

High Quality Podcast Recording

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Markus Völter
(voelter@acm.org)

Introduction

A good podcast comes with great content as well as great audio quality. Audio quality is as important for podcast as is layout, style, and formatting for documents. Just as these parameters influence readability, audio quality influences “listenability”. If you want to get a decent-sized audience as well as (potentially) interesting guests you have to make sure your content is presented adequately. Audio quality is an important ingredient here.

Note that today most well-known podcasts have really high production value, including professional audio quality. Some of the podcasts describe the equipment and the recording process, most don't. This document describes omega tau podcast's approach to recording decent quality audio . While it is not as professional as what Leo Laporte does [1], is also much more affordable. I hope this helps new podcasters get up to speed faster than I ☺

Environment

The most important ingredient to good audio quality is the quality of the raw audio. An important parameter here is the environment in which you record. Obviously, it should be as quiet as possible. That also means that you should make sure your computer does not produce excessive ventilation noise. There are silencer kits, although I don't use any of these.

The next important consideration is the dryness of sound. The sound is dry if it has no echo or other effects – natural or artificial – are applied to it. For the recording this means you should try to avoid any echo whatsoever. This is surprisingly hard to achieve outside professional studios. An office room with lots and lots of books and carpet and stuff is a good start. The inside of cars is also surprisingly good! You can also use specific dampers to achieve this effect. For example, I use a couple of HOFA audio absorbers [2] to dry up my voice.



Apart from just sounding better, not having an echo on the recording also makes editing easier. It is hard to cut something out when “echo sounds” remain after cutting.

Recording Equipment

Microphone

The next step for good audio is the microphone and recording equipment. As for the microphone I use a Heil PR 40 [3] together with a pop filter from BSW [4]. I also use a suitable microphone arm [5] and a spider web microphone mount from Heil. This makes sure that the microphone is free from movement noise from the surrounding.



Voice Strip

The next step in my processing chain is a microphone preprocessor, also known as a voice strip. We use two of them - one for Nora, one for me:

Aphex 230 [15]:



dbx 286a [6]:



These devices have a couple of features that improve the sound of spoken voice. The specific settings require some tweaking. It is important to make the voice sound “full”, but you don’t want to make it a radio DJ-style, big bottom booming voice either. The following table briefly explains these features and the settings I use for the dbx 286a.

High-Pass	Removes sounds below 80Hz	On
Compressor	Used to adjust the volume of your voice: increase quiet stuff, dampen loud parts.	Drive: 5 Density: 4
De-Esser	Removes the loud hissing sounds produced for example by s-sounds.	Frequency: 5k Threshold: 6
Enhancer	Basically an equalizer	LF Detail: 5 HF Detail: 3.5
Expander/Gate	Removes very very quiet sounds and zeroes it.	Threshold: -15 Ratio: 1.5:1
Output	Output Gain (make sure it never clips!)	Gain: +8

Mixer & Recording

Until recently, I used the Onyx 1620 [7] as a mixer. I have since switched to the Focusrite Scarlett 18i20 [19] , a USB audio interface. I do the routing with their software on the Mac.



The actual recording is done on a PC running Adobe Audition [13] based on the Onyx FireWire driver. Recording could also be done with the free Audacity tool. However, for editing, Audition is significantly better.

Cables

From time to time I hear that good audio cables are important for good sound. I have to say I cannot confirm this. While I don't use the cheapest cables, I don't use anything fancy either. You might want to make sure you don't have any unnecessary adapters or plugs, though: in my previous mobile setup I had used XLR to 1/4" stereo jacks and this actually did produce noticeable noise.

Recording from Skype

If you want to record from Skype, there are various Skype recorder software packages such as Pamela. However, my experience is that external recording equipment is better. In my case I simply route the line-out of the notebook that runs Skype into one of the line-in channels of the Scarlett USB interface, which then routes it back into Audition (you can do that on a single PC/Mac).

Skype can produce very good audio quality if you're lucky and if you stick to certain rules. All of them are explained perfectly in this video [9]; I have also collected some best practices on the omega tau site [20]. Apart from the obvious stuff such as shutting down everything else on your machine, especially the thing about a dedicated fixed port (which avoids intermediaries in the packet transport) seems to be very important.

Also, you want to make sure that your guest at the other end uses an acceptable microphone. 20 EUR USB headset microphones are good enough, the built in microphones of most notebooks are not. The Macbook Pro is an exception.

