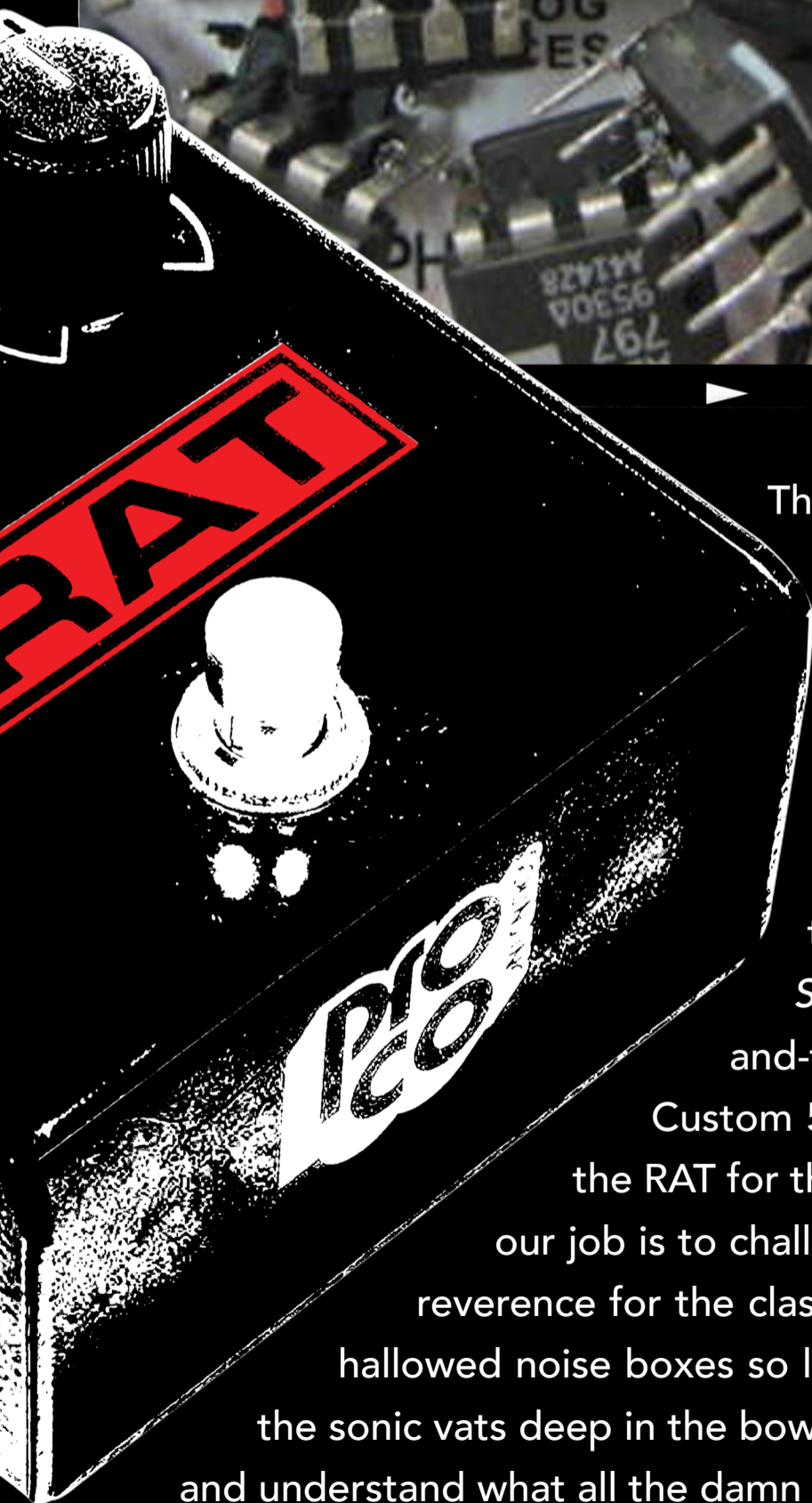
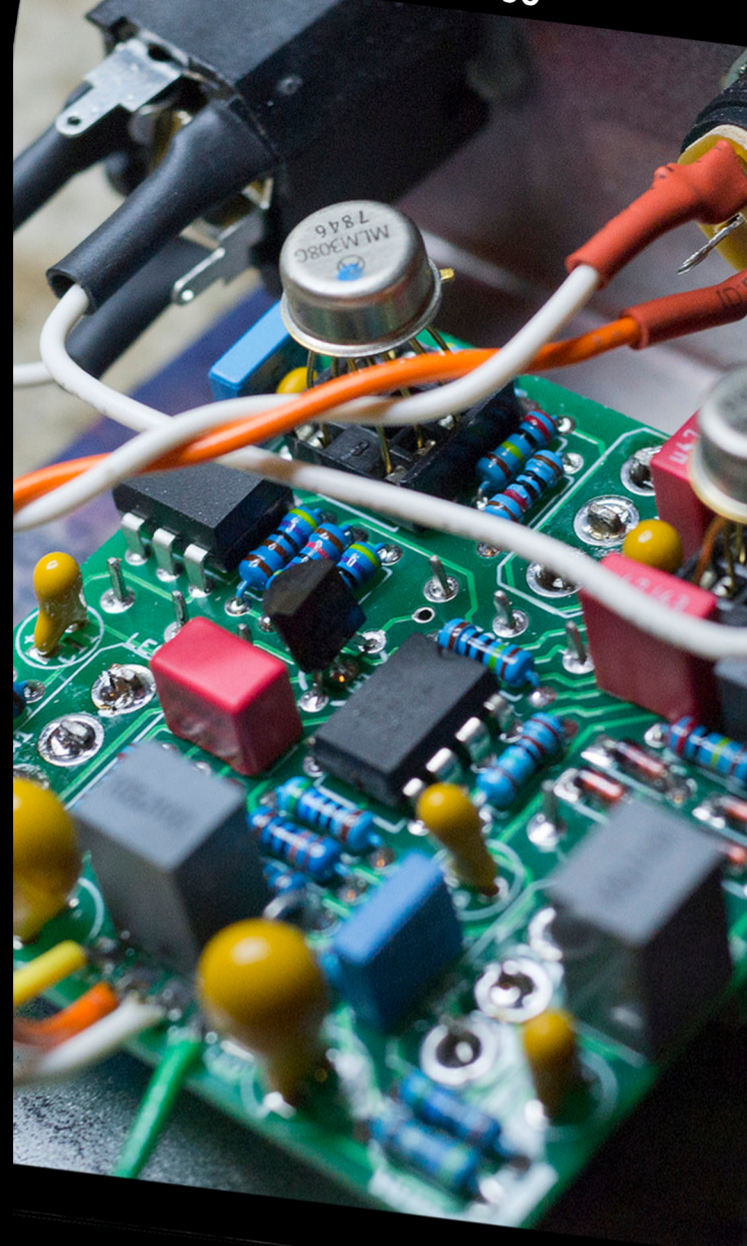
