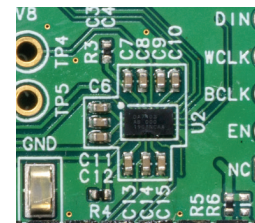


## Outstanding audio and battery lifetime for TWS earbuds and hearables

The world is more “on-the-go” than ever. But whether they’re relaxing to music or having vital conversations for work, consumers expect crystal-clear sound at all times. The SmartBeat™ DA7401 lets you deliver truly wireless stereo (TWS) earbuds and hearables to impress even the most demanding user. It combines industry leading audio and wideband hybrid digital active noise cancellation (ANC) in a space-saving solution whose low power consumption could enable longer playback times.



The SmartBeat™ DA7401 is a high-performance, ultra-low-power mono hi-fi codec. Featuring Dialog’s custom digital hybrid ANC technology, it offers stronger suppression of ambient noise over a wider range of frequencies for the best user experience in any environment.

With its integrated audio processor, the DA7401 delivers excellent audio performance including dynamic ranges of 115 dB for playback as well as sampling rates up to 384 kHz. It also offers 40 kHz audio bandwidth to support Hi-Res Audio. All this while consuming just 5.8 mW during playback with ANC.

The SmartBeat™ DA7401 is available in a choice of compact packages to meet the needs of even the most space-constrained applications. Moreover, it is part of a family of pin-compatible codecs, making it easier for you to develop a complete portfolio headphone, headset and earbud solutions for any application

### Applications

- TWS earbuds
- In-ear headsets (USB-C)
- Hearables

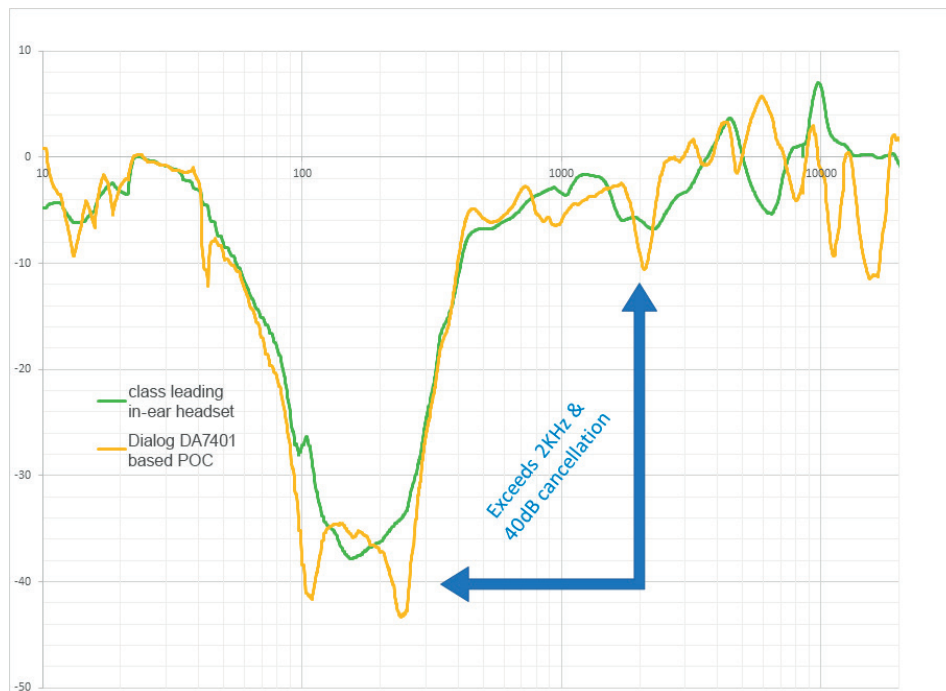
### Benefits

- Superior audio performance
- World-class magnitude and range of ambient noise suppression
- Class-leading low power consumption
- Highly compact footprint
- Minimal external component count
- Development kit including extensive tooling to speed up product development
- Family of pin-compatible variants

