to stop Asterisk.

CLI> stop now

2. Enter the directory to Asterisk source codes to uninstall Asterisk

 # cd /opt/asterisk-1.6.0.10
 # make uninstall-all *# Remove relative services and folders*

3. Enter the directory to SynAST source codes to uninstall SynAST

 # cd /opt/SynAST-1.4.0.0_cn/for_dahdi *# Enter the source code directory*
 # ls
 # ./Setup remove *# Uninstall SynAST and Dahdi drivers as well as the SynAST folder*

4. Remove the Dahdi directory and folder

At present the method supported is using a new Dahdi to override the old.

Appendix A Manual Installation of Dahdi and SynAST

Note: This part is a substitute for Chapter 3 Auto Installation of Dahdi and SynAST.

In case the system fails to auto install Dahdi and SynAST drivers or you want to install them manually, refer to the following steps.

1. Dahdi Installation

#cd /opt *# Enter the directory to the package of Dahdi source codes*

#tar –zxvf dahdi-linux-complete-2.2.0.2+2.2.0.tar.gz *# Decompress the Dahdi driver*

#cd dahdi-linux-complete-2.2.0.2+2.2.0 *# Enter the directory to Dahdi source codes*

#make *# Compile the driver*

#make install *# Install the driver*

#modprobe dahdi *# Load the driver*

#lsmod |grep dahdi *# Check if the driver is successfully loaded*

1) Enter the directory to Dahdi source codes and start compiling

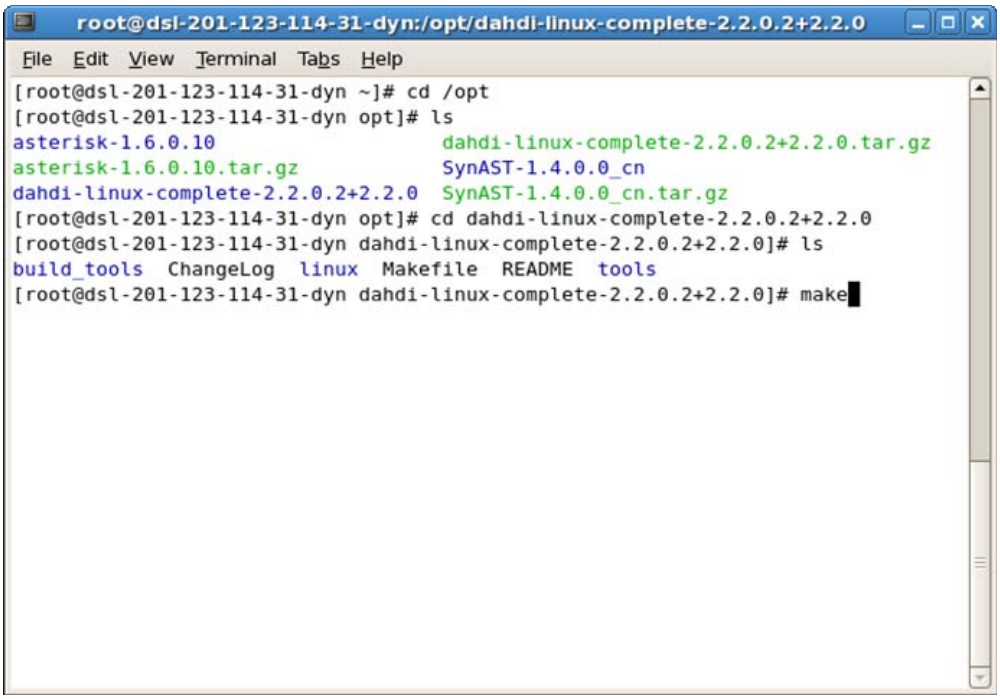

Figure 19 Compile Dahdi Source Codes

2) Input the command: # make and get the following result

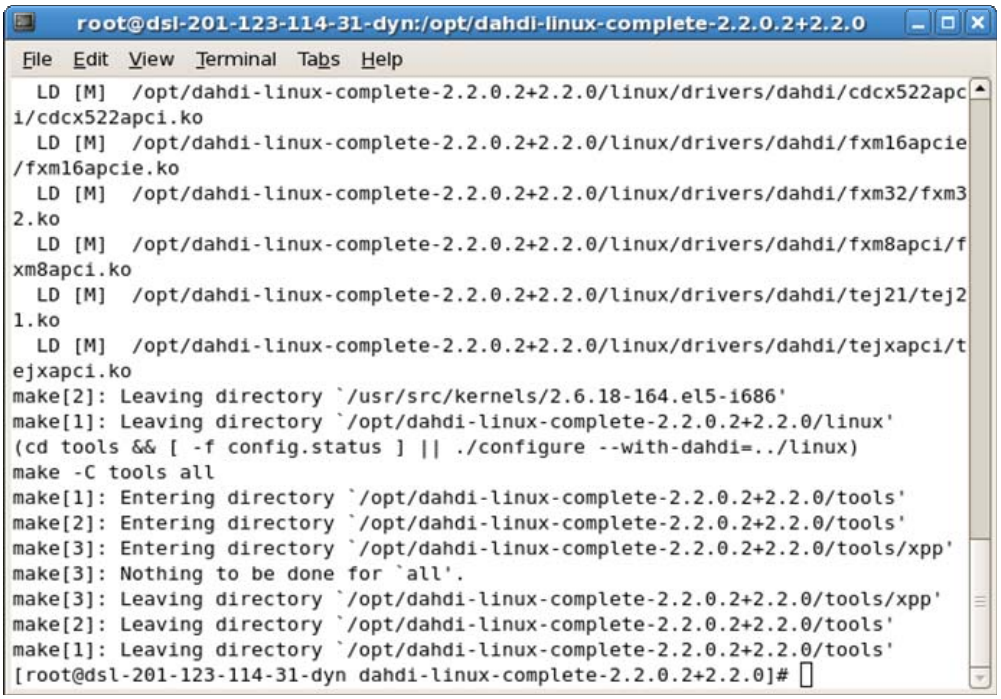

Figure 20 Interface upon Executing Command make

3) Input the command: # make install and get the following result

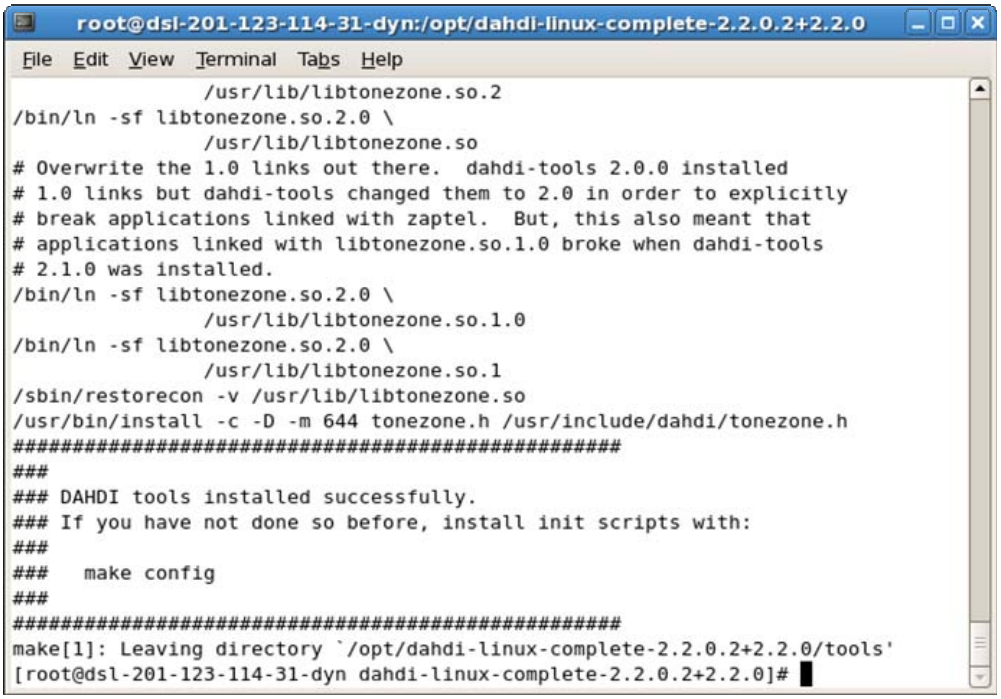

Figure 21 Interface upon Executing Command make install

4) Input the commands:

 # modprobe dahdi

 # lsmod |grep dahdi

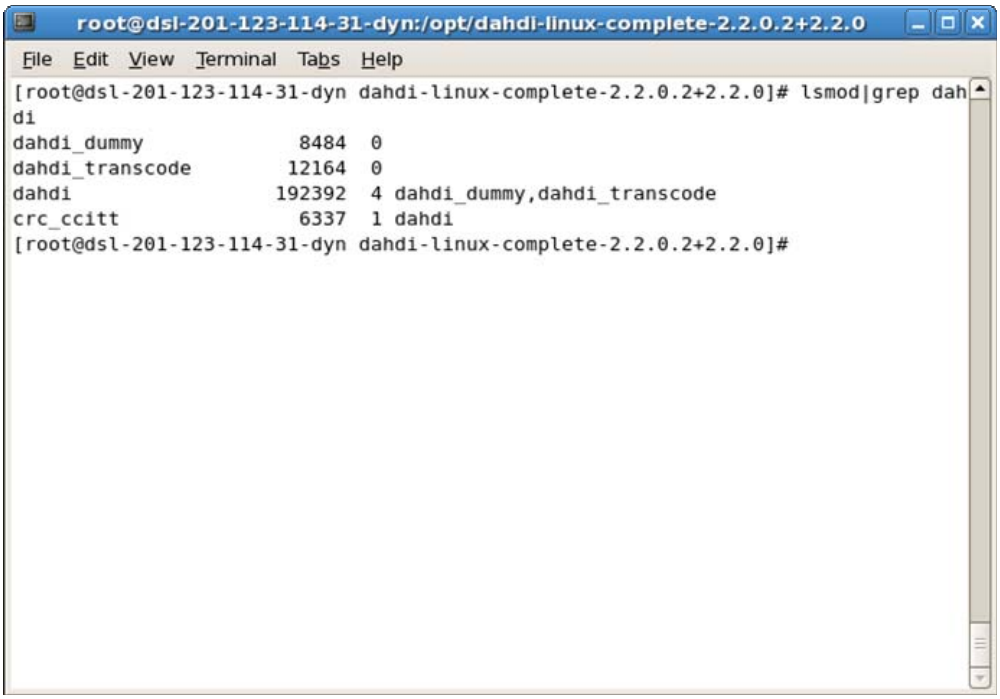

Figure 22 Checking Driver Load

2. SynAST Installation

#cd /opt *# Enter the directory to the package of SynAST source codes*

#tar –zxvf SynAST-1.4.0.0.tar.gz *# Decompress the source codes*

#**cp –rf /opt/SynAST-1.4.0.0/for_dahdi/src/fxm/fxm32**

/opt/dahdi-linux-complete-2.2.0.2+2.2.0/linux/drivers/dahdi

 # Copy the fxm32 driver to the Dahdi directory

#**cd /opt/dahdi-linux-complete-2.2.0.2+2.2.0/linux/drivers/dahdi/fxm32**

 # Enter the directory to SynAST source codes in Dahdi

Note: While using dahdi-2.2 or above versions, you should modify the file /opt /dahdi /linux /drivers /dahdi /fxm32/Kbuild, changing the statement EXTRA_CFLAGS := -I$(src)/.. -Wno-undef -I/usr/include $(ECHOCAN) in the Kbuild file to EXTRA_CFLAGS := -I$(src)/.. -Wno-undef -I/usr/include $(ECHOCAN) -DDAHDI22 (Pay attention that there is a blank before -DDAHDI22).

