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A2B Plugin for SigmaStudio+ Release Notes

Document Status:	Approved
Approved By:	Siva

Revision List

Table 1: Revision List

Document Revision	Date	Description
0.1	18-06-2020	Updated for Rel 0.1.0 Alpha
0.2	26-06-2020	Review comments addressed.
1.0	29-06-2020	Approved and Baselined for release 0.1.0 Alpha
1.1	16-02-2021	Updated for Rel 0.3.0 Alpha
2.0	18-02-2021	Approved and Baselined for 0.3.0 Alpha
2.1	15-11-2021	Updated for Rel 0.4.0 Alpha
2.2	02-12-2021	Update for Rel 1.0.0 Eval
2.3	06-12-2021	Review comments addressed.
3.0	09-12-2021	Approved and Baselined for 1.0.0 Eval
3.1	11-10-2022	Updates for 1.1.0
4.0	12-10-2022	Approved and Baselined for 1.1.0
4.1	24-11-2022	Updated for Release 1.2.0
4.2	22-12-2022	Resolved Review Comments
4.3	23-12-2022	Updated limitations section
5.0	26-12-2022	Approved and Baselined for 1.2.0
5.1	12-04-2023	Updated for Release 1.2.1
5.2	24-04-2023	Updated for Release 1.2.1.1
5.3	15-06-2023	Updated for Release 1.2.1.2
5.4	05-10-2023	Updated for Release 1.3.0
5.5	09-10-2023	Updated for Release 1.3.0
6.0	09-10-2023	Approved and Baselined for Rel 1.3.0
6.1	15-03-2024	Updated for Release 1.3.1
7.0	18-03-2024	Approved and Baselined for Rel 1.3.1

Copyright, Disclaimer Statements

Copyright Information

Disclaimer

Software License Agreement

The recipient of this package must agree to the terms specified in the software license agreement in "*2024-03-13-A2BSSPSW Click Thru SLA.pdf*" included in this package, to use its contents.

Note: This version of the software is developed as per software engineering best practices to avoid systematic faults in Software. However full compliance to ASPICE for production software will be expected by 2H of 2024.

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**

SigmaStudio+ plugins are provided as 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.

2 Release Information

2.1 Release Contents

Table 2: Release Contents

Sl. No	Release Item	Description	Details
1	A2B Stack Target Software (source code)	Evaluation Release	Version 1.3.1
		Supported Hardware platform	A2B Evaluation Boards EVAL-AD2428WD1BZ Rev 1.1 (Main/LPS) EVAL-AD2428WB1BZ Rev2.1 (Sub), EVAL-AD2428WC1BZ Rev2.1 (Sub), EVAL-AD2435WA3LZ Rev B (Main/Sub), EVAL-AD2435WJ3LZ Rev B (Sub), EVAL-AD2433WA1BZ Rev B (Main/Sub), EVAL-AD2433WB1BZ Rev A (Sub) EVAL – AD2430WD1BZ Rev B (Main / Sub) EVAL – AD2438WD1BZ Rev B (Main) EVAL – AD2430WC1BZ Rev B (Sub) EVAL – AD2430WG1BZ Rev B (Sub) EVAL – AD2437A1MZ Rev B (Main/Sub) (RJ45) EVAL – AD2437A1NZ Rev B (Main/Sub) (XLR) EVAL – AD2437B1MZ Rev A (Sub) (RJ45) EVAL – AD2437B1NZ Rev B (Sub) (XLR) EV-SOM-CRR Rev A EZ kit EV-ADSP21569-SOM Rev B EV-SC594-SOM Rev B
		Supported AD24xx Silicon revision	**AD2421 / AD2422 / AD2425:** R0.0, R0.1, R0.2 **AD2420 / AD2429:** R0.0, R0.1, R0.2 **AD2426 / AD2427 / AD2428:** R0.0, R0.1, R0.2, R0.3 **AD2433:** R1.0, R1.2, R2.0 **AD2431 / AD2432:** R1.1, R2.1 **AD2435 / AD2437:** R1.1, R1.3, R2.1 **AD2430 / AD2438:** R0.0, R1.0

		Supported OS Platforms	Embedded Main loop (e.g. no OS)
2	A2B Plugin for SigmaStudio+ (Library file)	Evaluation Release	Version 1.3.1
		Supported SigmaStudio version	SigmaStudio+ Version 2.2.0

3 Supported Features

3.1 **Rel 1.3.1**

Table 3: Supported Features

Release Number	Release Date	Features Supported
1.3.1	15 – 03 – 2024	• messtechnik *opto***A2B** Platform • Main node + 16 sub node support for AD2426/27/28. • Custom Node Information (.DAT schema version updated to 0x03). • Bandwidth and Response Cycle Updated as per latest spreadsheet (8.1). • Peripheral XML auto generation is invoked during load shape action for A2B platform. • Bugfixes and Improvements.

