



## **ABC Guide – Using Audacity for audio productions**

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## **Audio Production Guide - Introduction**

Audio production is the act of recording something like an interview, advert etc, and then using “post production” techniques so that it can be easily played in the studio AND sound good. Without doing this things can sound awful on-air – with gaps, buzzes etc and could be un-listenable.

The following pages take you through all the steps – including selecting and purchasing your own equipment, installing software etc.

If you are not very technically minded, but still want to be able to do basic editing and production, then you don't really need to worry about sections 1-3 dealing with purchasing, setting-up equipment, installing software etc. Instead ask a reasonably technically savvy friend or relative to do those stages for you. That means you can concentrate on the important parts – section 4 onwards.

Anyone who can use a PC for basic tasks like writing a letter or creating a powerpoint presentation should be capable of following these instructions and producing a professional-sounding promo, advert or interview.

## Audio Production

Stages 1-3 are once-only tasks. If you are not confident get a tech-savvy friend or relative to do them for you! Stages 4 onwards are the important bits.

Stages:

- 1 Equipment choice
  - 2 Equipment set-up
  - 3 Download & install application & mp3 add-in, set mp3 quality
  - 4 Getting levels right – recording audio
  - 5 Normalise audio, top & tail, remove spikes, normalise again, remove noise
  - 6 Editing audio, cut, paste, new file, save, export as mp3
  - 7 Multi-tracking and envelopes
- Making available on playout systems – Audio production area, e-mail etc.

### Step 1 – Equipment Choice

Think of audio production as two distinct steps – the recording of the material, and then the post-production where you edit and tweak that recording. For the first of these operations, there are a variety of ways to record your audio each with certain pros and cons as in the table below:

Recording method	Pros	Cons
Studio	<ul style="list-style-type: none"> <li>• Best quality</li> <li>• Records direct into digital for easy editing in Audacity</li> <li>• Can view recording levels as you record</li> </ul>	<ul style="list-style-type: none"> <li>• Getting access to a studio</li> </ul>
Laptop + microphone	<ul style="list-style-type: none"> <li>• Records direct into digital for easy editing in Audacity</li> <li>• Can view recording levels (volume) as you record</li> </ul>	<ul style="list-style-type: none"> <li>• Quality variable depending on microphone, room acoustics, proximity to microphone etc</li> </ul>
Mini-disc recorder	<ul style="list-style-type: none"> <li>• Quite simple to use</li> </ul>	<ul style="list-style-type: none"> <li>• Quality variable depending on microphone, room acoustics, proximity to microphone etc</li> <li>• Extra stage involved to convert to digital for editing in Audacity and playout</li> <li>• Tricky to get levels (volume) correct</li> </ul>
Mp3 recorder	<ul style="list-style-type: none"> <li>• Records direct into digital for easy editing in Audacity</li> </ul>	<ul style="list-style-type: none"> <li>• Some people find these devices too fiddly</li> <li>• Some mp3 recorders are very poor quality for recording (dictafone quality)</li> <li>• Quality variable depending on microphone, room acoustics, proximity to microphone etc</li> <li>• Tricky to get levels (volume) correct</li> </ul>
Audio Cassette	<ul style="list-style-type: none"> <li>• Simple to use</li> </ul>	<ul style="list-style-type: none"> <li>• Not good enough quality for radio – will sound terrible on-air.</li> <li>• Records in analogue, so extra stage involved to convert to digital for editing and playout</li> </ul>

If you are not going to use a proper studio, and plan to use a laptop, mini-disc recorder etc then you will need to purchase a half-decent microphone, and spend some time experimenting with it so that when you record your material it is not spoiled by being poor quality. Time spent getting the source recording of a good quality will be repaid many times over at the post-production stage, where it becomes very time consuming if you find you need to adjust volumes, remove noise etc. It will also give a more rewarding experience when you hear it on-air. There are some key things to look for in a microphone:

- Choose a microphone described as “condenser” or “electret condenser“. Many cheaper microphones (eg: ones used for karaoke) are described as Dynamic – unfortunately these are too quiet for recording on laptops, mini-discs etc.
- Choose one with a lead (the longer the better). Don't be tempted by microphones with no lead which plug directly into the socket. They will be likely to end-up too far from the speaker and pick-up buzz and motor noise from your recording device.
- It needs to have a 3.5mm jack plug (fits laptop, mp3 recorder, mini-disc etc) – or USB (laptop only)
- Unless you have a semi-pro home studio set-up, it should NOT have 48v or 12v "phantom power", or XLR plugs (intended for studio use)

3.5mm Jack plugs  
and microphone symbol



USB Plug and symbol



In the table below are a range of suitable microphones at various prices. The web site addresses are examples only, you may be able to find them cheaper elsewhere. For broadcast use ABC recommend a proper manufacturer like Audio Technica or Samson. It's worth spending the extra rather than being disappointed with the results after hours of recording.

