In Defense of Digital: What You Actually Miss About Analog Tape

If I had a dollar for every time I heard an artist say, "You know what? I'm doing my next album to tape!" do you have any idea how much Brooklyn-made, handcrafted, small-batch mustache wax I could buy? Williamsburg's local economy would rival Dubai, and people would be building private islands in the East River. Even in 2015, the audio community still seems to be firmly steeped in this ethos of "analog is better… vintage is better… tape is better," and for almost no legitimately defensible reason.

I'm not saying analog is bad or that vintage outboard gear has no place; there's a legitimate reason you still see Fairchild 670s going for $30,000. I'm also not necessarily trying to defend the MP3 as an audio format. **The fact of the matter is that digital is here to stay, and it couldn't be further from "the death of music as we know it," as many in the industry hail it.**

For some reason, there's an overwhelming horde of mindless, message-board-misinformation regurgitating zealots who

demonize the presence of a computer in the recording studio, or look at it as a necessary evil of our ever-increasing progress as the industry more or less railroads itself on digital rails towards some sort of musical Sodom and Gommorah. At least that's what they'd have you believe. So, let's take a look at why digital is not inferior to analog and why it is not the devil incarnate that has ruined music as we know it.

The analog sound

Before we go any further, what is the analog "sound"? Analog purists will throw out words like "rich," "fat," "warm," "unctuous," and any smattering of other terms that make them sound like they're writing a food blog review of a chocolate lava cake at some boutique patisserie more than describing audio. The "sound" that everyone is describing is the non-linear sonic signature imparted by the flow of the signal through certain components. **What's being described is distortion – albeit a pleasing distortion, but it's distortion nonetheless.** Odd or even harmonics, transformers or tubes, tape "compression" – regardless of what you're attributing it to, it's the sonic signature imparted by the process. Many people try to point to analog as more accurate than digital, but it's actually the more colored, less representative of the two.

The irony of analog and tape

We've reached a strange state in the research and development facet of the recording industry. Sit around any group of self-anointed analog enthusiasts, and you'll eventually hear someone say, "Oh man, I love hitting the tape hard. There's just nothing like that tape saturation sound." **And while the hard-hit sound of tape is indeed a certain sound, the sound most people have come to associate with analog and tape is ironically the sound of that gear being used incorrectly.**

Audio developers spent the first 40-some years of the commercial recording industry trying to make studio gear as accurate and transparent as possible, and now plugin developers spend most of their time trying to figure out how to add noise back into our audio workflow. You might be saying, "Aaron, isn't that an argument *for* analog, as it's a sound we've come to expect?" and the answer to that is, in a way, yes. I never said the "analog sound" isn't a totally legitimate part of the tonal palette in the modern studio, because it is. There just seems to be a pervasive misunderstanding on how to apply that in the modern recording realm.

The use of "tape" in the modern studio

Analog tape has become a tool more than a medium, even for the most discerning analog fanatics.

The "sound" of analog isn't the reason to shun digital and all of the vast improvements it brings. Tape, or the emulation thereof, is a totally viable solution to tonal issues. Taking something that sounds thin and brittle and throwing it to tape will usually leave you with a sweetened, fatter version of what you started with. The characteristics (or rather, the imperfections) of tape have a real world application. Sure, we still associate those open reels spinning with the recording process, but go into any major studio today and this is most likely how you will see real or virtual tape being used.

Even modern evangelists of analog recording who point to analog albums of the digital age – albums like *Lazaretto* **by Jack White,** *Brothers* **by the Black Keys,** *Only By the Night* **by Kings of Leon – tend to forget, or may not realize, that all of these passed through Pro Tools through digital converters at some point in their creation, despite seeing tape.** This further reiterates that, yes, there's something that analog tape does that is still applicable in today's recording environment, but no matter what, it has become a tool more than a medium, even for the most discerning analog fanatics. If you look at the plugin market alone, almost everyone makes some sort of analog-modeling plugin now. Much to the analog crowd's dismay, many of them perform arguably better than their hardware counterparts, or at the very least, well enough so that the pros of the software outweigh the cons of the hardware.

So why is it that there's <u>still this burning desire to work straight to tape</u>?

