Subject: SMPS Trick
Posted by gofar99 on Sun, 05 May 2024 02:33:04 GMT
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Hi Everyone this was posted on another site for their benefit as well.

Hi everyone. Once in a while a light bulb comes on in my brain. I had one of hose moments this morning. You have all probably seen the under $10 (US) DC to DC SMPS. The ones with both plus and negative outputs. Supposed to be able to do about 400 VDC from 12 VDC. They are noisy, have crappy regulation and largely not too useful in audio designs. I did manage to use one in the tube headphone amp that uses a push-pull arrangement like an Oddwatt. It used a 6DJ8 per channel and had a voltage gain of less than unity. It actually works quite well and the SMPS had 300uf and 0.1uf capacitor with a 1.5H choke to filter it. S/N surprisingly was really good and the gain was no issue as 1 volt output (max is about 10) will push about 16 mw into 62 ohms and with most phones having sensitivities in the 100 db per mw it will bust your ears. At max output into 62 ohms (seems a typical impedance) it will deliver over one watt. Ouch. So back to the thought for the day. If instead of using the +V and ground connections in the SMPS use the +V to -V and leave the ground disconnected. What happens is that common mode noise between them is less than on either side by themselves. In my testing today it was about 6 db. The waveform was the same though. It is a steep turn on with a sloping drop. Under test this AM it seemed to be about 7.5KHZ with minimal load. It will likely change frequency with loading. Without any external filtering and set for 44+44 (the lowest it would go) the peak junk was about 8%. So filtering is clearly still needed. Anyhow the tip might be of use to some of you

Subject: Re: SMPS Trick
Posted by Wayne Parham on Sun, 05 May 2024 13:33:49 GMT
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That's a great suggestion, Bruce!

On an unrelated but similar note, I've noticed that the similarly designed inexpensive AC-to-AC international voltage converters do the same thing. They don't generate a sine wave but instead create a pulse train that has sharp edges that are nasty and harsh.

One would think they would just use a step-up or step-down transformer - and some do - but they tend to be larger devices so the inexpensive ones use a switching circuit that isn't particularly clean.

In fact, the output signal is so dirty, the sharp pulses exceed the breakdown voltage of the internal surge-protection devices in most barrier strips. So if you use one of those on the output of the converter, it will instantly short-circuit, as designed to protect connected devices from the pulses generated by the converter. The result of all that is instantaneous destruction of both barrier strip and AC converter.

The problem of international voltage conversion is compounded by the fact that it isn't just the voltage that's different, but also the frequency. If the connected device requires accurate line

frequency, a transformer alone won't do the job. But most devices don't care about the 50/60Hz difference, so a transformer works just fine, and avoids the nasty switcher circuit. The most popular things that used the line frequency for time base were televisions with cathode ray tubes - using line frequency as a time base for vertical deflection - and those are largely a thing of the past.
