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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-Jul-19	Updates for Rel19.8.0 Alpha
V31.2	16-Jul-19	Incorporating review comments
V32.0	18-Jul-19	Approved and Baselined for 19.8.0 Alpha
V32.1	19-Jul-19	Updates for Rel19.3.0
V32.2	30-Aug-19	Review comments addressed
V33.0	30-Aug-19	Approved and Baselined for 19.3.0
V33.1	22-Oct-19	Updates for Rel19.8.2 Alpha
V33.2	24-Oct-19	Review comments addressed
V34.0	25-Oct-2019	Baselined for Rel19.8.2 Alpha
V34.1	15-May-2020	Updates for Rel19.8.3 Alpha
V34.2	20-May-2020	Addressed review comments.
V35.0	21-May-2020	Approved and Baselined for 19.8.3
V35.1	27-Jan-2021	Updated for release 19.9.0
V35.2	03-Feb-2021	Addressed review comments
V36.0	08-Feb-2021	Approved and Baselined for 19.9.0
V36.1	30-Nov-2021	Updated for release 19.10.0
V36.2	01-Dec-2021	Addressed Review comments
V37.0	01-Dec-2021	Approved and Baselined for 19.10.0

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Copyright Information

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Analog Devices is in the process of updating documentation to provide terminology and language that is culturally appropriate. This is a process with a wide scope and will be phased in as quickly as possible. Thank you for your patience.

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	V19.10.0
		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, EV-SC594-SOM Rev B, ADSP-SC573 EZ-Board BOM Rev 1.9 ADSP-SC589 MINI Board BOM Rev 1.5 ADZS-AD2435MINI (Slave), EVAL-AD2435WA3LZ Rev B (Master/Slave), EVAL-AD2435WJ3LZ Rev B (Slave), EVAL-AD2433WA1BZ Rev B (Master/Slave), EVAL-AD2433WB1BZ Rev A (Slave), EVAL-AD2410WFZ Rev1.0 (Smart Slave)
		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,R0.2 **AD2429, AD2420:** R0.0

			AD2431, AD2432, AD2433, AD2435: R1.0, R1.1,R1.2,R1.3
		Supported OS Platforms	Cross platform support Embedded Main-loop (e.g. no OS)
2	Sample A2B Stack Application	Supported target platforms	BF-527, ADSP-SC58x, ADSP-SC57x, ADSP-SC589_mini, ADSP-SC59x
		Supported tool version	CrossCore Embedded Studio v2.10.0 or later
3	SigmaStudio Plugin for A2B (Library file) A2B.dll A2BStack.dll	Version	V19.10.0
		Supported SigmaStudio version	SigmaStudio Version **4.6** Note: Rel19.10.0 DLLs are not compatible with earlier versions of SigmaStudio

3 Supported Features

3.1 Rel 19.10.0

Table 3: Supported Features

Release Number	Release Date	Features Supported
Rel 19.10.0	17-Nov-21	• Stream Information export to EEProm and .dat file • SPI Peripheral programming during discovery using EEProm and .dat file • Disabling SPI features for AD2432/AD2431 • Target application for ADSP-SC573 • Target application for ADSP-SC589 MINI(SAM) • Target application for ADSP-SC594 as Smart Slave • Connection warning pop-ups for Mixed node network • Compatibility of 19.4.2 exports in 19.10.0 • Option to save the schematics temporary to avoid overwriting of in-work schematics by auto-save. • Other bug fixes & minor enhancements

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) Supports BF716 as A2B processor 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	Supports BF719 as A2B processor

			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	19.7.0	03-May-19	Supports discovery & configuration of AD2435 Transceivers
6	19.8.0	18-Jul-19	Supports configuration of AD2443x (Content Protection Enabled) Transceiver. Added APIs to manage Content Protection events. Added post discovery APIs for SPI data transfer over A2B (AD243x only) Stream configuration in SigmaStudio is extended to SPI Data tunnels Example application to configure a remote tuner over SPI
7	Rel19.8.2	23-Oct-19	Added Stream information in Bus Configuration File (BCF) export Supports AD2443x configuration (Content Protection enabled) via SPI Added an optional discovery method to mitigate cross talk (applicable to AD2421, AD2422 and AD2425 only)
8	Rel19.8.3	22-May-20	Supported multiple power configurations for AD2435 Rev 1.0 & Rev 1.1 Silicon Supported Line fault diagnostics Supported configuration of Bus Self Discovered nodes via SigmaStudio)
9	Rel19.9.0	05-Feb-21	BERT calculation through SPI interface for AD243x Audio host configuration for bus self-discovery for AD243x Support multi-master I2C/SPI command list export for AD243x

			Support up to 16 sub node discovery for AD243x (up to 80m overall length) Full Duplex/Bulk SPI transactions beyond 256 bytes for AD243x GPIO based SPI busy check handling for AD243x Trace and sequence chart support for SPI for AD243x Export/Import functionality (NCF & BCF in XML format) for AD243x Post discovery Voltage Monitor (VMTR) and PWM APIs for AD243x Support for up to 32 streams' info in exported BCF XML/.c and NCF Full screen Maximize option for Export window Retry mechanism for Custom Node Authentication Export and Import of BCFs used to create Super BCF Interrupt mode support for A2B Stack example Node level discovery status callback from A2B Stack Partial discovery of dropped nodes (post discovery) Bandwidth and power calculation updates Saving EEPROM dump in .dat file Schematic auto-draw when importing BCF/NCF Schematic Validation and Report generation 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) Increase resilience to crosstalk in AD2410/AD2425 family by discovery flow updates.

