

# Why Pentodes?

First of all why not? There is this myth going around the internet that pentodes aren't as good as triodes. Says who? I certainly hope this is by those that actually listen to amplifiers they themselves built, but I suspect this isn't the case. And I hope if they are such a person they have given pentodes a fair chance. I mean if I hadn't given pentodes more than a cursory try they wouldn't be my favorite tube to make high fidelity audio amplifiers with. Now some could say that triodes produce less distortion, and that could be true depending on the circuit each is designed in. But then again an amplifier built with almost any type of transistor will produce less distortion, so that seems like the pot calling the kettle black. In the end pentodes are merely different, they were invented to solve some issues with tetrodes, tetrodes were invented to solve some issues with triodes. So in the case of pentodes necessity truly was the mother of invention.

Now we could start splitting hairs and get into the differences between the different types of pentodes, well many other things for that matter, but lets just stick with why. Specifically why do I like to design single ended amplifiers with pentodes? In short it is the same reason why many people like tubes over transistors, THE SOUND.

Now this is where some will disagree with me, and to be quite frank everyone is entitled to their opinion and preferences, but to back up an opinion with facts and so called science that triodes are better is just foolish because such an argument is limited at best by context. It is the same argument when it comes to single ended amplifiers and push pull amplifiers, technically yes push pull amplifiers have less 2<sup>nd</sup> order harmonic distortion, and operate "better" in some ways. But if that was the only reason then you are left asking why do some people really like single ended amplifiers when they have heard several of both types. It comes down to what people like when they listen to music, and you could say the type or genre of music they listen to. Each type of audio amplifier can perform with specific things better than others. So what is important to the listener will cause them to really like something when they hear it. When I first heard my first single ended amplifier, I liked it, and to be honest I was a little upset, I felt I had been lied to by the people that sold me audio gear in stereo shops and review magazines (but that is another story for another time). The first time I heard a 300b amp I really didn't like it, but I did like the 2A3 and the 45 tube based SET amplifiers. The largest issue for me with single ended amplifiers was the power, there just wasn't enough power, it was very limiting as to the speakers you could use. Here again we are bumping up against another issue and story that this paper isn't about. To be honest though on the power issue, it really does force someone to discover something that can add another layer of enjoyment to music and that is highly efficient speakers that work well with single ended amplifiers and have sonic benefits, but again that is another topic for another paper.

So why, why pentodes what is different about them that could possibly appeal to anyone? Well I don't really know how to explain this in just a few words and have it make total and complete sense, but I will try. The reason is nuance, the smallest things in a recording you notice when you listen to music are what pentodes are all about. Never have I heard any other type of amplifier reveal things in a recording like a pentode. Just the other day I was listening to a live performance, which BTW is the sort of thing pentodes excel with, and I heard the musician snap his fingers at the beginning of a song setting up the tempo for the other musicians so they could all start exactly at the same time. I had been listening to that recording for over 40 years, and now all of a sudden I notice the tiniest of detail. Why?

Because with a single ended pentode it was clearly there and every other amp it was veiled.

Now before you get too excited there are some things that pentodes do not do super well, although some people that have an amp I have made will disagree with me I like to be brutally honest. Sometimes with some music that is harmonically complex they just lose it and start sounding terrible. With some classical, some full symphony they just do not do well, as well as some other music types. But what they do well, they do ever so well. Solo cello has texture I have never heard with other amplifiers, as well as some saxophone recordings. Some music can sound shouty or shrill on dynamics, and in my amplifiers I really work hard to design this out, but sometimes you have to make sacrifices to get what you want with a pentode, so there is only so far you can go with things. The song "Seven Bridges Road." on the Eagles Live LP can sound shouty, and is one of my test songs to analyze this one aspect. Big band can sound harsh and shrill on a pentode amp, so I use big band to analyze a design, but then again it can on many other amplifiers. Often there are small things you can do to solve some issues, and sometimes you can only make them as good as you can and just have to live with some of the flaws of an amplifier. Each tube has its strengths and weaknesses when it comes to audio. Because no matter what you do solving one problem often creates another a designer is not willing to have as a result. The two things I sacrifice most often are amounts of power, I have to back off what a tube could do which means not having that extra watt or two, the second is bass extension, that last octave sometimes has to be sacrificed for everything else to be the best it can be.

Another characteristic pentodes have is a more aggressive attack, with percussions, and even with each note of any given instrument. But that one thing I like about them, I like the dynamic attack to music, with string plucks of a guitar it sounds more real, snare drum hits can startle you like you are there. Oh that is another thing that many have noticed that some recordings can sound like you are experiencing being right there in the room with the musicians. The greater dynamics often give a greater sense of power, when the power hasn't changed, so a pentode amp often sounds much more powerful than it really is. Pentode amplifiers focus, often seems to be on the performance rather than the music, it can be the difference between a piano sounding like a salon upright piano in a bar compared to a grand piano in a nice living room at home. One sounds exciting and is an experience, and the other is very sweet almost hard to believe someone hasn't touched up the sound to make it sound like a recording where the sound engineer fiddled with it to make it sounds its smoothest.

In short pentodes make music live, and come alive, all the flaws and the excitement is there in spades, they feel just like everyday life, like a street musician or a band at the local tavern. Not super smooth or refined, but exciting and real, like a smack in the face getting your attention by force. And you guessed it, with some music this can add to the performance and draw you in, and with other music it can annoy you to where you want to shut it off. A few of my customers have described them as having a foot tapping factor. Music you don't even like makes you start tapping your foot. You can't stop playing a CD or LP with just one song you just let it play through the entire album because it is just so palatable you want more.

Added to this is that each pentode has its own unique character. Some are super dynamic but need to be tamed a little, others are more lush and full bodied, and still others sound easy and relaxed as if the sound they are producing they are doing it effortlessly. Some cymbals splash, like rain drops are hitting them, others the cymbals are there but sound softer more delicate. The biggest thing with pentodes I have noticed as a designer, is how unforgiving they are, every little thing in the circuit can make so much more of a difference. Power supplies make a huge difference with single ended pentode(SEP) amplifiers. Their power supplies have to be quick to deliver small micro amounts of current very quickly, capacitors with very low esr are imperative with pentode amplifiers. Resistors are

huge in pentode amplifiers, you can readily tell the difference in brands, types, even wattage of resistors, most of the time higher wattage wire-wound resistors sound better, less muffled in pentode amplifiers. Even the wire can make a difference, the connection wire can do many nice things, gold wire sounds smoother and sweet, silver clean clear but sometimes edgy. I could go on and on, so what I learned is that you can get the pentode flavor fairly inexpensively, but the no holds barred approach when it comes to things only adds new never heard levels of sonic bliss.

So because of all the aforementioned I know for a fact that pentodes are NOT for everyone. Because of this I do not want people to have one of my pentode amplifiers if they don't like it, so I offer a 30 day free trial. I try to give enough information up front so people know that a 3 watt amplifier won't work with their speakers. Also if a person listens to nothing but classical music, and often harmonically complex classical music, I would steer them away from most single ended amplifiers in general. They just don't do that type of music very well. If you want something more conventional, that is ok, other amplifiers will give you that. What I have is something unique and for a unique few that are willing to design a system around a SEP for the sonics they do well, and the music they do it well with. This brings up another point, and that is I don't think there is an amplifier made that does everything great, everything well enough yes, but excel at it all no. So I like to have a few different amps, and speakers. I don't have the room for multiple systems in my home so I switch things out for periods of time depending on the genre of music I am all about at that time. At some point there will be something you discover you like more than other things, that often ends up being what you devote most toward.