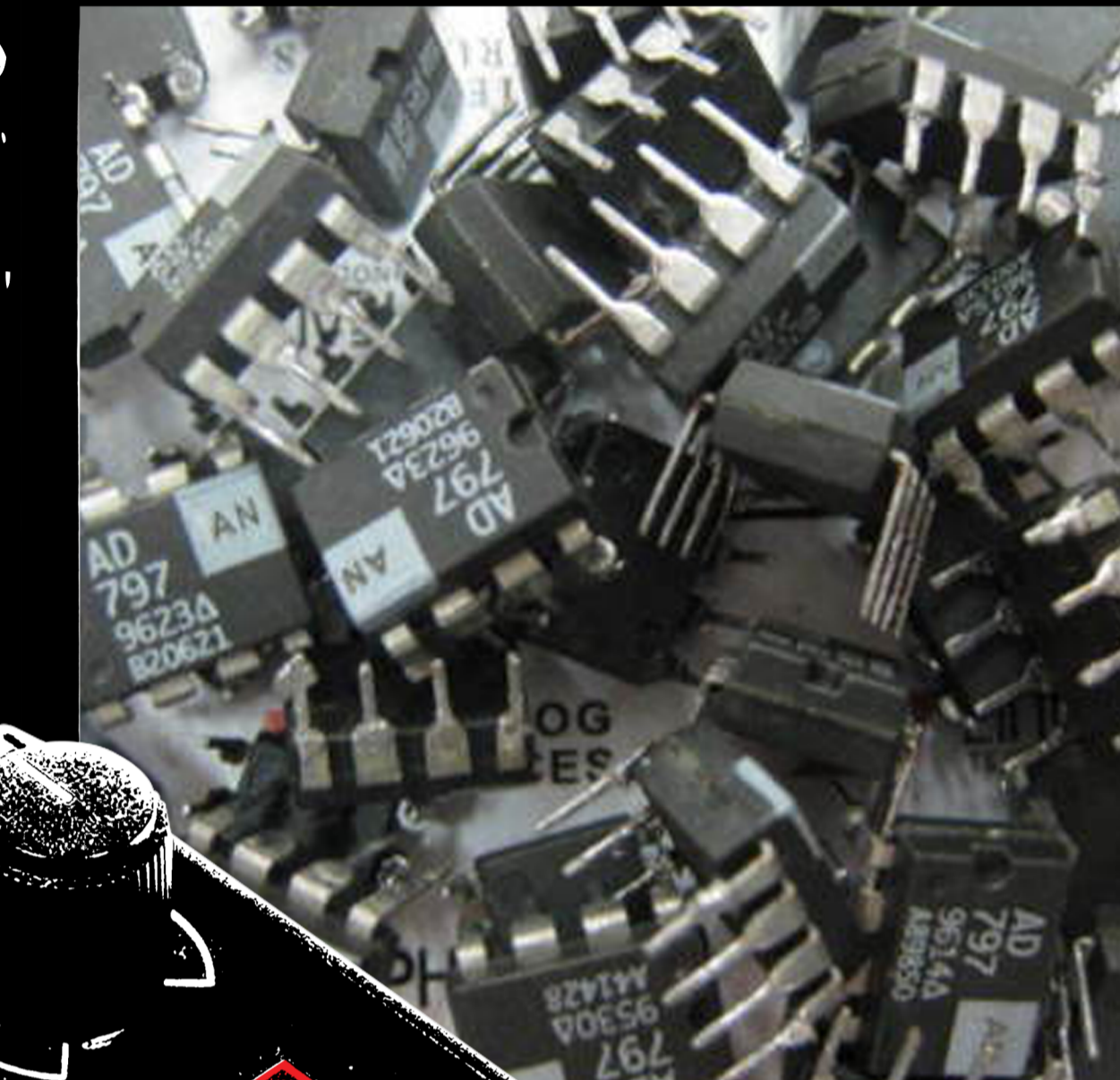