#gedit Kbuild *# Modify the above content in Kbuild*

#make *# Compile the driver*

#insmod fxm32.ko *# Load the driver*

#lsmod |grep fxm *# Check if the driver is successfully loaded*

Note: When using other AST series boards except FXM3201P, you should refer to the table below to find the corresponding driver file and use the filename to replace the parts 'fxm' and 'fxm32' in the above commands.

Subseries	Board Model	Directory to Source Codes	Driver File	Remark
FXM	FXM-8A/PCI	fxm8apci	fxm8apci.ko	Follow the above example.
	FXM-16A/PCIe	fxm16apcie	fxm16apcie.ko	Use the name of the driver file which corresponds to the board model you use to replace the parts 'fxm' and 'fxm32' in the above commands.
	FXM3201P FXM3201E FXM3200P FXM3200E	fxm32	fxm32.ko	
TEJ	TEJ-1A/PCI TEJ-2A/PCI TEJ-4A/PCI	tejxapci	tejxapci.ko	
	TEJ101E TEJ201E TEJ101P TEJ201P TEJ100E TEJ200E TEJ100P TEJ200P	tej21	tej21.ko	
CDC	CDC-1522A/PCI CDC-2522A/PCI CDC-3522A/PCI	cdcx522apci	cdcx522apci.ko	

Table 1 Board Model and Corresponding Driver

1) Input the command: #gedit Kbuild and add the following codes marked in red frames

