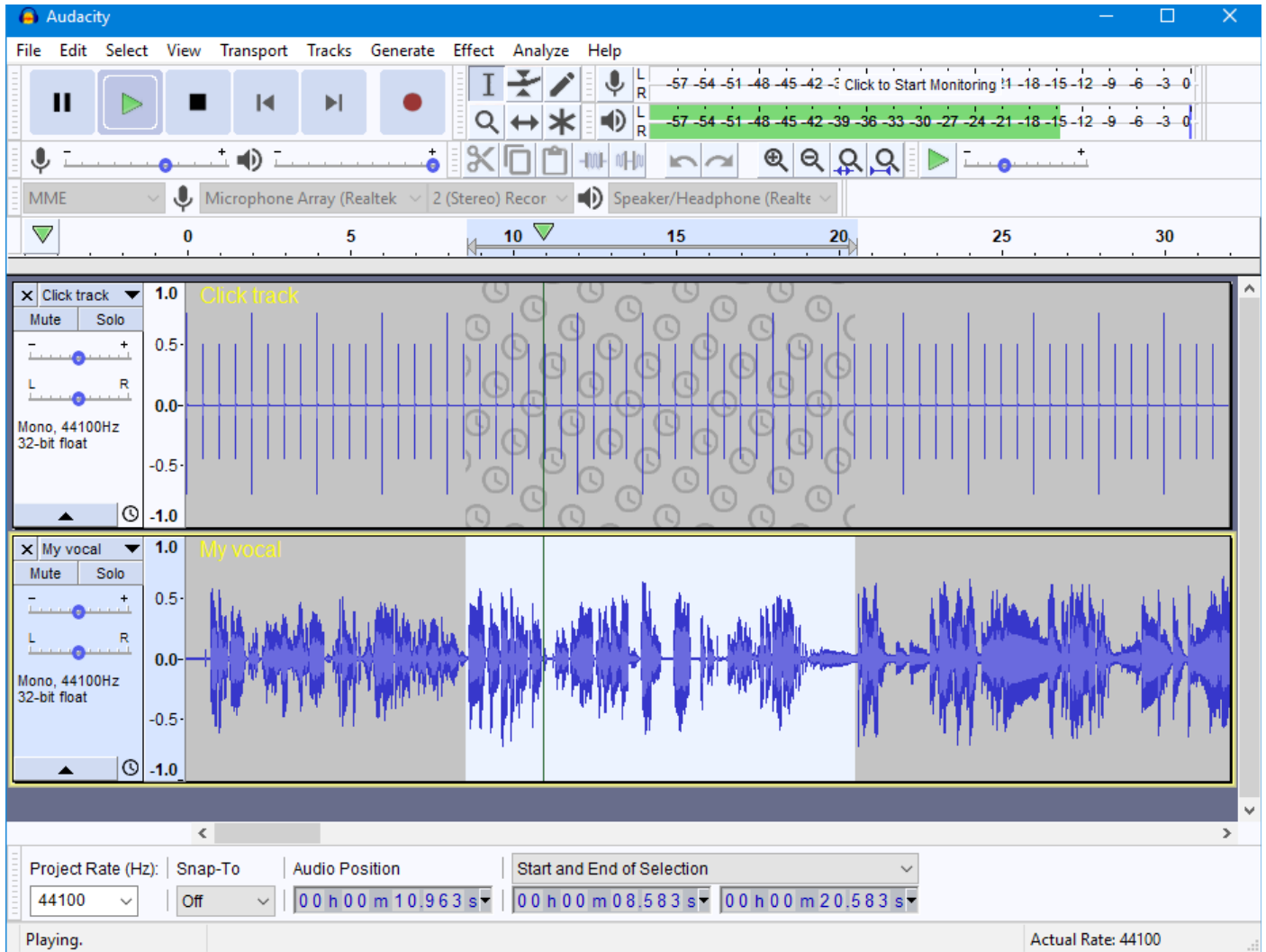# Digital Music 102
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Managing Digital Music with Audacity
By Rick Manning

Working with Audacity

A. Introduction

Audacity® is a free, open source, cross-platform audio software program for multi-track recording and editing.

Audacity is available for [Windows®](), [Mac®](), [GNU/Linux®]() and many other operating systems. Check the Audacity website for their [feature list](), [Wiki]() and [Forum](#)s for additional information.