THE GREAT RAT RACE

**A STUDY IN SOUND
ON THE PRO CO RAT**

WORDS BY:
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The Pro Co Rat is one of those old classics that seems to have silently made it onto many seminal albums of the '80s, '90s and even 2000s. David Gilmour, Jeff Beck, Andy Latimer, Robert Fripp, Bill Frisell, and Nels Cline are just a few of the people who have used this legendary circuit. Most people also don't know that all of Alex Turner's guitar tones on the debut Arctic Monkeys album, *Whatever People Say I Am That's What I'm Not* (2006) was the tried-and-true Strat and RAT combination through a Hiwatt Custom 50. Truth be told, we can probably sing praises on the RAT for the entirety of this feature, but here at *Tone Report*, our job is to challenge the status quo, and to knock you out of your reverence for the classics to get down and dirty with what makes these hallowed noise boxes so loved. The subject; a FAT RAT hand delivered from the sonic vats deep in the bowels of the Pro Co Sound Lab. The goal: to discover and understand what all the damn hype is about.

I think it is safe to say, the bulk of the hype surrounding the vintage RAT circuit among pedal nerds is the coveted LM308, which for those unbitten by the RAT is the single channel op-amp that lies in the heart of the pedal. RATs without the LM308 are not as highly valued, mainly because of the vintage association and the general scarcity of them. However, comparing the data sheet of the LM308 and the current production RAT op-amp, the OP07DP, the noise floor on the LM308 is higher, and the slew rate is very slightly lower, meaning it's noisier and it's response to changes in voltage is more sluggish. I'm no engineer, but to me it seems that the OP07DP would have a better tone due to its better specs. Unfortunately for most, this isn't the case. Call it nostalgia syndrome, but for many people, the LM308 can't be beat in a RAT circuit, even if its specs aren't as solid. The vehement and heated arguments from RAT enthusiasts around the world as to which op-amp sounds best, has opened up a whole new can of worms, with almost every single eight-pin single channel op-amp up for contest.