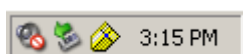
Microphone	Price	Comments	Photo	Example Web site
Skytronic 173.841 Electret condenser microphone	£6	Cheap and cheerful		<a href="http://www.ukdj.com">http://www.ukdj.com</a>
Maplin Stereo Condenser	£15	Stereo, comes with stand		<a href="http://www.maplin.co.uk">http://www.maplin.co.uk</a>
Audio Technica ATR 25	£30	Stereo. Includes long leads and camcorder adaptor		<a href="http://www.dv247.com/inv/2700/">http://www.dv247.com/inv/2700/</a>
Samson C01U	£50	Excellent quality. As used in TFM studio. USB version - for use with PC's with USB port		<a href="http://www.dolphinmusic.co.uk">http://www.dolphinmusic.co.uk</a>

## Step 2 – Initial Equipment Set-up

The first time you try to record on a laptop or desktop computer you may find it does not work. There are many different system settings which can trip you up, and they are too numerous to explain in detail in this document. Here are some basic things to check:-

First ensure that your laptop/pc can play a file and you can hear it. Ensure that your speakers are not muted – which may be indicated by a small symbol in the bottom right of the screen as below:

Speakers muted:



Speakers not muted:



Next ensure that you have plugged your microphone into the correct socket. There will be a microphone symbol, and often it will have red plastic around the socket. Some laptops also have a slide switch to select between internal and external microphone:



If this is all correct, then the next thing to check is that in the windows software the microphone channel is switched on and turned-up to the right level. This varies slightly from PC to PC, but follow these general steps:

- In the Start menu, navigate to Control Panel, then “Sounds and Audio Devices”.
- Next click on the “Audio” tab and then the “Volume” button.
- In the volume control screen, select Options, Properties, then “Recording”. Ensure “External Mic” is selected, select “OK” and ensure that the “External Mic” fader is up, and the “Internal Mic” fader (if present) is down.

When it is working correctly, you should be able to set Audacity recording, see activity when you speak into the microphone, and then stop, playback and hear your test recording.

Note that if you intend to use a device like a mini-disc or DAT recorder which does not record direct into .wav or .mp3 format (ie: digital files which can be transferred to your computer for editing in Audacity and playout in the studio), then you will introduce another step into the audio production process. Essentially after making your recording, you will need to connect your device to the sound card of your computer (typically by a lead with 3.5mm jack plugs at each end), and then play your recording into the computer whilst recording it digitally in Audacity. You will need to use the “Line in” (blue socket) for this activity, not the red microphone socket, and follow the advice later in this document about getting the correct levels (volume).



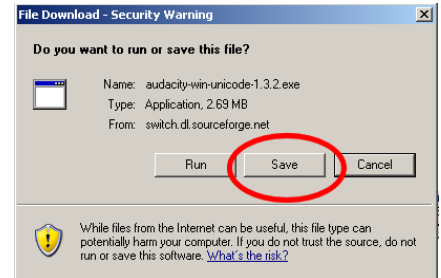
Typical sound card inputs on computers to the right. Red – microphone input, Green – Audio/speaker output, Blue – audio input.



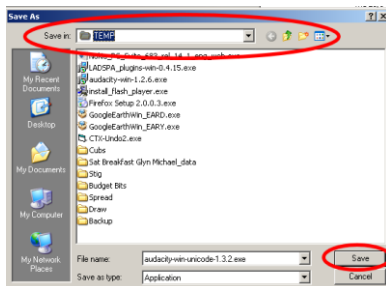
## Step 3 - Download & Install Audacity

If you are not confident using a computer, it is suggested that for this section you get the help of someone familiar with operating a PC, selecting directories and installing applications. This part is a little bit fiddly and only needs to be done once, so as long as it is done you don't need to worry about doing it again!

Go to <http://audacity.sourceforge.net/> and navigate to the download section. When you click on the link to download the application you should get a prompt like this. If you do not, it maybe that you have a firewall installed which is not permitting the download. Typically this can be temporarily over-ridden for this download by clicking on a yellow bar which appears towards the top of the screen.



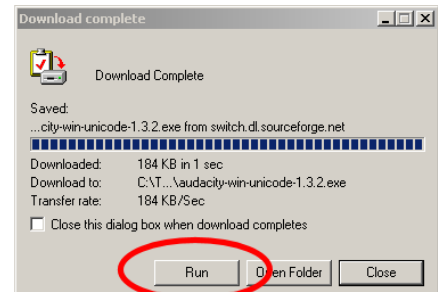
We suggest you click on the "Save" button rather than "Run" at this stage.



Having clicked "Save", you should then be presented with this prompt. Use the indicated buttons to navigate to a known area of your computer to save the installation file. Eg: C:\Temp. Then click "Save".

The download should not take long to complete, but maybe several minutes on dial-up.

When the download is complete, you will be presented with a screen like this to run the installation application. Click "Run" and follow the instructions. When it prompts you that the software publisher could not be verified, just ignore it and click "Run" again.