Audacity can be used to record from the following: tape, cassette tape, LP, musical instruments, or vocal inputs. It will edit them all; and then save to multiple file formats, including MIDI, WAV, WMA, MP3 and now iTunes M4A.

This version on Audacity has the most complete and comprehensive "***help file and Manual***" of any previous version. I highly recommend that you read through them on your own if you want more information that will be provided here. I will be covering the most advantageous sections pertinent to our needs as Callers. A Music Producer or Sound Mixer/Musician might want to use this product/program for their recording and make full use of most of the features available.

IF YOU ARE A NOVICE: I suggest you use trial and error method on ALL the features in Audacity. Be sure to make backups of all the music you will be editing and modifying. IT WILL take time and patients for you to learn what works and what does not work, TRUST ME, that's how I learned what I know at this point.

B. Advance Editing Feature of Audacity
a. Three categories for Editing
1. Effects
There are numerous features for editing and recording sound either louder or quieter; fading in or out; changing sound quality; repairing damage audio; changing the pitch, tempo and speed; adding special effects like reverberation or echo; vocal removal; and looping (lengthening the file for longer play time).
2. Generators
Creates new audio, either in an existing track or in a new track
3. Analyze tool
Performs analysis on a selection of audio - it does not change the audio and does not create new audio.

In this session we will only be at the following "***Effects***" features: looping, speed, pitch and tempo changes, vocal removal, and batch processing (chains).

C. Lengthen a File (Creating an Audio Loop) or Fixing a Corrupt Segment
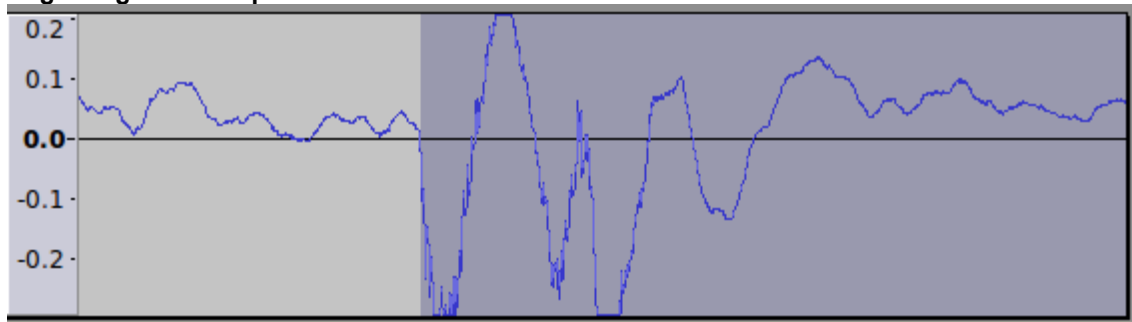#### a. Creating a Loop
Creating a "***Loop"*** or "***Editing"*** a section of music is time consuming. It takes a good "ear" for listening and a good "eye" to watch the wave form as it moves while playing the MP3 file. You are constantly using the "zoom in" and "zoom out" key strokes or the, 🔍 , 🔍 on the tool bar.
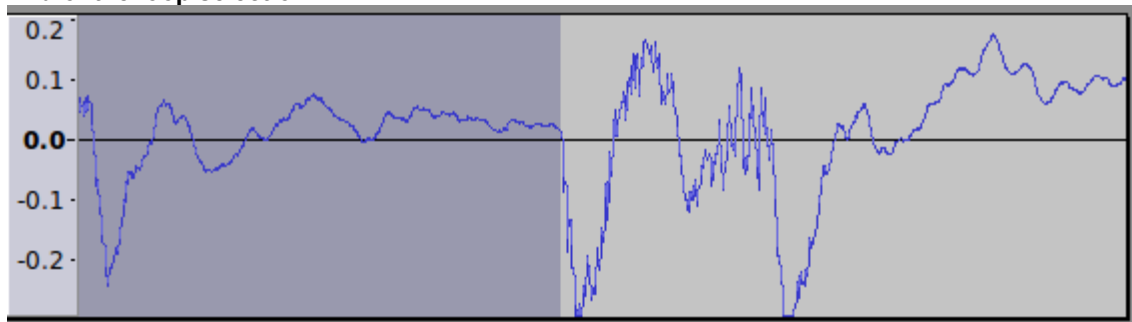
Note: Suggest you use a scrap piece of paper to write down the time segments from ***Timeline*** bar.

