

Installation Guide

GRINS



Requirement for GRINS

GRINS (Gramin Radio Inter-Networking System) is an integrated software solution for running a community radio station that allows:

- Program scheduling and play-out
- Full telephony integration
- Internet streaming
- Content management
- Play-out history analysis and other statistics

In order to install GRINS we need some specific hardware. This section contains a brief introduction of every piece of hardware and their respective specification. For installing GRINS following hardware would be required:

- 1) **Computer:** First and foremost, a computer would be required to install GRINS. We called it a GRINS BOX, which is a simple CPU (Central Processing Unit) assembled by us. Hardware specification for the same is mentioned below:

S.No	Hardware	Specification
1	Motherboard	We are using atom kit.
2	RAM	Minimum 2 GB
3	Hard disk	500 gb

- 2) **Sound Card:** For installation of GRINS, one sound card is required, with two input two and output channels. We are work with following two soundcards:

- Maudio fast track pro



- ESI Maya44



- Maudio delta 44



- 3) **GSM Modem:** We would also require GSM Modem to integrate Telephone line with GRINS.



What is a GSM Modem?

A **GSM modem** is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. When a GSM modem is connected to a computer, this allows the computer to use the GSM modem to communicate over the mobile network. While these GSM modems are most frequently used to provide mobile internet connectivity, many of them can also be used for sending and receiving SMS and MMS messages.

Installation of GRINS

Assuming Station is ready to install grins. We will divide installation process in four phases.

- a) Collection of information from station
- b) Installing GRINS on a computer
- c) Connecting GRINS in a radio station
- d) Testing of GRINS

a) Collecting information from station

Before you begin installation it is highly recommended to collect following information from stations.

Question	Purpose of Asking
Hours of Broadcast everyday	
Number of Rooms (recording studio, control room, broadcast studio)	
In which room is the broadcast computer and the broadcast mixer placed?	
Does the presenter control the mixer and the computer or a separate person does this job?	
What software is used for broadcasting?	
Which mixer is used for broadcast? Is the same used for production also?	
Is there Internet connection at your station? If yes, do all computers have Internet connection or only select ones have it? Is the Internet connection always on or is turned on manually only sometimes?	
Who is the technical person at the station? What is his/her phone number, email address, Skype id?	
Do you have access to a person who can do audio cabling? What is his/her phone number, email address, Skype id?	
Do you have access to a person who can do computer hardware and software work? What is his/her phone number, email address, Skype id?	

Once you collected that information you are in good position to install GRINS

Installing GRINS on a computer

In this phase you are required to purchase a computer or assemble it at your own and install ubuntu and GRINS.

i) Hardware requirement -

- PC - No Specific requirement except ubuntu 10.04 work with graphics and audio properly. We are using Intel atom kit for GRINS installation. Most Intel mother board works with ubuntu10.04.
- Soundcard- In addition to internal soundcard one additional sound card is required to setup grins at a

station. It is still possible to use grins with two usb sound cards.

- GSM Modem – This is needed to integrate telephony feature with grins. Currently grins is working only with huwai e173 modem. More models are likely to be supported soon.

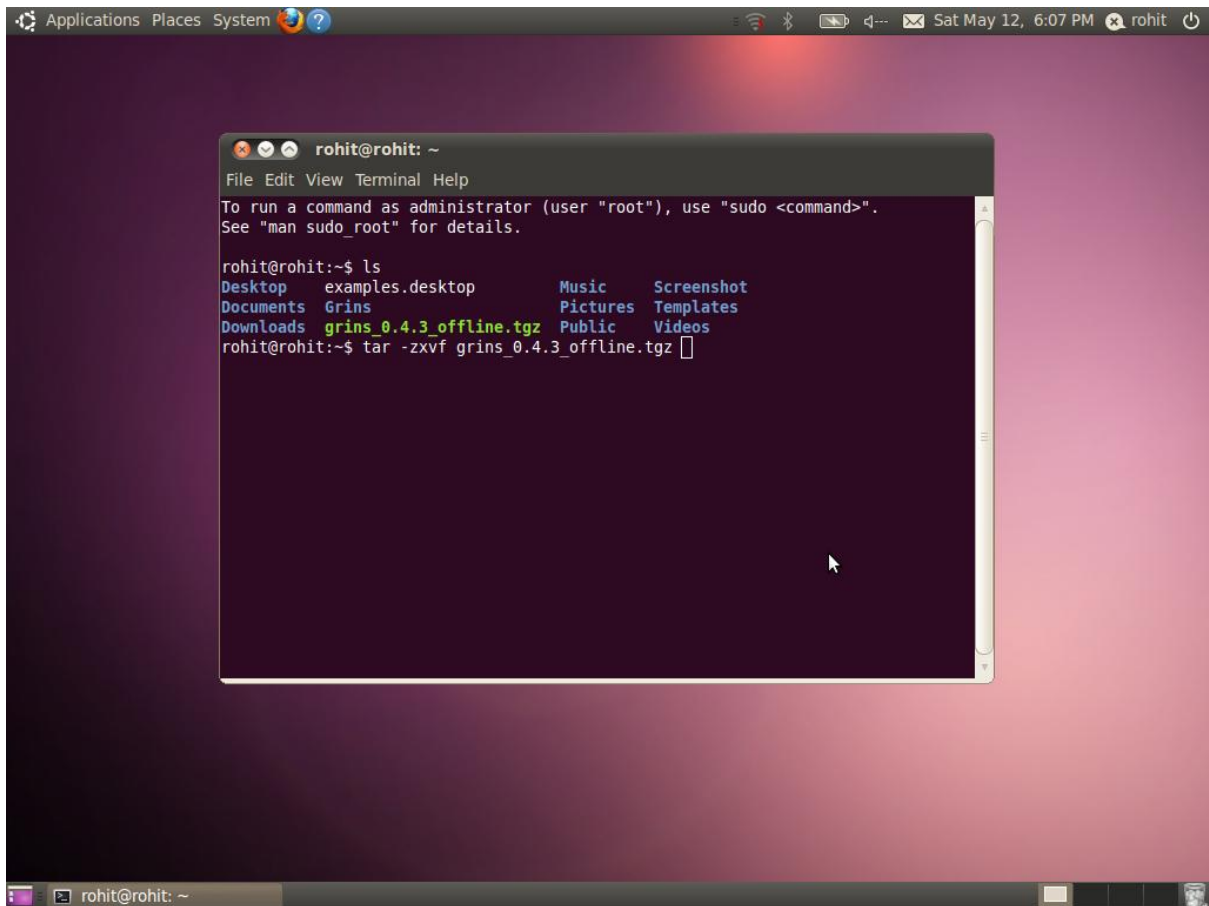
ii) Installing Ubuntu 10.04 - Install ubuntu 10.04 on the system and boot it.

iii) Installation of GRINS -

Once we are done with all these initial setup, we would advance towards installing GRINS. We will provide you a tar file of GRINS.

