SmartBeat™ DA14195 low-power peripheral audio solution
Immerse yourself in audio wherever you are

With the rise of high-quality online media streaming, headphones are no longer a simple accessory – they are the gateway to entertainment. Dialog's SmartBeat™ DA14195 offers a simple route to active headphones with built-in audio processing. Based on industry-standard IP, this powerful SoC enables headphones that control ambient noise and enhance content for truly immersive listening anywhere.

The DA14195 is an open audio platform for high-end active headphones. It combines extremely low power consumption with impressive processing performance in a small package. As a result, it allows you to develop attractive looking headphones that deliver top-end features such as ambient noise / echo cancellation, virtual surround sound and voice control. It supports up to 6 mics for beam forming and position-aware applications. Plus it handles high-end audio signals such as 192 kHz, 32-bit PCM for the ultimate sound quality.

Use cases

- USB, Bluetooth and / or analog active headphones
- USB and / or Bluetooth headsets
- Position-aware applications (such as desk phones)

Key benefits

- Enables ambient noise cancellation
- Supports high voice quality
  - Noise reduction
  - Voice enhancements
  - Echo cancellation
- Supports high-end audio up to 192 kHz, 32-bit PCM
- Supports voice control for hands-free calling

Efficient processing power

The SmartBeat DA14195 integrates an efficient 32-bit ARM Cortex-M0 microcontroller and C-programmable 32-bit Cadence (Tensilica) HiFi 3 DSP. This combination ensures a small, low-power solution with all the performance necessary for high-end headphones offering outstanding sound quality and ambient noise cancellation. Moreover, the MCU speed can be scaled to further reduce power consumption, while the DSP is supported by a wide range of 3rd-party audio algorithms.

Flexible memory architecture

The DA14195's shared memory architecture comprises onboard cache, system RAM and DSP RAM. For maximum design flexibility, the MCU code (executed in place) and DSP code is stored in external QSPI Flash memory so you can tailor your memory costs to your application requirements.

Versatile power management

With its integrated step-down converter, the DA14915 can be powered directly from USB or by batteries ranging from 1.9 to 5 V. A high-precision fuel gauge maximizes battery lifetime and means users always know how much music time they have left. Meanwhile the dead battery wake-up feature ensures the display works no matter how long the product has been on the shelf – so buyers don't confuse a flat battery for a faulty product.

Consumer-friendly connections

With the DA14195, you can create audio solutions that let consumers connect to personal and online content libraries however they want. It features a USB 2.0 FS/HS port which supports USB charging specifications 1.2. It offers data rates up to 480 Mbps for excellent voice and music quality, and is fully compatible with USB 3.0 type C – the next-generation smartphone connectivity option. Moreover, the DA14195 supports two different host controller interface (HCI) clocking schemes.
So you can easily combine it with the Bluetooth HCI of your choice to create exciting wireless applications.

Modular and open software architecture

The DA14195's architectural layering and towering ensures a highly versatile and easily extendible software platform. It gives you all the building blocks you need plus the flexibility to create your own unique solutions. Power management is a core component, while the flexible audio API allows you to set up multiple streams independently. Software is available as source code, so can be fully customized. To maximize flexibility and customization, we offer a powerful yet compact embedded development kit. Furthermore a host of codecs, sound enhancements and other audio packages are available from Dialog and third parties.

A complete system solution

The DA14195 is an open audio platform that can be combined with any audio codec to create high-end digital applications like headphones and headsets. For example, it is the perfect partner for the Dialog DA7217. This advanced codec offers an outstanding power / performance ratio and includes a voice trigger function that can monitor for voice commands before waking up the DA14195 to start command interpretation.

Key features

Benefits

- Single co-processor platform for Bluetooth, USB and analog headphones
- 32-bit ARM Cortex-M0 MCU operating up to 165 MHz
- 32-bit Cadence (Tensilica) HiFi 3 DSP operating up to 290 MHz
- USB 2.0 HS/FS interface (compatible with USB 3 type C)
- Multiple HCI clocking schemes for Bluetooth integration
- Triple stereo hardware sample rate converter up to 192 kHz
- Dual input 10-bit ADC
- Supports external QSPI Flash
- Integrated battery management for Li-ion and Li-polymer batteries
- High-precision fuel gauge
- Dead battery wake-up
- Extensive range of digital audio interfaces (SPDIF, PDM, SPI, UARTs, I2C etc.)
- Small form factor 81-balls, 0.4-mm wafer-level chip-scale package (WLSCP)

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