



The Podcaster's Audio Handbook

A Technical Guide
for Creative People

Corey Marie Green

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Creative People**

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About the Author



Corey Marie Green is an audio engineer from Melbourne, Australia, who specializes in podcasting and radio. She has filled many roles in her radio career, including journalist, producer, editor, and sound engineer at live events. Through her business, Transducer Audio, she provides a range of services for podcasters including editing, content development, and training.

Photo Credit: Karoline Morwitzer

About the Technical Reviewer

After completing studies in both sound production and electronic engineering, **Riah Williams** has been professionally active in the communications, broadcast, and music industries. As Station Technical Worker at 3CR Community Radio in Melbourne, Riah has set up remote live broadcasts from rallies and blockades, parks, pubs, and inside prisons. In 2014, Riah designed talkback equipment which was installed in 16 community radio stations in Timor-Leste. Riah's time is currently divided between 3CR and repairing music instrument amplifiers at Open Ear Audio.

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Preface

UK comedian Deborah Frances-White was about to quit comedy due to the grind of dealing with sexism in the industry. Instead, she decided to start a podcast: *The Guilty Feminist*. When she shared her experiences, she found a community of like-minded people and created a much-needed space for diverse comedians.¹

The audio quality of your podcast is important, because your podcast is important. Most podcasters start out because they're passionate about a topic and want to share that passion with other people. Your podcast might make people laugh, teach them a new skill, or inform them about an important issue. Podcasts are an excellent way to build community. However, poor-quality audio can be an impediment to reaching your audience.

The Importance of Audio Quality

Audio quality sends a message to your listeners about how much you value your ideas. And it's not just your ideas: if you invite a guest onto your podcast, you will want to give them the best platform possible. If you value your work, then it will encourage others to do the same.

Good-quality audio is not just an extra, it's an accessibility issue. Improving your audio quality will make your work available to a much wider audience.

¹ Frances-White, D., 2018. *The Guilty Feminist: From Our Noble Goals To Our Worst Hypocrisies*. London: Virago.

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You should also consider that the audio you release into the world might not reach your listeners in the same state as you sent it. Even if your initial recording sounds OK, a podcast that has been played through a streaming service undergoes processing. On top of that, you have no control over the equipment your listeners are using or the circumstances in which they're listening. You do have control over the recording and editing process.



You can't stop a member of your audience from listening to your podcast in a laundromat out of an old shoe, but you can release a podcast with high-quality audio

High-Quality Audio Is Accessible Audio

Maximizing your audio quality makes your podcast accessible to a wider range of people. When creating a podcast, you should consider who your audience might be and what needs they have. Low-quality audio could make it impossible for certain people to access your work.

People who are hard of hearing particularly need a podcast to be clear. This might be a specific consideration if you expect your audience to be older or to be made up of people who frequent rock concerts.

Another thing to consider is that you or an interviewee might have difficulty speaking. Alternatively, you could be speaking with an accent that is different to your listener's. It's incredibly important to include a diversity of voices in the media, and independent media such as podcasts often take up this work. In this instance, a high-quality recording will be helpful for the listener.

Your listener's attention may be divided between your podcast and another task. In 2019, Edison Research surveyed podcast listeners in the United States and found that 59% of respondents had listened to a podcast while doing chores.² You may be competing for your listener's attention with the task of removing mold from between bathroom tiles. You will know from your own experience that it takes your full attention to be able to understand poor-quality audio. You want to make it easy for your listener to be able to concentrate on both tasks.

Often people listen to podcasts in noisy environments: on the train, while driving a car, or while working. Audio that has inconsistent volume levels is impossible to listen to in these circumstances.

Your listener might be using poor-quality equipment, or they might have a poor Internet connection. It's not uncommon for people to listen to a podcast using low-quality earbuds or out of the tinny speaker of their smartphone.