For installation of GRINS you have to follow these steps and commands:

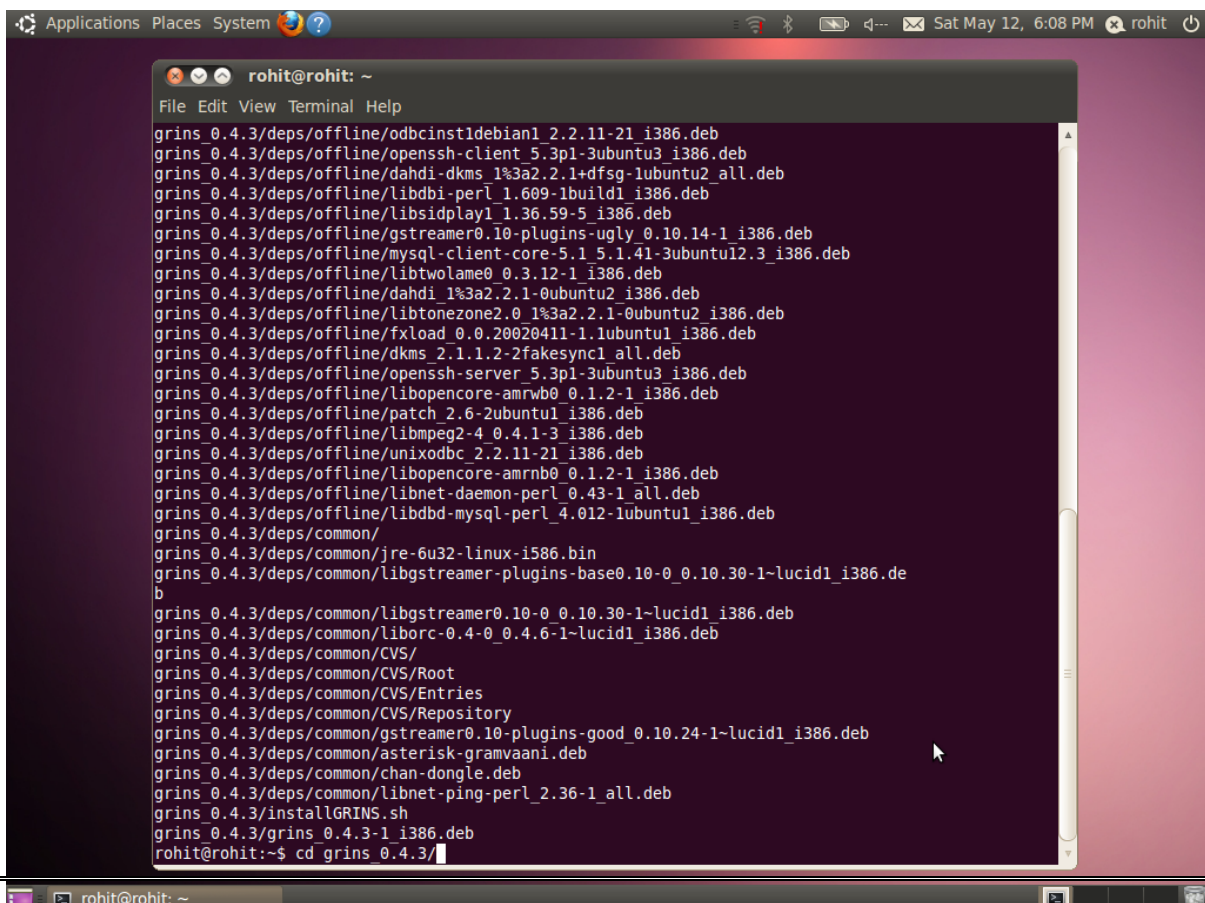
- i) Copy GRINS tar file into home folder and open terminal.
- ii) Untar the GRINS packages by using this command



```
rohit@rohit: ~  
File Edit View Terminal Help  
To run a command as administrator (user "root"), use "sudo <command>".  
See "man sudo_root" for details.  
  
rohit@rohit:~$ ls  
Desktop  examples.desktop      Music      Screenshot  
Documents Grins                  Pictures   Templates  
Downloads grins_0.4.3_offline.tgz Public      Videos  
rohit@rohit:~$ tar -zxvf grins_0.4.3_offline.tgz
```

ubuntu@localhost\$ tar zxvf <grins tar file name>After running untar command. It will create a directory. Enter the directory by using this command:

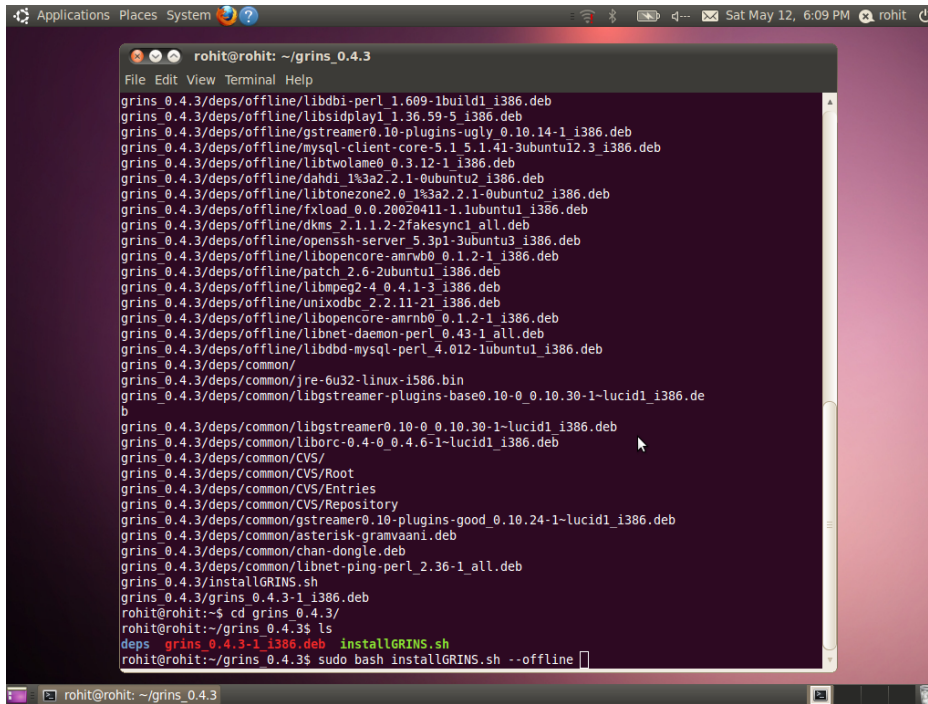
ubuntu@localhost\$ cd <directory name>



```
rohit@rohit: ~  
File Edit View Terminal Help  
grins_0.4.3/deps/offline/odbcinst1debian1 2.2.11-21 i386.deb  
grins_0.4.3/deps/offline/openssh-client 5.3p1-3ubuntu3 i386.deb  
grins_0.4.3/deps/offline/dahdi-dkms 1%3a2.2.1+dfsg-lubuntu2_all.deb  
grins_0.4.3/deps/offline/libdbi-perl 1.609-1build1 i386.deb  
grins_0.4.3/deps/offline/libsidplay1 1.36.59-5 i386.deb  
grins_0.4.3/deps/offline/gstreamer0.10-plugins-ugly 0.10.14-1 i386.deb  
grins_0.4.3/deps/offline/mysql-client-core-5.1 5.1.41-3ubuntu12.3 i386.deb  
grins_0.4.3/deps/offline/libtwolame0 0.3.12-1 i386.deb  
grins_0.4.3/deps/offline/dahdi 1%3a2.2.1-0ubuntu2 i386.deb  
grins_0.4.3/deps/offline/libtonezone2.0 1%3a2.2.1-0ubuntu2 i386.deb  
grins_0.4.3/deps/offline/fxload_0.0.20070411-1.lubuntu1 i386.deb  
grins_0.4.3/deps/offline/dkms 2.1.1.2-2fakesync1_all.deb  
grins_0.4.3/deps/offline/openssh-server 5.3p1-3ubuntu3 i386.deb  
grins_0.4.3/deps/offline/libopencore-amrwb0 0.1.2-1 i386.deb  
grins_0.4.3/deps/offline/patch 2.6-2ubuntu1 i386.deb  
grins_0.4.3/deps/offline/libmpeg2-4 0.4.1-3 i386.deb  
grins_0.4.3/deps/offline/unixodbc 2.2.11-21 i386.deb  
grins_0.4.3/deps/offline/libopencore-amrnb0 0.1.2-1 i386.deb  
grins_0.4.3/deps/offline/libnet-daemon-perl 0.43-1_all.deb  
grins_0.4.3/deps/offline/libdbd-mysql-perl 4.012-lubuntu1 i386.deb  
grins_0.4.3/deps/common/  
grins_0.4.3/deps/common/jre-6u32-linux-i586.bin  
grins_0.4.3/deps/common/libgstreamer-plugins-base0.10-0 0.10.30-1-lucid1 i386.de  
b  
grins_0.4.3/deps/common/libgstreamer0.10-0 0.10.30-1-lucid1 i386.deb  
grins_0.4.3/deps/common/liborc-0.4-0_0.4.6-1-lucid1 i386.deb  
grins_0.4.3/deps/common/CVS/  
grins_0.4.3/deps/common/CVS/Root  
grins_0.4.3/deps/common/CVS/Entries  
grins_0.4.3/deps/common/CVS/Repository  
grins_0.4.3/deps/common/gstreamer0.10-plugins-good_0.10.24-1-lucid1 i386.deb  
grins_0.4.3/deps/common/asterisk-gramvaani.deb  
grins_0.4.3/deps/common/chan-dongle.deb  
grins_0.4.3/deps/common/libnet-ping-perl 2.36-1_all.deb  
grins_0.4.3/installGRINS.sh  
grins_0.4.3/grins_0.4.3-1 i386.deb  
rohit@rohit:~$ cd grins_0.4.3/
```