The musty, crumbling church of analog tape

I hear so many people out there interested in "getting that real, warm sound" who are wrapped up in the sea of indoctrination that is the analog tape movement. For many people, this is either a reactionary swing from being disenfranchised with the recording process as a whole, or thinking that since their idols or the album they like "went to tape," things would be better if they did as well. **Most of these people aren't actually embracing the medium itself; they're looking to it as the answer to their creative angst, chasing that elusive "thing" that will fix their musical woes.** Think your band sounds crappy in digital? Wait 'til you hear how crappy you sound in analog. Most of these people pining for this medium have absolutely no concept as to what the process is actually like, or the limitations and headaches associated with it.

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If you want to go to tape as a creative exercise specifically for the limitations it brings, I say go right ahead. Civil War

reenactments and Renaissance fairs are a thing, and it's fun to play "olden times" – I get it. Sarcasm aside, if you're looking to use tape as a tool for your process, or you've always worked on tape and it's truly what you know best, go right ahead. Limited track counts and having to make sonic choices along the way that you have to commit to for some can be a useful exercise. If you're old school and all you've ever worked on is analog tape, and you just don't know how to deal with these kids, their "hippity-hop" and their lasers, then do what you know best. For most people though, this will be the bane of your existence. **If you think it's the absolute only way to get the sound you're looking for, or you think somehow the magic in the magnets is going to add what's been missing to your music, you're setting yourself up for a very sad and very expensive time.**

What are some of these long-forgotten studio headaches people may not know about or may not remember for some reason?

- Tape machines need to be aligned and calibrated before every session.

- Want to use more than the 16, 24, or 32 (if you were that lucky) tracks on one machine? No problem, let me bring in another machine, record some timecode on both reels, run them both together, start tracking, and then pray they don't

stop chasing one another at any point.

- Wow and flutter are more than just plugin parameters; they're a real issue regarding the speed stability of your particular machine and may make for some interesting results on the tape. Tape stretching, depending on the quality and construction of the tape backing itself, can also lead to pitch and time issues.

- Every time you run the tape over the heads, you're literally shaving the high-frequency information from the tape. This can cause problems if an excessive number of passes or punch-ins are needed for a particular section.

- Your average reel of two-inch tape is going to get you about 14 minutes of record time and can run you anywhere from $200 to $400. If you're planning to do a full album, you might want to run a second Kickstarter for your tape alone.

- Analog board and outboard recalls. If you thought waiting a few minutes for Pro Tools to bring in a session was bad, try

the hours of documenting patchbays and settings, followed by the hours bringing those settings up every time you want to change songs based on your drawings alone. Want to just pull that vocal up a touch in the last chorus? Sure thing. Give me four hours, and I'll get a new version of that for you.

- Analog board and outboard maintenance.
  Everybody *loves* the idea of outboard gear and analog consoles, and a fraction of those people have any idea what it takes to keep them up and working. The upkeep of these wonderful pieces isn't always cheap or infrequent, not to mention hard on your HVAC bills. Most people have no concept of what the utility bill for a commercial studio is like when the place isn't even being used. Everyone thinks they're getting a steal on that used SSL J9000, until the first $3,000 electric bill comes from trying to keep that thing from burning up in your control room.

- Storage woes for certain types of tape stock – things like "<u>sticky-shed</u>."

- Print-through ("ghosting" of information from one part of the tape to the other, resulting in part of that print-through

being heard faintly under another part) is a real concern and irreversible.

- It's true edits can be made on tape, but get your trusty razor blade and edit tape handy. Not to mention all edits are destructive. Once they're done, there's no command+Z-ing your way out of it if you decide you don't like what you did. Yes, there are some old school tricks that allow you to nudge some small specific elements around on tape, but to compare your ability to manipulate and edit to modern DAWs, we're talking the Wright Brothers at Kitty Hawk versus the B-2 Bomber.

It leads one to wonder why, with all of these *sweet* conveniences, reel-to-reel ever ceased to be a common thing (may or may not contain sarcasm).

The "problem" with digital

When looking for an ideal recording medium, in a nutshell, you want a medium that when you throw something at it, you get back exactly what you threw at it or as close to that as possible. Many of our digital biases are carried over from early digital methods that had storage issues, hasty release schedules, and

resolution/conversion concerns, and are nothing like the systems we see today, even at the home studio level.

The problem with digital today is that it does that job too well. Many people still file claims of inaccuracy in reproduction – but the issue is not inaccuracy, it's actually too much accuracy. Many make the argument that because digital audio is the result of sampling, it's merely the "suggestion" of a sound. Not only is this a gross oversimplification of the digital conversion process, it's just wrong. For the record, digital audio is *not* stairsteps, so please stop illustrating, diagramming, and therefore arguing about it as such. Those of you who do this are greatly confusing people.

