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# A2B Release Notes

| Document Status: | Approved |
|---|---|
| Approved By: | ASH |

## Revision List

**Table 1: Revision List**

| Document Revision | Date | Description |
|---|---|---|
| V20.1 | 08-Nov-2016 | Updated for Rel13.0.0 |
| V20.2 | 10-Nov-2016 | Incorporated Review comments |
| V20.3 | 10-Nov-2016 | Incorporated review comments from SQAL |
| V21.0 | 10-Nov-2016 | Approved and baselined for Rel13.0.0 |
| V21.1 | 30-Nov-2016 | Draft version for Rel 13.1.0 – Updated sections 3, 4.1 and 6.2 |
| V22.0 | 09-Dec-2016 | Approved and baselined for Rel13.1.0 |
| V22.1 | 17-Jan-2017 | Updated features, release contents, for Rel 14.0 |
| V22.2 | 23-Jan-2017 | Addressed review comments. Added workarounds, known problems, notes sections |
| V23.0 | 23-Jan-2017 | Baselined for Rel14.0.0Beta |
| V23.1 | 21-Feb-2017 | Updated Section 4.1, 3, and 5.1 for Rel15.0.0. |
| V23.2 | 23-Feb-2017 | Absorbing review comments |
| V23.3 | 28-Feb-2017 | Addressing Quality Review comments |
| V24.0 | 03-Mar-2017 | Baselined for Rel15.0.0 |
| V24.1 | 09-May-2017 | Updated for Rel16.0.0 |
| V24.2 | 11-May-2017 | Updated limitation section |
| V24.3 | 12-May-2017 | Absorbing review comments |
| V25.0 | 12-May-2017 | Baselined for Rel16.0.0 |
| V25.1 | 28-Sep-2017 | Updated for Rel17.0.0 |
| V25.2 | 03-Oct-2017 | Addressing review comments |
| V25.3 | 05-Oct-2017 | Absorbing QA review comments |
| V26.0 | 05-Oct-2017 | Baselined for Rel17.0.0 |
| V26.1 | 15-Nov-2017 | Updated for Rel18.0.0 Beta |
| V26.2 | 01-Dec-2017 | Updated the details of BF716 inclusion |
| V26.3 | 05–Dec-2017 | Absorbing review comments |
| V27.0 | 06-Dec-2017 | Baselined for Rel18.0.0 Beta |
| V27.1 | 07-May-2018 | Updates for Rel19.0.0 |
| V27.2 | 11-May-2018 | Review comments incorporated |
| V27.3 | 24-May-2018 | QA review comments incorporated (Section 2, 3) |
| V28.0 | 06-June-2018 | Baselined for Rel19.0.0 |
| V28.1 | 19-Oct-2018 | Updates for Rel19.1.0 |

| | | |
|---|---|---|
| V28.2 | 25-Oct-2018 | Review comments incorporated |
| V29.0 | 31-Oct-2018 | Baselined for Rel19.1.0 |
| V29.1 | 4-Dec-2018 | Updates for Rel19.2.0 |
| V29.2 | 11-Dec-2018 | Addressed review comments |
| V30.0 | 12-Dec-18 | Approved and Baselined for Rel19.2.0 |
| V30.1 | 30-Apr-19 | Updates for Rel19.7.0 Alpha |
| V30.2 | 02-May-19 | Addressed review comments |
| V31.0 | 03-May-19 | Baselined version for Rel19.7.0 Alpha (test version) |
| V31.1 | 09-July-19 | Updates for Rel19.8.0 Alpha |
| V31.2 | 16-July-19 | Incorporating review comments |
| V32.0 | 18-Jul-19 | Approved and Baselined for 19.8.0 Alpha |
| V32.1 | 19-Aug-19 | Updates for 19.3.0 release |
| V32.2 | 30-Aug-19 | Review comments addressed |
| V33.0 | 30-Aug-19 | Approved and Baselined for 19.3.0 |
| V34.0 | 16-Oct-19 | Approved and Baselined for 19.3.1 |
| V34.1 | 31-Aug-20 | Updated for Rel19.4.0 |
| V34.2 | 02-Sept-20 | Review comments addressed |
| V35.0 | 02-Sept-20 | Approved and Baselined for 19.4.0 |
| V35.1 | 27-Apr-21 | Updated for Rel19.4.2 |
| V35.2 | 03-May-21 | Review comments addressed |
| V36.0 | 03-May-21 | Approved and Baselined for 19.4.2 |
| V36.1 | 18-April-22 | Updated for Rel19.4.3 |
| V37.0 | 25-April-22 | Approved and Baselined for 19.4.3 |
| V37.1 | 25-July-22 | Updated for Rel19.4.4 |
| V37.2 | 28-July-22 | Review comments addressed |
| V38.0 | 02-Aug-22 | Approved and Baselined for 19.4.4 |
| V38.1 | 15-May-24 | Updated for Rel 19.4.5 |
| V38.2 | 24-May-24 | Review comments addressed |
| V39.0 | 24-May-24 | Approved and Baselined for 19.4.5 |