² Edison Research. 2019. *The Infinite Dial - The Podcast Consumer 2019*. [online] Available at: www.edisonresearch.com/wp-content/uploads/2019/04/Edison-Research-Podcast-Consumer-2019.pdf



Podcasts are often played through the speaker of a smartphone. This can significantly reduce audio quality

I have prepared an audio file so you can appreciate how much audio quality can degrade between your original work and the final playback. In this case, I have uploaded the file to the Internet, streamed it through Apple Podcasts, and played it back through the speakers of my smartphone on my parents' porch (Audio 0-1).

Audio 0-1 How your podcast might sound when played through the speakers of a smartphone in a noisy environment

You can hear quite a difference between the quality of the audio at the beginning of the file and the quality at the end. The words I am speaking are still clear at the end of the file, but only because the original recording was of a high quality.

If you do everything you can to maintain the quality of your audio files through the recording and editing process, you'll be making your podcast accessible to the widest audience.

Maximizing Audio Quality to Compensate for Challenging Conditions

One of the great things about podcasting is that if you live somewhere with an Internet connection, there's a low barrier to entry. That does not mean that podcasts are created on an even playing field.

Sometimes your recording environment can be quite noisy, or you might have to work with low-end equipment. You might need to conduct an interview over the phone or the Internet, which is convenient but can compromise audio quality. It is at these times that it is particularly important to understand audio engineering techniques.

Regardless of your circumstances, you can improve the quality of your podcast using the audio engineering techniques contained within this book.



Understanding audio engineering techniques will help you make a clear recording in a noisy environment, such as a UFO convention

How This Book Works

The information in this book will help you to optimize the audio quality of your podcast in the easiest and most effective ways. Once you have a handle on some audio basics, you can focus on expressing yourself creatively and making content that will connect with your audience.

This book is intended for both new podcasters and well-established podcasters who wish to improve their audio. For many people, podcasting is their first exposure to audio engineering. While there are many online resources available for podcasters who wish to improve their audio, it can be hard to know where to start. Many podcasters will make a few recordings, run into problems, and then look for a way to fix them. The solutions they find can be difficult or expensive and often unsatisfactory. This guide provides an overview, which will help you avoid common audio issues before they arise. I know that people often dip in and out of technical books, but there is a benefit to reading this book in chapter order.

Many online resources assume a high level of technical knowledge. My aim is to make the information in this guide accessible to people who don't have that background. As mentioned, I have concentrated on the simplest and most effective techniques for improving audio quality. I have presented the information in plain English and demonstrated my points with real-world experiences. I explain key audio terms as they arise, and you will also find a glossary. The most important points in every chapter are summarized so that you can refer to them later. This guide will provide you with a solid foundation in basic audio techniques: enough information to get started, make a really good recording, and shape it into a podcast. If you then decide you want to learn more about audio engineering as it relates to podcasting, then having this solid foundation will make it much easier for you to access audio industry resources.

One of the principles that I work from is that it's easier and more effective to make a high-quality recording than to fix a low-quality recording. As such, most of the book concentrates on the process of

making a high-quality recording, with only two chapters on editing at the end. Even though a large part of my work as a sound engineer involves repairing audio, I barely cover this topic in the book because it gets quite complicated. You can think of fixing a bad recording as being a bit like trying to fix a cake after you've baked it. You can cut the burnt bits off the cake and add more icing, but if you really want a good cake, you'll need to start again – this time with a recipe book.



Trying to fix a bad recording can be a bit like cutting the burnt bits off a cake and adding more icing

It's easier to make a high-quality recording if you're using suitable audio equipment, but not everyone has a huge budget to spend on the latest gear. Where possible, I have made suggestions on how to get the best sound for the least money. Following on from the principle that it's easier and more effective to make a high-quality recording than to fix a low-quality recording, I recommend spending more money on the recording stage of your podcast than the editing stage. As such, I advise you in Chapter 2, "Gear," to invest in some good-quality recording equipment, but then I demonstrate editing techniques using the very basic audio editing

PREFACE

program *Audacity*. Audacity might not be the best audio editing program, but it's the most accessible – it is free, it runs on Windows and Mac, and it is adequate for creating a basic podcast. If you wish to undertake more advanced editing, then I discuss a few other options in Chapter 8, “Editing.”

