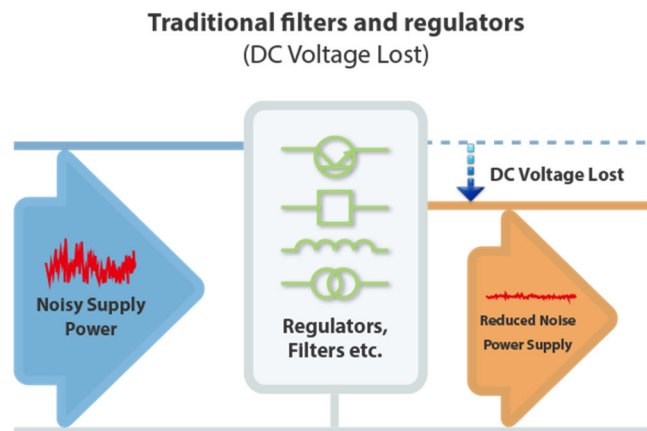


iDAC2: Spilling the Secret Sauce (5/6)

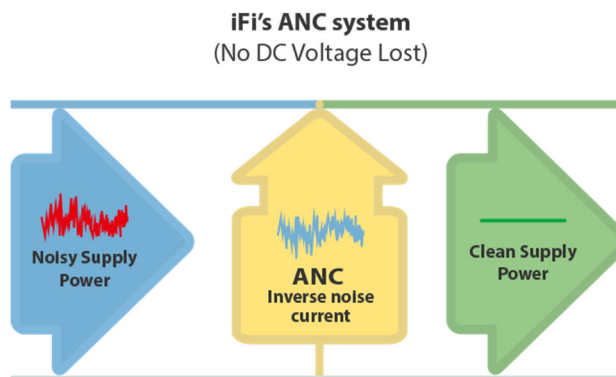
Active Noise Cancellation® gives >1,000X noise reduction

Another new feature used is the Active Noise Cancellation® power supply conditioning. First seen here in the iDAC2 micro and specially developed for USB-powered devices. They are not ‘Regulators’ in the classic sense of the word, but instead they only work on noise on the power supply voltage, without actually ‘regulating’ the voltage.

The traditional approach (see first graphic) using filters and regulators sees DC voltage lost AND noise is not comprehensively eliminated, there is still a residual level.



However, in comparison to the iFi ANC system, there is no DC voltage lost AND the power is noise-free:



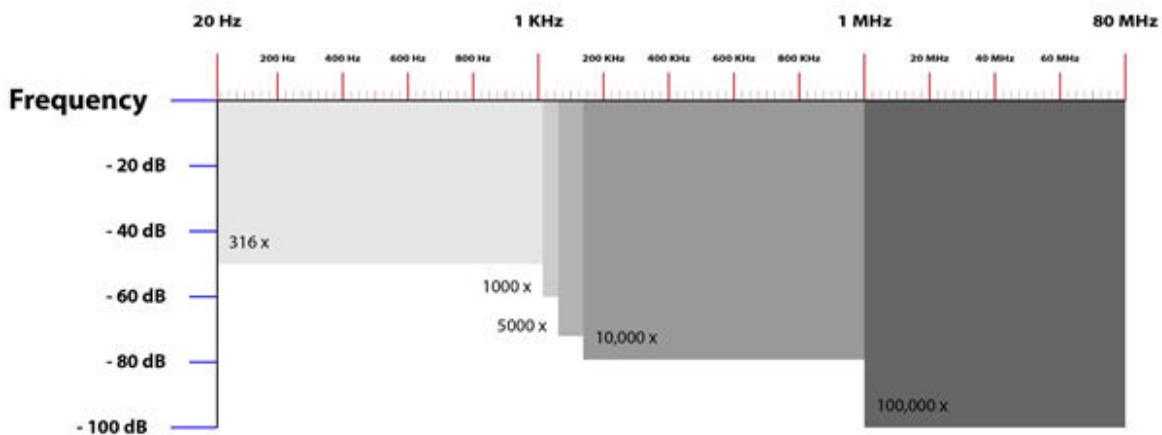
We all know that USB Power from common USB ports is very noisy (usually tens if not 100's of millivolts of noise). So normally, power supply regulation is required to remove this noise. Common regulators use regulation elements in series with the powerline and require at least several 100mV to several Volt to work. In a USB-powered device this loss is not acceptable as we need at least 5V to give sensible levels for line outputs and headphones.

The all-new Active Noise Cancellation® avoids the loss of power supply voltage, while achieving similar or better rejection of power line noise as classic regulators. No extra series elements are needed. The

Active Noise Cancellation® circuit cleans up the incoming USB power before it is distributed inside the iDAC2. A further such Active Noise Cancellation® circuit is cascaded after the first before supplying the headphone amplifier and analogue stage with power. A third Active Noise Cancellation® circuit is cascaded after this to give the DAC Chip the cleanest possible power source.



This multi-stage cascade achieves a reduction of USB noise by over 60dB (1,000 times) at low frequencies for the headphone amplifier and analogue stage. At higher frequencies where switching noise from switched mode power supplies is found, the noise attenuation is even greater.



At the DAC Chip the noise is reduced by over 90dB (31,600 times) for low frequencies. So even very high noise levels of several 100mV are suppressed below the self-noise of the analogue circuitry and DAC Chip, giving the iDAC 2 micro a Signal/Noise ratio of > 114dB(A) or an equivalent number of bits of > 19 Bits. Many DACs with an extra 'zero' on the end of the retail price do not go this far.

Next time, *Power Supply – with great power come great responsibility (final, part 6)*



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About iFi

iFi Audio, part of AGL, is headquartered in Southport, UK. And also owns the HiFi brand Abbingdon Music Research (AMR). AMR designs and manufacture high-end audio 'home-based' components. iFi Audio designs and manufactures portable and desktop 'ultra-fidelity' audio products. The combined in-house hardware and software development team enables AMR and iFi audio to bring to market advanced audio products.

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