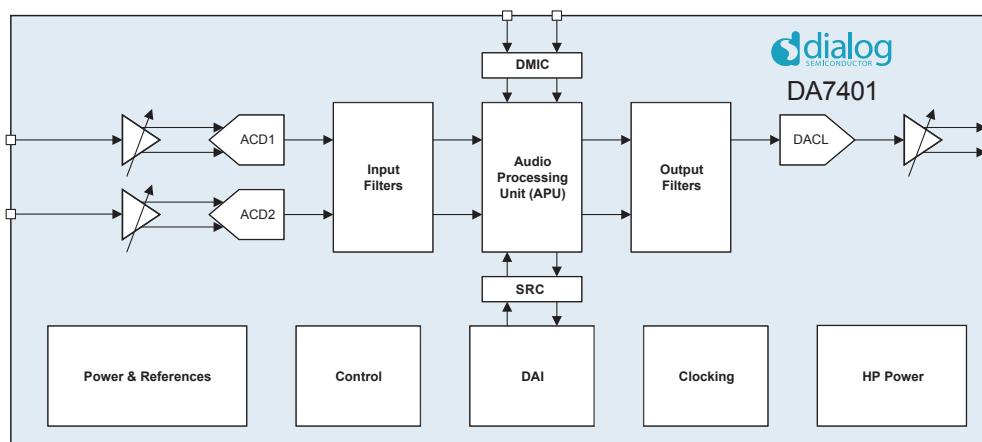


## Wideband digital hybrid ANC

The DA7401 features our proprietary digital ANC technology that can be configured to work in feedback, feedforward or a novel hybrid mode. In hybrid mode, the DA7401 delivers best-in-class ambient noise suppression in terms of both magnitude (Upto 35dB at 100 Hz) and frequency range (over 2.5 kHz).

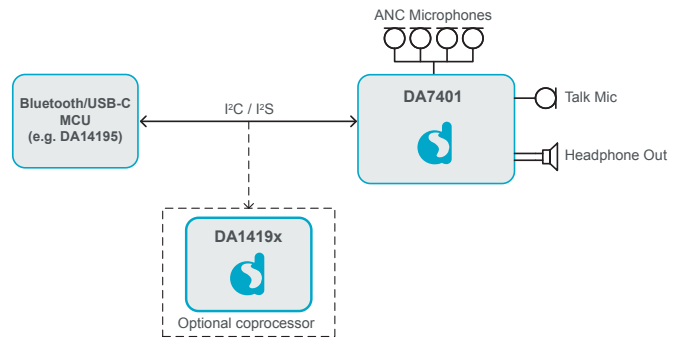


Key to this performance is a custom DSP that is optimized for ANC and enables an input-to-output latency of just 25  $\mu$ s. Meanwhile a dedicated fast equalization (FEQ) path operating at the digital microphone (DMIC) clock rate delivers improved cancellation at high frequencies.



## Tailored support

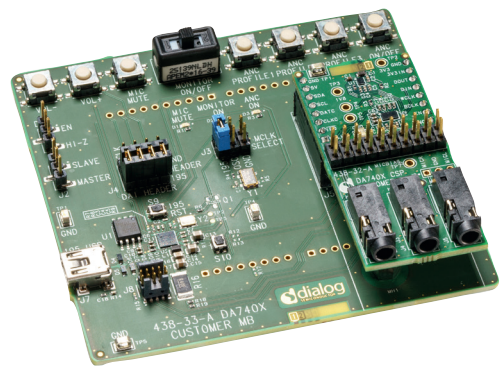
Dialog offers all the tools and support you need to develop new DA7401-based applications fast. This includes the option for hand-on support from experts in our audio labs in Europe and South East Asia.