1. Select the "start" and "end" points of the wave you want to use for looping or editing by clicking on the wave form at the time stamp or number your wrote as your start point. Hold the :*Shift: key* and select the "end time stamp" or number you wrote as the end point. A gray area or section appears. **NOTE:** *You need to be as close to the zero crossing point when selection the start and end points for your loop*.
2. Press the "*Space Bar*" to play the section that is highlighted and make sure you have all the music section you need or want. This is usually a whole music phrase, 16, 32, or 64 counts of music.
3. Now that you have the correct section of music, Copy that section by using "*Ctrl+C*" or "*Edit*" "*Menu*", "*Copy*".
4. Go to "*Menu*" and Click "*File*", "*New*", and open a new Audacity window.
5. Click "*Edit*", "*Paste*" to put the clip or section you want to use for looping or editing

Beginning of the loop selection

End of the loop selection

b. **Exporting Loops**
   Exporting or "saving" the portion of music to create the Loop; use "*File*, *New*,** to bring up a new Audacity window then use "*Menu*, *Edit*, *Past*,** to past the portion you have copied to the memory. Now use "*Menu*, *File*, *Save Other*, *Export as MP3*". This saves that "snip-it" of the WAV or MP3 file.

c. **Using Loops**
   Now that you have the loop saved and while you are still in your music file (switch back to the other work copy file window) you now need to create your' looping. This can be done by using the "*Menu, Effect, Repeat*" option. A dialog box will appear. In the "Number of repeats to add:" 1, the default is highlighted. You can increase the number of loops at this point, and then *select/click "OK"*. And your loops will be created.
   NOTE: *ALL editing short cut features, like a word processer, are the same here, so you can use those short cut keys, if you wish.*

d. Timeline Quick-Play to Create a Loop

The above process can be aided by using the Timeline to help create a seamless loop:
1. Ensure that "*Quick-Play*" is enabled in the Timeline, right-click context menu.
2. Select "**Enable dragging selection**" in the Timeline, right-click context menu.
3. Make an approximate selection of the audio to be looped.
4. *"Shift + Left-Click"* within the selection to loop play the selection.
5. *"Shift + Left-Click"* and drag the start/end of the selection, as necessary, to adjust the selection closer to "seamless" looping positions.
6. If necessary, zoom in on the start/end positions to make adjustments to the play region and selection.
7. Note that if "zooming in" causes the selected region to extend beyond the visible track area, Audacity will, by default, cause the waveform to scroll. The scrolling behavior can be disabled from the Timeline, "*right-click*" context menu.
8. While "zoomed in", use "*Ctrl + [*" (left bracket) and "*Ctrl +]*" (right bracket)to view the start/end of the selection.
9. If a long selection is being looped, "playback" may be stopped at any time by pressing the "*Space" key*, then looped "Quick-Play" may be restarted from a short way before the end of the selection with "*Shift + Click*" on the Timeline.
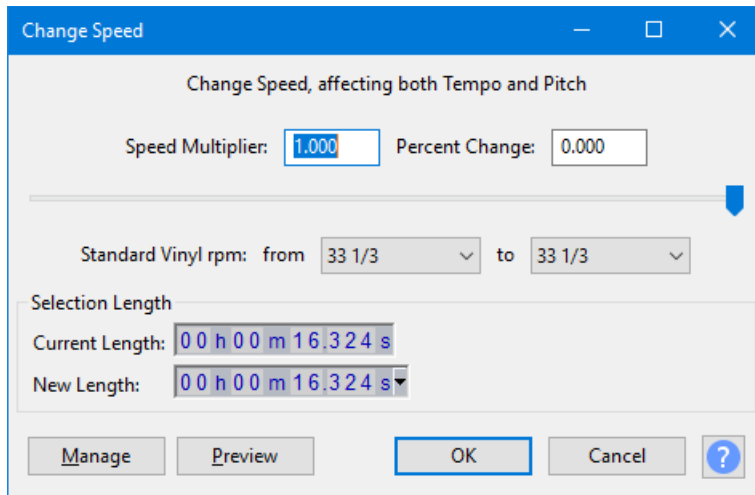10. Then Optionally label the loop region (use *Ctrl + B*)

When the selection loops seamlessly, "playback" may be stopped (using *Stop button* or its *Space shortcut*) and the selection exported or trimmed as required (use "*Ctrl + T*" to trim to the selection).

Seamless loops should normally be exported in a lossless format such as WAV. Note that seamless loops should NOT be exported in MP3 format because "encoder/decoder overall delay" is not defined, which means there is no official provision for "gapless playback".