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## Copyright Information



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The recipient of this package must agree to the terms specified in the software license agreement in "**2024-05-23-A2BSTKW Click Thru SLA.pdf**" included in this package, to use its contents.

## Table of Contents

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## List of Tables

# 1 Introduction

The Automotive Audio Bus (A2B) is a proprietary bidirectional audio bus from Analog Devices that provides physical connectivity to devices like microphones, speakers and processing ECUs in a car. The A2B topology is cost effective because of its twisted pair connectivity and its ability to provide single point connection to the head unit or the ECU. It is also capable of transferring multichannel audio across devices like microphones and speakers.

## 1.1 Purpose

Software package contains A2B Stack and plugins to SigmaStudio. A2B Stack is a highly portable and flexible framework for developing and deploying A2B networks in automotive environments. Plugins enable graphical programming of A2B network using SigmaStudio.

## 1.2 Scope

A2B Stack and sample applications are provided in source form. SigmaStudio plugins are Dynamic Link Libraries (DLLs).

## 1.3 Organization of the document

Section 1 to 8 details about the content of the releases, the changes or the features which got added and other known issues/ problems in the release.

Section 9 talks about setting up the hardware and perform a quick demo with the example application.

Section 10 is intended for the integrator where the software deliverable shall be integrated and ported to custom platform.

# 2 Release Information

This version of the product supports all variants of the AD240x, AD241x, and AD242x transceiver family. The product has been tested on

- AD2428 transceiver using EVAL-AD2428WD1BZ Rev 1.1, EVAL-AD2428WC1BZ Rev2.1, EVAL-AD2428WB1BZ Rev2.1 boards and example schematics are provided.
- Example target applications are provided for BF-527, ADSP-SC58x, ADSP-SC57x, and ADSP-SC589_mini for AD242x transceiver.

## 2.1 Release Contents

**Table 2: Release Contents**

| Sl. No | Release Item | Description | Version Details |
|---|---|---|---|
| 1 | A2B Stack Target Software (source code) | Production - Upgrade | V19.4.5 |
| | | Supported OS Platforms | Designed for cross-platform/cross-OS usage through a well-defined platform abstraction layer (PAL)<br>Examples on BareMetal (no-OS) platform |
| 3 | SigmaStudio Plugin for A2B (Library file)<br><br>A2B.dll<br>A2BStack.dll | Production - Upgrade | V19.4.5 |
| | | Supported SigmaStudio version | SigmaStudio Version **4.7**<br>Note: Previous release DLLs are not compatible with SS4.7. |

