iFi iDAC, iCAN, and iUSBPower

The Little Boxes That Could

By Steven Stone   Jul 18th, 2013

Ever hear of iFi Audio? Me neither. But at the 2012 Rocky Mountain Audio Fest, there was a quartet of miniature products bearing the iFi logo in the Avatar Acoustics room. Darren Censullo, head honcho at Avatar, was very excited about his role as U.S. distributor for iFi. He claimed that at their price its products were not merely outstanding values, but offered performance that would compete with any component with similar functions. He went on to tell me that one particular iFi product, the iPower, offered an entirely new and better- performing solution for devices that use USB power as their power source. Obviously I took his comments with a grain of salt. But I was intrigued enough to request the iDAC, iCAN, and iUSBPower for review (the fourth iFi product, the iPhono, was outside my primary area of expertise, so I passed on it).

After several months of putting this trio through its paces, I understand why Darren was so enthusiastic. All three devices offer a level of performance and ergonomics that a scant few years ago would have been impossible from a similar device, regardless of price. And even in today's highly competitive audio marketplace the iFi devices deliver an exceptional combination of performance, features, and value. That's not too shabby for a company's first efforts.

Three for the Road

A big reason for the iFi trio's exceedingly high level of performance is due to "trickle-down" technology. All of iFi's designs were created by Abbingdon Music Research, a U.K.-based high-end audio firm that's been making high-end components since 2000. AMR doesn't directly manufacture iFi products; instead AMR licenses the technology to iFi, which assembles the units at its own facility in China.

All three iFi devices share the same-sized silver-toned chassis which is approximately 158mm x 68mm x 28mm. Obviously iFi realizes substantial economies of scale with these components since they share one of the most expensive parts in most audio gear. Other shared parts are the external power supplies and the volume knobs. These volume knobs were nicely machined, but they do have one flaw—they are a pressure-fitted and can easily be pushed back too far so that their back edge

touches (and scrapes) the chassis when you turn the knobs. Yes, you can eliminate the problem by pulling the knob out slightly, but chances are, the next time you use the iFi device, you will push them back in and the scraping begins again. Sure, this is a minor annoyance, but it diminishes the overall quality of the iFi products.

Given their size and weight (the heaviest is under 0.43 pounds), the iFi devices were created with the traveling audiophile in mind. Although not designed to be completely portable, since all but the iDAC require an external power source, they are aimed at "road warriors" and other frequent travelers who wish to have a compact, yet high-quality audio in their hotel rooms or vacation condos. The iDAC can be used with any device that has a powered USB-compatible output, including an iPad or laptop.

The iDAC

The $299 iDAC, as you would surmise from its name, is a D-to-A converter. It also has a headphone amplifier, whose output is controlled by the volume control on its front panel. Although I wrote "front panel," in point of fact the iDAC doesn't really have a front and back like a full-sized component. On one end the iDAC has a volume control for its headphone output level, a mini-jack for headphone output, and a pair of fixed-level RCA outputs. The opposite end has a single USB input. When in use the iCAN will always have something plugged into the USB and at least one cable (either a headphone or pair of RCAs) plugged into the other side. That makes for a potential wire jumble. It's a shame there wasn't a clever way to have both the USB and RCA cables exit from the same side.

On the USB end the iDAC uses the same asynchronous interface as the $5000 AMR DP-777. This employs firmware based on the XMOS processor, but with custom "turnkey" modifications developed by AMR specifically for the iFi iDAC. The "heart" of the iDAC is an ESS Sabre DAC chip, used directly "without additional filtering" according to AMR. The iDAC's designers paid special attention to the iDAC's power supplies for its digital devices. Instead of generic 3-pin regulators, the iDAC employs "more modern types" of regulators that have "300 times greater noise suppression" than the usual 3-pin types. Also the USB receiver, XMOS processors, and input/output circuits have their own separate power supplies. On the analog side iFi employs a "DirectDrive" technology for both its headphone and RCA outputs that is similar to a directly coupled output.

During listening sessions I used the iDAC both alone— powered by my computer's USB output—as well as connected to the iFi iUSBPower device. Performance, even without the addition of the iUSBPower, was startlingly good. Using the fixed- level RCA outputs, the lack of extraneous background noise and the essential silence of the iDAC was excellent. Unfortunately for the owners of some especially large-barreled premium RCA cables, the iDAC's RCA outputs are situated so close together that employing these cables may be difficult, if not impossible.

The iDAC's headphone output drove a wide variety of full- sized headphones successfully, including the Sennheiser HD600, Audeze LCD-2, and Beyer-Dynamic DT-990 (600 ohm.) On the other end of

the sensitivity spectrum, the iDAC's headphone output did produce some low-level hiss with the Shure SE500 in-ear monitors, but was virtually silent with the Etymotic ER-4P.