iii) Run GRINS Installation Script by using following command

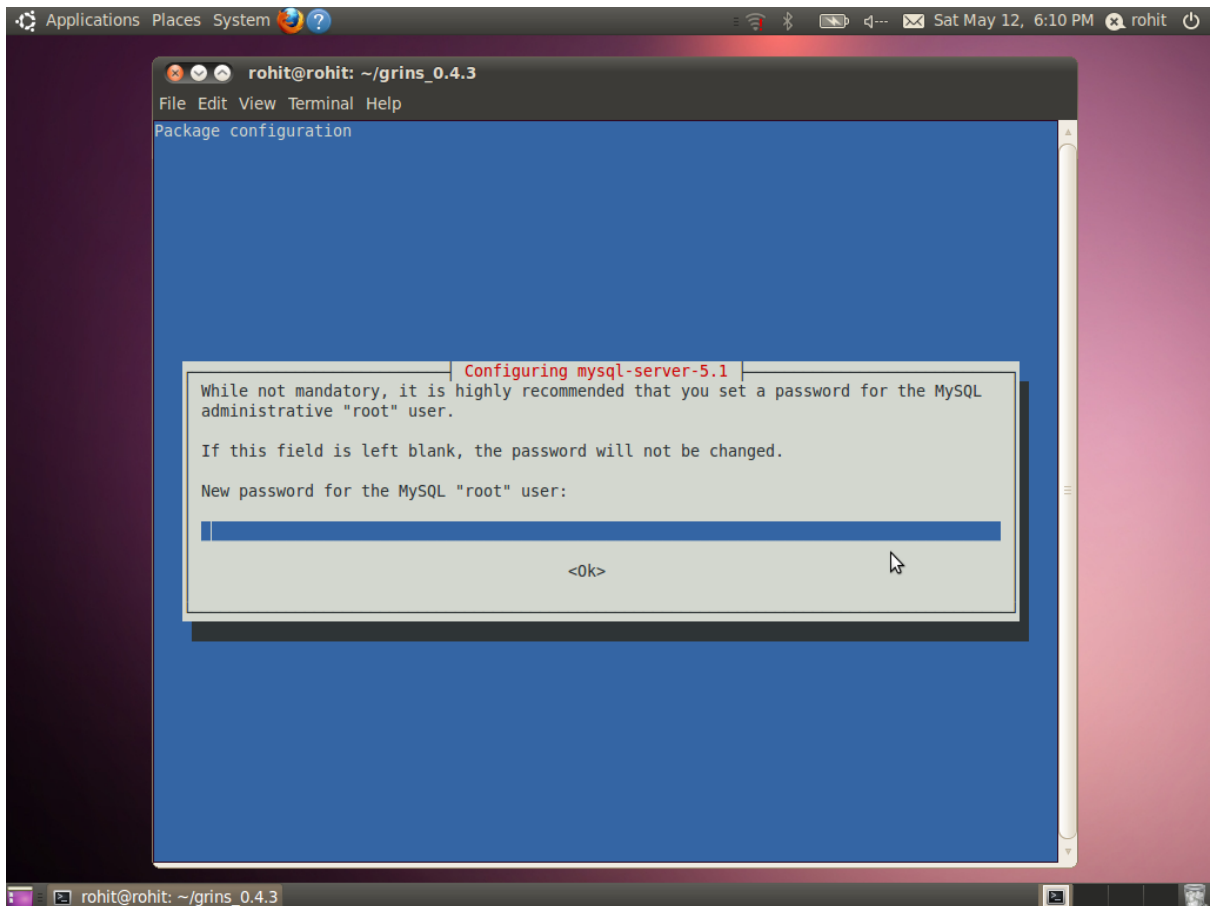
```
ubuntu@localhost$ sudo bash installGrins.sh --offline
```