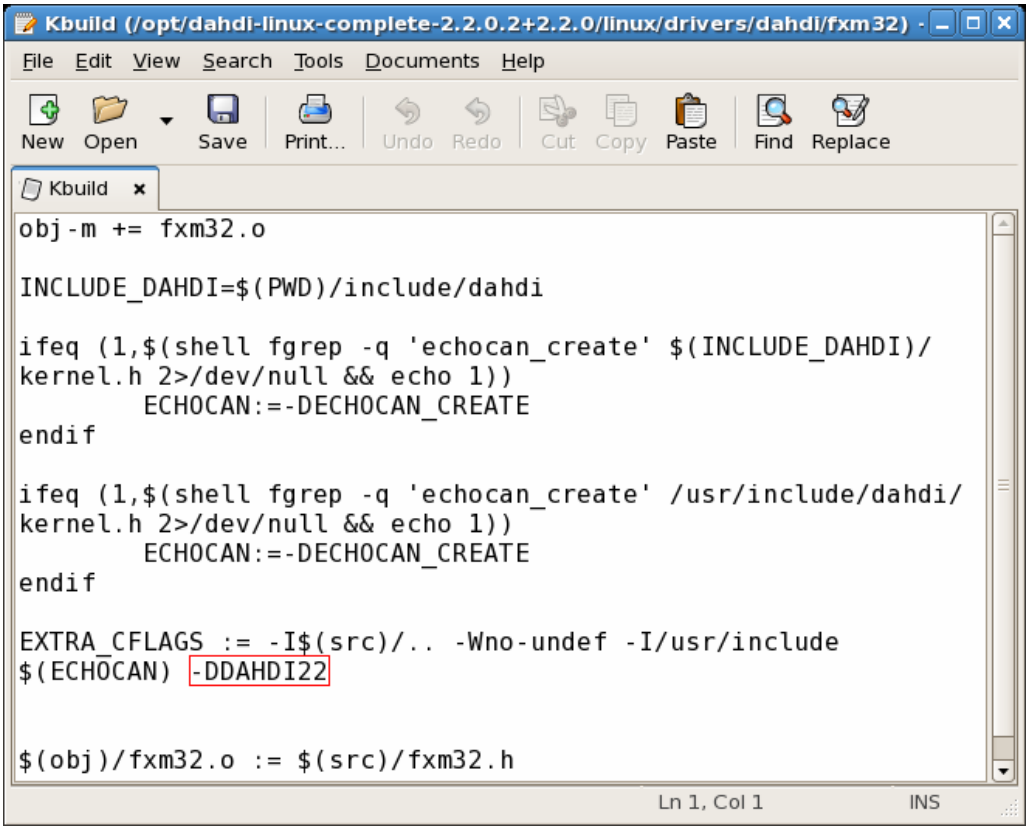

Figure 23 Using gedit to Edit Kbuild Interface

2) Input the command: #make

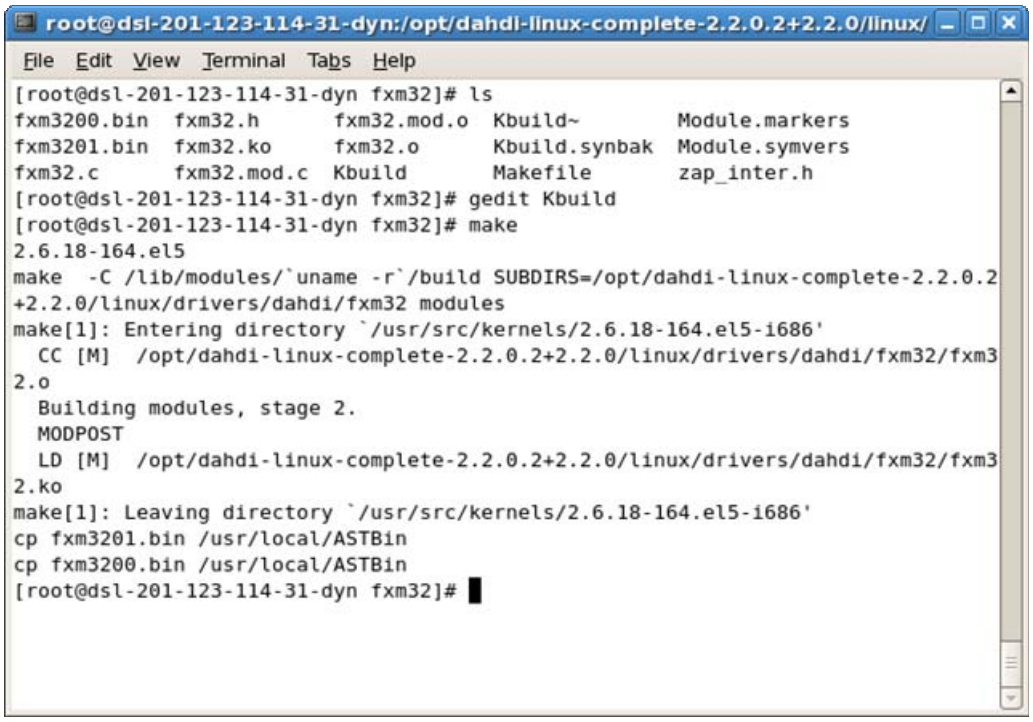

Figure 24 Interface upon Executing Command make

3) Input the command: # insmod fxm32.ko *# Load the fxm32 driver*

 # lsmod |grep fxm *# Check if the fxm32 driver is successfully loaded*

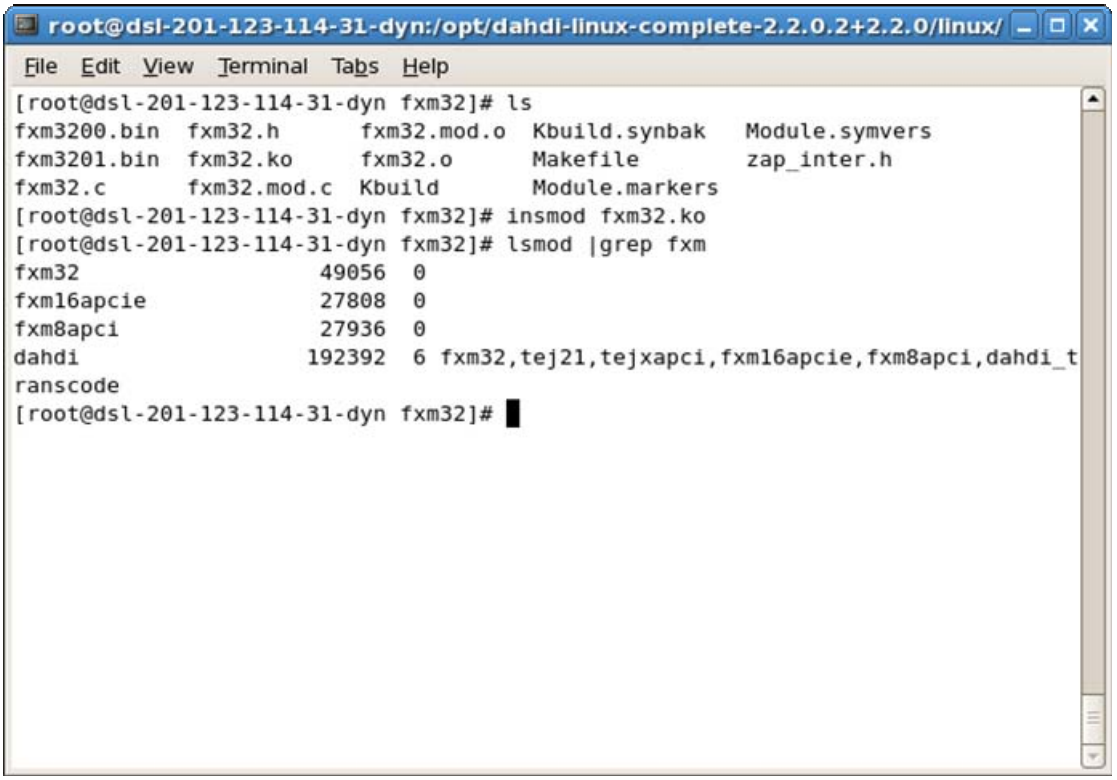

Figure 25 Loading and Checking fxm32 Driver

If the interface as shown in Figure 25 shows a line **fxm32 49056 0**, the driver fxm32.ko is already loaded successfully.

Note: If you failed to use the insmod command to load the driver, you may use it to check if the driver has been loaded. In case the driver is already loaded, errors probably occur in loading the driver again by the command insmod.

Appendix B Manual Uninstall of Asterisk, SynAST and Dahdi

1. **Stop Asterisk**

   While Asterisk is running, switch it to Asterisk terminal and execute the following command to stop Asterisk.

   CLI> stop now

2. **Enter the directory to Asterisk source codes to uninstall Asterisk**

   # cd /opt/asterisk-1.6.0.10

   # make uninstall-all *# Remove relative services and folders*

3. **Uninstall the fxm32.ko driver**

   After stopping Asterisk, start installing the fxm32.ko driver.

   # lsmod |grep fxm *# Check the loaded driver*

   # rmmod fxm32 *# Uninstall the fxm32.ko driver*

   To check if the fxm32.ko driver is uninstalled, use the following command.

   #lsmod |grep fxm32

   If there is no output when you execute this command, the fxm32.ko driver is already uninstalled; or, if there is any output with fxm32, the driver is not uninstalled properly.

   Note: When the driver is failed to uninstall, we suggest you restart the system and uninstall the driver again on condition that you make sure the driver is not being used. That's because errors may occur in uninstalling fxm32 by rmmod at the time fxm32.ko is being used by the application program.

