

BLOWING UP SPEAKERS

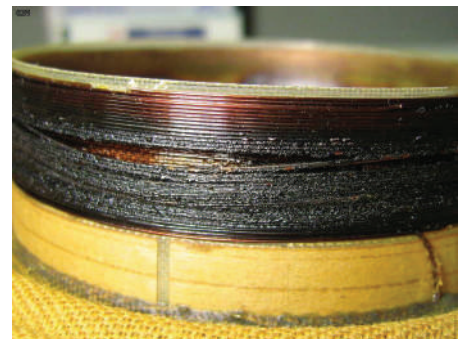
Why do you (or anyone) blow up speakers? You went and bought the CORRECT power rated speakers that matched your amplifiers RMS power. 100-watt speakers and 100-watt per channel amplifier. ...So.o. .how can you blow them up? They're "matched"!!!

Stop thinking that way! I know its "Seems" logical, but it isn't!! Audio doesn't work that way. It would be nice. That "Fairies, Pixie dust, Unicorn " ideal exists. (would be nice!!) .

What is the real problem? The REAL problem is that users (in general) have UNREASONABLE expectations. You will say "NO...not me!!!" Un Huh!! IF you've ever blown a speaker.....then you are one of THOSE people, no matter what you say. As they say...get over it. The truth is the truth. Speakers just do not BLOW..." just cause". In 50 years, I have seen VERY FEW actual BLOWN speakers ...like cones launched or torn to sh#&t! Rarely. Especially Midrange or Coax speakers.

The typically "failure mode" (over 95%) is TOASTED voice coils.

Burned to a crisp, cooked voice coils. The issue is, especially on a bike, is that the road noise (ambient floor noise) is SO high that you need to be 10-20 dB above it (louder by a HUGE margin) to hear your stereo system on your bike. And you're scratching your head and going...Huh? 10dB what does that mean. 10dB means you need 10 times the power to play LOUDER than the road noise. A LOT of power!!!! You don't have 1000 watts. You have 100 watts. It will play LOUD for sure...but for some...NOT loud enough. And that is who this article was written for..**THOSE GUYS!**



BURNED VOICE COIL

FOR THOSE WHO IT ISNT LOUD ENOUGH

So you CRANK it! For all its got! To 11 and beyond!! And yes 100 WRMS with 100 WRMS speakers is good. Really good. BUT can the voice coils of those speakers take the heat generated by the amplifier!! You may say? "Heat.. what are you talking about? Amplifiers don't put out HEAT!". Ahhh..YES they do!! (Just for grins and giggles after playing your system REALLY load for 10 minutes or so...touch your speaker wire. Its going to be warm. If you have a woofer a connected , check that speaker wire it will be pretty hot actually)



AC VOLTAGE? CURRENT? YEAH.. I GAVE AT THE OFFICE!!!

Actually A/C volage and CURRENT come out of your amplifer. Like the stuff that comes out of your wall at home to power your TV's, computers...and PlayStations. So when you think RMS power rating of your amplifier ...think AC voltage.

For example, 20 volts AC into a 4-ohm speaker is 100 WRMS. Meaning your 100-watt RMS amplifier is putting out 20 volts per channel. Not constantly as music is dynamic (NOT like sinewaves which are constant) but 0 to 20Vac. Faster than you can snap your fingers together. MUCH faster. Bigger the power.... the bigger the voltage (and current),



But POWER in of itself does NOT kill the speaker. YOU (or whomever is turning the volume control knob!!) IS.

When the speaker starts yelling and screaming "Don't beat me no more". WHOMEVER is touching the volume knob says F#\$K it!! I have 100-watt speakers and 100-watt amplifier THEREFORE its matched and I shouldn't be able to hurt ANYTHING. No matter what I do!!

ITS MATCHED.....ITS MATCHED.....!!!!!! F#\$K IT!!!!!! (Those bastard speaker manufacturers!!)
CRANK IT FOR ALL ITS GOT!!!!!!

ITS ALL THE SPEAKERS FAULT!!!



"infamous SLINKY"

Yeah...whatever!!! Keep telling yourself that. Have you EVER smelled something? ...like a "burning" smell.. interestingly coming from or near the speakers?? That's the glues holding the voice coil windings onto the voice coil former - MELTING!! Ye-ah...coming undone! If you been into 12V audio for a while you have seen friends (enemies?) blow up speakers (such a misnomer!!) And sometimes they cut them apart to see what happened and you've seen the infamous "slinky". This is the aftermath of continuously heating the voice coil up. Over and over again. For LONG periods of time. This sh#%t does not happen in a few seconds. If it was a "arcing" or a voice coil "Zap" that happens instantly. That's caused by having WAY too much power for the particular speaker (not ALL speakers, just THAT one!) You passed SO.ooo much voltage quickly that it arc welded the coil in one spot.