One small quirk I noticed was that with some brands of basic no-name RCA interconnects the headphone output was noisier than with well-shielded ones. With the Shure SE500s, the overall noise floor dropped precipitously when I disconnected the RCA cables (which were connected to a Benchmark DAC 2 HGC).

When I connected the iDac to the SicPhones high-current headphone amplifier, the noise when the RCA interconnects were connected between the iDAC and the SicPhones amp was even louder and more pronounced. When I substituted the iUSBPower device for the stock AC power source, the iDAC's noise level remained the same until I flipped the ground-lift switch. When I lifted the ground the noise level dropped back down to almost as silent as when nothing was connected to the iDAC's RCA outputs. It seems that the iDAC is quite sensitive to noise or ground loops generated by whatever device is connected to its RCA outputs. I strongly suggest disconnecting the iDAC's RCA cables when doing any critical listening using its headphone outputs, even when employing the iUSBPower supply.

The iDAC's overall sound quality was noticeably superior to the Fiio E-17, both through its headphone and line-level outputs. In comparison the iDAC not only had more dynamic life, but a much greater sense of dimensionality. When I listened through ProAc Jubilee Anniversary Tablettes, the iDac's imaging precision (with the iUSBPower supply) was on a par with both the Benchmark DAC-2 and the Mytek 192/DSD DACs. I was also impressed by the iDAC's well-defined space between instruments and vocals, which certainly equaled these far more expensive DACs.

On my own 192kHz/24-bit live concert recordings I was especially impressed by the iDAC's ability to portray the recording space accurately with all dimensional and spatial cues intact. My recording of Richard Stoltzman with the Boulder Philharmonic performing Copland's Clarinet Concerto captured all the lushness of Stoltzman's impeccable tone while preventing it from blending with the woodwind section, even during the loudest passages. The words "dynamically implacable" came up often in my listening notes, be it my own classical recordings or bombastic pop such as Toy Matinee's "Last Plane Out," where the gunshot 2:36 into the cut pushes the limits of any DAC.

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Yes, the iDAC is a very good USB DAC. In point of fact, so good that it could be used in a system where you would usually be sorely tempted to "move up" to a far pricier USB DAC solution. If your budget for a USB DAC is above the combination price of $448, I strongly advise you to listen to the iDAC/iUSBPower solution before climbing the price-point ladder.

The iCAN

The $249 iCan, like all the iFi devices, shares the same case as the iDAC, but it definitely has a front and a back. On the backside of the iCAN you'll find its power supply input as well as a single pair of RCA inputs. On its front there's a volume control knob, 1/4" full-sized single-ended headphone output, and a pair of three- way toggle switches. The first of these switches is iFi's XBass control. It has three settings, "direct" (no bass boost,) "average," and "for bass-shy headphones." According to iFi's Thorsten Loesch, "The XBass boost is 3dB/7dB at 50Hz relative to 1kHz. However, this number does not as such describe adequately the operation of XBass. XBass is not intended as a traditional tone control or loudness circuit (nor is it based on these). The response is rather different and is intended to compensate suppressed bass and excessive LF phase-shift found with many headphones."

Most "bass enhancement" schemes and circuits I've heard have, at best, been merely "fun" features rather than anything of value to audiophiles. The iFi XBass is different. While I still preferred most of my reference headphones in the "direct" mode, I found that with one particular pair of in-ear monitors (Shure SE500s converted by Fisher Hearing into custom in-ears) the "bass shy" setting provide just the right amount of bass to turn what were sorely bass-deficient in-ears into well-balanced cans. I've tried to accomplish the same bass augmentation using iTunes, Pure Music, and Amarra's EQ functions with much less satisfactory results. If you have a headphone that you love that lacks the last bit of bass punch and impact, the iFi XBass might be just what your audio doctor ordered.

The second toggle switch on the iCAN controls iFi's "3D Holographic sound" circuit. The three settings are "direct," "3D for flat recordings," and "3D for recordings with excessive stereo effect." According to Thorsten Loesch, "Our 3D Holographic Sound circuit is not based on the Linkwitz crossfeed. We did not find the Linkwitz circuit adequate to provide even a crude first-order approximation of the time and frequency domain responses needed. Further, for both operations the sets of coefficients are based on internal research and listening tests and in part derive from work I was involved with in the 1980s at the RFZ (then East Germany's equivalent of the IRT). The coefficients are fairly complex and not simply expressed by a simple number of XdB at YHz."

