

AudioQuest DragonFly Black & Red - Technical Q&A

An interview with Steve Silberman (AudioQuest)

When we published our world-premiere review of the fantastic new DragonFly Black and Red, we also sent a proof-of-publishing link to AudioQuest. They were thrilled by our favorable review but Steve Silberman, one of the people at AudioQuest who had been working so hard to develop these new 'critters', asked us why we wrote so little about the technical background of the new DragonFlies. We explained that we had chosen to do a 'short' review because we felt that the target group would primarily consist of consumers who care more about sound quality and ease of use than about what goes on inside the device. Leaving out most of the tech-stuff gave us more room to talk about those other things. But it was not hard to understand that Steve and his team at AudioQuest were very proud of what they had achieved, so the idea to do an additional technical write-up about the new DragonFlies was born. After that, it was quickly decided that it would be both fun and educational to do a Q & A interview with Steve. So with pride, and without further ado, we hereby present the AudioQuest DragonFly Black and Red interview with Steve Silberman.

What were the design goals?

The design goals were to retain the now-iconic industrial design of the original DragonFly, significantly improve the overall sonic performance, lower power consumption to enable compatibility with mobile devices, and provide software upgradability for all of our future DACs.

What is the design process?

Bill Low has a mantra: *"Take all the time you need, just don't waste any."* Our design process may be a little different from other companies whose primary business is something like a DAC. Since we are first and foremost a cable company, "The Critters" group has the luxury of not being under the same pressures as if DACs were the primary source of our revenue.



The year following the launch of DragonFly 1.0 we began researching and eventually choosing some new vendor partnerships (our suppliers). Once we began to identify who our supply partners were going to be, we could then begin to develop a more specific strategy for how the next DragonFly would function and perform.

This is an oversimplification, but from this point, we then begin prototyping and listening. Along these stages of the design process, there were some wins and some losses. But those experiences eventually took us from an original idea of only one new DAC to two new DACs.

There are always some unexpected pleasant and challenging surprises along the way.

Why did you choose to work with Microchip, a company that is not a familiar name in USB audio?

At the time, the state of the USB microcontroller market was really frustrating. We knew from the start that we weren't going to continue using the Texas Instruments TAS1020b — it was scheduled for "end of life" several years ago. Additionally, when we talked with TI, they had no plans to replace it with an improved version. So, we began looking at the rest of the current suppliers of USB microcontrollers, companies like XMOS and Tenor, but none of them met the design criteria we were looking to achieve.

Gordon Rankin then proposed that we should look at Microchip's PIC32 (Peripheral Interface Controller) products. From the start, these were very attractive because they have extremely low power consumption, they don't generate a lot of noise (they are the quietest solutions we are aware of), and they have extremely powerful programming capabilities. However, beyond the product itself, the engineering team at Microchip, with whom we've had the pleasure of working over the last three years, is an extraordinary and supportive group. It really takes a community to make advancements.

When we approached them about using their PIC32s for USB audio, they immediately bought into the whole idea and offered us all of the support we could have possibly hoped for.

Why is the update feature important to you and why should it be to customers?

It's very important to us that we can support our customers well beyond their initial purchase.

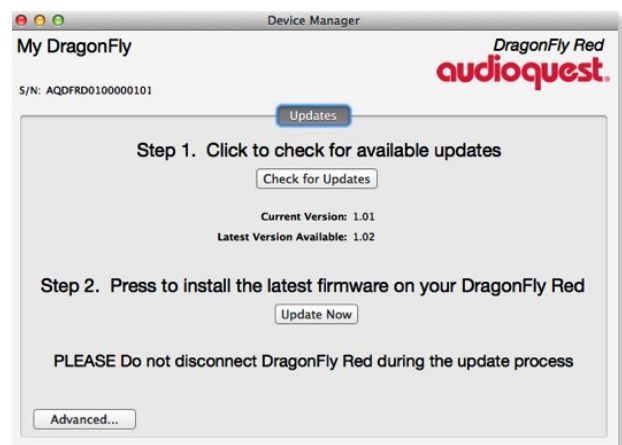
We've asked ourselves: "What if there's a new audio format? Or what if Apple, Google, or Microsoft make changes to future operating systems that create incompatibility issues?"

