

## Press Release

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For Immediate Release

### **PS Audio's DirectStream DAC Exposes Major PCM Cover-up**

*First, in a Field of One*

*"It blew my mind. The PCM through DirectStream was the best I had ever heard at that point. It still is the best I have ever heard."* --Gus Skinas, Director, Super Audio Center SACD Mastering Center, and DSD pioneer.

**Boulder, CO: February 27, 2014**— PS Audio, manufacturer of fine audio equipment for over 40 years, is proud to introduce the revolutionary new DirectStream DAC. DirectStream is the result of lead designer Ted Smith's decade-long obsession with DSD, the first in a field of one: a DAC so radical that it will show how most other DACs on the market are...well, broken. How so?

**The back-story:** In 1981, music was reproduced exclusively on analog-based turntables and tape decks. Although there are inherent limitations in their media, records and tape have benefitted from a century of development.

Despite the very listenable music coming through those grooves, the audio world wanted more: greater dynamic range, lower noise, extended frequency response. No wonder that when, in 1982, Sony and Philips announced they had achieved "Perfect Sound Forever", music lovers around the world waited in eager anticipation of analog's promise finally fulfilled.

The launch of the PCM-based Compact Disc would set in motion a 30-year war amongst Audiophiles, decimate the analog format, cover up subtle musical details for decades and turn the music and audio industries upside down --and not necessarily in a good way.

It might not have ever been a problem if Sony and Philips had waited another decade, and passed over the classic PCM delivery system. It turns out the processing of the CD and its higher-resolution siblings is fundamentally flawed, and has been from the beginning.

**Most modern DACs are fundamentally broken:** Music's details have been more faithfully recorded than we ever suspected, and the cover-up of those recorded

details has been with us for more than 30 years. Happily, the missing musical information is still buried deep within our audio libraries—waiting to be revealed.

The problem is the PCM decoding process itself: whether a classic ladder-DAC or more modern multi-bit Sigma-Delta type, PCM processors universally mask some of the subtle cues in music, and no amount of upgrading, expenditure, tweaking or improvement can fix this fundamentally-flawed system.

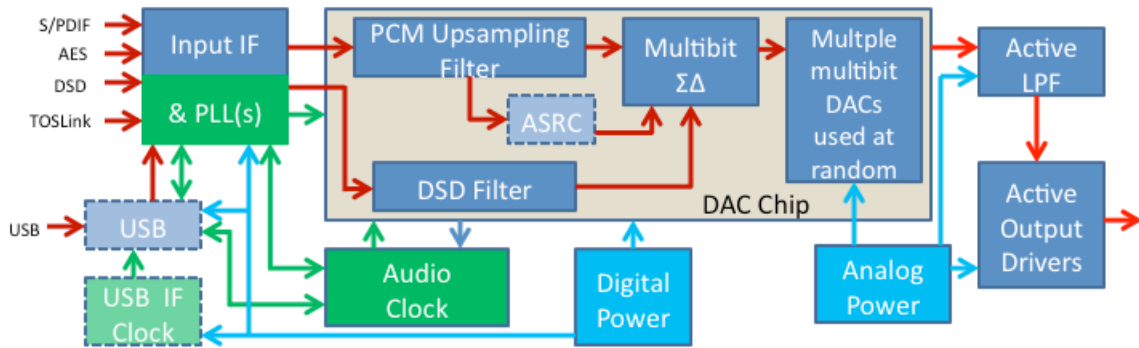
In order to extract everything hidden in PCM recordings, a completely new processing method is needed.

**An end to the 30-year PCM cover-up:** PS Audio is proud to end the cover-up, and finally, with the revolutionary DirectStream DAC, reveal all the missing information buried within PCM-based digital recordings.