Click through the next few options, and when it prompts you in which folder to install Audacity then accept the default (C:\Program Files\Audacity ...) or else make a note of where you have installed it. This is important as in a moment we will have to copy a file to this location. Then click through the remaining screens and install the application.

So that's it? Not quite! Unfortunately for some kind of licencing reason Audacity does not come with mp3 functionality as standard. Mp3 is the type of audio file our studio systems use. The mp3 format is handy because these files are some ten times smaller than the default type of audio file, and so are easier to e-mail around and store. We now need to download a small but important file, save it into the Audacity directory, and then "point" the Audacity program at this file so it knows it is there. This is a once-only operation which you will not have to do again. Here's how to do it...

1. Using your Internet browser (eg Internet Explorer) download and run this file:  
[http://lame.buanzo.com.ar/Lame\\_v3.98.2\\_for\\_Audacity\\_on\\_Windows.exe](http://lame.buanzo.com.ar/Lame_v3.98.2_for_Audacity_on_Windows.exe)
2. Follow the "Setup" instructions to install LAME for Audacity. Do not change the offered destination location of "C:\Program Files\Lame for Audacity"
3. Run Audacity. Press the red record button, wait a few seconds and then press the yellow stop button to record a short audio file a few seconds long

4. Next select "File, Export as, MP3". This will prompt you to type a file name and select where you want to save it.
5. When you press save, for this time only, it will ask where you have stored the file "lame\_enc.dll". Point it at the file which hopefully (if you have been paying attention and followed these instructions!) will be in of "C:\Program Files\Lame for Audacity
6. Finally, select "Edit, Preferences, File Format". In the MP3 Export Format box, ensure the bit rate is set to 192 or above. This rate is an acceptable compromise between audio fidelity and file size. A smaller number will be poorer quality (possibly OK for interviews if no lower than 96), a bigger number if you are an audiophile with plenty of disc space and a broadband connection!

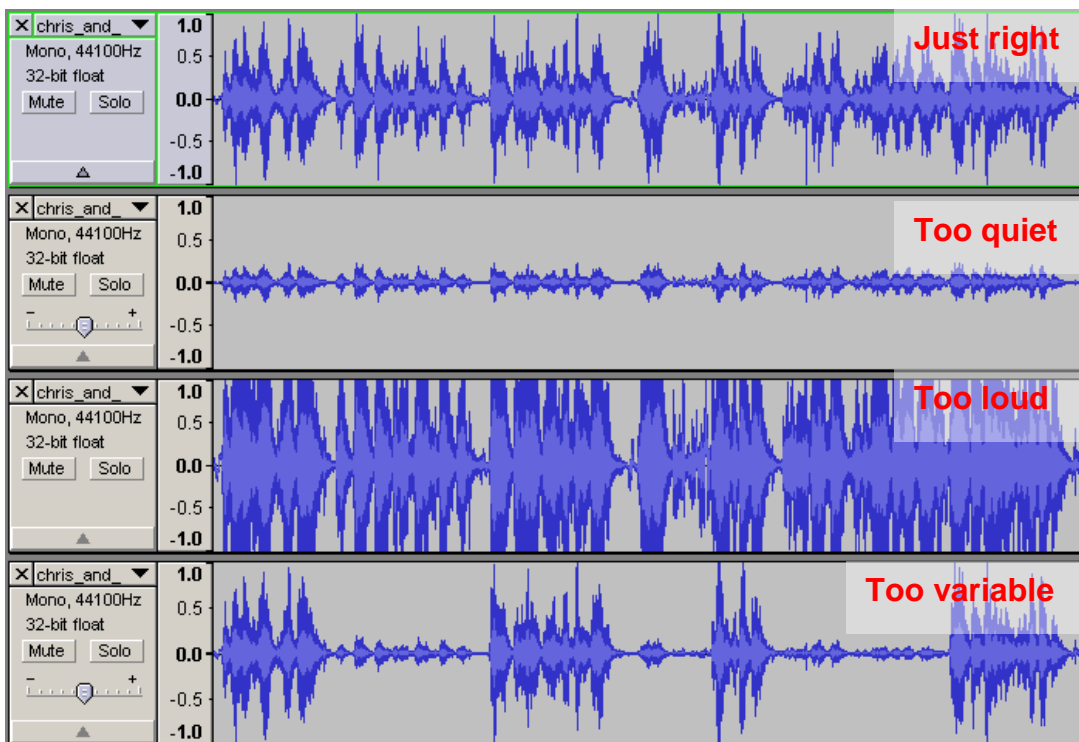
Phew – that's Audacity installed now!



## Step 4 – Recording Audio

Before leaping-in and starting on a production for broadcast, please read these few key guidelines and try to take them on board. If you follow them, it will save you a lot of time later on and result in far better results and probably more listeners.

- Get the levels (volume) right. Too loud, and it will be distorted, too quiet and no-one will be able to hear you. Practice beforehand! Don't make your first recording an important interview with a VIP! Have a go making some test recordings first, have a listen to them and learn what they should like on Audacity as it records. Have a look at the example Audacity waveforms below.