## 2.2 Hardware and Software Requirements

**Table 3: Hardware and Software Requirements**

| Pre-Requisite | Details |
|---|---|
| **Hardware Platform** | A2B Evaluation Boards<br>EVAL-AD2428WD1BZ Rev 1.1 (Master/LPS)<br>EVAL-AD2425WDZ Rev1.3 (Master),<br>EVAL-AD2425WFZ Rev1.3 (Slave),<br>EVAL-AD2425WBZ Rev1.4 (Slave),<br>EVAL-AD2425WCZ Rev1.4 (Slave)<br>EVAL-AD2425WGZ Rev1.1 (Slave)<br>EVAL-AD2428WB1BZ Rev2.1 (Slave),<br>EVAL-AD2428WC1BZ Rev2.1 (Slave)<br>ADSP-SC584 EZ-Board BOM Rev 2.4 |

| | |
|---|---|
| | ADSP-SC573 EZ-Board BOM Rev 1.9<br>ADSP-SC589 MINI Board BOM Rev 1.5<br>EVAL_SDP-CB1Z Rev 1.7 |
| **Transceivers & Silicon** | **AD2401, AD2402, AD2403, AD2410:** R1.0 R2.0, R2.1<br>**AD2421, AD2422, AD2425:** R0.0, R0.1, R0.2<br>**AD2420, AD2429:** R0.0, R0.1, R0.2<br>**AD2426, AD2427, AD2428:** R0.0, R0.1, R0.2, R0.3 |
| **Compiler details with version** | **CrossCore Embedded Studio v2.11.0 or later** |
| **PC** | Window10 22H2 |

# 3 Supported Features

## 3.1 Rel19.4.5

**Table 4: Supported Features**

| Release Number | Release Date | Features Supported |
|---|---|---|
| 19.4.5 | 27-May-24 | • Response Cycle Formula B support for AD2426/27/28<br>• Support for Silicon Revision 0.3 for AD2426/AD2427/AD2428<br>• I2C Error Notification<br>• Separate error for Transceiver Authentication failure<br>• Bug fixes and minor enhancements |

## 3.2 Features from earlier versions

**Table 5: Features for Previous Release**

| Sl. No | Release No./ Build Version | Release Date | Changes/Enhancements from previous release |
|---|---|---|---|
| 1 | 18.0.0 | 06-12-2017 | Support for AD2428, AD2427 and AD2426 A2B transceiver variants added. |
| 2 | 19.0.0 | 07-06-2018 | Supports Aardvark I2C Host Adapter for network configuration (Alternative to USBi I2C adapter)<br>Scripting support to automate A2B system verification<br>Compression option to encode Bus Configuration File (BCF.c)<br>Added A2B Mailbox Communication software module and an example application<br>Example schematic and application for EVAL-AD2428WD1BZ Rev 1.0<br>Added a fix for USBi download issue. Refer section 7.1 of [3] for details |
| 3 | 19.1.0 | 31-10-2018 | Added workflow & example application for multi-master use case<br>Supports optimized auto configuration of bus from the EEPROM connected to ECU<br>Added example application and platform abstraction layer for QNX<br>Note: QNX application & drivers are available as separate package. Please contact ADI representative for more details |

| | | | |
|---|---|---|---|
| 4 | 19.2.0 | 12-Dec-18 | Supports AD2429 & AD2420 A2B Transceivers |
| 5 | 19.3.0 | 03-Sep-19 | Supports for 0.1 rev silicon of AD2428. |
| 6 | 19.3.1 | 16-Oct-19 | Broad market release for AD2428 A2B Transceivers |
| 7 | 19.4.0 | 3-Sep-20 | Bandwidth and power calculation updates<br>Saving EEPROM dump in .dat file<br>Schematic auto-draw when importing BCF/NCF<br>Schematic Validation and Report generation<br>Maximize option for export window<br>Support for up to 32 stream's info in exported BCF XML/.c and NCF<br>Retry mechanism for Custom Node Authentication<br>Node level discovery callback notification from stack<br>Communication Channel upgrades (En/Dis Framing, interrupt mode support etc.)<br>Line Diagnostics software flow update for Local Power Slave (LPS) node (including partial bus operation during line faults)<br>Interrupt mode support for A2B stack target example applications<br>Increase resilience to crosstalk in AD2410/AD2425 family by discovery flow updates.<br>Other bug fixes & minor enhancements |
| 8 | 19.4.2 | 30-Apr-21 | Target application for ADSP-SC573<br>Target application for ADSP-SC589 MINI(SAM)<br>Other bug fixes & minor enhancements |
| 9 | 19.4.3 | 22-Apr-22 | Stream reordering for Bandwidth Optimization.<br>Addition of new field “Channel to Skip” in Stream configuration.<br>Additional RX offset on top of offset calculated by “Auto Slot calc”.<br>Stream information can be included in exported “.DAT” file.<br>Scripting APIs for exporting network/node configuration files.(BCF, NCF ,Command List)<br>Support added for Analyzer module as sub node. |