Modders such as Monte Allums, Keeley, and Vodka Mods all have their favorite tricks for hot rodding RATs, and it seemed like Pro Co was behind the curve for a while, pushing the Pro Co RAT 2 that RAT aficionados didn't seem so quick to trade for their old Big Box reissues. A few years back, Pro Co released the FAT RAT, as an answer to the growing mod market and the success of the '85 Whiteface RAT Reissue. According to Chris Frankhouser, director of Inside Sales at Pro Co, the engineers went to great lengths to

try and get as close as possible to the original RAT circuit, down to tracing the PCB (save for the new mods), utilizing original spec CTS pots, and many other small details such as that to maintain authenticity. The pedal has a couple of popular mods at which Pro Co tried its hand, adding a Bass Boost Switch, a switchable MOSFET clipping stage, and up to 18-volt operation for increased headroom. The most important part of this pedal, (and the reason I chose it for this test), was the IC socket that allowed easy switching between the different op-amps.

For this test, in addition to asking the engineers at Pro Co to provide suggestions for op-amps, I scoured the corners of guitar forums and long forgotten arguments to find as many possible options as I could for RAT op-amps. In theory, any single channel, eight-pin op-amp should work, which blew wide open the conceivable opportunities for testing the RAT. I chose seven different op-amp chips, many of which users purportedly have tried in their RATs. Now, a fair word of warning: many of the op-amps essentially do the same thing in the RAT circuit, and the bigger tonal changes really don't take effect unless you start messing with resistors and diodes. The differences between these chips is extremely, I repeat, extremely subtle if any at all. I can barely hear the difference between all of the op-amps, but I'll leave it up to you readers to see if you can hear a discernable difference. Much of the perceived difference is in the "feel" and response of the pedal, which is usually best dictated by slew rate. For the demos, I recorded one pass through the looper to maintain consistency, then I

DISTORTION

FILTER

VOLUME

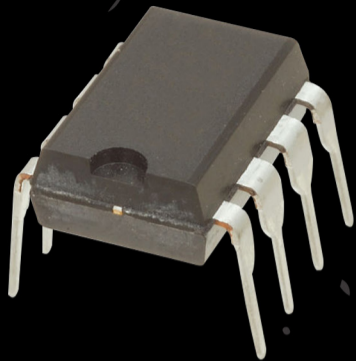


GERAT



ran that through to the RAT. After each clip, I switched out the op-amp and record another one. Here are the op-amps used (with slew rate specs, measured in microseconds and gleaned from the datasheets) I have also

included a clip of an old Big Box Reissue RAT as a comparison. Please remember that slew rate is only one piece of the puzzle, and doesn't completely reflect the differences between the op-amps.



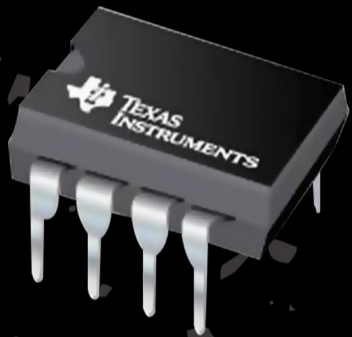
OP07DP

(Modern stock RAT op-amp; Slew Rate: 0.3 V/ μ s)



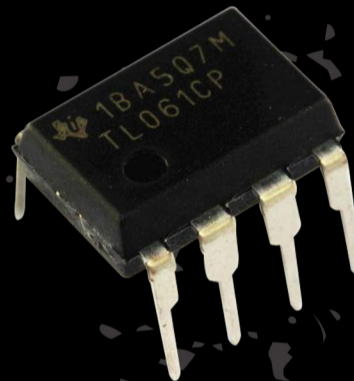
LM308

(Most widely loved RAT op-amp; Slew Rate: 0.3 V/ μ s)



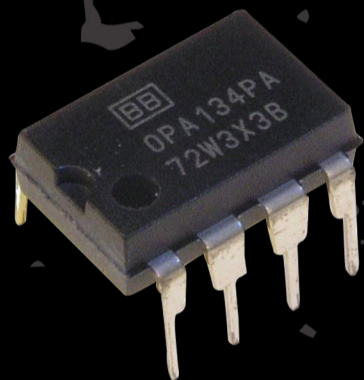
TL071

(A favorite amongst modders); Slew Rate: 13 V/ μ s



TL061

(Slightly different spec TL071); Slew Rate: 3.5 V/ μ s



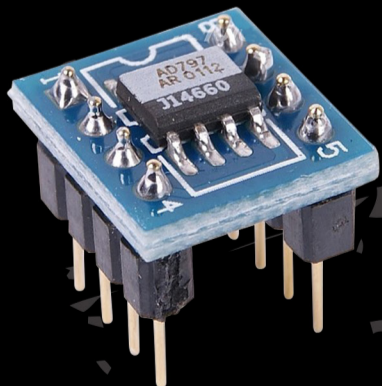
Burr Brown OPA134

(Common hi-fi op-amp); Slew Rate: 20 V/ μ s



NE5534

(Not as popular as the TL071 or the LM308, but still has its fans amongst RAT users); Slew Rate: 13 V/ μ s



