21M.380 · Music and Technology
Recording Techniques & Audio Production

Sound editing exercise 2 (ed2)
Equalization

Due: Monday, October 10, 2016, 9:30am
Submit to: Mit Learning Modules ▸ Assignments
5% of total grade

1 Instructions

Using only parametric filters and EQs, process the provided sound files such as to complete the tasks described below. In an accompanying write-up, describe separately for each audio file which problems you faced and how you have addressed them.

1.1 Source materials

The source files for this assignment come from Chris Ariza's 21M.380 ocw archive and from Mike Senior's Multitrack Download Library and have been kindly provided for educational purposes.[1]

- 03_Snare.wav and 05_Bass.wav from http://www.multitracks. cambridge-mt.com/MR0804_JesperBuhlTrio.zip (39 MB)

- 09_BassCab.wav from http://www.multitracks.cambridge-mt.com/ MR0911_BobbyNobody.zip (70 MB).

- femaleVoice02.aif and kick01.aif from http://ocw.mit.edu/ ans7870/21m/21m.380/S12/audioProcReport01.zip (23 MB)

- http://www.root.cambridge-mt.com/SiteAudio/MSFTSS/Ch11/MS1116_ GuitarHum01_Raw.wav[2]

[1] See https://ocw.mit.edu/ help/faq-using-ocw-materials/ and http://www.cambridge-mt.com/ms-mtk-UsageFAQs.htm for details.

1.2 Tasks to be completed

You are *not* required to edit or submit any audio files from the downloaded .zip archives other than the six files listed below. Remember, only parametric filters and EQs may be used.

[2] If you get an error message in your browser for any of the files on cambridge-mt.com, reloading the page should resolve the problem.

- 03_Snare.wav: Optimize the snare's timbre to taste by means of peaking filters. Also try to remove leakage from other instruments without affecting that timbre, but do not sacrifice too much.

- `05_Bass.wav`: Remove leakage from other instruments with a high-cut or HF-shelving filter. Use peaking and notch filters to iron out unpleasant resonances in the bass and give the bass more definition.

- `09_BassCab.wav`: Attenuate unpleasant resonances and adjust the overall timbre to taste, such that it would mix in well with the rest of the band. Use primarily peaking and notch filters.

- `femaleVoice02.aif`: Start by identifying the low-frequency background rumble in this recording (which will require a decent pair of headphones or loudspeakers). Remove the rumble with a low-cut filter, but without noticeably affecting the vocal timbre.

- `kick01.aif`: Remove leakage from other instruments and improve the kick drum's definition without introducing unpleasant resonances. Use high-cut or HF-shelving as well as peaking and notch filters.

- `MS1116_GuitarHum01_Raw.wav`: Remove the AC hum on the guitar, which is best addressed by a series of very sharp notch filters tuned to the harmonics of the recording location's power line frequency (60 Hz in the US, 50 Hz in Europe – a fantastic way to determine where a recording might originally have been conducted).

2 Guidelines

2.1 Some general remarks on EQing

I would like to refer to EQing as the art of compromise. Or, as I recall reading somewhere, EQing compares to make-up in reasonable doses, but it's more like heavy plastic surgery if overdone. Neither should you think of sound editing as a process that primarily fixes problems, nor will an EQ allow you to fix all the problems that you might identify in the provided sound files. You might never get entirely rid of leakage from other instruments, for example, without destroying the timbre of the actual instrument you are working on. Instead, find a balance that satisfies you. This will require some of that most elusive property of the human auditory system, which we all need to keep developing: taste. ☺

   Another important purpose of this assignment is to learn how to switch your attention to different levels of detail in an editing project. Once you start listening in detail, the things that need to be taken care of do not seem to end. But if you actually decide to

address them all, you and your ears will soon develop fatigue, and you will unlikely make the best possible decisions. Any editing project should therefore aim to use the engineer's ears efficiently and economically. Try to create a first version of your edit rather rapidly (definitely within a space of minutes, not hours), and then take a step back. Take breaks. Plan to revisit your project on another day. These things are essential to develop your aural judgment.

2.2 Which software to use?

Use *Reaper*, or whichever other DAW package you might have agreed on with the instructor, for this asssignment.

- Reaper: On the audio track, click FX ⟩ VST: ReaEQ (Cockos) .

- Logic: On the audio track in the mixer, either double-click on EQ , or select Audio FX ⟩ EQ ⟩ Channel EQ ⟩ Mono . Details:

  - https://youtu.be/rQJ2ccrHE0Y?t=1m12
  - http://logic-pro-expert.com/logic-pro-blog/2014/01/20/logic-pro-x-channel-eq-tutorial.html

- Ardour under Linux:

  - Install the x42-plugins package from the Ubuntu Software Center or via the terminal (sudo apt-get install x42-plugins).
  - In Ardour, right-click *above* the Fader symbol in the plugin section of the channel fader and select New Plugin ⟩ By Category ⟩ Equaliser ⟩ x42-eq – Parametric Equalizer Mono . You should then see a x42-eq symbol above the Fader symbol. If it is instead below the Fader symbol, drag it to the right place with the mouse.