			Notify error to application if master running is not detected Other bug fixes & minor enhancements

4 Package Details

The release package contains folder structure as shown below.

ADI_A2B_Software_Rel19.10.0

|

\---GUI

| |---x86_x64

| |---A2B.dll

| |---A2BStack.dll

| |---plantuml.jar

| |---postProcessUML.exe

\---Target

| |---a2bstack

| |---a2bstack

| |---a2bplugin-master

| |---a2bplugin-slave

| |---a2bstack-protobuf

| |---examples

| |---demo

| | |--- a2b-bf

| | |--- a2b-adsp-sc58x

| | |--- a2b-adsp-sc59x

| | |--- a2b-adsp-sc57x

| | |--- a2b-adsp-sc589_mini

| | |--- a2b-uart-utility

| | |--- app-plugin

| |--- advancedapp

| | |--- remoteTuner

| | |--- mboxcommch

| | |--- multimaster

| |---a2b-commandlist

| |---a2bcommchannel

| |---tools

\---Schematics

| |---PC

| |---SC58x

| |---SC59x

\---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_CommCh_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, SC58x and SC59x 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 ADSP-SC58x.
demo/a2b-adsp-sc59x	This folder contains the source files for PAL, application and CCES example A2B demo project for ADSP-SC59x.
demo/a2b-adsp-sc589_mini	This folder contains the source files for PAL, application and CCES example A2B demo project for ADSP-SC589_mini.
demo/a2b-adsp-sc57x	This folder contains the source files for PAL, application and CCES example A2B demo project for ADSP-SC57x.
demo /a2b-uart-utility	This folder contains the source files for UART commands.
demo/a2bapp	This folder contains the source files for A2B Stack service APIs.
advancedapp/remoteTuner	This folder contains the source files for RTM Slave Plugin, PAL, application and CCES example A2B project on BF527 demonstrating Remote Tuner as slave plugin using SPI APIs
advancedapp/multimaster	This folder contains the source files for PAL, application and CCES example A2B project on ADSP-SC584 & ADSP-SC594 demonstrating multi master use case.
advancedapp/mboxcommch	This folder contains the source files for PAL, application and CCES example A2B projects on ADSP-SC584, ADSP-SC594 and ADSP-21489, demonstrating communication channel application using A2B mailbox.
a2b-commandlist	This folder contains an example application to use the exported command list from SigmaStudio (Both SPI or I2C)
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 overall memory requirement for A2B Stack based application depends on the number of A2B nodes, requirements of A2B programmable peripherals and stack feature configuration (as complier switches). Refer to 'AE_09_A2B_Stack_UserGuide.pdf' (available at **[2]**) for scaling the memory usage. Refer to the file 'a2bstack-frmwrk-bf.map.xml' [**9**] which captures the typical memory requirement for 3 node sample demo application running on ADSP-BF527 processor.

Note: 'a2bstack-frmwrk-bf.map.xml' gets generated once the application is built (using CCES). Ensure "Generate symbol map (-map)" option is selected in Project properties → C/C++ Build → Settings → Tool Settings → CrossCore Blackfin Linker → General options

7 Known Issues and Workarounds

7.1 Limitations

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

- AD243x specific limitations
    - USBi Rev 1.4(or lower) cannot be used for AD243x SPI interface. Use aardvark or USBi Rev1.5.
    - I2S TDM Crossbar programming supported only from 'Register View'.
    - Power calculation feature in SigmaStudio is yet to be updated for AD243x.
    - BERT PRBS mode results in errors for AD243x when Data tunnels are enabled.
    - Partial discovery on AD243x boards is applicable only on first re-attempt.
- Scripting: New AD243x A2B_GET_NETWORK_LINEFAULT_CODE_243x() API is limited only to old fault codes.
- Concurrent download (link-compile-download) during partial discovery attempt is refrained to user.
- 'Allow Real-Time A/B Testing' feature of SigmaStudio is not supported for A2B schematics
- The current release of A2B software stack supports up to discovery of 17 A2B nodes (AD243x) in a network. A forthcoming Response Cycle formula update is required before going to production with systems beyond 11 nodes (up to 17) and/or more than 40m total cable length. Discovery of systems with more than 40m of cable length may not succeed without the response cycle formula update. Please contact ADI for production values of RESP_CYCLES for discovery of 17 nodes".
- ADSP-SC594 smart slave application has noise while switching audio between master and sub node0

7.2 Notes

- Refer to Silicon Anomaly list for details on Bus Line Diagnostics for High Power use cases of AD243x
- 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.

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 at the function level, refer '*AE_09_A2B_Stack_API_Reference.chm*' (available at **[5]**)
- 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 **[3]**)
- Refer to '*AE_09_A2B_CommChannel_IntegrationGuide.pdf*' (available at **[8]**) document for A2B communication channel usage for inter-processor communication over A2B

Terminology

Table 7: 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 8: 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/ContentProtection/AE_09_A2B_CP_QuickStartGuide.pdf
[7]	./ADI_A2B_Software-RelX.Y.Z/Docs/scripting/AE_09_A2B_Scripting_Guide.pdf
[8]	./ADI_A2B_Software-RelX.Y.Z/Docs/CommCh/AE_09_A2B_CommChannel_IntegrationGuide.pdf
[9]	./ADI_A2B_Software-RelX.Y.Z/Software/Target/examples/demo/a2b-bf/Debug