ANALOG DEVICES

AHEAD OF WHAT'S POSSIBLE™

Analog Devices, Inc.

www.analog.com

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

Copyright, Disclaimer Statements

Copyright Information

Disclaimer

Analog Devices, Inc. reserves the right to change this product without prior notice. 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 infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under the patent rights of Analog Devices, Inc.

Software License Agreement

The recipient of this package must agree to the terms specified in the software license agreement in "*2020-09-02-LWSC-A2B Click Thru SLA.pdf*" included in this package, to use its contents.

Table of Contents

List of Figures

No table of figures entries found.

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

2.1 Release Contents

Table 2: Release Contents

Sl. No	Release Item	Description	Details
1	A2B Stack Target Software (source code)	Version	V19.4.3
		Supported Hardware platform	A2B Evaluation Boards EVAL-AD2428WD1BZ Rev 1.1 (Master/LPS) EVAL-AD2425WDZ Rev1.3 (Master), EVAL-AD2425WFZ Rev1.1 (Slave), EVAL-AD2425WBZ Rev1.4 (Slave), EVAL-AD2425WCZ Rev1.4 (Slave) EVAL-AD2425WGZ Rev1.1 (Slave) EVAL-AD2428WB1BZ Rev2.1 (Slave), EVAL-AD2428WC1BZ Rev2.1 (Slave) ADSP-SC584 EZ-Board BOM Rev 2.4 ADSP-SC573 EZ-Board BOM Rev 1.9 ADSP-SC589 MINI Board BOM Rev 1.5
		Supported AD24xx Silicon revision	**AD2410, AD2401, AD2402, AD2403:** R1.0, R2.0, R2.1 **AD2425, AD2421, AD2422:** R0.0, R0.1, R0.2 **AD2428, AD2427, AD2426:** R0.0, R0.1 **AD2429, AD2420:** R0.0
		Supported OS Platforms	Cross platform support Embedded Main-loop (e.g. no OS) Embedded OS
2	Sample A2B Stack Application	Supported target platforms	BF-527 ADSP-SC58x ADSP-SC57x
		Supported tool version	CrossCore Embedded Studio v2.10.1 or later
3	SigmaStudio Plugin for A2B (Library file) A2B.dll A2BStack.dll	Version	V19.4.3
		Supported SigmaStudio version	SigmaStudio Version **4.7** Note: Previous release DLLs are not compatible with SS4.7.

3 Supported Features

3.1 Rel19.4.4

Table 3: Supported Features

Release Number	Release Date	Features Supported
19.4.4	02-Aug-22	• Removed unused files from package • Supported features are same as 19.4.3

3.2 Features from earlier versions

Table 4: 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) Scripting support to automate A2B system verification Compression option to encode Bus Configuration File (BCF.c) Added A2B Mailbox Communication software module and an example application Example schematic and application for EVAL-AD2428WD1BZ Rev 1.0 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 Supports optimized auto configuration of bus from the EEPROM connected to ECU Added example application and platform abstraction layer for QNX 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 Saving EEPROM dump in .dat file Schematic auto-draw when importing BCF/NCF Schematic Validation and Report generation Maximize option for export window Support for up to 32 stream's info in exported BCF XML/.c and NCF Retry mechanism for Custom Node Authentication Node level discovery callback notification from stack Communication Channel upgrades (En/Dis Framing, interrupt mode support etc.) Line Diagnostics software flow update for Local Power Slave (LPS) node (including partial bus operation during line faults) Interrupt mode support for A2B stack target example applications Increase resilience to crosstalk in AD2410/AD2425 family by discovery flow updates. Other bug fixes & minor enhancements
8	19.4.2	30-Apr-21	Target application for ADSP-SC573 Target application for ADSP-SC589 MINI(SAM) Other bug fixes & minor enhancements
9	19.4.3	22-Apr-22	Stream reordering for Bandwidth Optimization. Addition of new field “Channel to Skip” in Stream configuration. Additional RX offset on top of offset calculated by “Auto Slot calc”. Stream information can be included in exported “.DAT” file. Scripting APIs for exporting network/node configuration files.(BCF, NCF ,Command List) Support added for Analyzer module as sub node. Other bug fixes & minor enhancements

4 Package Details

The release package contains folder structure as shown below.

ADI_A2B_Software_Rel19.4.4

|

\---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

\--- 2020-09-02-LWSC-A2B 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 5: 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 6 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 6: 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 7: 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 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 8: 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 9: 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’