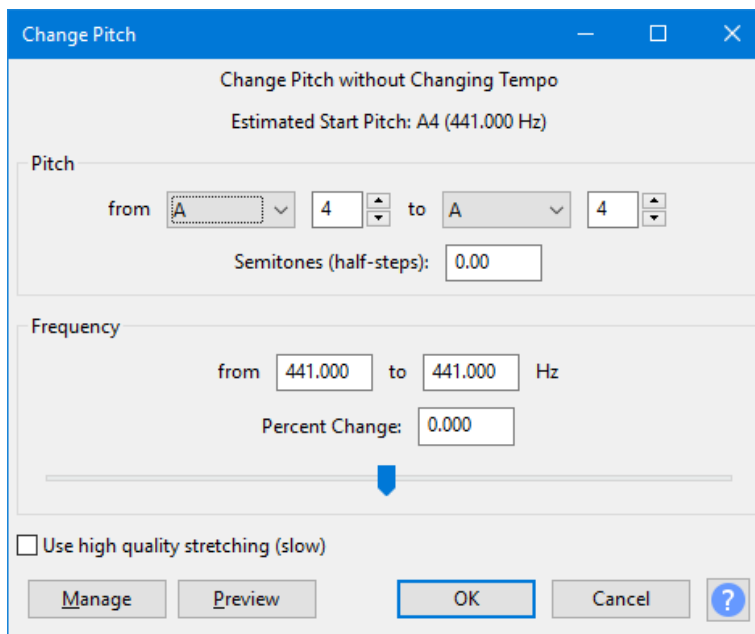D. **Changing Pitch, Speed, and Tempo (Effects)**
   a. **Changing Speed**
      1. Open the file like before, then **click "Select"** from the menu, then **click "All" (or CTRL+A)**. You will now see that the whole music wave format is highlighted in a gray tone.
      2. Next you **Click "Effect"** from the Menu bar, and **Click "Change Speed"**. A dialog box opens.
      3. Use the "**Slide Bar"** to slide the arrow left to decrease or increase the Speed.
      4. **Click "Preview"** to check the speed.
      5. Repeat steps 4 and 5 above until you have the speed you like.
      6. Now Click "OK" and save the file with a slightly different name than the original.

b. **Changing Pitch**
   1. Open the file like before unless you are adding or removing effects.
   2. **Click "Effects"**, **Click "Change Pitch"**
   3. Use the **Slide Bar** to slide the arrow left to decrease or increase the Pitch.
   4. **Click "Preview"** to check the Pitch.
   5. Repeat steps 4 and 5 above until you have the speed you like.
   6. Now **Click "OK"** and save the file with a slightly different name than the original.
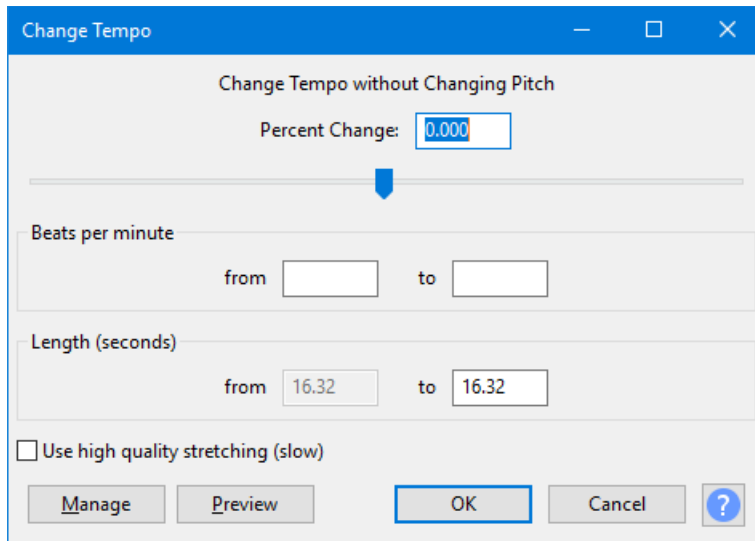

c. **Changing Tempo**
   1. Open the file like before unless you are adding or removing effects.
   2. **Click "Effects"**, **Click "Change Tempo"**
   3. Use the **"Slide Bar"** to slide the arrow left to decrease or increase the Tempo.
   4. **Click "Preview"** to check the Tempo.
   5. Repeat steps 4 and 5 above until you have the speed you like.
   6. Now **Click "OK"** and save the file with a slightly different name than the original.

d. **Sliding Time Scale /Pitch Shift**

Sliding Time Scale and Pitch Shift allows you to make a continuous change to the tempo and/or pitch of a selection by choosing initial and/or final change values.