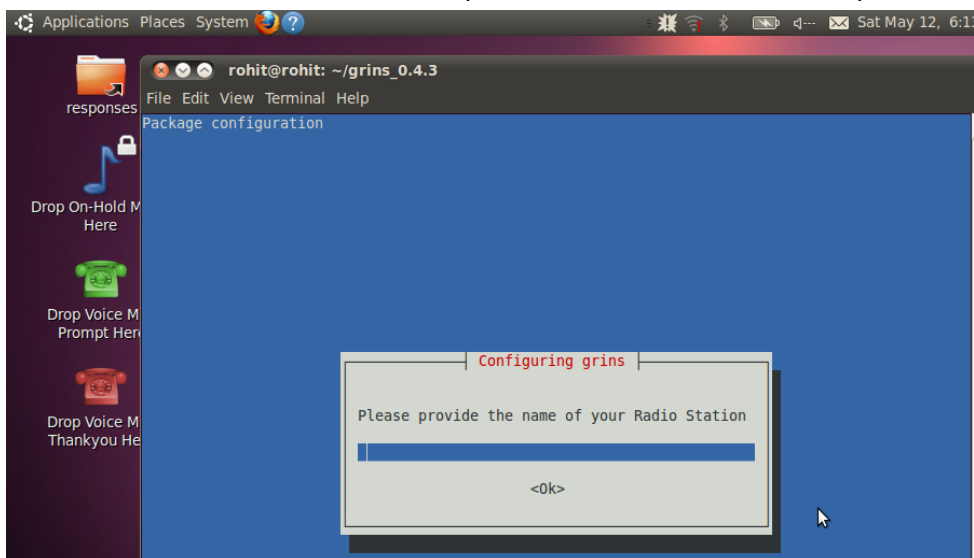
```
rohit@rohit: ~/grins_0.4.3
File Edit View Terminal Help
grins_0.4.3/deps/offline/libdbi-perl_1.609-1build1_i386.deb
grins_0.4.3/deps/offline/libsidplay1_1.36.59-5_i386.deb
grins_0.4.3/deps/offline/gstreamer0.10-plugins-ugly_0.10.14-1_i386.deb
grins_0.4.3/deps/offline/mysql-client-core-5.1_5.1.41-3ubuntu12.3_i386.deb
grins_0.4.3/deps/offline/libtwolame0_0.3.12-1_i386.deb
grins_0.4.3/deps/offline/dahdi_1.3a2.2.1-0ubuntu2_i386.deb
grins_0.4.3/deps/offline/libtonezone2_0.133a2.2.1-0ubuntu2_i386.deb
grins_0.4.3/deps/offline/fxload_0.0.20020411-1_ubuntu1_i386.deb
grins_0.4.3/deps/offline/dkms_2.1.1.2-2fakesync1_all.deb
grins_0.4.3/deps/offline/openssh-server_5.3p1-3ubuntu3_i386.deb
grins_0.4.3/deps/offline/libpencore-amrwb0_0.1.2-1_i386.deb
grins_0.4.3/deps/offline/patch_2.6-2ubuntu1_i386.deb
grins_0.4.3/deps/offline/libmpeg2-4_0.4.1-3_i386.deb
grins_0.4.3/deps/offline/unixodbc_2.2.11-21_i386.deb
grins_0.4.3/deps/offline/libpencore-amrn0_0.1.2-1_i386.deb
grins_0.4.3/deps/offline/libnet-daemon-perl_0.43-1_all.deb
grins_0.4.3/deps/offline/libdbd-mysql-perl_4.012-1ubuntu1_i386.deb
grins_0.4.3/deps/common/
grins_0.4.3/deps/common/jre-6u32-linux-i586.bin
grins_0.4.3/deps/common/libgstreamer-plugins-base0.10-0_0.10.30-1-lucid1_i386.de
b
grins_0.4.3/deps/common/libgstreamer0.10-0_0.10.30-1-lucid1_i386.deb
grins_0.4.3/deps/common/liborc-0.4-0_0.4.6-1-lucid1_i386.deb
grins_0.4.3/deps/common/CVS/
grins_0.4.3/deps/common/CVS/Root
grins_0.4.3/deps/common/CVS/Entries
grins_0.4.3/deps/common/CVS/Repository
grins_0.4.3/deps/common/gstreamer0.10-plugins-good_0.10.24-1-lucid1_i386.deb
grins_0.4.3/deps/common/asterisk-gramvaani.deb
grins_0.4.3/deps/common/chan-dongle.deb
grins_0.4.3/deps/common/libnet-ping-perl_2.36-1_all.deb
grins_0.4.3/installGRINS.sh
grins_0.4.3/grins_0.4.3-1_i386.deb
rohit@rohit:~$ cd grins_0.4.3/
rohit@rohit:~/grins_0.4.3$ ls
deps grins_0.4.3-1_i386.deb installGRINS.sh
rohit@rohit:~/grins_0.4.3$ sudo bash installGRINS.sh --offline
```

The system will start installing GRINS following this command.

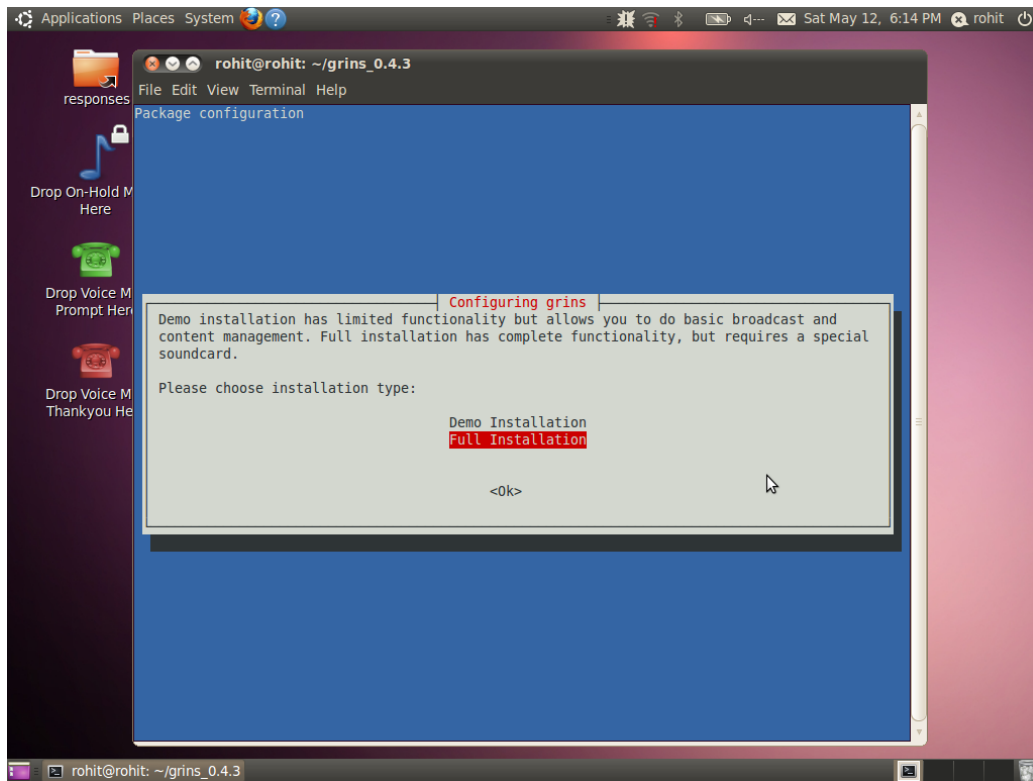
- First it will ask password for mysql.



