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Subject: Re: Under-Biasing Output Tubes

Posted by [Wayne Parham](#) on Fri, 09 Mar 2012 15:39:15 GMT

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Remember that bias is used to bring an active component into its linear operating range. In a class A amp, it should be biased precisely at the center of its range, so the signal swing can move as far in the positive direction as it can in the negative direction without exiting the linear range. If it were to be biased too low, then it would cutoff on negative cycles, partially rectifying the input signal. If biased too high, it will hit B+, and again, partially rectify the signal. So by biasing in the middle, you get the largest usable swing before clipping.

In a Class B amp, there is no bias because each side operates on a half cycle, so each really does rectify the signal and operate on its half. But the "handoff" between half cycles is not clean. In class AB, each amp is biased slightly, to prevent this crossover distortion. So assuming the amp is Class AB, the bias level isn't quite as important as Class A, but you still don't want to go so low that crossover distortion becomes apparent.

I'd probably get out my scope and watch the output with a sine on the input. Zoom way in on the zero crossing and look for artifacts. See how low you can bias the tube before the slope of the zero crossing changes. Maybe Bruce will chime in on a better way to do it, but I think that's what I'd look for when playing around with bias levels.