- Room acoustics. The best microphone in the world will sound terrible if you record in the wrong environment. Conversely some cheap microphones costing pennies can sound great when carefully used in the right environment. If you are not using the studio to make the recording, try to use a room which has plenty of sound-adsorbent (ie soft) materials to prevent a hollow, echoey recording. A lounge with carpet, plenty of cushions, curtains drawn etc is ideal. A kitchen with tiled floor, hard work-surfaces etc is not good! It may sound silly, but if you cover any hard surfaces with something like a quilt it will really help to deaden reflections and echoes and significantly improve sound quality. This isn't just "audiophile" speak – anyone will notice the difference. (If you get this part wrong it will sound like it was recorded in the bathroom!)
- Try to position the microphone close the speaker (say 1 ft / 30cm). If there is more than one speaker, hold the microphone and move it between them as they speak. If you do not do this it could mean that your recording may not be listenable by the audience, or you have to spend many hours correcting volumes on Audacity.
- Try to avoid large variations in volume such as having one speaker close to the microphone and one far away. This would be perceived by listeners as our signal fading in and out, and they will probably lose patience and tune to another station.

- Equally, make sure the recording is not too loud such that it is distorted. There is no way to remove distortion after it is created, so it could mean having to re-record the whole session if you get it wrong.
- Practice this and the following steps before trying to produce your first recording for broadcast. There is no substitute for getting it right at this stage, although some problems can be partially alleviated later on.

## Step 5 – Basic Audio Production Techniques

At this stage you will have made a recording which now resides as a computer file (.wav or .mp3 format) on a computer on which you have installed Audacity. These basic actions you will have to perform on virtually anything you ever record.

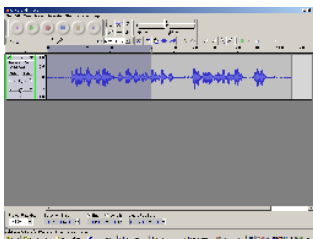
### Action 1 – Normalise the audio

This is techno-speak for making your recording play at the same volume to everything. It is much better to get it right at this stage than to have to adjust faders in the studio when playing it. This step will also make subsequent steps easier, because it makes the audio waveform larger, and thus makes it easier to identify words and pauses to perform editing. This is what you do:

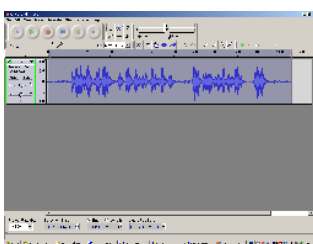
#### Action 1

#### Why is this bit important?

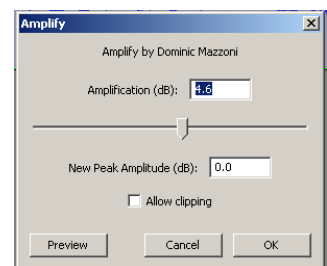
If you do not follow this step the volume of your recording will be wrong compared to the rest of the station output and listeners will think your broadcast is fading in and out.



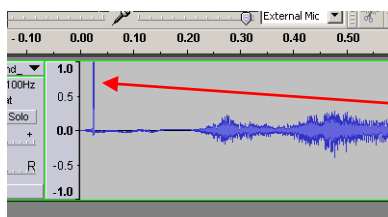
Having opened your audio file in Audacity, you need to select (highlight) the whole file. Do this by clicking the left mouse button and dragging from left to right over the waveform, or for long recordings do it from the menu by selecting Edit, Select, All, or simply by rapidly double-clicking on the waveform.



Next, from the menu, select Effects, Amplify. In the box that appears, ensure that the “Allow Clipping” box is not ticked. In the amplification box there should be a decimal number. The larger the figure, the more wrong you recorded your material. If it is more than 10-20dB, you should probably record it again. The figure labelled “New Peak Amplitude” should read 0.0dB. When you press OK, Audacity will boost your recording up to the standard audio level (volume) that we use on everything in the studio.



The audio waveform display should increase in size such that the peaks just fit in the window.



If you find it does not want to boost the level at all, you either recorded it with a perfect level, or else there is a large spike somewhere in the recording which reaches the peak of the waveform display. This is very common at very start or end of recordings with some portable devices. Delete this spike (by highlighting it and pressing the delete key), and then repeat this normalisation step.