It is, however, still important that the guest uses headphones, otherwise you will get your own voice, through his speakers, back into your recording on his track. This is almost impossible to edit out.

Recording from the Telephone

In many cases you will also want to record the good old telephone. One way of doing this is to call the person via SkypeOut and then use the Skype-based recording process. I record the phone directly with a a Telos ONE digital telephone hybrid [10].



It captures "the other end" of the telephone conversation and feeds it into the mixer. It also feeds my own voice signal from the mixer into the telephone. The setup produces really good quality if the telephones you use are connected via real land lines. Voice over IP phones (found more and more often in corporate environments) will result in significantly reduced quality.

Studio Link

Studio Link [21] is a remote audio solution that produces amazingly good audio quality, much much better than Skype. In fact, used correctly, one cannot tell that the recording is remote! Studio Link has hardware and software solutions.

I have not used it so far because (and this is its only drawback) guests are typically familiar with Skype, but not with Studio Link. However, if you want to do a „panel podcast“ with the same group of (remote) people in every episode, Studio Link is the only sane alternative.

Mobile Equipment

To record conversations outside of my studio I use a Zoom H-6 [11] as the recording device. It can record four tracks over all simultaneously. Importantly, it can connect up to 4 XLR mic unputs. It creates uncompressed WAV files. It also has a built in compressor.



We use AKG C 520 [12] headset microphones with pop filters; they can be plugged into the H-6 via the XLR connectors directly.



Using headset microphones is important to make sure the speakers don't move the microphone away from their mouth while talking. Make sure the microphone does not touch the speaker, and put it outside the mouth/nose breathing airstream.

Sometimes, when I record outside or when we move through stuff, I also use the built-in microphones of the H6. This does not result in great audio quality, but it makes sure nobody gets tangled up in XLR cables.

The “standard” podcaster headsets are the Beyerdynamic DT297 [16]. They have somewhat better audio quality, and all participants can hear “the mix” in their headphones. However, I often carry the recording equipment on business trips, and weight and volume is a factor: the AKG C 520s are just much smaller; and this is more important to me than the last 5% of audio quality.

Postprocessing

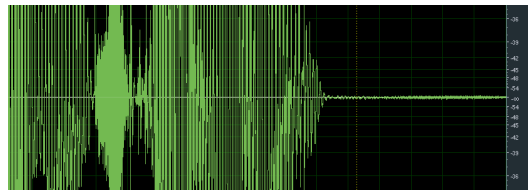
If you record the raw data in the way explained above you will not have to do a lot of postprocessing (of course you have to do content editing, but not a lot of sound stuff).

The most important thing I do is adjusting the levels to make sure that the voice has an even level and is pleasant to listen to, especially in noisy environments where podcasts are often consumed. Let's look at an example.

Here is the waveform of a raw recording. Notice the different levels (amplitudes). We want to make sure they are more even after postprocessing.

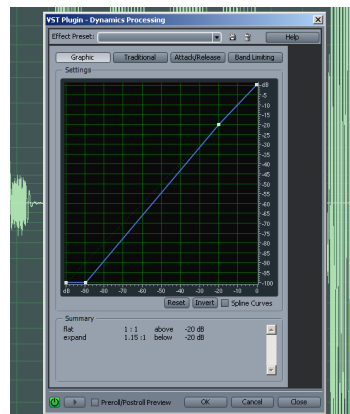


If you zoom in you can see that the parts that look quiet really are not completely quiet (which will be a problem when we use the limiter later).

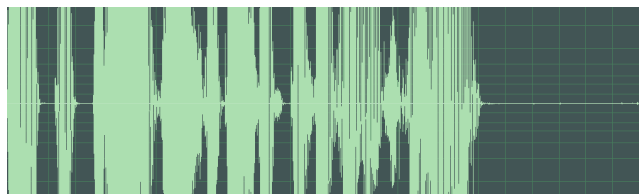


So the first thing I do is to run the dynamic processor to remove everything below -90 dB (sometimes also below -80 dB if there is more noise).

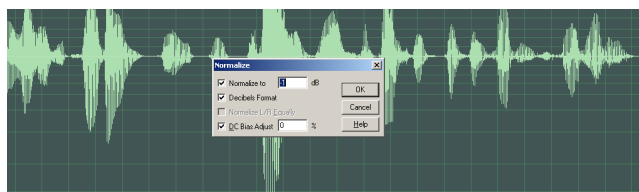
Alternatively you can also use a noise reducer, if it is good quality (the Audition noise Noise Reduction (Process) works well).