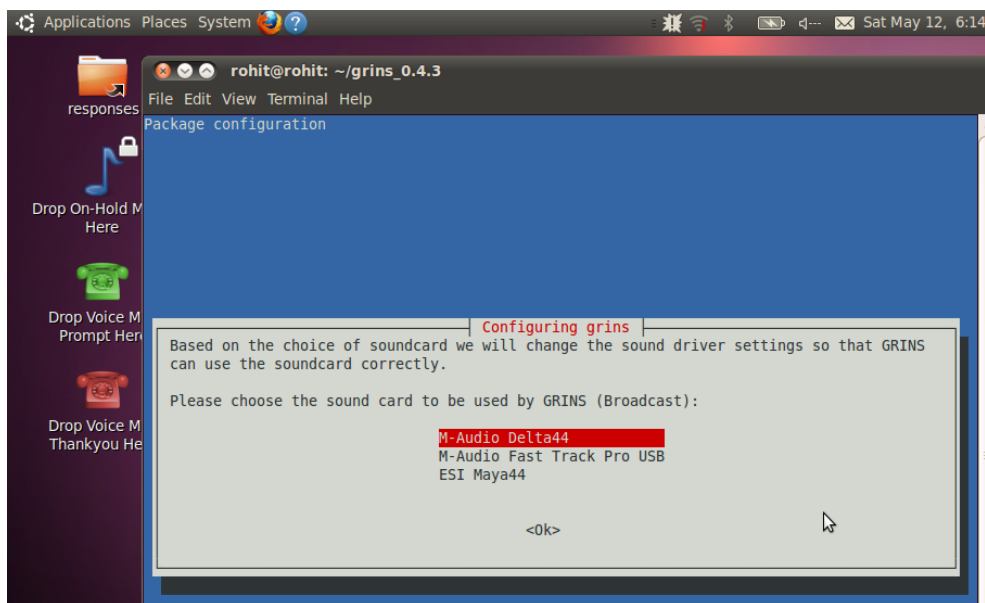
- it will ask the station name. Please provide the station name and press enter.



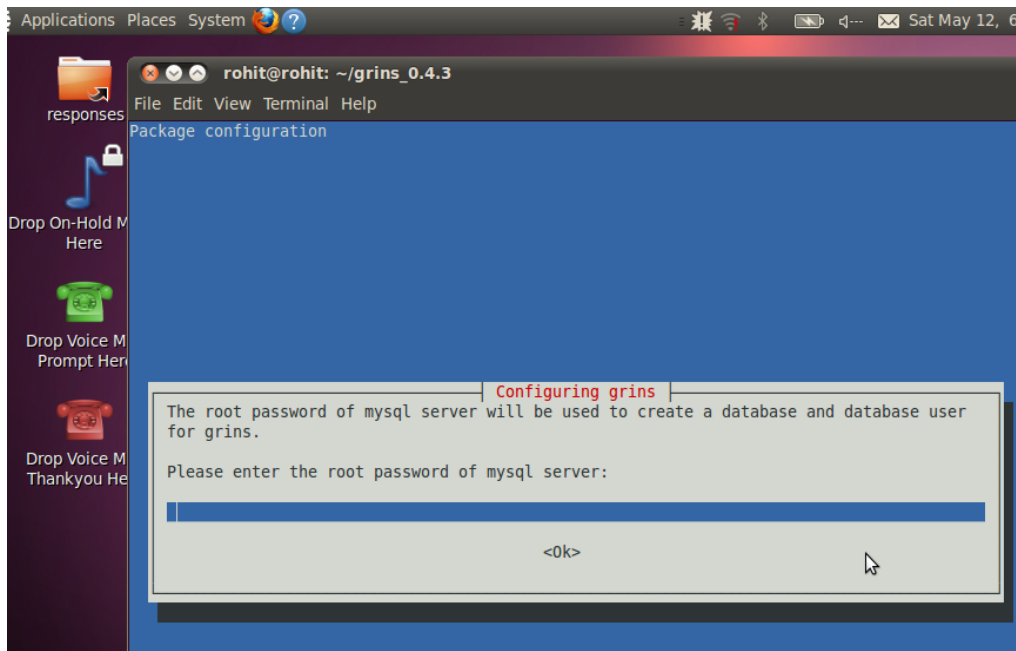
- It will then ask for the type of installation with two options – ‘Full Installation’ or ‘Demo Installation’. In case of installing GRINS in a radio station, please select ‘Full Installation’.



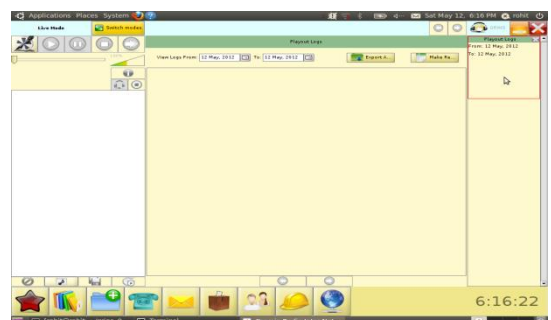
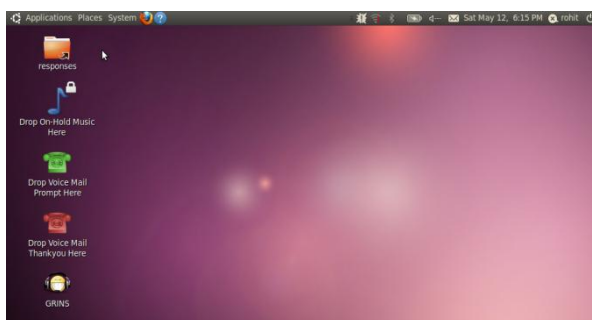
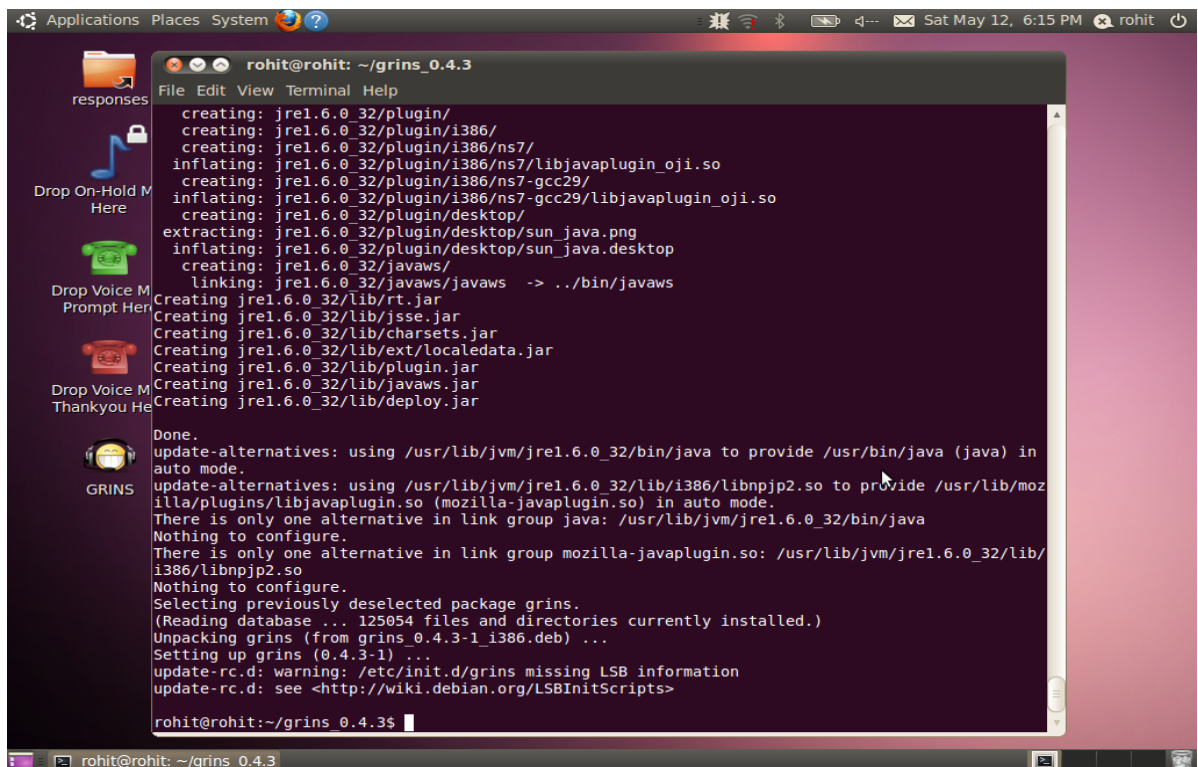
- It will then ask 'Sound card type'. Please select the sound card type and press enter.