## Action 2 – Topping & Tailing

This is the simplest form of audio editing. Basically this is just the act of removing any long gaps at the beginning and end of your material. For short jingles and adverts which will be stacked for automatic play in your studio playout system this step is mandatory. You can also extend this action to removing any pre-amble or failed “takes”, shortening (or lengthening) any pauses during the piece. Here’s what you do:

### Action 2

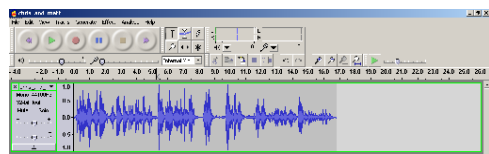
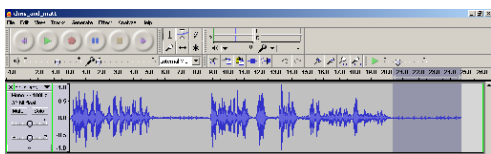
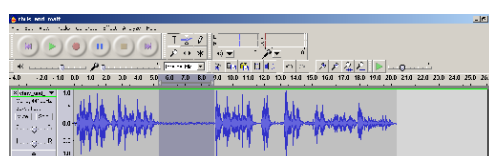
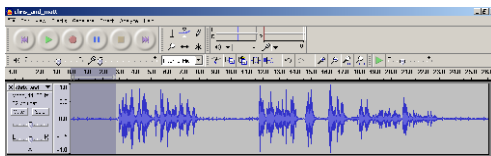
#### Why is this bit important?

If you do not follow this step, when you play it on air there may be a long gap before it starts, or you may play some pre-discussion which you did not want aired. If there is a long gap at the end it will sound silly if stacked with other material in the playout system.

Hopefully you will already have mastered the art of selecting part of the audio by clicking the left mouse button and dragging it. There are a number of buttons which will help you perform this task more accurately. Have a play with these buttons, as they will make your life much easier when you know how to use them. From left to right they are: Zoom in, Zoom out, Fit highlighted selection to window, Fit whole recording to window.



Now the easy bit. With the mouse, simply select any silence at the start of the recording and press the “Delete” key. Repeat this for any gaps you want to remove in the middle.



The end result at this stage will be a shorter recording with the gaps removed and adjusted to the correct volume for playout in the studio. Congratulations, you have performed your first piece of audio production! Pat yourself on the back! Before you have a cup of tea though, we had better save it. In order to do this (presuming you have fully followed the earlier Audacity installation instructions!), simply select File, Export as MP3 (or WAV for maximum quality, but filesize is 5-10 times bigger) and choose a file name and directory to save it to.

### Hot Tip

If you need to record say an advert with several sentences, break it down into several sections. Record them in one take, but take your time, having a good breath between each sentence. If you stumble on one sentence, carry on recording but just have another pause and do it again. Perhaps do some sentences more than once with different emphasis on words or different speeds. Then using your new-found Audacity skills simply delete the pauses and mistakes, and there you go! This is much easier than trying to do it all correctly in one piece (which could take many attempts depending on the reader!).

## Action 3 – Editing

You have already learned the essentials. Now we will move onto some slightly more advanced techniques which you may find useful. Don’t worry though, nothing too difficult yet! The first things worth learning are the Ctrl-C, Ctrl-X and Ctrl-V keyboard shortcuts (ie: Hold down the “Ctrl” key on the keyboard and press the letter C. These work in most windows applications (eg Microsoft Word), not just Audacity. They are a quick way of using the keyboard to perform actions that you would otherwise do more slowly with a mouse in the

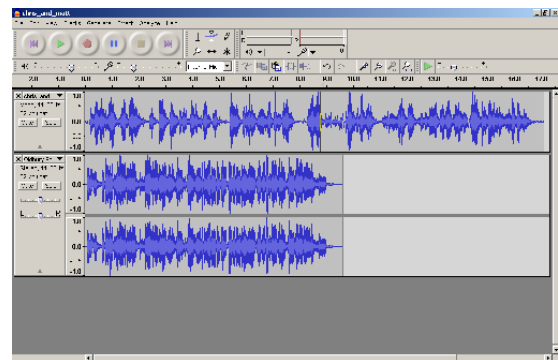
menus by selecting Edit, Copy etc. For repetitive tasks like this they are a real time saver. These key strokes are equivalent to the following menu actions:

Ctrl-C = Edit, Copy  
Ctrl-X = Edit, Cut  
Ctrl-V = Edit, Paste

Give this a try – using the mouse select a portion of your material – say a whole sentence. Now press Ctrl-X and that portion should disappear. (In fact it is still there in the background in the computer's "Clipboard"). Now click the mouse somewhere in your material –say at the beginning, and press Ctrl-V. The removed section should now magically appear where you pointed.

You can use this technique to rapidly edit your recording, maybe changing the running order etc.

How about if you have 2 separate recordings which you want to merge, or combine in some way, cutting and pasting between the two? This is pretty straightforward – you just need to get both (or more) files open at the same time in Audacity with multiple windows. If you have one file open already, to open another at the same time select File, Import Audio, and select the file you want. This should open a new window in Audacity below the one you had already. In the example to the right we have one mono file (top) and one stereo file (bottom) opened.



Have a play manipulating audio between two different files so that you are confident. This stage is a pre-requisite for the next stage – multi-tracking.