As you can see, this makes quiet parts really quiet. This also makes editing much simpler!

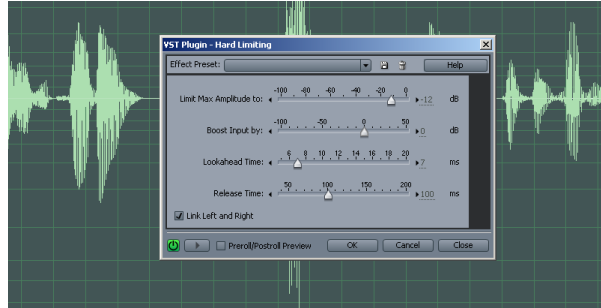


I then use the normalizer to "pull up" the max amplitude to -1 dB, exploiting fully the available dynamic range.

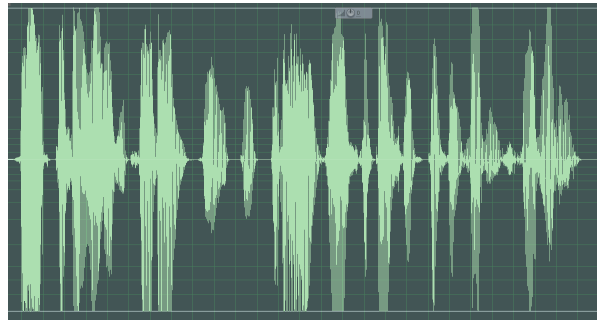


I then use the limiter to cut away everything above a certain dB limit. Depending on the raw material this can be anywhere between -3 and -15 dB.

Sometimes I use a compressor instead of the limiter – I can never tell which sound I prefer :-)



I then normalize again to -1 dB. This results in a relatively homogeneous amplitude. In the example at the right you might want to do the limit/ normalize sequence once again, for example at -4 dB.



Mixdown

There's not much to consider during mixdown. If you use the postprocessing approach shown above for all the constituent parts of the final mix, the overall volume should be fine. Here are a couple of things to consider:

- Sometimes you want to adjust the overall level between the tracks. For example, things recorded via the phone aren't perceived as loud as locally recorded material (phone recordings have less base!). So you might want to boost the phone track by 2 or 3 dB (or lower the local track by that amount).
- If you use music, especially highly compressed rock music, make sure you reduce it by 3 to 4 dB since it is always perceived to be louder than the actual numerical dB value suggests.
- Finally, if you have a dialog of two people, you might want to use +15/-15 stereo panning. More than +15/-15 is annoying, don't do it.



Final Production & Chapters

As a final step, I run the finished MP3 through auphonic [17], a free audio production web service. It does overall leveling, according loudness standards used for radio and/or online publishing. It also supports defining presets that include most of your ID3 Tags, so this simplifies the overall production quite a bit.

Auphonic also adds chapter marks into the MP3 file. The chapter marks are provided in a simple text format (explained at auphonic).

References

- [1] <http://wiki.twit.tv/wiki/Equipment>
- [2] <http://hofa-akustik.de/pages/produkte/absorber.php>
- [3] <http://www.heilsound.com/pro/products/pr40/index.htm>
- [4] <http://www.bswusa.com/proditem.asp?item=RE27POP>
- [5] <http://www.heilsound.com/pro/products/pl2t/>
- [6] <http://www.dbxpro.com/286A/286A.php>
- [7] <http://www.mackie.com/de/products/onyx1620/>
- [8] <http://www.mackie.com/products/onyxfirewire/>
- [9] <http://www.blogarithms.com/index.php/archives/2007/12/23/skype-for-interviews/>
- [10] <http://www.telos-systems.com/one/default.htm>
- [11] <https://www.zoom-na.com/products/field-video-recording/field-recording/h6-handly-recorder>
- [12] http://www.akg.com/site/products/powerslave,id,984,pid,984,nodeid,2,_language,EN.html
- [13] <http://www.adobe.com/products/audition/>
- [14] <http://www.conversationsnetwork.org/levelator/>
- [15] <http://www.aphex.com/aphex-products/973/>
- [16] <http://www.beyerdynamic.de/shop/dt-297-pv.html>
- [17] <https://auphonic.com/>
- [18] <http://retail.contourdesign.com/?/products/23>
- [19] <https://focusrite.de/usb-audio-interfaces/scarlett-18i20>
- [20] <http://omegataupodcast.net/feedback/for-guests/>
- [21] <http://studio-link.de/>