I found the iCAN's 3D options less useful than XBass. The 3D setting for "flat sounding recordings" introduced a slight lift to the midrange and lower treble that changed harmonics in ways I did not find appealing. The "excessive stereo" correction setting was better, but very few recordings seemed to benefit from the reduced soundstage width of this setting. Most of the time, I came back to the "direct" setting.

Like the iDAC the iCAN employs iFi's "DirectDrive" circuitry, which Loesch says, incorporates two sets of features. "First a negative voltage is generated on board to allow a ground- referenced, direct-coupled output and greater output levels, while still operating with a single low supply voltage. In most cases headphone outputs require substantial 'build out' resistors to ensure that the amplifier remains stable. We are able to dispense with these, so the output resistance of our headphone amplifiers is mostly down to the contact resistance in the socket and a little bit for PCB traces. This means the damping factor is maximized and excessive source resistance does not alter headphone response. All this together is what we call DirectDrive."

Traditional wisdom is that good headphone amps are big, heavy, and expensive. The iCAN makes a strong argument against such generalizations. Not only did it have the raw power to drive high-impedance headphones such as the 600-ohm version of Beyer-Dynamic DT-990 with ease, but it also delivered a black, low-noise background to the high-sensitivity Shure SE500 in-ear monitors. Even the Bryston BHA-1 couldn't generate as little noise with these high-sensitivity earphones as the iCAN.

My favorite headphones with the iCAN were the Audeze LCD-2 (version 2.2) with upgraded Cardas headphone cabling. The combination produced a high-resolution, yet full-bodied presentation that rivaled my reference Stax setup, which consists of the SR-X Mark 3 and SRM1 Mark-2 amplifier. The LCD- 2/iCAN combo matched the Stax in low-level detail and immediacy, and beat the Stax when it came to low-frequency impact and dynamics. The Stax SR-X Mark 3 headphones still had an edge when it came to high-frequency air and detail. But in the critical midrange both setups delivered a level of finesse and musicality that distanced them from all the other headphone/ amp combinations I've heard recently. For the price, the LCD-2/ iCAN combo makes an unbeatable pairing.

The iUSBPower

Aftermarket power solutions are nothing new, but iFi's approach to the problem of cleaner USB power is unique. Instead of resorting to a battery and some sort of battery-charging scheme, iFi has opted for regulating, isolating, and cleaning up the USB power supply itself. The $199 iUSBPower has a single USB 2.0 (it will also take 1.0) input with an AC power input on one end and a pair of USB outputs on the other. One USB output is designated "power only" while the other passes both power and audio signals. For most applications the power and audio combination USB output will be the one used, but if you have a USB device in need of 5.0V power the iUSBPower can supply it via its "power-only" output.

iFi iUSBPower

In my nearfield desktop system replacing the stock AC power supply with the iUSBPower lowered the iDAC's already low noise floor to the point where it sounded very much like what I'm used to hearing from a live microphone feed. Micro-dynamics seemed more pronounced when the iUSBPower was attached and the smallest details buried in the mix were easier to hear.

The only glitch I experienced with the iUSBPower device was when connected to my Mac it "took over" as an über USB connection—the other two USB DACs connected to my Mac disappeared from my sound devices selection box, leaving the "AMR USB audio 2.0" as the only selectable sound device. To add additional sound devices I had to disconnect the iUSBPower from my computer and perform a reboot. If you don't use a Mac or only have one sound device connected to your system (most setups) you won't experience this problem.

Is There an iFi in Your Future?

I suspect that many audiophiles will purchase iFi products with the intention of using them in a portable, traveling, or desktop system. But after trying any one of these little wonders, you might be tempted to move them into your main system. That could be a mistake. Why? Because once you hear the iFi iDAC, iCAN, and iUSBPower in your main system, you may be forced to buy a second set, because they won't be coming back out. That's how well the iFi gear performs.

SPECS & PRICING

iFi iDAC
Device type: USB DAC/headphone amp
Input: USB Audio Class 2.0
Output: RCA (single-ended), minijack for headphone
Output power: 150mW (headphone amp)
Signal-to-noise ratio: 97dB(A)
Dimensions: 68 x 28 x 158mm
Weight: 0.43 lbs.
Price: $299

iFi iUSBPower
Device type: USB power supply
Input: USB (Type B)
Output: USB (Type A) power only, USB (Type A) power + music
Dimensions: 68 x 28 x 158mm
Weight: 0.43 lbs.
Price: $199

iFi iCAN
SNR: >117dB (A-weighted)
Frequency response: 0.5Hz to 500kHz (-3dB)
Dimensions: 68 x 28 x 158mm
Weight: 0.48 lbs.
Price: $249