

iDAC2: Spilling the Secret Sauce (2/6)

Digital section: 'True Native' augmented by latest gen Octa-Core Transputer

At the heart of AMR/iFI products including the iDAC2 micro is the same Burr-Brown 'True Native' chipset which we have explained before in the micro iDSD thread. This particular Burr-Brown chip offers two separate signal pathways for PCM and DSD. What this means is that one chip offers the 'best of both formats' as the signal quality remains *native*.

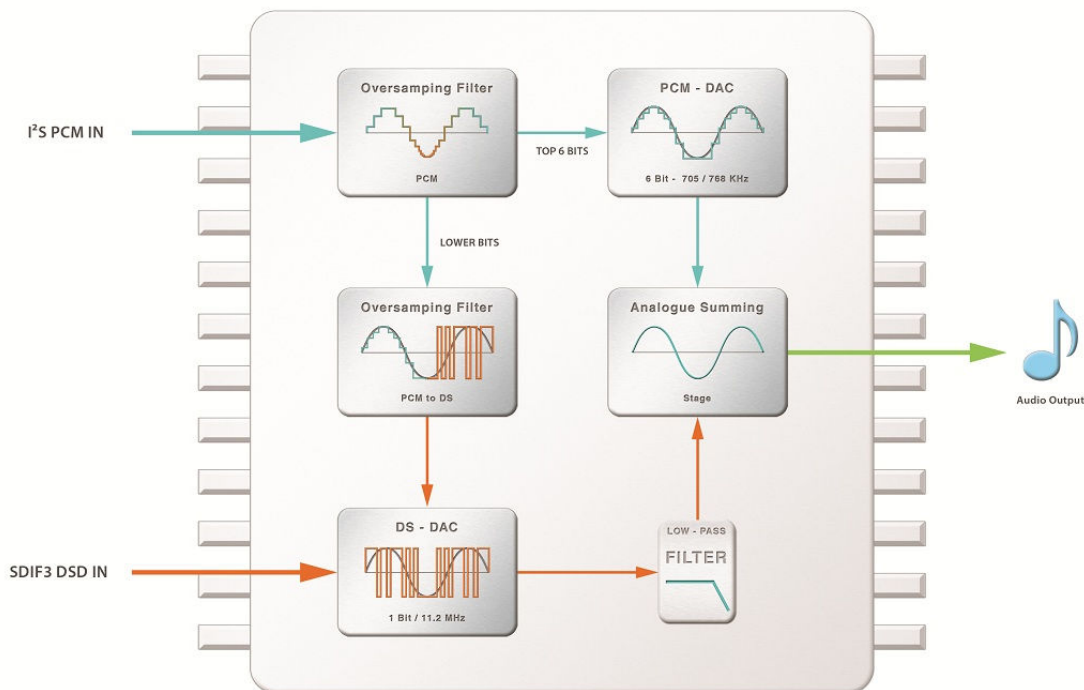
Choosing the right DAC topology significantly effects the final sound. We loved the dynamics and slam of the multi-bit topology (e.g. the legendary Philips TDA1541A), however when a High-Definition signal is used, the Multibit topology (actually no true multi-bit DAC chipset available yet) doesn't have the low-level linearity of the Delta-Sigma topology.

So to get the best of both worlds, we need:

- Multi-bit for dynamics and slam (the higher bits of the PCB data);
- Delta-Sigma for the low level linearity (the lower bits of the PCB data);

So the DAC chip we picked for the micro iDSD has the following topology:

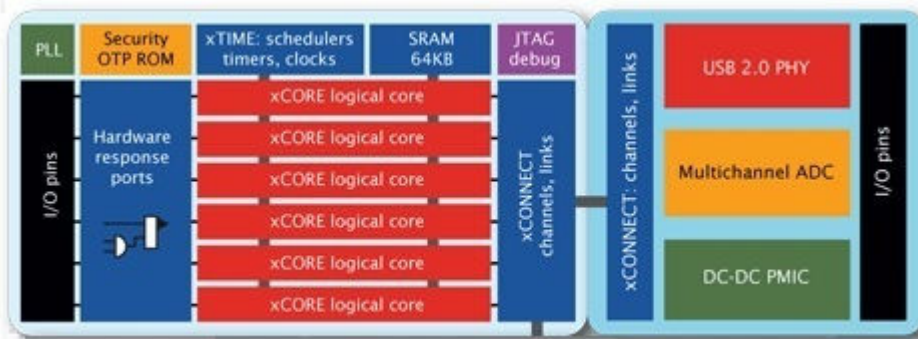
- Top 6 bit: true multi-bit;
- Lower bits: Delta-Sigma.



As a result, the iDAC2 micro also supports DXD and DSD up to DSD256#. Three Digital Filters are included; Bit-Perfect (Non-Oversampling), Minimum Phase and Standard and three selectable analogue filters for DSD.

DSD256 is available on Windows via ASIO DSD and with special firmware on OSX, Windows and Linux via DoP DSD

Running alongside the Burr-Brown 'True Native' chipset is the 8-Core XMOS. But with one essential difference – our own firmware. Such update to the XMOS Design and Firmware introduced by iFi include Star Clocking as first outlined in the iDSD micro.



The iDAC 2 implements Version 4 AMR XMOS Platform and uses the latest generation 8-Core 500MIPS XMOS1 transputer derived main processor. These processors are quite unique in their architecture and are based on a technology that once was considered to have revolutionized computing, the INMOS Transputer: which allows extremely high sample rates, supporting 384kHz/32Bit PCM and 11.2MHz single bit (DSD).

¹INMOS transputing to XMOS

The 'Transputer' (Trans – Com – Puter) was a pioneering microprocessor architecture of the 1980's, intended for parallel (multi-core) computing. It was designed among others by David May and produced by Inmos, a semiconductor company based in Bristol, United Kingdom.

For some time in the late 1980's many considered the Transputer to be the next great design for the future of computing. While INMOS themselves ultimately faded from the scene, their pioneering parallel computing platform is echoed in every modern PC running Dual or Quad Core CPU's and in any Smartphone or Tablet featuring multi-core CPU's.

XMOS was started among others by David May and modernised the Transputer core architecture. XMOS 'Transputer' Chips have since found many applications where their unique architecture outperforms both traditional CPU's and FPGA systems, not the least in USB Audio.

While the digital section is very extensive and based on fairly unique items that stand out from the crowd, without a commensurate highly dedicated analogue section, the iDAC2 would not be half the DAC it is.



Next time – *Secret to the ‘Analogueness’ (part 3)*



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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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