4. **Uninstall the Dahdi driver**

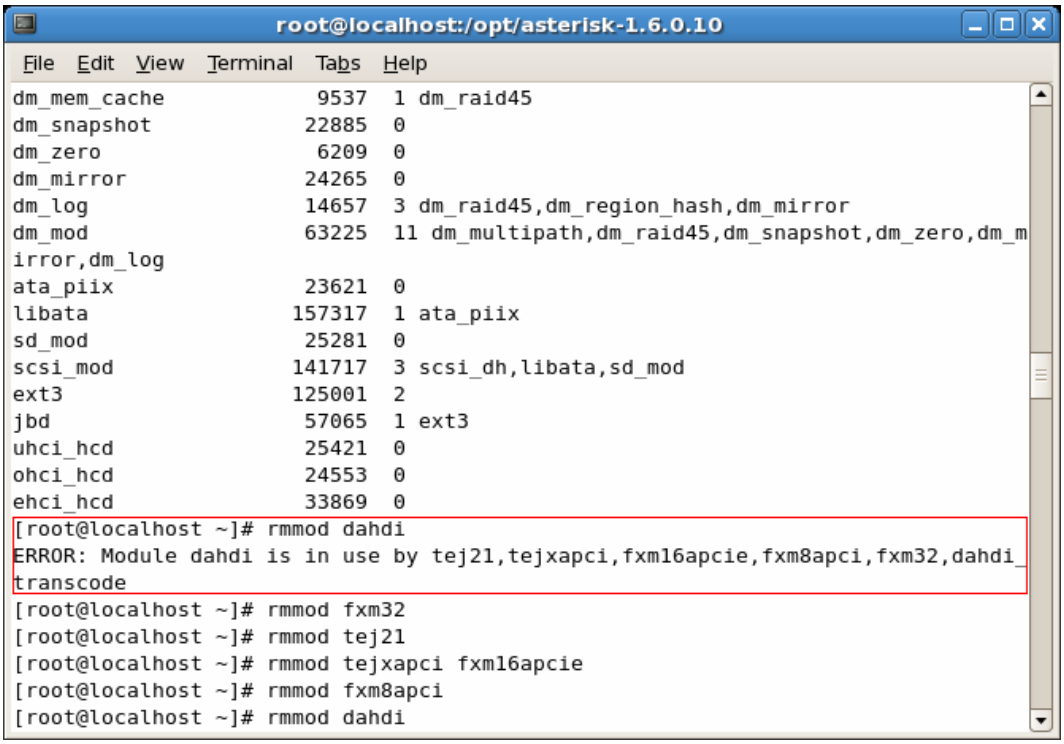

Figure 26 Load and Check fxm32 Driver

#rmmod dahdi *# Uninstall the Dahdi driver. If Dahdi is using other modules, the content marked in the red frame in the above figure will appear. To uninstall these modules being used, use the following commands.*

#rmmod tej21 tejxapci fxm16apcie fxm8apci fxm32 *# Uninstall these modules*

#rmmod cdcx522apci *# First uninstall cdcx522apci*

#rmmod dahdi_transcode *# Then uninstall dahdi_transcode*

#rmmod dahdi *# Finally uninstall Dahdi*

Check if Dahdi is successfully uninstalled.

#lsmod |grep dahdi

If there is no output when you execute this command, the Dahdi driver is already uninstalled; or, if there is any output with Dahdi, the driver is not uninstalled properly.

5. Remove folders

Note: To uninstall relative folders, you should do it manually by the directory created upon installation.

Appendix C Technical/Sales Support

Thank you for choosing Synway. Please contact us should you have any inquiry regarding our products. We shall do our best to help you. However, our technicians and salesmen are mainly responsible for maintaining our boards and providing relative technical support. If there are problems about Asterisk, please keep touch with Digium Inc. for help.

Headquarters

Synway Information Engineering Co., Ltd

http://www.synway.net/

9F, Synway D&R Center, No.3756, Nanhuan Road, Binjiang District, Hangzhou, P.R.China, 310053

Tel: +86-571-88860561

Fax: +86-571-88850923

Technical Support

Tel: +86-571-88864579

Mobile: +86-18905817070

Email: techsupport@sanhuid.com

Email: techsupport@synway.net

MSN: synway.support@hotmail.com

Sales Department

Tel: +86-571-88860561

Tel: +86-571-88864579

Fax: +86-571-88850923

Email: sales@synway.net