

A²B 2.0 BUS FEATURES

Line topology

- Single main node, up to 11 subordinate nodes
- Up to 15 m between nodes and up to 80 m overall cable length
- 98.304 Mbps full duplex

Clock synchronous multichannel I²S/TDM data over distance

- 119 upstream and 119 downstream channels per link (for 48 kHz sampled 16-bit channels)
- Individual 16, 24, or 32-bit channels
- Phase-aligned sampling at all nodes
- Low latency node to node communication

Asynchronous data over distance

- Up to 23 Mbps Ethernet Layer-2 A²B MAC-PHY unicast/multicast/broadcast
- SPI to SPI, SPI to I²C
- I²C to I²C
- Mailbox message exchanges up to 126 bytes
- GPIO to GPIO

ADAA245x TRANSCEIVER FEATURES

- Configurable as A²B bus main node or subordinate node
- Node descriptor/one time programmable (OTP) memory
- Auto-discovery

Line diagnostics per link without bias

Wake-on-A²B activity

Clock output on subordinate nodes without bus operation
EMC, ESD optimized for automotive applications

ADAA245x INTERFACE FEATURES

Ethernet interface via OA SPI

8 configurable serial IO (SIO) (I²S/TDM/PDM) data pins

2 SIO (I²S/TDM) clock domains

I²C and SPI interfaces

4 PWM outputs

2 general-purpose ADC inputs

Up to 16 GPIOs (multiplexed onto other pins)

4-channel ASRC input and output

AUTOMOTIVE APPLICATIONS

Distributed audio systems

Personal audio zones

Rear seat entertainment

Remote AM/FM/DAB/HD tuner modules

In-car telematics and emergency call system

Overhead console

High definition (HD) audio

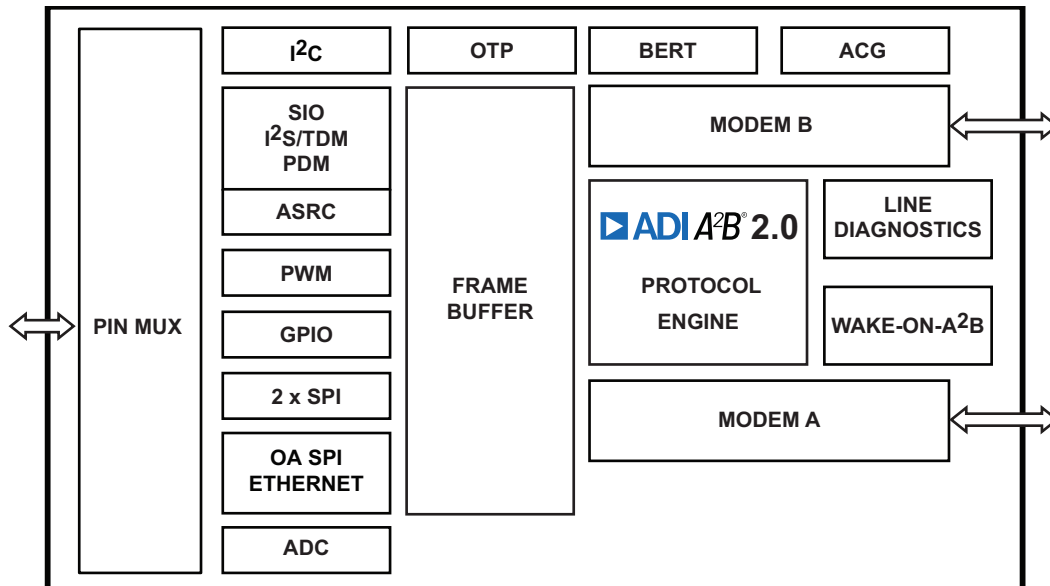


Figure 1. Functional Block Diagram

A²B and the A²B logo are registered trademarks of Analog Devices, Inc.

Rev. Sp0

[Document Feedback](#)

Information furnished by Analog Devices is believed to be accurate and reliable. However, no responsibility is assumed by Analog Devices for its use, nor for any infringements of patents or other rights of third parties that may result from its use. Specifications subject to change without notice. No license is granted by implication or otherwise under any patent or patent rights of Analog Devices. Trademarks and registered trademarks are the property of their respective owners.

ADAA2455/2456/2457

GENERAL DESCRIPTION

The Automotive Audio Bus A²B[®] 2.0 transceivers (ADAA245x) quadruple the available bus bandwidth relative to existing A²B 1.0¹ devices, making them particularly well suited for high definition (HD) audio transport in ECU connectivity applications. ADAA245x devices are compatible with existing A²B 1.0 cabling/connector infrastructures and fully supported by SigmaStudio+[®], a unified software framework from Analog Devices. Additionally, the ADAA245x family and future A²B 2.0 devices can easily be connected to A²B 1.0 branches using their integrated, industry-standard I²S, I²C, and SPI interfaces.

A²B provides a multichannel, multistream digital audio link over distances of up to 15 m between nodes. It embeds bidirectional synchronous pulse code modulation (PCM) data (for example, digital audio from I²S/TDM interface), clock, and synchronization signals, as well as asynchronous data (for example, Ethernet packets) onto a single differential wire pair. A²B supports a direct point to point connection or line topology with multiple, daisy-chained nodes at different locations that can contribute and/or use time division multiplexed channel content.

¹ A²B 1.0 in this document refers to AD240x/AD241x/AD242x/AD243x products.

Table 1. Product Comparison Guide

Feature	ADAA2455	ADAA2456	ADAA2457
Main node capable	No	Yes	Yes
I ² S/TDM interface	No	Yes	Yes
PWM outputs	No	Yes	Yes
PDM microphone inputs	4 mics	4 mics	4 mics
SPI interface	No	Yes	Yes
OA SPI Ethernet interface ¹	No	No	Yes

¹ Media independent SPI interface with serial communication protocol in accordance to Open Alliance TC6.

A²B is a single main node, multiple subordinate node system where the transceiver at the host controller is part of the main node. The main node generates clock, synchronization, and framing for all subordinate nodes. The main A²B transceiver is programmable over a control bus (I²C or SPI) for configuration and read back. An extension of this control bus is embedded in the A²B data stream, which grants direct access to registers and status information on subordinate transceivers, as well as I²C to I²C, SPI to SPI, SPI to I²C and GPIO to GPIO communication over distance.

The transceiver can connect directly to general-purpose digital signal processors (DSPs) or microprocessors, field-programmable gate arrays (FPGAs), application specific integrated circuits (ASICs), microphones, accelerometers, analog-to-digital converters (ADCs), digital-to-analog converters (DACs), and codecs through a multichannel I²S/TDM interface. It also provides a pulse density modulation (PDM) interface for direct connection of up to four PDM digital microphones. The transceiver's pulse width modulated (PWM) outputs can control LED drivers or voltage regulators. GPIO status and control is directly conveyed between nodes.

Complete technical specifications are available for the A²B transceivers. Contact auto.a2b.support@analog.com to receive additional product information.

I²C refers to a communications protocol originally developed by Philips Semiconductors (now NXP Semiconductors).