Tempo changes made without selecting a "pitch change" preserve the original pitch, and pitch changes made without selecting a "tempo change" preserve the original tempo. By changing only one of tempo and pitch and choosing the same initial and final value, you can use Sliding Time Scale / Pitch Shift in the same way as Change Tempo or Change Pitch to produce a high quality fixed change. However Sliding Time Scale / Pitch Shift lets you, for example set the initial tempo change to -50% while also setting the final tempo change to +20%, the initial pitch change to +3 semitones and the final pitch change to +1 semitone.

*1. **Tempo Change***
Initial and final tempo change values can be managed using the slider (which will move in whole number values only) or by entering a value in the box, which can be either a whole number or a number including a fraction.

Initial (%)
The percentage of the original rate required for the beginning of the processed "Audio. Positive" percentages speed the audio up and negative percentages slow the audio down: -50% is half-speed, 0% is unchanged, 50% is 1.5 times the original speed, 100% is double speed and so on.

Final (%)
The percentage of the original rate required for the end of the processed audio.

*2. **Pitch Shift***
The two "Initial" input boxes are inter-dependent. Entering the required "value" in one of the boxes for Initial Pitch Shift will automatically display the "equivalent value" in the other Initial box. Similarly, entering a value in either "Final" input box will display the equivalent value in the other Final box.

Initial (semitones)

Enter the "pitch shift" in semitones (half steps) required for the beginning of the processed audio.
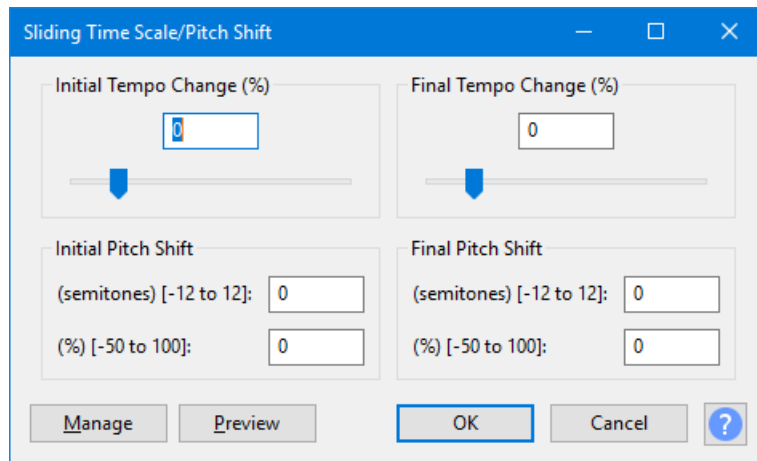
Initial (%)
Alternatively, enter the "pitch shift" as a percentage of the original frequency as required for the beginning of the processed audio.

Final (semitones)
Enter the "pitch shift" in semitones (half steps) required for the end of the processed audio.

Final (%)
Alternatively, enter the "pitch shift" as a percentage of the original frequency as required for the end of the processed audio.

E. **Vocal Reduction and Isolation, Vocal Removal (Effects)**
Audacity has the ability to reduce, or in some cases remove. vocals from your music. It is a bit complicated and I recommend you read the **Help** file that comes with Audacity IF you really want to reduce the vocal sound in your music. There are two ways to do this, Vocal Reduction and Isolation or Vocal Reduction, is recommended..