| | | | |
|---|---|---|---|
| | | | Other bug fixes & minor enhancements |
| 10 | 19.4.4 | 02-Aug-22 | • Removed unused files from package<br>• Supported features are same as 19.4.3 |

# 4 Package Details

The release package contains folder structure as shown below.

**ADI_A2B_Software_Rel19.4.5**

**|**

**\---GUI**

**| |---x86_x64**

**| |---A2B.dll**

**| |---A2BStack.dll**

**| |---plantuml.jar**

**| |---postProcessUML.exe**

**\---Target**

**| |---a2bstack**

**| |---a2bstack**

**| |---a2bplugin-master**

**| |---a2bplugin-slave**

**| |---a2bstack-protobuf**

**| |---examples**

**| |---demo**

**| | |--- a2b-adsp-sc57x**

**| | |--- a2b-adsp-sc58x**

**| | |--- a2b-adsp-sc589_mini**

**| | |--- a2b-bf**

**| | |--- app-plugin**

**| |----advanced-app**

**| | |--- bert**

**| | |--- mboxcommch**

**| | |--- multimaster**

**| |---a2b-commandlist**

**| |---a2bcommchannel**

**| |---tools**

**\---Schematics**

**|  |---BF**

**|  |---SC58x**

**\---Docs**

**|  |---AE_09_A2B_Stack_UserGuide.pdf**

**|  |---AE_09_A2B_SigmaStudio_UserGuide.pdf**

**|  |---AE_09_A2B_QuickStartGuide.pdf**

**|  |---AE_09_A2B_Stack_API_Reference.chm**

**|  |---AE_09_A2B_Scripting_Guide.pdf**

**|  |----CommCh**

**|  |----AE_09_A2B_CommChannel_IntegrationGuide.pdf**

**|  |----AE_09_A2B_CommChannel_API_Reference.chm**

**\--- 2024-05-23-A2BSTKW Click Thru SLA.pdf**

**\--- AE_09_A2B_ReleaseNotes.pdf**

**\--- GettingStarted.rtf**

The below section explains the different folders and their purpose in the current release

**Table 6: Package Details**

| Folder Name | Purpose |
|---|---|
| GUI | This folder contains the SigmaStudio A2B DLL and A2B Stack built as a DLL for 32 and 64-bit windows. |
| Target | This folder contains the A2B software stack target related files. Refer to Table 7 for more detailed explanation for each of the folders under Target directory. |
| Schematics | This folder contains the example A2B and SigmaDSP schematics for BF and SC58x platforms |
| Docs | This folder contains the documents such as quick start guide, user guide etc., which helps in integration of A2B Stack to the required platform. |

The below table explains the different folders under Target directory and their purpose.

**Table 7: Target Directory**

| Folder Name | Purpose |
|---|---|
| a2bstack | The generic or target agnostic portions of the A2B Software Stack. |
| a2bplugin-master | The sources for the A2B Software Stack master node plugin. The A2B network discovery algorithms and line fault diagnostics are encapsulated within these sources. |
| a2bplugin-slave | The sources for a simple A2B Software Stack slave node plugin. These sources are a trivial example of a slave plugin for use as a launching pad for developing custom plugins. |