- Finally, it will ask for mysql password for root. The password will be provided to the station beforehand. Please enter the password and run the programme.



- Following this GRINS will start functioning on the system.

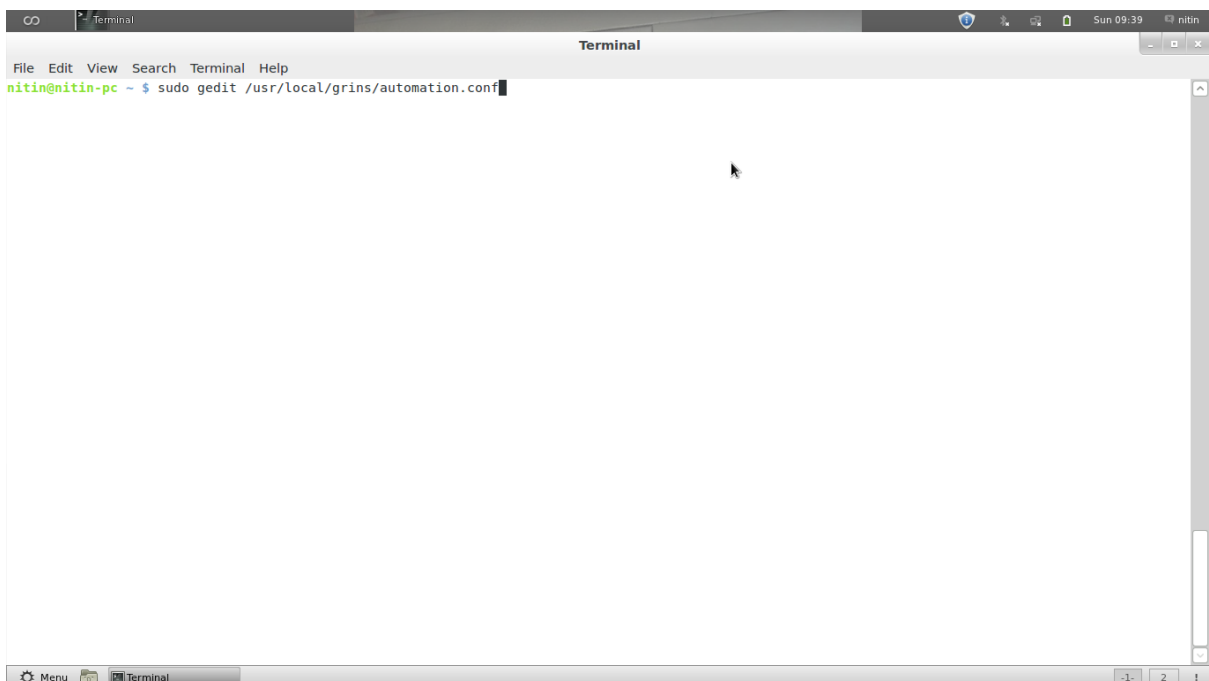


iii) Configuring GRINS - After installation GRINS. You are required to configure following things

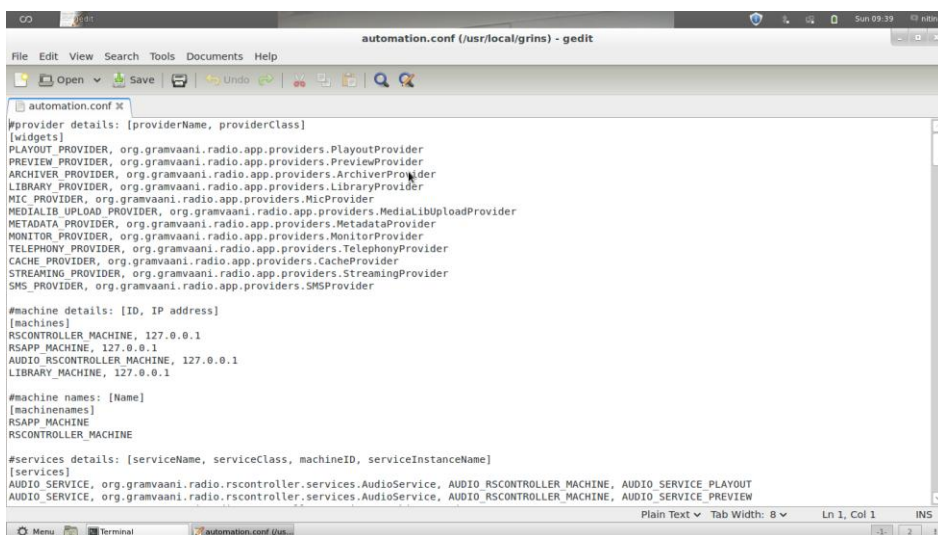
- Change in automation.conf – First We would like to tell you what is automation.conf. Automation.conf is a file where we stored all the configuration related parameter. For example Which sound card out put is used to play audio and which device is used to make a telephone call. So We have to enter the telephony device imei number. Following steps show how to change this parameter.

1. Open automation.conf in gedit by using this command

```
ubuntu@localhost$ sudo gedit /usr/local/grins/automation.conf
```



2. It will open automation.conf. This will look like that



3) Edit these file to change these lines

```
[telephonyline]
```

```
[smsline]
```

And change in to

```
[telephonyline]
```

```
Dongle0, Dongle, <Imei number of usb modem>, *.*
```

```
[smsline]
```

```
Dongle0, Dongle, <IMEI Number of usb modem>
```

4) Save and close the file.