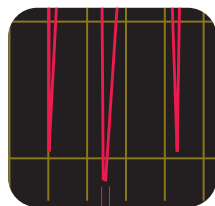


CLIPPING AND YOU... DEFINITELY NOT YOUR FRIEND!!!

MOST common failure is.....Amplifier clipping. This is an issue that can ABSOLUTELY blow up (cook, melt?) your speakers voice coils. In the car audio community this is a big arguing point as some “experts” say that it isn’t true and it simply an over-powering issue. Meaning excessive voltage (or RMS power) ...same deal. Power is AC volts Squared divided by the impedance. Simple math. Nothing mystical or magically about it. BUT.. clipping, in MY humble, opinion is the REAL offender, especially in motorcycle audio. Because you are ALWAYS trying to get above the road noise!!

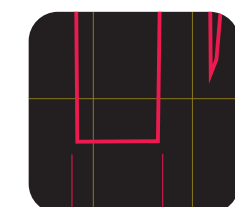
SCOPE LOOKING AT AC WAVEFORM OF MUSIC (UN CLIPPED)

AC WAVEFORM “UNCLIPPED”



SCOPE LOOKING AT AC WAVEFORM OF MUSIC (HARD CLIPPED)

AC WAVEFORM “HARD CLIPPED”



This problem arises when the amp is overdriven, and the tops and bottoms of the audio waveform are literally clipped off. If clipping occurs, it’s possible to damage speakers that are designed to handle more power than the amp is even rated to put out, since the clipped waveform results in too much power being delivered to the speaker over a longer period of time. TIME is the issue. Remember amplifiers produce AC voltage. Music is dynamic, so even if you put 500 watts (or 44.75 Vac into 4 ohms) to a midbass driver (as an example) the AVERAGE continuous power would be 50 watts(14.2Vac) assuming a crest factor of 10dB ...with PEAKS of 500 watts. And of course, you, or no one you know, EVER drives their audio amplifiers into clip? And obviously gains are set correctly? That’s funny as hell! For the last 8 years 80% of ALL my tech phone calls were “How do I set gain and crossovers?” So I know ABSOLUTELY that VERY few people know how to set gain (that is another White paper I wrote, which is really long, BUT very informational on my Cicada Audio support pages.

<https://www.cicadaaudio.com/wp-content/uploads/2021/08/SETTING-GAIN-FINAL-COM-1.pdf>



CONCLUSIONS TO ALL THIS BLATHER?

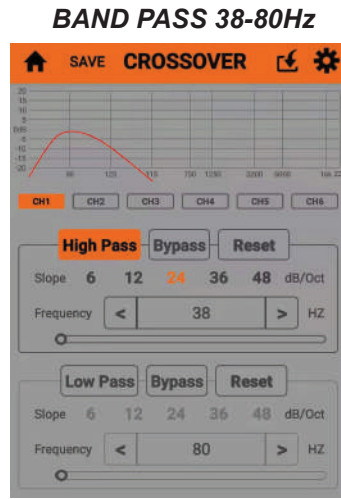
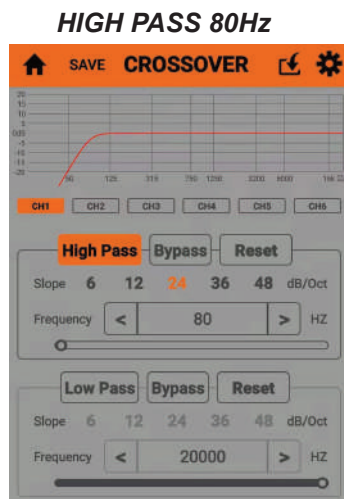
1. Set YOUR expectations REALISTICALLY!! Listen to your buddies bike, or his buddies bike and get a really good idea of what direction you want to go. There is NO right OR wrong!!
2. Make the executive decision to research what you really want and how much you want to spend to get there. Making it REALLY loud is possible, but at what cost!!! Not only money, but rideability of your bike. IF riding it is NOT an issue, and it is going to be a "Parking Lot Queen" then GO FOR IT!!

SERIOUS "PARKING LOT QUEEN"



(Courtesy of Michael Shawn Foundation - STURGIS 2021)

3. After designing and installing your system - set gains CORRECTLY (that is a HUGE discussion all by itself, read my White paper on that IF you really want to understand what is going on. Not as straight forward as you probably would like...It is what it is)
4. HIGH PASS ALL Speakers on your bike! ALL. Including woofers (here you would do a Bandpass filter) That alone will save you a TON of grief!!! And "Blown" speakers. If any of that spikes your interest...Trust me on this - DO WHAT I SAY!!! (just humor me on this!!)..OR don't. Your choice.



SCREEN SHOTS FROM MY DSP125.4D AMPLIFIER/DSP PROCESSOR "GUI"