2.3 Rendering the results

Method 1 You can either set up a dedicated DAW session for each source file and, when you are done, render the master output:

- Reaper: File ⟩ Render ⟩ Master mix

- Ardour: Session ⟩ Export ⟩ Export To Audio File(s) …

- Logic: File ⟩ Bounce ⟩ Project or Section…

A challenge that you will face is that you will be required to render the source files, which are mono (single-channel), back to mono audio files, whereas the master output of your DAW is stereo by default. The following options will be useful for a workaround:

- Reaper: File ⟩ Render ⟩ Options ⟩ Channels

- Ardour: Session ⟩ Export ⟩ Export To Audio File(s) … ⟩ Channels ⟩ Channels

Method 2   Or you can set up all source files in a single DAW session,[3] mute channels as needed[4] while you work, and then render all tracks individually to separate target files:

- Reaper: File ⟩ Render ⟩ Stems (selected tracks)

- Ardour: Session ⟩ Export ⟩ Stem export …

Again, note that you are required to render the (mono) source files to mono audio files. The following options will be useful in this respect:

- Reaper: File ⟩ Render ⟩ Options ⟩ Tracks with only mono media to mono files

- Ardour: Session ⟩ Export ⟩ Export To Audio File(s) … ⟩ Channels ⟩ Channels

2.4   Accompanying write-up

The purpose of the write-up is for me to have something to refer to whenever questions arise regarding the editing decisions you have made. Keep this document very concise and informative, and do not make it too verbose. This should really be an editing, not a writing assignment.

Your write-up should include all relevant EQ and filter settings in either tabular form (make sure you include all relevant units) or – preferably – as legible screenshots. Rationalize your choice of these parameters in the text. Try to verbalize the audible effects of your editing processes.

3   Submission format

Submit your assignment as a single archive `submission.zip`, which should be structured as follows:[5]

[3] This approach works particularly well here because all source files share the same sample rate, so no resampling will be required.

[4] I recommend to *mute* the tracks *not* needed rather than to *solo* those that are, since the solo bus often introduces additional signal processing that we want to avoid.

[5] Please make sure you stick closely to the requested submission format. Detailed guidelines can be found in the syllabus.

```
submission.zip

├─ writeup.pdf (1–3 pages)

├─ 03_Snare.wav (mono, 44.1 kHz, 24 bit)

├─ 05_Bass.wav (mono, 44.1 kHz, 24 bit)

├─ 09_BassCab.wav (mono, 44.1 kHz, 24 bit)

├─ femaleVoice02.wav (mono, 44.1 kHz, 24 bit)

├─ kick01.wav (mono, 44.1 kHz, 24 bit)

└─ MS1116_GuitarHum01_Raw.wav (mono, 44.1 kHz, 24 bit)
```

- Please do really use the original source files' base names for the six audio files that you submit.

- Make sure you render all files in mono, not stereo! See section 2.3 for details on how to accomplish this.

- Double-check all rendered files to ensure that they comply with the requested format (mono, .wav, 44.1 kHz, 24 bit). There are many ways in which this information can be retrieved from an audio file. Find a method that you are comfortable with and that works for your specific software environment.

- Each submitted audio file should have the same duration as the original source file. Avoid mysterious silence at the end of a file, for which Reaper's `File ⟩ Render… ⟩ Render bounds` option will be useful.

- No accidental submission of the original (unprocessed) source files, please. This is *your* responsibility!

4 Assessment criteria

The submitted audio files should demonstrate your ability to handle the following tasks by means of a digital audio workstation (DAW).

- Using parametric filters and EQs to increase the quality and mixing potential of recorded sound

- Rendering audio files in a specified format

References & useful resources

Ariza, Christopher (2012). *21M.380 Music and Technology. Filters and Filter Parameters*. URL: http://ocw.mit.edu/courses/music-and-theater-arts/21m-380-music-and-technology-recording-techniques-and-audio-production-spring-2012/lecture-notes/MIT21M_380S12_lec07.pdf (visited on 09/30/2015).

Izhaki, Roey (2011). "Equalizers." In: *Mixing Audio. Concepts, Practices and Tools*. 2nd ed. Focal Press. Chap. 14, pp. 202–57. ISBN: 978-0240522227. MIT LIBRARY: 002302617.

Katz, Bob (2014). "Audio restoration." In: *Mastering Audio. The Art and the Science*. 3rd ed. Burlington, MA: Focal Press. Chap. 8, pp. 111–23. ISBN: 978-0240818962. MIT LIBRARY: 002307049. On course reserve at the Lewis Music Library.

Senior, Mike (2011). "Equalizing for a reason." In: *Mixing Secrets for the Small Studio*. 1st ed. Focal Press. Chap. 11, pp. 171–90. ISBN: 978-0240815800. MIT LIBRARY: 002092991. Electronic resource. Accompanying information and sound examples: http://www.cambridge-mt.com/ms-ch11.htm.

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