Throughout the book, I demonstrate techniques using specific pieces of audio equipment and computer programs, but you might already have a setup. The audio techniques and principles that I am discussing apply to similar equipment and programs.

Some people might find the idea of presenting a very polished podcast as being inauthentic. They might feel that removing some of the rough edges compromises their DIY ethic. Why might people feel this way? It's because technical choices are a part of the creative process. While everyone needs to know the basics, technical choices can be an important part of the storytelling, helping you create atmosphere and individual character. I don't want you to see this book as a series of rules about recording and editing. Instead, I hope to demonstrate that a good understanding of the technical side of podcasting will enable you to express yourself and to reach the people who are important to you. I have included audio clips throughout so that you can hear the outcome of technical choices and learn to be the judge of your own work. For those who are reading the print version of this book, the audio files are located at <https://www.transducer-audio.com/audio-files-for-book>. Saying that, there is a focus on creating clear recordings of human speech, so as to make podcasts accessible. Not every podcast has to sound like it was produced in a professional studio, but every podcaster should make the utmost effort to record and edit speech so that it's intelligible to the listener. Podcasting has become an important way for people to share information, and I would like to see as many people included in that as possible. I will be discussing issues of accessibility throughout the book. Once you have made a high-quality recording, you can present it in any way that you like.

Everyone has to begin somewhere. Some of you will be new to podcasting and some more established. No matter where you are in your journey, I would like you to join me in the next chapter at a time when I was just starting out in radio so that I can share an important lesson that I learned.

CHAPTER 1

File Formats and Settings

A good understanding of file formats and settings can make a huge difference to your audio quality. When working with clients, this is the number one issue that I encounter, so I've put it at the front of the book. No matter what equipment you're using, this is the easiest way to improve the audio quality of your podcast.

I learned the importance of understanding file formats and settings the hard way, while making a radio documentary early in my career.

I had met a woman called Auntie Dawn Daylight. Auntie Dawn Daylight is Aboriginal; she is a proud Jagera-Turrbal woman and a respected elder who is a fixture of Brisbane's West End Community. She looks out for others and is always ready with a joke or a song.

Dawn's childhood experience was shocking – she'd been held as a child slave at my former Catholic high school. Some may find the term "slave" too strong, but Dawn had been taken away from her family, imprisoned, and forced to work without pay. What's worse is that this was a perfectly legal thing to do to an Aboriginal child in the state of Queensland in Australia at the time.

Dawn had a lot of unanswered questions, and I was in a unique position to find some answers because one of the nuns who looked after the school's archival collection was a family friend. I got in contact with the school's archival organization, and they agreed to speak with me

and to show me around the convent. Previously, I had been all over the school, but I had never before entered this area. I can still recall my visceral reaction to finding child-sized cells. I suppose to the nuns they looked like ordinary dormitories, just with higher security. I imagined how they would look to a child who was staring out through the bars wondering why she'd been taken away from her family.

I really wanted to do right by Dawn. I spent a year researching and refining the story. I hoped that the radio documentary could raise awareness for the **Stolen Wages** campaign, which aims to restore the wages of the many Aboriginal people in Queensland who had been forced to work without pay.

Despite all my work, the harsh truth is that the documentary is almost unlistenable. In some places, you can't even make out the words. I released it with an accompanying transcript so that people could follow along.

One of the main reasons the recordings were so bad was because I didn't have a good understanding of file formats and settings. I recorded all of the interviews in the mp3 format. I can't even go back and repair the recordings because I didn't record enough audio data.

Thankfully somebody else made a follow-up documentary with Aunty Dawn. What follows is a technical guide so that you can give full justice to the stories that matter to you.