| | |
|---|---|
| a2bstack-protobuf | The Google Protobuf implementation called Nanopb. This also include the BCF to BDD parsing routines such as master/slave node configuration, master/slave pin muxing etc. |
| demo/a2b-bf | This folder contains the source files for PAL, application and CCES example A2B demo project for BlackFin (ADSP-BF527) |
| demo/a2b-adsp_sc58x | This folder contains the source files for PAL, application and CCES example A2B demo project for SC58x. |
| demo/a2b-adsp_sc57x | This folder contains the source files for PAL, application and CCES example A2B demo project for SC57x. |
| demo/a2b-adsp_sc589_mini | This folder contains the source files for PAL, application and CCES example A2B demo project for SC589 mini. |
| advanced-app/mboxcommch | This folder contains the source files for PAL, application and CCES example A2B projects on ADSP-SC584 and ADSP-21489, demonstrating communication channel application using A2B mail box |
| advanced-app/ multimaster | This folder contains the source files for PAL, application and CCES example A2B project on ADSP-SC584 demonstrating multi master use case |
| advanced-app/ bert | This folder contains the source files for PAL, application and CCES example A2B project on BF527 demonstrating Bit error rate test application |
| a2b-commandlist | This folder contains an example application to use the exported command list from SigmaStudio |
| a2bcommchannel | This folder contains source files for communication channel module (using A2B Mailbox) |

# 5 Package Installation

## 5.1 Windows

Double click the A2B Software package (executable) to install. The package is installed into "*C:\Analog Devices\ADI_A2B_Software-RelX.Y.Z*"

# 6 Performance Figures

The following table captures the Memory requirements (in bytes) for A2B Stack and Sample application (Memory measured on BF527 for 3-node sample demo network).

**Table 8: Memory Requirements**

| Modules | L1-Code (Bytes) | L3-Code (Bytes) | L1-Data (Bytes) | L3 Data (Bytes) | Remarks on memory usage |
|---|---|---|---|---|---|
| Stack | 10166 | 0 | 695 | 0 | Application and Platform **independent** |
| Master-Plugin | 14668 | 0 | 1296 | 0 | Application and Platform **independent** |
| Slave-Plugin | 1498 | 0 | 1045 | 6000 | Application **dependent** |
| BDD helper | 7654 | 0 | 40 | 0 | Application and Platform **independent** |
| PAL | 1270 | 1226 | 276 | 6244 | Platform **dependent** |
| App | 2020 | 0 | 8815 | 0 | Application **dependent** |
| BCF* (3-Node demo) | 0 | 0 | 176 | 2388 | Application **dependent** |
| Peripheral data in BCF | 0 | 0 | 8988 | 4452 | Application **dependent** |

*Depends on the number of A2B nodes and programmable peripherals used in the network

Note: The memory calculations are done by performing the following

- 3 node BCF is exported with “Optimized exported file for memory” option enabled
- Enabled optimization for code size in CCES compiler options
- Redefining A2B_CONF_MAX_NUM_SLAVE_NODES as “3” in conf.h

# 7 Known Issues and Workarounds

## 7.1 Limitations

The following are some of the important limitations known at the time of this release.

- Master in SC584 Ez Board has been tested for TDM Mode 2, 4 and 8 only
- Master in SC573 Ez Board has been tested for TDM Mode 2, 4 and 8 only
- Master in SC589 MINI Board has been tested for TDM Mode 2, 4 and 8 only
- Allow Real-Time A/B Testing' feature of SigmaStudio is not supported for A2B schematics

## 7.2 Known Problems

There are no known problems at the time of this release

## 7.3 Work Arounds

Not Applicable

## 7.4 Notes

- Line fault BP short to GND may not be detected after discovery for AD242x master.
- Line fault BN short to GND may not be detected after discovery, unless bit errors indicate that there is an issue, e.g. because off a noisy GND or other electromagnetic interferences.
- Line fault 'BP short to GND' and 'BN short to Vbat' are not consistently identified in all the discovery modes except Simple discovery flow.
- The location of Line fault 'BP and BN together short to GND' is not detected correctly.
- Copy paste won't preserve the order of peripheral programming. A warning message is added in the GUI.
- Enabling Print console messages in target application will make audio at target choppy as print will be blocking. Therefore, it should be used only for Debug purpose. In actual use case Print console should be disabled.
- In Advanced discovery, noise may be observed on Audio Sink node for upstream Audio stream during the discovery of Audio Source node. This is due to Data decoding errors as Sink node starts sampling invalid Audio data as soon as Source node discovery is initiated.
- Clipping might be seen at the end of rendering very big sequence charts. In such cases, the generated sequence.txt file can be used to generate the sequence change using platuml text editor.