- **Sondcard ordering** - We need to fix sound card ordering. As we know grins need two sound card. We need to fix order of soundcard. In our case internal sound card should be first soundcard and other is second. Here some steps for fixing soundcard ordering

- 1) Find out current sound card order by using this command
ubuntu@localhost\$ sudo cat /proc/asound/cards

it will give output like that

- 2) Open alsa-base.conf file by using this command
ubuntu@localhost\$ sudo gedit /etc/modprobe.d/alsa-base.conf

3) Check loaded module of soundcard by using this command

```
ubuntu@localhost$ sudo cat /proc/asound/modules
```

out put will look like that

```
0 hda_intel
```

```
1 snd_ice1712
```

4) To Set order of device add these lines into alsabase.conf

Options <module name > index= in order

For example if you want to make internal soundcard as a first soundcard add this line

```
Options snd_hda_intel index=0
```

So for first soundcard index will be 0, for second index will 1

5) Then restart alsabase by using this command

```
sudo /sbin/alsabase force-reload
```

6) Again confirm the order of soundcard by using command

```
sudo cat /proc/asound/cards
```

Usb Soundcard - in case of usb sound card it is highly recommended that both soundcard should not from same vendor. To order usb sound card you must mention vid (vendor id) and pid (product id) in alsabase.conf. To Fix order of usb soundcard just follow these steps.

- Check vid and pid of device by using following command
lsusb
- Edit alsabase.conf. All usb device load same module usb-sound. To order the usb device add these lines into alsabase.conf
Options usb-sound vid=<vendor id of first device>, pid=<product id of first device> index=0
- Save alsabase.conf and restart alsabase by using same command.

➤ Change in dongle.conf -

What is dongle .conf ?

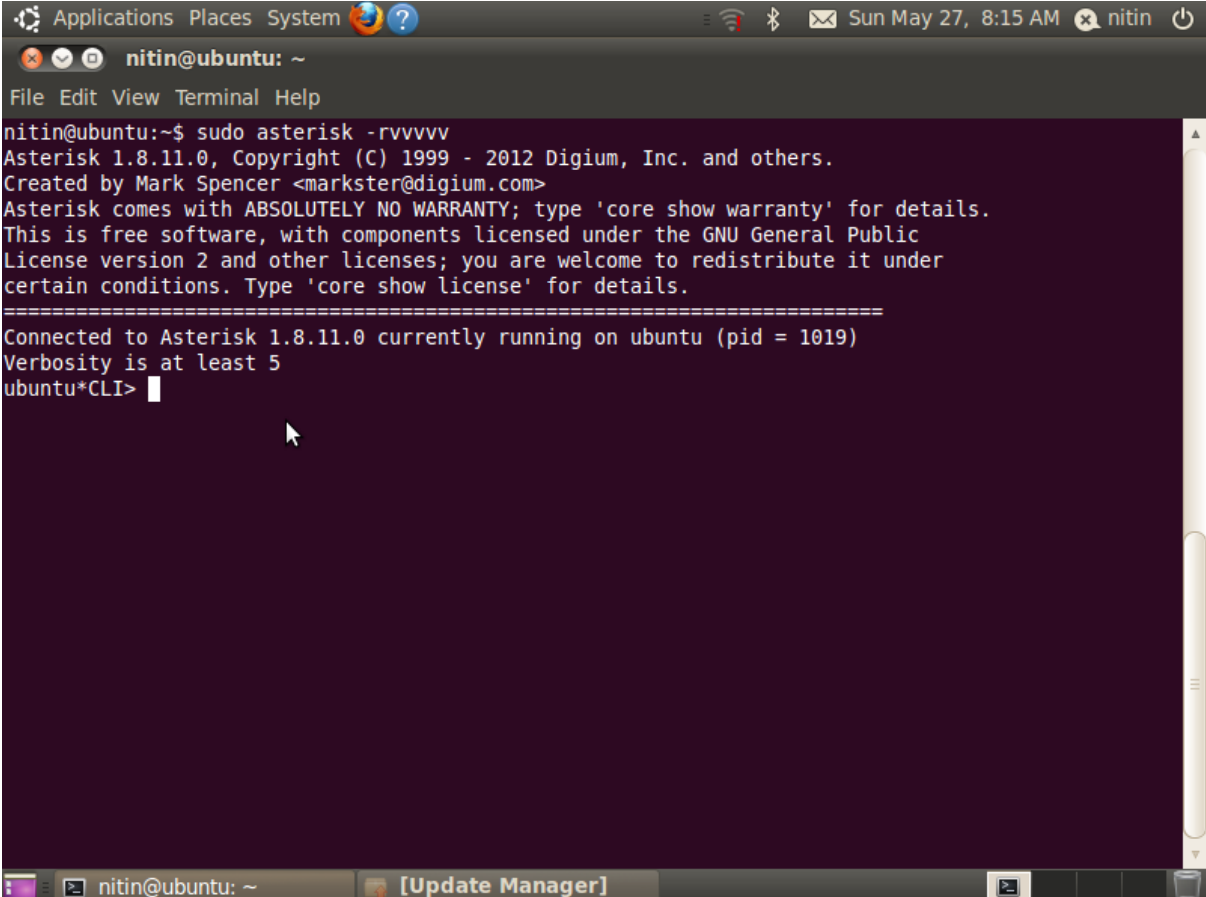
dongle .conf is a file. In which system stored information which is used by asterisk (a telephony engine used by grins).

When a gsm-modem connects with computer. It will connect with several usb device. Like /dev/ttyUSB1, /dev/ttyUSB2/ /dev/ttyUSB3/. In these one channel will be used for data and one will be used for voice. These entry should be enter in dongle.conf. Here some steps mention how to edit these file.

- Open dongle.conf by using this command
`sudo gedit /etc/asterisk/dongle.conf`
- Open asterisk console in other terminal by using this command.

`sudo asterisk -rvvvvvvv`

this will look like this



```
nitin@ubuntu:~$ sudo asterisk -rvvvvv
Asterisk 1.8.11.0, Copyright (C) 1999 - 2012 Digium, Inc. and others.
Created by Mark Spencer <markster@digium.com>
Asterisk comes with ABSOLUTELY NO WARRANTY; type 'core show warranty' for details.
This is free software, with components licensed under the GNU General Public
License version 2 and other licenses; you are welcome to redistribute it under
certain conditions. Type 'core show license' for details.
=====
Connected to Asterisk 1.8.11.0 currently running on ubuntu (pid = 1019)
Verbosity is at least 5
ubuntu*CLI> █
```

- Connect dongle on your grins system. Go to asterisk console and wait for some time. If it will show following message on asterisk console

```
Device is connected
Device is initialized and ready to use.
```

Then no need to edit dongle.conf

- If asterisk console show message like this

```
Device is connected
Device is disconnected.
```

Then you need to edit the file. This will comes when a another usb device connect with grins system. You need to change this line in dongle.conf

```
audio=/dev/ttyUSB1
```

```
data= /dev/ttyUSB2
```

To this

```
audio=/dev/ttyUSB2
```

```
data= /dev/ttyUSB3
```

Save the file and restart grins. And again check at asterisk console. Now you will get message

```
Device is connected and ready to use.
```

Phase 3: Connecting GRINS into a radio station

We configure grins. Now its time to setup grins into a radio station with a mixer. We need different set of cable and connector.