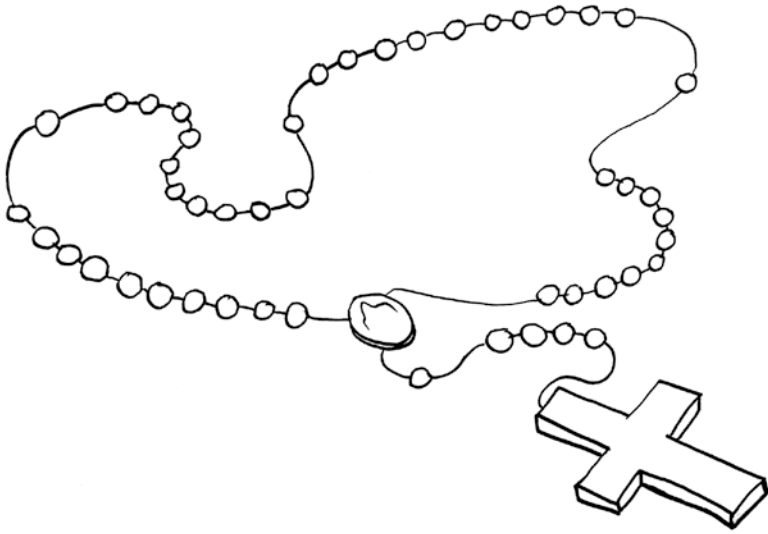


Figure 1-1. *Aunty Dawn described the nuns: “You used to always hear them coming with their rosary beads and keys”*

A good understanding of file formats and settings will help you create files that strike the right balance between size and quality.

In this chapter, I explain some basic audio concepts. I discuss compressed and uncompressed formats, bit rate, sample rate, and stereo vs. mono. These are all concepts that you will encounter in the recording and editing of a podcast. The concepts I am discussing in this chapter apply to recording using a computer or a portable recorder. I go into the settings on a portable recorder in more detail in Chapter 6, “[Recording Outside](#)” in the subsection “[Settings on a Portable Recorder](#)”.

There are two types of learners: people who need to know the reason for things and people who just want to get to the point. I have prepared a summary of this chapter for the latter type of learner where I simply list the recommended file formats and settings. You can find it in this Chapter in the subsection “[Just Give Me the Executive Summary](#)”. If you’re like me and you need to understand something to be able to use it, then read on.



Figure 1-2. *Me making breakfast*

What Is Audio?

When you're working with audio, it pays to know the basics.

Sound moves in waves, like the ripples caused when you drop a rock in a pool of water.

Generally speaking, audio is sound that has been translated into electricity. From there, it can be stored in a number of ways. For example, it can be physically etched into the grooves of a vinyl record. Audio can be reproduced, manipulated, and transmitted. At the end of the process, the audio is played back through a speaker and once again becomes sound.

The squiggly line that you see in your editing program represents the audio waveform (see Figure 1-3).