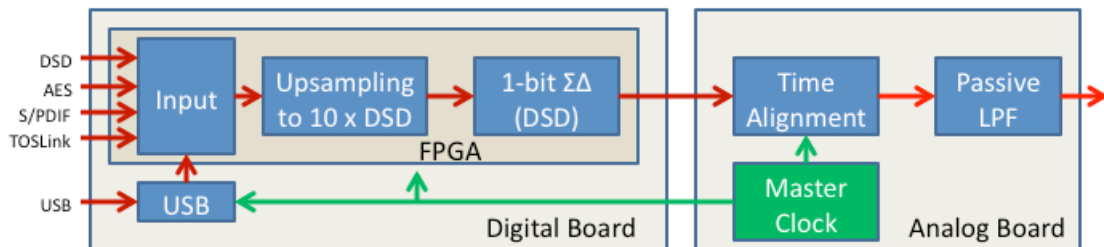
Put DSD into DirectStream, you get DSD. Put PCM into DirectStream, you get—DSD. DirectStream converts all digital inputs, including PCM, to pure 1-bit DSD, in an elegantly-simple path. In the process, the PCM feed becomes more linear, less edgy, and never-before-heard musical details are released from all digital audio recordings. Billions of CDs and high-resolution downloads worldwide will gain new life, and be saved from obsolescence -- and recycling bins or landfills.

**Its secret is in its simplicity:** Take a look at this comparison diagram: on the top is a block diagram of one of the best PCM-based processors in the world, the ESS Sabre DAC. Look at that nasty, circuitous path—then look at the pure simplicity of the DirectStream. The PCM processor's tendency to mask music's subtle details is largely due to its complex needs, and the technical requirements of PCM processors.

# Liberation from a chip and complexity



ESS Sabre Block diagram



PS Audio DirectStream

**It's not enough to just convert PCM to DSD:** Converting PCM to DSD can be an easy exercise using any number of computer software programs. Converting PCM to DSD properly, and in such a way as to reveal missing details in the music, is a serious technical challenge. DirectStream utilizes 66-bit fixed-point FIR filters, eliminates headroom issues common to PCM, flattens noise response in the 20-100kHz region, uses coefficients optimized for best sound rather than faster processing speed and optimizes hardware-specific operations not possible in software.

**Method:** Unlike other processors available today, DirectStream unifies all inputs (PCM or DSD) at 10 x DSD, then uses a true single-bit double-rate DSD core engine. True DSD core engines (compared to the standard multibit Sigma-Delta converters followed by random lower quality multibit converters) offer advantages in simplicity, linearity, and in analog-like overload characteristics that avoid PCM's "hard clipping" potential and a PCM processor's propensity to mask subtle details.

**Construction:** DACs designed around dedicated IC (integrated circuit) chips are limited in the amount of signal-processing and math they can perform, due to their restricted ability to dissipate heat. Their limited "real estate" also forces digital circuitry to be located directly adjacent to analog circuitry, which can introduce noise and jitter into the signal output.

Instead of being based upon a packaged PCM-based DAC chip, with all of its inherent compromises and limitations, DirectStream utilizes an FPGA (Field-Programmable Gate Array). An FPGA is capable of dissipating large amounts of heat, enabling intensive levels of signal-processing that are impossible to achieve with an off-the-shelf chip.

Further information of lead designer Ted Smith's seven-year journey leading to DirectStream, as well as complete details of DirectStream's design and features, can be found at on PS Audio's website. <http://www.psaudio.com> Videos of Ted's discussions of his design process as well as the entire Gus Skinas interview can be found here: [http://www.youtube.com/channel/UCo\\_DbREtI74UrmWajBqVHCQ](http://www.youtube.com/channel/UCo_DbREtI74UrmWajBqVHCQ).

PS Audio's DirectStream is a totally new approach to processing digital signals. By means of its radical architecture and construction, it is able to offer state-of-the-art digital performance and previously masked musical details from all formats, at an affordable price. DirectStream will change viewpoints regarding ultimate sound-quality while simultaneously offering greater value than any contender for state-of-the-art.

PS Audio's DirectStream isn't just another, better DAC. Discover what you've been missing.

**Release:** The PS Audio DirectStream DAC will be announced March 1, 2014. Shipments to dealers and distributors will begin in April, 2014. A limited number of units are available for review at the present time.

**MSRP:** Manufacturer's Suggested Retail Price is \$5995 in the United States. Pricing in overseas markets will vary.

**Upgrades:** PS Audio provides an aggressive upgrade program for all PerfectWave DAC owners to convert their existing units to the new DirectStream standard.

**About PS Audio:** Founded by Paul McGowan and Stan Warren in 1973, PS Audio has a long history of offering innovative designs at affordable prices. PS has been an industry-leader in the fields of power-regeneration, phono preamplifiers, DACs and transports. PS Audio's administration, engineering and manufacturing facilities are all located in Boulder, Colorado, and all core products are fully made in the USA.

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