Typical application design

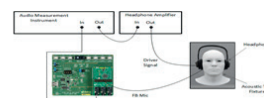
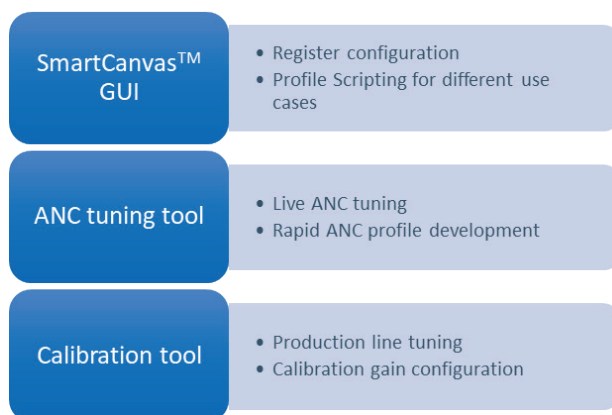
## Development kit

The DA7401 development kit contains all the hardware you need to explore the potential of this high-performance ANC codec for yourself. The motherboard includes the codec and a DA14195 co-processor, while the daughterboard features the DA7401 in your choice of package.



## Development tools

We also offer an extensive range of tools covering the whole development cycle to help you design and tune your hardware and software. This includes a semi-automatic ANC tuning tool to simplify and speed up the optimization of your ANC configuration. In addition, an easy-to-use production line calibration tool helps you compensate for tolerances within commercial microphones to ensure consistently great performance in every product you make.



## Key features

- Wideband digital active noise cancellation:
  - Supports hybrid, feedforward and feedback topologies
  - Up to 35 dB cancellation at 200 Hz
  - Over 2.5 kHz suppression range
  - 25 µs input-to-output latency
  - Dedicated fast equalization path for higher frequency noise canceling
  - Dedicated calibration and tuning tool
- Ultra-low power consumption
  - 5.8 mW hybrid ANC playback
- Enhanced audio performance
  - 115 dB playback dynamic range
  - 40 kHz bandwidth supports Hi-Res Audio
- 4-wire digital audio interface with support for I2S, TDM and other common audio formats
  - Up to 32 bits per channel
  - Up to 384 kHz sample rate support
- Three stereo PDM inputs for digital microphones and low latency connection from host processors
- Integrated low-noise microphone bias
- Flexible DSP supporting mixing, gain, equalization, sidetone, and automatic gain control
- Bypassable asynchronous sample-rate converters
- Clocking
  - Programmable fractional-N phase-locked loop (PLL)
  - Sample rate tracking
- 2-wire I2C compatible control interface
- Package: 32-ball 3.26 mm x 1.72 mm, 0.4 mm pitch WLCSP

## Dialog Semiconductor Worldwide Sales Offices

[www.dialog-semiconductor.com](http://www.dialog-semiconductor.com) email: [info@diasemi.com](mailto:info@diasemi.com)

### United Kingdom

Phone: +44 1793 757700

### The Netherlands

Phone: +31 73 640 88 22

### Japan

Phone: +81 3 5769 5100

### Singapore

Phone: +65 648 499 29

### Korea

Phone: +82 2 3469 8200

### Germany

Phone: +49 7021 805-0

### North America

Phone: +1 408 845 8500

### Taiwan

Phone: +886 281 786 222

### Hong Kong

Phone: +852 3769 5200

### China (Shenzhen)

Phone: +86 755 2981 3669

### China (Shanghai)

Phone: +86 21 5424 9058

This publication is issued to provide outline information only, which unless agreed by Dialog Semiconductor may not be used, applied, or reproduced for any purpose or be regarded as a representation relating to products. All use of Dialog Semiconductor products, software and applications referred to in this document are subject to Dialog Semiconductor's Standard Terms and Conditions of Sale, available on the company website ([www.dialogsemiconductor.com](http://www.dialogsemiconductor.com)) unless otherwise stated. Dialog and the Dialog logo are trademarks of Dialog Semiconductor plc or its subsidiaries. All other product or service names are the property of their respective owners. © Copyright 2019 Dialog Semiconductor. All rights reserved.