# 8 Technical Support

## 8.1 Contact information

If you have a technical problem and you can't find a solution, you can contact for Technical Support at:

mailto:a2bsoftwaresupport@analog.com

## 8.2 Type of support

All technical queries, bug reporting, issues and feedbacks addressed to the above-mentioned contact shall be processed and responded accordingly based on the nature of the support required.

# 9 APPENDIX A: Quick Setup Guide

The document ‘AE_09_A2B_QuickStartGuide.pdf’ (available at **[1]**) provides build instructions to run the sample application on ADI platforms.

# 10 APPENDIX B: Integration Guide

- Integrating A2B Stack and porting the stack to a custom platform is described in the document '*AE_09_A2B_Stack_UserGuide.pdf*' (available at **[2]**)**.** The document provides code examples on PAL initialization, Interrupt call-back function, Power and Line Fault diagnostic call-back function and others.
- To understand the A2B stack and CommCh at the function level, refer '*AE_09_A2B_Stack_API_Reference.chm*' and *'AE_09_A2B_CommCh_API_Reference.chm'* (available at **[5]** & **[8]**)
- To customize A2B schematics and diagnose the A2B network using SigmaStudio, refer to document '*AE_09_A2B_SigmaStudio_UserGuide.pdf*' (available at **[3]**)
- To use SigmaStudio's test automation(scripting) interface for A2B, refer to document '*AE_09_A2B_Scripting_Guide.pdf*' (available at **[6]**)
- Refer to '*AE_09_A2B_CommChannel_IntegrationGuide.pdf*' (available at **[7]**) document for A2B communication channel usage for inter-processor communication over A2B

## Terminology

**Table 9: Terminology**

| Term | Description |
|---|---|
| A2B | Automotive Audio Bus |
| BERT | Bit error rate test |
| CCES | CrossCore Embedded Studio |
| GUI | Graphical User Interface |
| MISRA | Motor Industry Software Reliability Association |
| VDSP | Visual DSP++ |
| DLL | Dynamic Link Library |
| USB | Universal Serial Bus |
| I2C | Inter-IC |
| I2S | Inter –IC-Sound |
| BF | Blackfin |
| SH | SHARC |
| PAL | Platform Abstraction Layer |
| GND | Ground |
| BCF | Bus Configuration File |
| TDM | Time Division Multiplexing |

## References

**Table 10: References**

| Reference No. | Description |
|---|---|
| **[1]** | ./ADI_A2B_Software-RelX.Y.Z/Docs/AE_09_A2B_QuickStartGuide.pdf |
| **[2]** | ./ADI_A2B_Software-RelX.Y.Z/Docs/AE_09_A2B_Stack_UserGuide.pdf |
| **[3]** | ./ADI_A2B_Software-RelX.Y.Z/Docs/AE_09_A2B_SigmaStudio_UserGuide.pdf |
| **[4]** | ./ADI_A2B_Software-RelX.Y.Z/Docs/AE_09_A2B_Stack_Linux_UserGuide.pdf |
| **[5]** | ./ADI_A2B_Software-RelX.Y.Z/Docs/AE_09_A2B_Stack_API_Reference.chm |
| **[6]** | ./ADI_A2B_Software-RelX.Y.Z/Docs/scripting/AE_09_A2B_Scripting_Guide.pdf |
| **[7]** | ./ADI_A2B_Software-RelX.Y.Z/Docs/CommCh/AE_09_A2B_CommChannel_IntegrationGuide.pdf |
| **[8]** | ./ADI_A2B_Software-RelX.Y.Z/Docs/CommCh/ AE_09_A2B_CommCh_API_Reference.chm’ |