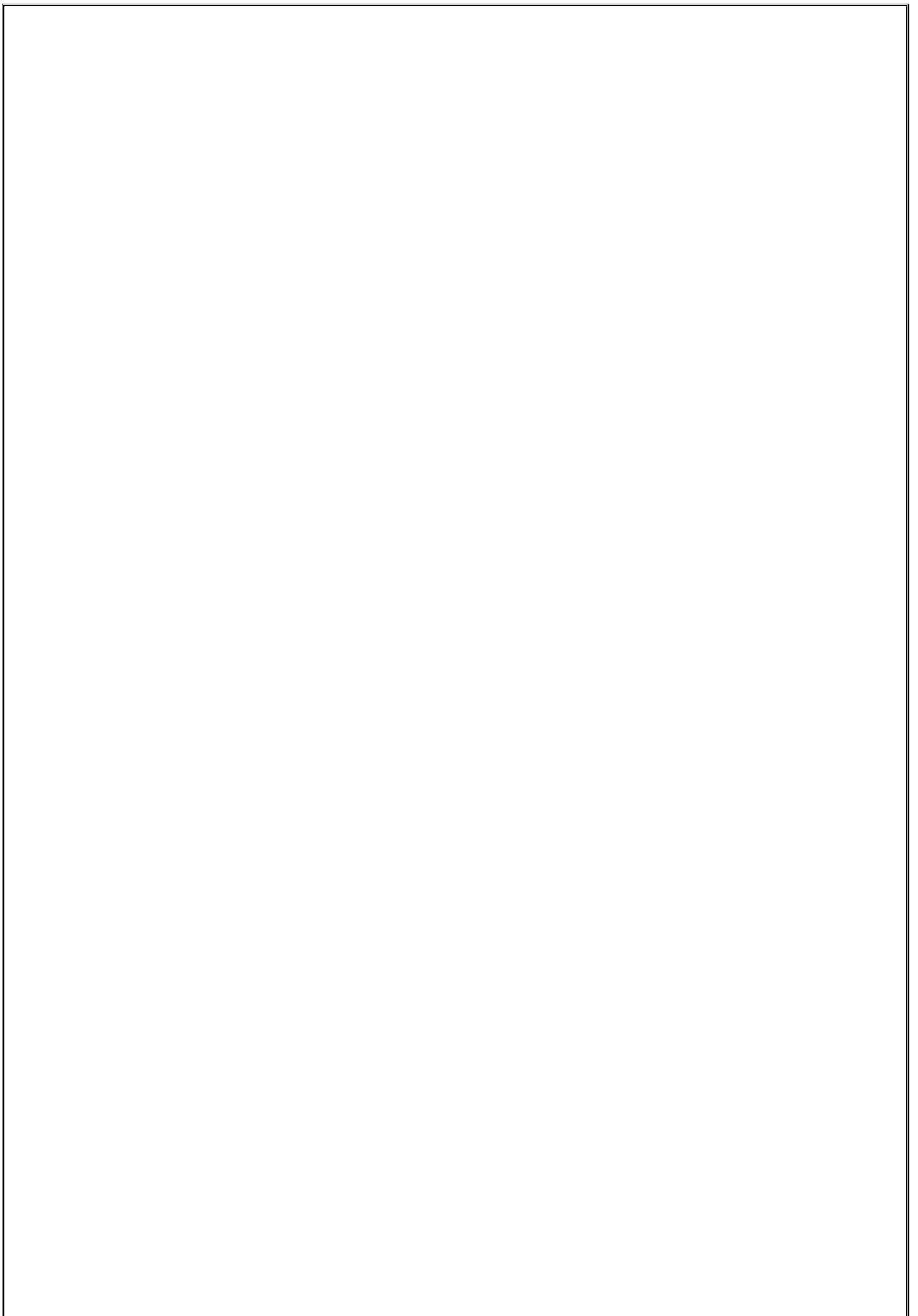
What is a audio mixer ?

An audio mixer is an electronic device that channels incoming audio signals while maintaining control over such effects as volume level, tonality, placement, and other dynamics for music production. In professional sound mixing an audio mixer is sometimes called a soundboard (sound board), mixing console, or mixer. If you want to know more about audio console just go to this link

http://en.wikipedia.org/wiki/Mixing_console

GRINS provides various audio and telephony related functions. To make use of these functions certain kinds of audio streams are required to enter and leave GRINS. The requirements put constraints on the number of soundcards lines required and on the audio connections between the soundcards and the external mixer. We now list the GRINS functions and highlight the various audio streams resulting from it. Note the term "line" is used to mean either line-in or line-out. Since a soundcard can have multiple line-ins/line-outs we used the term line instead of soundcard in the description below. Table 1 summarizes lines needed for different operations of GRINS and Figure 1 provides a rough schematic of the same.

Function	Line
Playout	Line-out to send audio on air
Preview	Line-out to send audio on preview headphones
Archive	Line-in to capture speech spoken live on air
Mic	Uses archive line for input and playout line for output.
Monitor	Line-in for routing to preview line everything that goes on air
Off air telephony	Line-in to be able to speak to the caller. Audio from the caller routed to preview headphones.
On air telephony	Uses archive line to speak to the caller. Audio from caller routed to playout line (if on the same machine) or a separate line-out. Audio from caller also routed to the preview line or a separate line-out depending on the studio setup.
Streaming	Use Line-in for stream broadcast over a network.



- a) **Playout:** GRINS must have a line-out that can be used to playout audio on air. His line can either be connected directly to the transmitter or can be fed to a mixer which is connected to the transmitter. The exact connection will depend on the actual configuration as we shall see later.
- b) **Preview:** GRINS must have a line-out that can be used to preview audio. The preview line must be different from the playout line so that audio can be previewed while something else is played out on air. The preview line is expected to be connected to a pair of headphones.
- c) **Archiving:** When an RJ speaks live on air, his/her speech must be recorded. This is to ensure that we meet the government requirements of logging all audio that goes on air and to be able to reuse the speech in future broadcasts. This means that GRINS must have a line-in that receives as its input whatever is spoken on the microphone. Note that this feed should not contain any background music going on air, otherwise reusing the speech may become difficult. The archive line could be directly connected to a microphone or could be fed by a mixer depending on the setup.
- d) **Mic:** In case a microphone is directly connected to the archive line, then the audio fed to this line must also be routed to the playout line so that the speech goes on air. In the other case where a mixer is connected to the archive line, we assume that the mixer takes care of sending the speech on air. However, if needed, GRINS can do the audio routing in this case too.
- e) **Monitor:** GRINS allows an RJ or a radio station staff to use the same headphones for monitoring broadcast as well as previewing audio. To enable this GRINS must have a line-in that receives as its input everything that goes on air. This feed is then routed to the preview line when nothing is being previewed. When the staff member previews something on the headphones, the monitor feed is stopped.
- f) **Telephony:** GRINS allows RJs to preview phone calls and to put the calls live on air. When previewing calls the conversation between the staff and the caller must not go on air. To enable this, the audio from the caller is fed to the preview line when the staff member is previewing calls. At the same time, a line-in with a mic is required for the staff member to be able to speak to the caller. Depending on the configuration this may or may not be the same as the archive line. When the conversation is put live on air, the audio from the caller must be sent on air. This is done by routing the audio to the playout line. In case the playout line is on a computer separate from the telephony computer (which is possible in GRINS), then a separate line-out is required. The audio from the caller must still be available to the staff member talking on air. Depending on the setup this may need a separate line-out.
- g) **Streaming:** Grins allows stream your broadcast over internet and local network also. Grins works as a streaming client.