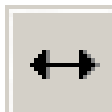
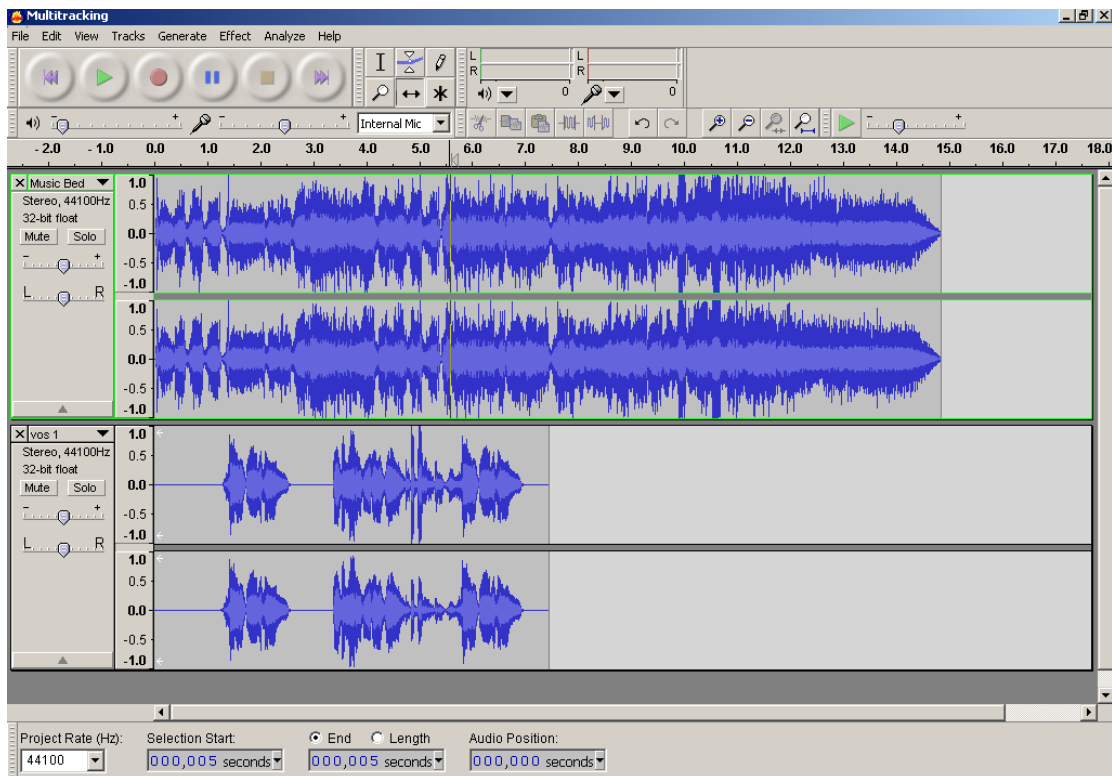
## Action 4 – Advanced Techniques and Multi-tracking

If you are at your limit with the preceding material, then don't bother with this section. If you are hungry for more, then read-on!

### 4.1 – Multi-Tracking

In this section we are going to learn how to add background music and sound effects to your material. We will do this by using a technique called "Multi-tracking". This simply means that rather than playing the music or sound effect "live" whilst you are recording (which is difficult to get right), we will add it in after we have finished recording. The advantage of this is that you don't have to get it right first time. You can take your time adjusting timing and volumes until it is perfect. Once you have mastered this you will easily be able to produce effective jingles adverts and maybe dramatic productions. Although you could add such music and sound effects "live" as you speak, it is much easier and more flexible to do it as this "Post-production" activity in Audacity. Once you have learned this bit the limit will only be your creativity and time you have at your disposal.

In the last section we learned how to open more than one audio file at a time. Now to get started with multi-tracking, try opening a short file with speech in it, and another file with just music using the File, Import Audio menu. The display will look something like the one below.



Now try using this button at the top of the screen in Audacity called the “Time Shift Tool”. Having clicked on this button, it now allows you to time shift one audio track in relation to another by clicking and dragging that track. Having done so, you can now press play, and hear the two audio tracks overlapped, with one track starting where you have now chosen for it to start. You can zoom in and out and slide the audio tracks around to get the timing absolutely perfect, although at this stage you may well find that the relative volumes of the tracks may be wrong (eg music too loud).