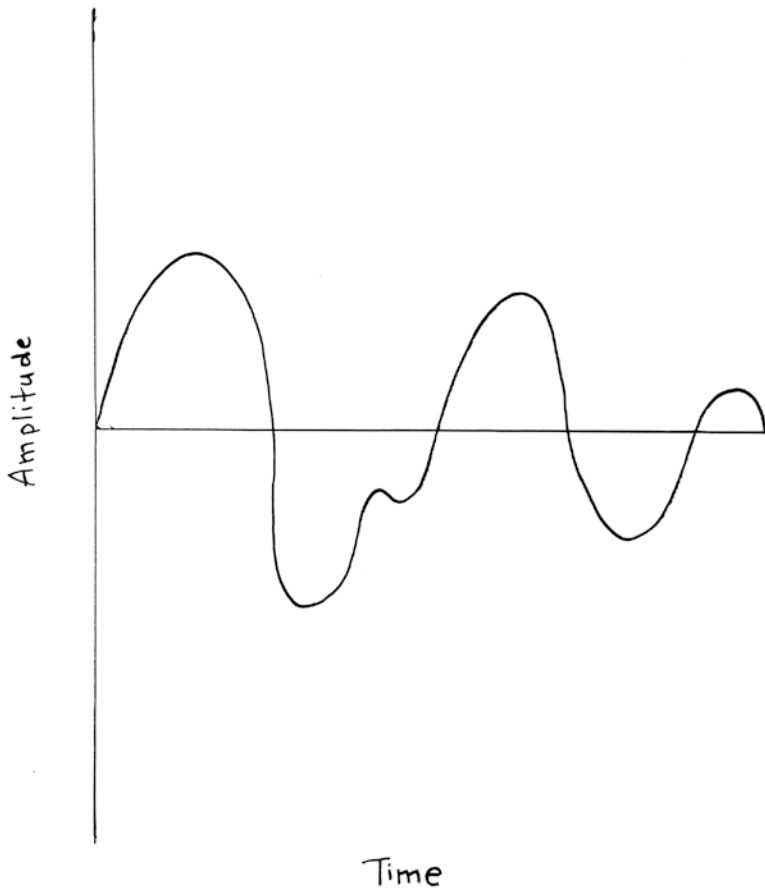


Figure 1-3. *This is a grossly simplified representation of an audio waveform*

This representation of an audio waveform has been magnified many times. If it were a real audio clip, it would be very short.

If you've ever worked with any kind of audio, you probably already know that the horizontal line in the middle is a time value that moves from left to right.

The vertical line that I have marked “amplitude” is the strength of the signal. A strong signal, which looks like a big wave, more or less means a loud signal. I’ll go into this in more detail later.

The audio waveform moves back and forth above and below the horizontal line. You can think of this as your speaker cone (Figure 1-4) moving in and out, pushing the air in and out, and causing a vibration. The round object that you can see on the front of your speaker is a speaker cone.

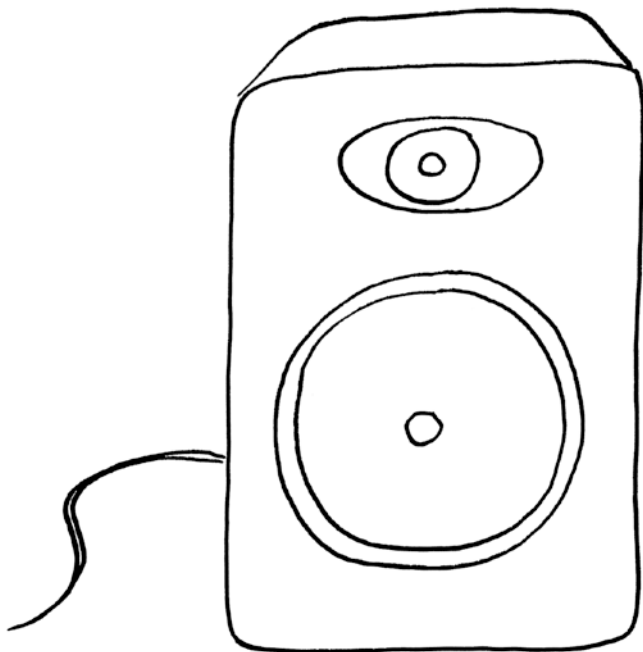


Figure 1-4. *Speaker cones in their natural habitat*

When the waveform is far above the horizontal line, your speaker cone is pushed far out. When the waveform is far below the horizontal line, your speaker cone is pushed far in. At the point that the waveform hits the middle line, the speaker cone is in the middle. If the idea of the speaker cone causing waves by physically pushing air is hard to visualize, then imagine that it’s pushing water as in Figure 1-5.