Having the ability to quickly and easily provide new software updates in the face of technological advancements and shifts means that our products gain longevity and our customers gain value. In the end, it's a long-term investment — one that is about respecting the customer and the product.

Why did you pick ESS as your DAC vendor?

We have a long history with ESS. When we were prototyping DragonFly 1.0 (back in 2011/12), we'd taken the time to build several DragonFly prototypes, each with a different (but applicable) DAC from many of the major pedigree manufacturers. This gave us the ability to evaluate each company's respective DAC chip perspectives.

When we'd do listening evaluations at AudioQuest, everyone, time after time, would select the ESS prototype as their favorite.



Then, at CES 2013, we had a really important meeting with Robert Wong of ESS. He and his team explained their plans for a new class of 32-bit DAC chips (9010/9016/9018) that would outperform their then current production solutions. In addition to the performance jump, ESS was thinking about power consumption — they wanted to be able to offer serious performance solutions to the mobile market. And they did!

What is the significance of mobile compatibility?

Almost from the very moment the original DragonFly was released, customers expressed interest in a version that could be used with their mobile devices.

More and more, people want to be able to use their phones and tablets to listen to and watch all of their media. And, within that community are people who want this experience to be as musically satisfying as possible. DragonFly Black and Red meet this mandate.

But the other perspective is this: If you look at the current DAP market, almost all of these devices are Android-based, *phone-like*, devices. Why repurchase all of that redundant hardware when you can leverage your existing mobile device?

An iOS or Android device already has all of the performance potential a person could ever ask for. It just takes proper execution to get there.



Why is the output of the DF Black considerably lower than that of the Red (and the v1.0 and v1.2 for that matter)?

The reason is rather simple: The ESS 9010 (the DAC in the DragonFly Black) has a lower output than either the 9016 (the DAC in DragonFly Red) or the 9023 (the DAC in the original DragonFlies). Despite Black's lower output voltage, it successfully and comfortably drives a wide range of moderate- to high-efficiency headphones, and offers more than enough power to satisfactorily drive all preamplifier, integrated amplifier, and receiver inputs.

Why did you limit the resolution to 24/96, since the ESS DAC's you use are capable of more?

This is a great question. First of all, the Microchip PIC32MX controllers do not run at High-Speed USB. So, they can't deliver anything above 96kHz.

But again, their overarching performance characteristics are such that we found them to be sonically superior to the competition, regardless of sample rates.

In a low-power portable package, would you rather have a solution that sounds fantastic, but is limited to 96kHz sample rates? Or would you rather have a solution that accommodates all the sample rates, but exhibits lower overall sonic performance (at all sample rates)?

Now, this is a question that only an individual customer can answer for him or herself. Some customers will decide that they care more about the sound, while others will decide they care more about specifications. Neither is wrong.

We just have to follow the path we believe in. And we believe in delivering the best possible sound to the most possible music lovers.

Why does the DF Red have a digital volume control? Didn't you tell us that analog is better?

When we made the first DragonFly, that was true, within the context of what could be done in this size of a package.

But, for some time, there have been bit-perfect volume controls that didn't compromise the data or the performance. Previously, in order to reach that level of performance, you'd have to step up and purchase something like a DCS (which I love and own myself).

ESS took a good look at how to execute a digital volume control inside of the DAC chip itself. What they've achieved is unprecedented at this price. It would be best to read their [white paper](#) for a detailed explanation.

Why is there no DSD capability in the DragonFly?

For the same reason we don't go beyond 96kHz. See above.

Use [this](#) link to learn more more about the different models of the AudioQuest DragonFly.



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