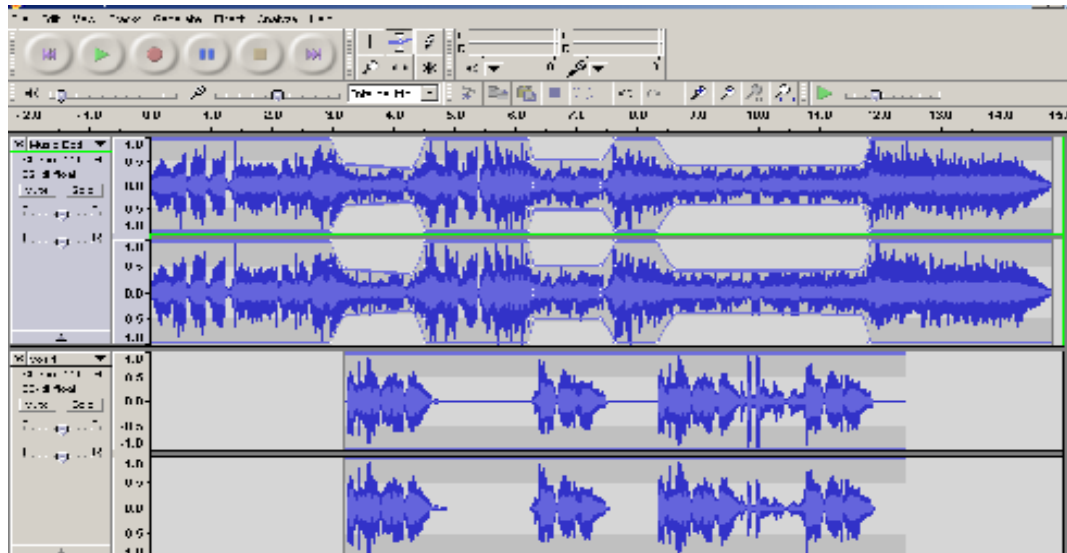
In order to restore Audacity to the normal mode where you can play and edit audio, you will need to click on this button, also at the top of the screen in Audacity. This is called the “Selection Tool”. You will have to become used to shifting between the two modes of operation using these two buttons,



There is one more very important button which is used in Multi-tracking called the “Envelope Tool”. This tool can be used to modify the audio levels of each track up and down. The net effect is like moving the fader on the mixer in the studio up and down. The key point to realise, is that you can modify the volume levels of each track individually, and to different levels at different times. This is extremely useful for all sorts of audio productions. As mentioned before, it is much more controllable to do it this way in “Post-Production”, rather than to try and do it “live” as you record the piece.

When the “Envelope Tool” icon is selected, you should notice a fairly thick blue line appear at the top and bottom of each audio track. If you double-click on one of these blue lines you will find that a dot appears on it. This is a “Control Point”. You can move the line up and down, and from side to side and in so doing you will modify the volume of that section of audio of that track.

In practice you will find you need to create pairs of control points by double-clicking elsewhere and moving the mouse. It is rather complex to describe, but quite simple and intuitive to use, so you are best to practice at this stage. In this simple production, you will want to aim to reduce the music volume immediately before the speech starts (try not to ramp it down slowly, do it in a quick, sharp step as speech starts), and then boost it again between sentences and after the speech ends thus:



For added control you may find it easiest to chop your speech file into individual sentences and save these to individual files. If you then open them all up in such a multi-track view, it gives you maximum flexibility to align speech with drum-breaks etc in the backing music for maximum effect. Alternatively you can get similar control by adding and deleting different length silences in between sentences.

You can use these tools to add as many audio tracks as you like, move them in time and adjust their volume levels and produce a polished audio production. Having done this, you will want to save your work. There are two options here:

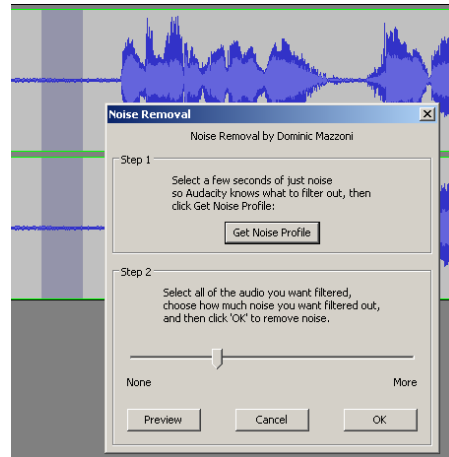
1. If you are happy with your production and confident that you do not want to change it any further then you can “Mix it down” into a single audio file. Do this by selecting File, Export as, mp3.
2. If however you think you may want to work further on this production – for example adding more tracks, moving material, changing levels more etc, then you should save this as an “Audacity Project”. Do this by selecting File, Save Project As. This will create a file with a “.aup” extension, and a directory with some files in it which are used to “remember” all the settings of your project.

That’s the essentials finished now. The next few steps are really just the icing on the cake if you have mastered the above and want to go that little bit further.

#### 4.2 – Noise Removal

This is a useful facility which can be used to reduce background noise in your recording. It would be far better to avoid the background noise in the first place, but if it is unavoidable, this feature *may* help. One thing to be aware of – it only works with constant low level noises such as hiss, hum or buzz. It will not work for loud, irregular noises such as cars, aircraft, kids shouting etc. Be warned, sometimes it does not work and can make things worse!

It is a two stage process. First you need to get a “noise profile”. This lets Audacity learn what noise you want to remove. To get a good noise profile, you need to find a section of the audio file in which there’s no talking. Click and drag the mouse to highlight the largest possible sample of pure noise and then, select Effect, Noise Removal and click the “Get Noise Profile” button. Depending on the size of the noise sample that you selected, this can take anywhere from one to a few seconds.