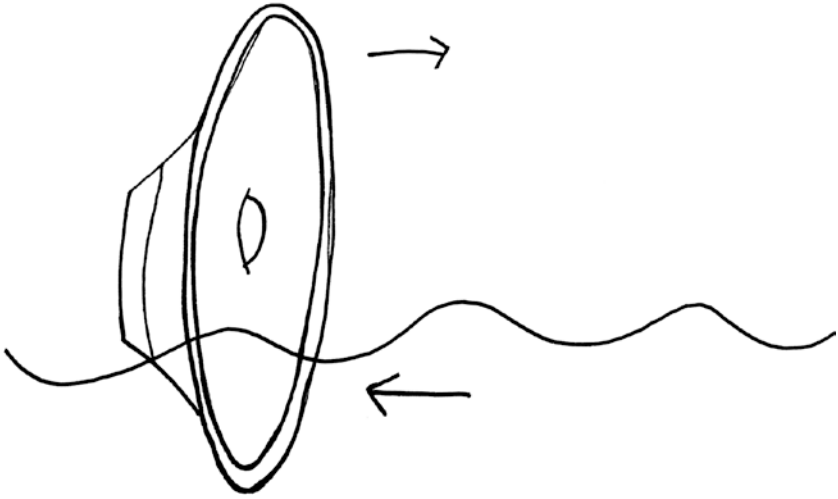


Figure 1-5. *A speaker cone creating a wave by moving in and out*

This all happens very fast, at the speed of a vibration. If you have a speaker at your house, you can put on your favorite tune, crank the bass, and see the speaker cones vibrating.

So, audio is sound that has been translated into electricity, from which point it can be stored in a number of ways, reproduced, manipulated, transmitted, and played back.

Audio can be analog or digital. Vinyl records are one example of an analog audio technology that is still in use today. The difference between analog and digital is that analog waveforms are continuous, whereas digital waveforms are not.

Digital Audio, the Sample Rate, and the Bit Rate

The audio on a CD or a computer is digital audio. The audio on your computer starts off as analog and is converted to digital by an analog-to-digital converter. Digital audio is then once again converted back into analog for playback on your speakers.

Digital audio is different to analog audio in that rather than recording a continuous waveform, the computer samples the waveform. When you set your sample rate to 44,100 Hz (or 44.1 kHz), you are telling the analog-to-digital converter to take a snapshot or a “sample” of the analog audio 44,100 times every second. The data is not stored as a continuous waveform as it would be if it were analog. Instead, it is stored as a series of numbers or points of data.

If you zoom really closely into an audio file in Audacity, you can see the samples (see Figure 1-6).

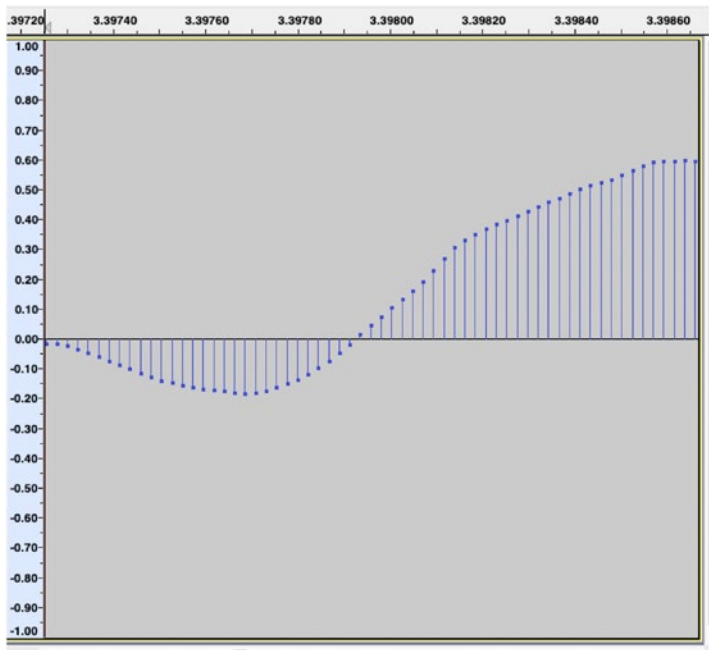


Figure 1-6. *An extreme close-up of an audio file in Audacity*

There are two settings that will determine the detail with which your computer will convert analog audio into digital audio: the sample rate and the bit rate. The sample rate is connected to the time measure or the horizontal axis. You can remember that because it’s a certain number of