Automotive Audio Bus A^{2}B Transceiver

Data Sheet

AD2426W/AD2427W/AD2428W

A^{2}B BUS FEATURES

Line topology
   Single master, multiple slave
   Up to 15 m between nodes and up to 40 m overall cable length
Communication over distance
   Synchronous data
      Multichannel I^{2}S/TDM to I^{2}S/TDM
      Clock synchronous, phase aligned in all nodes
      Low latency slave to slave communication
   Control and status information I^{2}C to I^{2}C
   GPIO over distance
Bus power or local power slave nodes
Configurable with SigmaStudio graphical software tool
Qualified for automotive applications

A^{2}B TRANSCEIVER FEATURES

Configurable as A^{2}B bus master or slave (AD2428W)
I^{2}C interface
8-bit to 32-bit multichannel I^{2}S/TDM interface
   I^{2}S/TDM/PDM programmable data rate
      Up to 32 upstream and 32 downstream channels
PDM inputs for 4 high dynamic range microphones on masters or slaves
Support for receiving I^{2}S data on nodes with up to 4 PDM microphones
Unique ID register for each transceiver
Support for crossover or straight-through cabling
Programmable settings to optimize EMC performance

APPLICATIONS

Automotive audio communication link
Active noise cancellation
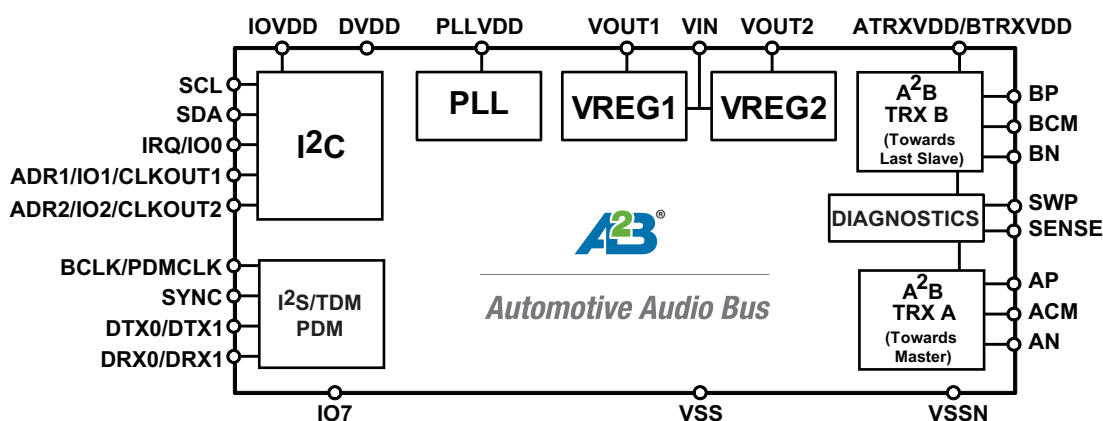**Microphone arrays for hands free and in car communication**

Figure 1. Functional Block Diagram

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GENERAL DESCRIPTION

The Automotive Audio Bus (A^{2}B$^®$) provides a multichannel, I^{2}S/TDM link over distances of up to 15 m between nodes. It embeds bidirectional synchronous pulse-code modulation (PCM) data (for example, digital audio), clock, and synchronization signals onto a single differential wire pair. A^{2}B supports a direct point to point connection and allows multiple, daisy-chained nodes at different locations to contribute and/or consume time division multiplexed channel content.

A^{2}B is a single-master, multiple-slave system where the transceiver chip at the host controller is the master. The master generates clock, synchronization, and framing for all slave nodes. The master A^{2}B chip is programmable over a control bus (I^{2}C) for configuration and read back. An extension of this control bus is embedded in the A^{2}B data stream, which grants direct access of registers and status information on slave transceivers as well as I^{2}C to I^{2}C communication over distance.

The transceiver can connect directly to general-purpose digital signal processors (DSPs), field-programmable gate arrays (FPGAs), application specific integrated circuits (ASICs), microphones, analog-to-digital converters (ADCs), digital-to-analog converters (DACs), and codecs through a multichannel I^{2}S/TDM interface. It also provides a PDM interface for direct connection of up to four PDM digital microphones.

Finally, the transceiver also supports an A^{2}B bus powering feature, where the master node supplies voltage and current to the slave nodes over the same daisy-chained, twisted pair wire cable as used for the communication link.

Complete technical specifications are available for the A^{2}B transceiver. Contact your nearest Analog Devices sales office to complete the nondisclosure agreement (NDA) required to receive additional product information.

Table 1. Product Comparison Guide

Feature	AD2426W	AD2427W	AD2428W
Master capable	No	No	Yes
Functional TRX blocks	A only	A + B	A + B
I^{2}S/TDM support	No	No	Yes
PDM microphone inputs	4 mics	4 mics	4 mics
Max node to node cable length	15 m	15 m	15 m

I^{2}C refers to a communications protocol originally developed by Philips Semiconductors (now NXP Semiconductors).

ANALOG DEVICES

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