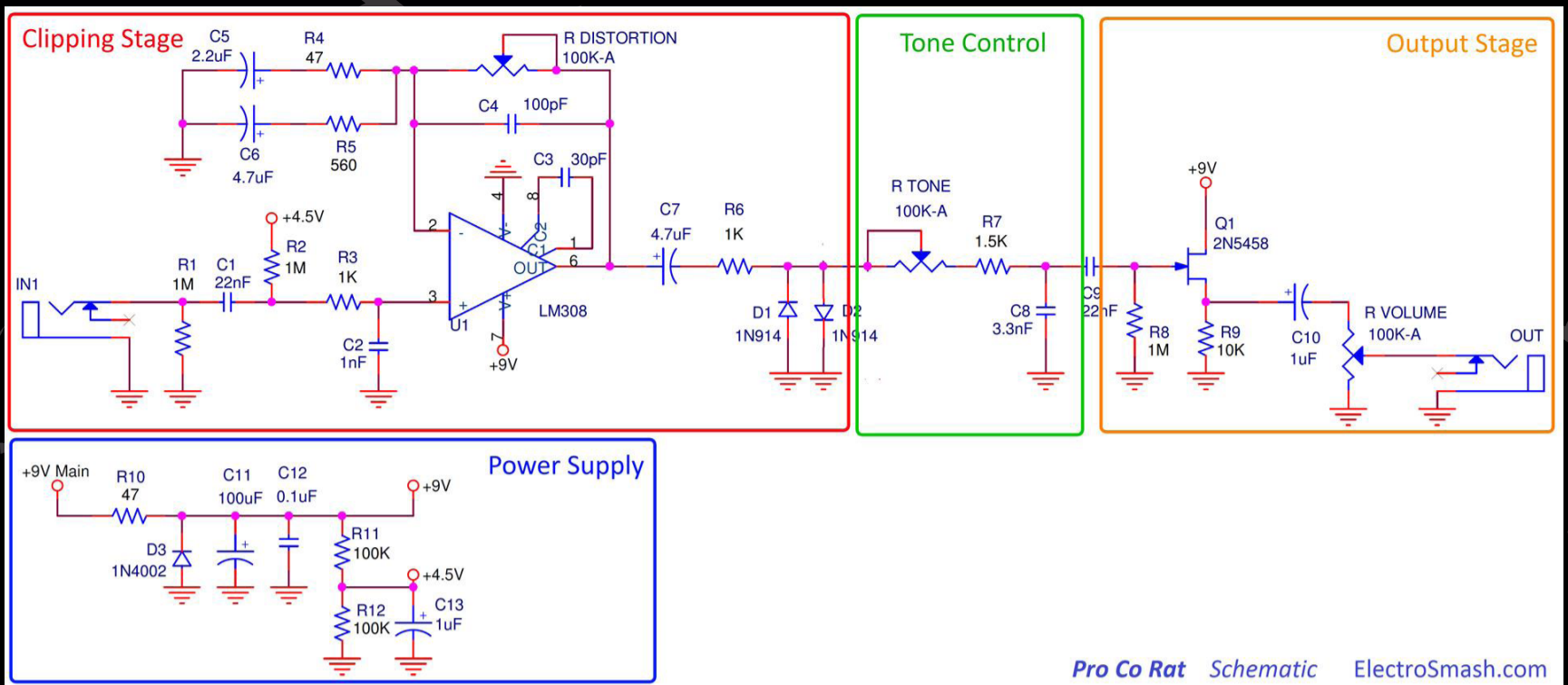
AD797

(Incredibly expensive hi-fi op-amp); Slew Rate: 20 V/ μ s



Big Box Reissue RAT

with LM308 (Same slew rate as LM308 above)



I don't know about you, but I hear almost no discernable difference between the ultra-expensive AD797 and the very common TL061, other than the response being a little tighter, most likely due to the slew rate. The TL071 clip sounds a bit different, because the mic was slightly knocked by accident, drastically changing the tone of

the recording, but the characteristic of the drive is still there. What we hear of course is all subjective, so I will allow you readers to figure out for yourselves which sounds the best. Whether the op-amp myth is busted or not will be entirely up to you. Until next time friends!



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