a. **Vocal Reduction and Isolation**
Complicated, I recommend reading the "help file". Also, what I read, did not work as described; I'm not a music producer or sound man. Definenately, this is not for the novice.
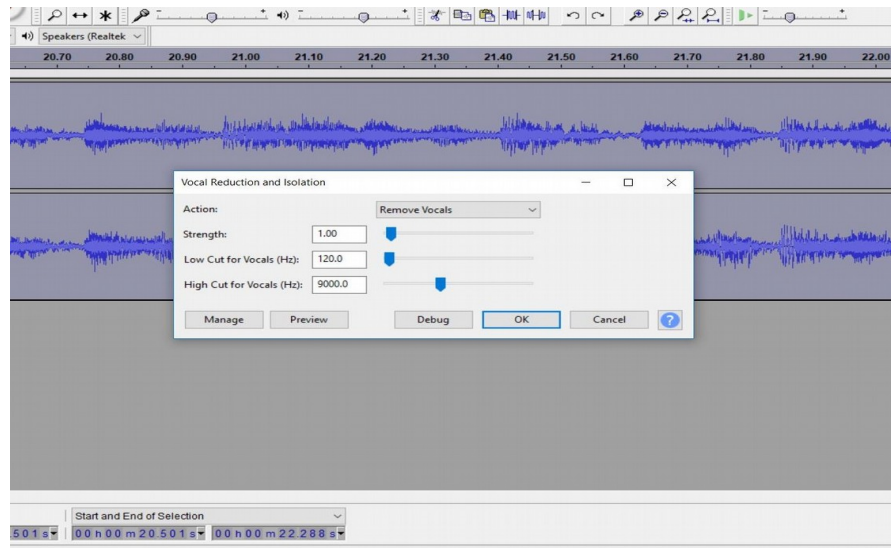
I use this but it does not really "isolate" the vocal as described. It does reduce the volume of the vocal so that it does not over power the instrumental part of that music in that section.

Here are the steps.
1. **Select** your music. Make sure it is a "backup" copy to work on.
2. **Play** the music to where you hear the vocal you wish remove.
3. **Select** that section, "start" and "end points" of the wave form.
4. **Click "Menu", Click "Effect", Click "Vocal Removal"**, *Select* the correct "Plug-in".
5. In this dialog window, the **Remove "Vocal"** in the "Action:" location should be selected. Leave the "Strength", "Low Cut" and "High Cut for Vocals" alone unless you want to experiment.
6. **Click "Preview"** button to hear the new volume.

7. IF that works for you, **Click** the "**OK"** button.
8. Find the next section where the same vocal appears and repeat the process from step 3 above.

Sorry, I could not find a way to "auto repeat" this process.

Vocal Reduction and Isolation screen shot

   b. **Vocal Removal**

   Again, this is complicated as described in the help file. Also I could not get this to work, as described.

F. **Chains (Batch File) Processing**

If you have ever written a "script file" or an old "DOS batch file" or maybe some "Web Page scripting", then you can grasp the idea about "Chains".
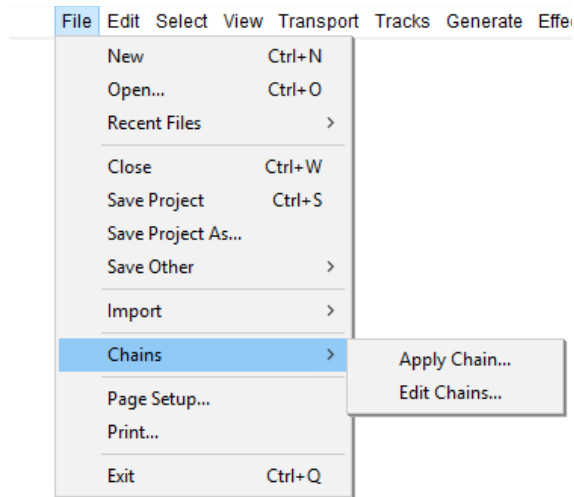
There are two types of Chains; "**Batch Processing"** and "**Effects Automation".** Audacity comes with one pre-existing "Edit Chain" as an example on how to create chains for processing.