Many people assume that because of the fact that there's a physical, tangible cap to the resolution of digital that it must be inferior. Does that mean we can actually hear this limitation, though? Many people fail to realize, and understandably so, that the human brain is actually pretty bad at processing stimulus information, particularly in sight and sound. We hate to think of ourselves as flawed, but we as humans actually kind of suck as data-taking devices. The entire field of psychoacoustic study circles around this: frequency masking, the Haas effect (or precedence effect), rate-distortion theory (which creates the basis for MP3 compression algorithms), Deutsch's High-Low Illusion, the Franssen effect, and Shepard-Risset tones are all

plays on the flaws in our auditory system that we exploit in music and audio on a regular basis.

Therefore, digital audio begs the question: just as we perceive rapidly changing images as motion in video, can we actually perceive the purity of a waveform analyzed and sampled at 44,000+ times per second and converted back to analog against the same sonic signature on magnetized tape? What we do tend to notice are timbral changes, not actual resolution changes, when discussing differences in formats, and these results also tend to be relative, often requiring some sort of ABX format test to determine the results of "hearing" these differences with an acceptable margin of confidence. This is why <u>we can usually tell the difference between a WAV and MP3 when played side by side</u>, but more than likely would not be able to confidently do so without hearing the contrast.

Just because we can measure an inherent improvement doesn't necessarily mean we can perceive it. In science, your measurements are only as accurate as the limitations and imperfections of your measuring tools, and we humans have pretty fuzzy built-in tools in the grand scheme of things.

Shooting the messenger

What I propose to you is this: perhaps it's not the medium itself we're mad at. As we can see, the "sound" and mojo of analog is still a relevant tool for its sonic footprint, despite its decay as a format for recording. Digital is not a "bad" format; a lot of the prejudices against it stem from old biases, and in more ways than not, it really can be considered a superior format. **Perhaps what we're really all fighting over is what the advent of digital has done to the recording industry as a whole, and we're just shooting the proverbial messenger.**

Is the obsession with analog tape merely that we're clawing for something real, something authentic, in a sea of white-washed mediocrity?

Digital is a double-edged sword. In the reel-to-reel and even early digital days, having a home studio was effectively a financial impossibility. The bar was set high, and really only those with a record deal saw the inside of a truly top-notch commercial studio. Digital has, more or less, made the same tools the pros use available to anyone with a computer. It has made quality recording available to people who never may have been able to participate in the process previously. <u>Everyone has a chance to get their art heard, and this renaissance-like explosion allows for more music to be available than ever before</u>. Art can finally reign supreme, as you're no longer beholden to the record company overlords that ultimately want a say in how you put your music together.

The other side of this metaphorical sword, of course, is that now *anyone* can make music. There are no guardians curating the music that's available to the masses anymore. The gatekeepers are irrelevant, because we just blew a hole in the wall and started running through it. This is anarchy, and with the good comes the bad. The music industry as we know it has been flipped on its head, and we're still trying to figure out what the next step is.

There are musicians way worse than you who are on international tours with major label backing, and there are musicians better than you will ever hope to be, pulling espresso shots and trying to crowdfund their EP, playing shows to only 12 people. *Everyone* with a pair of headphones thinks they're a recording engineer/producer/mastering engineer, and that has made a major impact on the music we hear every day, and predominantly not for the better. There are plugins out there that, while incredibly powerful and life-saving in the right hands, also allow people to make music and prosper who debatably shouldn't be making music to begin with. Major studios, some of them icons of the industry, are closing their doors as they can't sustain the business they once did, and in turn people are flooding message boards offering to mix your album for $200 and "master" it for $10 per song because "I got that Logic and the Waves Mercury Bundle" – which I'm sure there's no doubt that they shelled out the $7,000 for, but I digress.

Is the obsession with analog tape merely that we're clawing for something real, something authentic, in a sea of white-washed mediocrity? Progress is always terrifying for some, but digital itself is not the enemy here. "The times they are a-changin'," but it's not too late to try and define where things are heading. So don't worry, no need to run for the two-inch – you're going to sound just fine recording digital. You can even get some of that analog mojo in there one way or another if you want. What you *should* be worrying about is how the cream is going to rise to the top, and how to get people to notice you in the modern era of digital distribution and home recording.