Then, highlight the entire audio file by double-clicking it, or dragging the mouse. Select Effect, Noise Removal again. Experiment with the slider near the bottom of the dialog box. Click the Preview button to test your selection out. The “None” and “More” indicators can be misleading, so experiment with several settings if you get strange audible artefacts or distortion.

When you have found the best setting, click the Remove Noise button. Depending on the length of the piece and the power of your PC, this may take from seconds to minutes.

### 4.3 – Compression

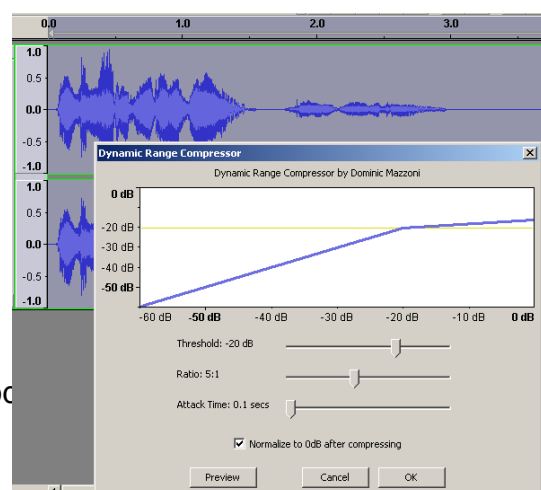
Compression in audio terms is the reduction of the dynamic range of a piece of audio – that is to say reducing the difference in volume between the quiet bits and the loud bits. This is standard practice and is used by all broadcasters. Virtually all stations use compression on their live transmissions but sometimes that is not enough, and some additional compression is needed at the audio production stage using the feature in Audacity. This extra compression is typically required for one of two reasons:

- If the audio material has widely fluctuating audio levels and you cannot re-record it – for example an interview where the interviewer is close to the microphone, and the interviewee is too far away. This will be difficult for the audience to listen to and needs to be addressed. You *could* manually select all the quiet bits and boost their level, but that is very time-consuming for a long piece, so it is better and quicker to use compression either instead, or in addition to manual adjustments.
- For “punchy” presentation such as short adverts and promotions, careful use of compression can add extra “strength” or “presence” to a voice such that it can be heard more easily in noisy environments.

The downside of this technique is that it is easy to get carried-away and over-use the effect. At best this could make the piece fatiguing to listen to, and at worst it could boost background noises, and in particular make breaths taken between sentences clearly audible (a kind of “just run up the stairs” effect!).

To use the Compressor, first highlight the section of the file containing the sound that you want to even out. Often this is the whole file, so just double-click on it to select it all. Then, select Effect, Compressor.

The Compressor dialog box looks intimidating, but once you get going it is fairly easy to use. Focus on the Threshold setting. The threshold is the maximum amount of volume that the Compressor will tolerate. The threshold is measured in decibels (dB). Any bit of audio that is louder than the threshold has its volume reduced.



You should set a threshold somewhere between the loudest and softest parts of your audio. So, if the loudest part is -7db and the softest is -13db, then you should set a threshold of -10db. Set the threshold by clicking and dragging the Threshold slider.

Next, look at the Ratio setting. This sets the level of compression. 2:1 may be enough, but you may need to push this as far as 5:1. Stronger settings are not recommended. Attack time just controls how reactive the compressor is. A fast setting of 0.1 or 0.2 seconds is generally good.

Ensure the “Normalise after compressing” option checked, otherwise the compressed file will be too quiet, and you will have to manually normalise it. Click the Preview button to test whether or not you chose the right settings. Once you finalize those settings, click OK. The compression process takes several seconds, depending on the size of the file.

As with all effects in Audacity, it is best to use this one sparingly. It is easy to over-use these effects. It is good practice to compare your modified version with an unmodified version to check that you have not got carried away, and you actually have improved rather than degraded it!

#### 4.4 – Echo

This is available in the Effects menu of Audacity. You can use it in a variety of ways:

- You can use it in the obvious way such as adding echo for dramatic effect (eg: to make it sound like an aircraft hanger or suchlike). Try a setting of 0.5 seconds delay and decay factor of 0.3 for a “Grand Canyon” effect.

However echo is also useful in other situations such as:

- A subtle amount of echo with a short delay can add extra “presence” to a vocal or acoustic performance. Try a delay of 0.05 seconds, and a decay factor of 0.2.
- If you have a jingle or other production which has been chopped-off before it properly finished, then you can use echo to extend the final syllable and restore a more natural ending. For this application, select the final say quarter second of the piece, and extend the selection into say 0.5 seconds of silence beyond the end of the piece. (You may need to manually add a silent gap at the end first). Start with a delay of 0.1 seconds, and a decay factor of 0.3 and go-forward from there.

Experiment with different settings for the effect you want. Strangely, shorter delays seem to take longer to process. Remember - use it sparingly!