



**DAE-3™ Family of Solutions  
for Digital TV Applications  
White Paper**

*Delivering Premium Audio in a High Definition World*



## **DAE-3 Family of Solutions for Digital TV Applications**

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D2Audio has recently announced a new Intelligent Digital Amplifier™ chip, the DAE-3™ that adds home theater quality sound to flat panel TVs without adding additional cost. The new D2Audio 3<sup>rd</sup> generation Digital Audio Engine™ 3 (DAE-3™) for Digital TVs (DTV) uses a true Digital Signal Processor (DSP) specifically designed to deliver life-like enhancements to digital TV audio. Sleek, modern designs and small speakers create challenging audio playback issues for TVs that only an audio DSP can correct. These audio corrections and extensions are encompassed in the D2Audio® SoundSuite™ family of psycho-acoustic and immersive processing algorithms.

In addition to basic correction of several speaker anomalies, the D2Audio SoundSuite family of algorithms brings the listening into a rich and realistic sound stage for a true home theater like experience. The D2Audio DAE-3 running the D2Audio SoundSuite algorithms is an exceptionally effective combination that corrects the sound from low-cost or premium speakers alike, meaning that there is no need to pass the cost of premium speakers on to consumers since the built in DSP is more effective and more economical. With special attention to delivering realistic sound from even the smallest flat-panel speakers, the DAE-3 delivers a rich and immersive listening experience to match the brilliant video of today's flat screen TVs.

D2Audio looked deeper into the system requirements than just audio processing, and integrated a number of support features to reduce overall Digital TV system BOM (Bill of Materials) costs. One of the most prominent items in this group of cost saving features is the flexible power stage approach that allows the widest range of discrete and integrated power stages to be paired with the DAE-3 to address various channel count requirements with completely scalable power needs. A modern Digital TV must support several secondary outputs such as line outputs, headphone outputs, subwoofer output, and more. The DAE-3 incorporates a group of small-area Class-D PWM controllers to meet the growing channel count needs from a single chip. In addition to multiple channel count support, graceful power stage protection and control is integrated into the DAE-3. To support the several other input and output signals, the DAE-3 incorporates a full complement of digital and analog I/O options. These range from SPDIF/I2S inputs and outputs, to the integrated ADC (Analog to Digital Converter) supporting legacy analog inputs. One IC and one simple schematic with one simple control interface, take system integration to a new level.

The HDMI interface has become a convenient and now very common interface in today's Digital TVs. One of the main benefits of HDMI transport is that both video and audio data are transferred from one component to another over a single cable. What is not as widely understood is that the digital clocking is video-dominated, and not quite compatible with standard audio clocking formats. Audio data sent over HDMI arrives intact, but also contains clock and timing anomalies that are audible in the speakers during playback. The DAE-3 incorporates multiple advanced Sample Rate Converters (SRCs) for re-clocking digital audio data from all digital sources and completely corrects these anomalies. The DAE-3 delivers high quality playback without any of the audible artifacts that come from HDMI transport. Other amplifier suppliers will instead be forced to add an additional SRC device to the system, or



convert the digital data back into analog – losing the quality and fidelity of the original digital audio. The DAE-3 offers a lower cost, higher performance, and a more rounded system solution.

The D2Audio DAE-3 family of solutions for Digital TV incorporates a fully reprogrammable DSP with support for the key algorithms popular in consumer electronics. Full DAE-3 support for branded algorithms from Dolby Labs® and SRS Labs® offers Consumer Electronic (CE) brands options in addition to the powerful D2Audio SoundSuite group of algorithms. For example the newest multi-channel SRS TruSurround HD4™ virtualizer technology from SRS Labs includes support for up to 4.1 channel powered speaker configurations. With the DAE-3, CE brands now have flexibility in configuring their products to best meet consumer demands.

D2Audio provides a number of evaluation platforms for the various Digital Audio Engine products. The newly announced TKF15-5 platform, targeted towards Digital TV platforms, includes the standard Digital TV input and output connections, as well as four primary powered channels, plus an amplified subwoofer power stage. CE brands and TV design companies can quickly evaluate the full range of functions and amplifier configurations with this platform.

The D2Audio DAE-3 family of solutions for Digital TVs is a significant step forward for TV sound systems. The growing complexity of these sound systems has been addressed while still holding system level costs down. The D2Audio SoundSuite immersive processing algorithms add a new dimension to the fidelity and realism of DTV sound to create a home theater like environment. Scalability and ease of use from D2Audio DAE-3 and the D2Audio SoundSuite solutions round out the feature offering to deliver next generation performance, cost, and usability.