NOTE: The files to be "batch processed" and have the chain applied, **MUST** be in a separate directory than your primary music directory.
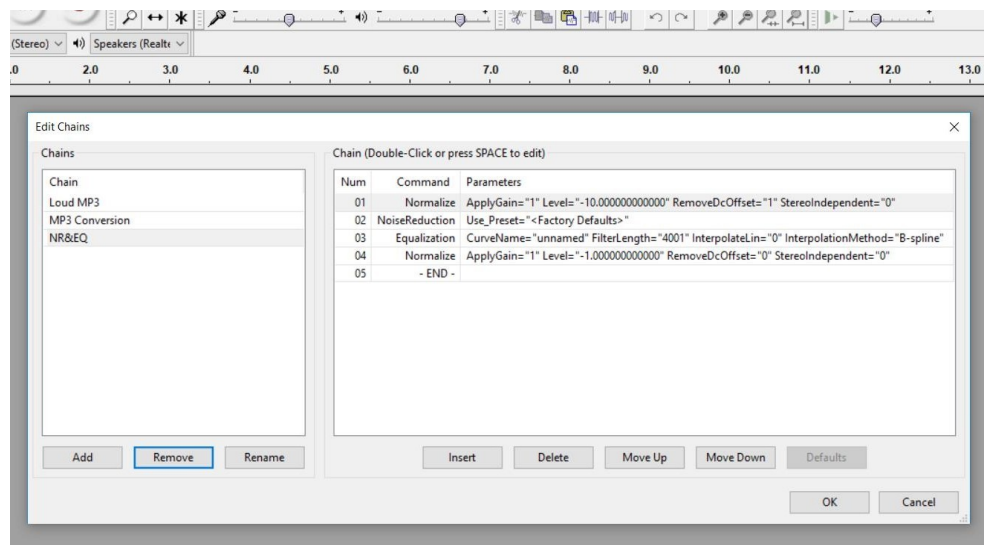
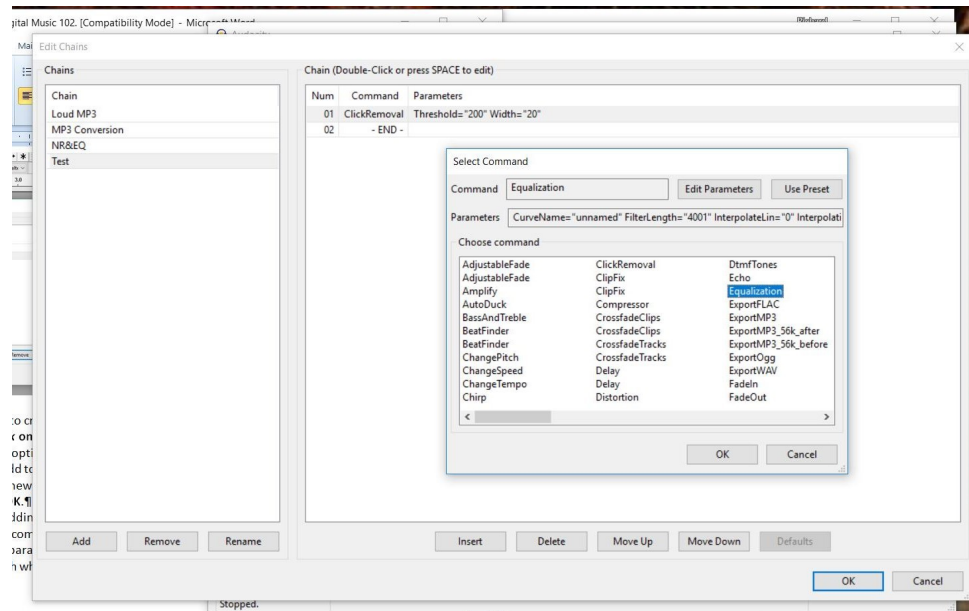   a. **Batch Processing**
      1. **Look at Editing/Creating a Chain**
         a. **Click "FILE", Click "CHAINS", Click "EDIT CHAIN"**

b. When clicking **"EDIT CHAINS"**, the following dialog box appears:

c. If you want to create a new chain, "***Click* Add"** in the left bottom corner. If you want to edit a chain, "***Click* on the name of the chain"** in the left window then the sequence of commands/options/effects will show in the right window.
d. To edit or add to this chain ***Click*** either "**Insert", "Delete", "Move Up"** or "**Move Down"**.
e. To create a new chain, ***Click* "Add",** in the small dialog box type the name of the new chain. Then ***Click* "OK"**.
f. Now start adding you commands/effects by ***Clicking*** "**Insert"**.
g. Click on the command from the list in the "***Select*"** Command Dialog Box. Notice that there are default parameters when selected. ***Click"* Edit Parameters"** to change any of these defaults with what you have learned or experimented with to that command.
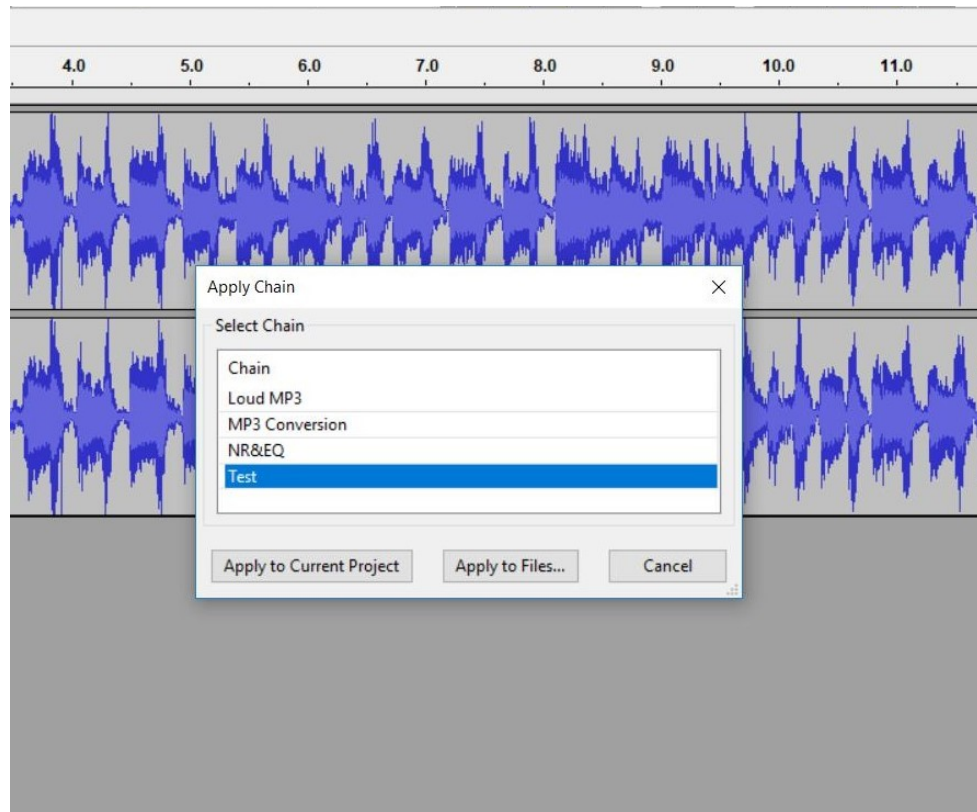
h. Continue to "**Insert" (Add)** commands to your chain as needed. I have found that four (4) commands work well. The less the better. Also some commands work well together while others lock up Audacity, closes it and you have to restart Audacity.

i. To save the new Chain, *Click* **"OK"**. (Move to Apply a Chain for next set of steps)

2. **Apply a Chain**
   At this point, choose only one of your music files to test this chain. Move it to the Test directory you have created for this work.

   There are two ways to apply chains, "*Apply to Current Project"* OR "*Apply to Files"*. To test the chain I always use the "*Apply to Current Project".*

   a. *Select* you music. Make sure it is a backup copy to work on.
   b. *Click "FILE", Click "APPLY CHAINS", Select* the chain you are testing "**Test**".

c. ***Select "Apply to Current Project".*** Now see if the effects work the way you wanted by playing the music file before saving. If things did not work or sound correctly, go back to the "**Edit Chain**" and make your changes.

d. If the chain works then you can apply it to the files in your editing directory by selecting the "**Apply to Files**" button.

b. **Effects Automation**

Effects Automation is nothing more than what you/we just did in applying the chain to a current project. So in preparing your music for use is a combination of steps included from both processes. I your working on one file use "**Effects Automation**". If you want to speed up managing your files use "Batching Process of "**Apply to Files".**

G. **Exporting to Different File Types**

There are a number of audio formats that Audacity, as shipped, can export to. Other formats can be added by installing extra software libraries.

- As shipped formats include **WAV**, **AIFF**, **Ogg Vorbis**, **FLAC** and **MP2**.
- To export as **MP3**, the optional **"Lame MP3"** encoder must be installed.
- You may install the optional FFmpeg library to export to many more audio formats including **AC3, AMR(NB), M4A(AAC) including MP4** and **WMA**.

I have included on the flash drive these last two files for those attending the conference. They are "freeware" and can be downloaded over the WEB for those not attending.

In each of the examples above, I have included the steps to save the files; all you need to do is select the file format to save the project or music file to and the location.

H. **Summary**

Well, that's it! Now, your music is ready to use. I hope that this Session has helped the novice as well as the more advanced computer user with some of the features of Audacity that can make your life easier when working with your music files, and converting vinyl into MP3.

Remember, a lot of using Audacity is "trial and error" and seeing what works. Save those steps in "chains" then applying the chains to either the current project (current music file) or to all the music files in a test or temp directory.

Best of luck to you in making Audacity work for you and your music!