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	0.1.0	29-06-2020	Supports the following for AD2428 in SigmaStudio+ • Bus discovery • Stream configuration • Line fault during discovery • Network export
2	0.3.0	18-02-2021	Supports the following for AD242x and AD243x in SigmaStudio+ • Added SPI support (USBi (v1.5) and Aardvark) • Discovery • Register Read/Write • Remote peripheral configuration with SPI-I2C during discovery and SPI-SPI tunnel post discovery (EEPROM on Standard power AD243x WBZ board) • Post discovery line fault diagnostics • Schematic dump to XML, .dat and EEPROM • Generics for AD242x (Balius, Chiron and LCC) and AD243x (Standard and High power) is added • Added support for Trace and Sequence chart • Stream export in BCF xml • Import BCF • Copy / paste of device properties (and the transceivers) • Register value export to and import from CSV files

3	0.4.0	15 -11-2021	• Added support for AD2430 and AD2438 • Modified Discovery Support
4	1.0.0	09-12-2021	• Added AD2437 support • SigmaDSP Integration • Bus Self Discovery • Main / Sub – Node Terminology • Bandwidth chart viewer and Power chart viewer. • Crossbar Enhancements • Command List Export • BERT support with SPI • Sequence window to input and output xml • SC59x Target Example for AD2430 / AD2437
5	1.1.0	12-10-2022	• Multi-main for SS+ and examples (PC as host, SC594 as host) • Multi-main bus configuration export • Thrift Interface for Automation • Analyzer Integration to SigmaStudio+ • SigmaDSP Integration on Main and LPS • Crossbar Enhancements • Refresh Network Status • Support AD2430, AD2438 – Line fault updates • Partial re-discovery • Import node configuration file • Stream information export to .dat • Stream reordering for optimal bandwidth • Additional Receive Offset • Channels to skip • Bug fixes
6	1.2.0	26-12-2022	• Command List Merge Utility • Tunnel Overlap • Line Fault Diagnostics Update for AD2430, AD2438 • Optimized Discovery Mode support for AD2430, AD2438 • General View Control for XCVRBINV bit • Support for AD2437 RJ45 boards with two step discovery • XLR Support for AD2437 Rev B boards • Connection Serialization • Bug fixes
7	1.2.1	12-04-2023	• Bundle of A2B 1.2.0 and 2.0.1 SS+
8	1.2.1.1	24-04-2023	• Embed XML as a part of shape file • Shape file loadable from directory • Bug fixes
9	1.2.1.2	15-06-2023	• Cable Length display on System View and Update from Properties Window

			- Multi-Main .dat export - Custom Node Identification - Multiple Methods - Serialization of Power Module - Support for Power, Network Parameters from thrift - Toast Notification for i2c error - Toast Notification for Peripheral Programming Error - Support for Exclude Node from Discovery - Peripheral programming window support - - Program during discovery - Embed XML - Generate XML - Register Read/Write - Add command - Address in Hex - save sequence file - Bug fixes
10	1.3.0	09 – 10 – 2023	- Selection of A2B chains from multiple chains to aid Variant handling. - Multi-Instantiation of Analyzer UI through SigmaStudio+ (Single Emulator and Bus Monitor per channel) - A2B project migration from SigmaStudio to SigmaStudio+ - Bugfixes

4 Package Details

The release package contains folder structure as shown below.

ADI_A2B-SSPlus_Software-Rel1.3.1

|

\---GUI

| |---Components

| |---Plugins

| |---Redistribute

\---Target

| |---a2bstack

| |---a2bstack

| |---a2bplugin-master

| |---a2bplugin-slave

| |---a2bstack-protobuf

| |---examples

| |---advancedapp

| | |--- mboxcommch

| |---demo

| | |--- a2b-adsp-sc59x

| | |--- a2b-adsp-sc59x_AD2437

| | |--- a2b-adsp-sc59x_AD2437-RJ45

| | |--- app-plugin

| | |--- a2b-uart-utility

| | |--- a2b-bf

| | |--- multimaster

| | |--- remoteTuner

| |---a2b-commandlist

| |---a2bcommchannel

| |---LDR

| |---Utility

\---Schematics

| |---PC

| |---SC59x

| |---A2BBusAnalyzer

| |---Thrift

\--- 2024-03-13-A2BSSPSW Click Thru SLA.pdf

\--- AE_65_A2B-SSPlus_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+ plugin Dlls
Target	This folder contains flashing utility for ADSP-2156x processor and example applications for SC59x
Schematics	This folder contains the example A2B schematics

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-SSPlus_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 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

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 with .Dat file)

Table 6: Memory Requirements

Modules	L1-Code (Bytes)	L3-Code (Bytes)	L1-Data (Bytes)	L3 Data (Bytes)	Remarks on memory usage
Stack	18298	0	477	0	Application and Platform independent
Master-Plugin	24264	0	4961	0	Application and Platform independent
Slave-Plugin	1324	0	589	0	Application dependent
BDD Helper	4520	0	0	0	Application and Platform independent
PAL	2508	1396	644	7264	Platform dependent
APP	2708	0	13448	0	Application dependent

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

Note: The memory calculations are done for 3 Node .DAT file by performing the following

- Enabled optimization for code size in CCES compiler options

- Redefining A2B_CONF_MAX_NUM_SLAVE_NODES as "2" 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:

- AD243x specific limitations
    - BERT PRBS mode results in errors for AD243x when Data tunnels are enabled.
    - Partial discovery on AD2435 boards is applicable only on first re-attempt.
- Crossbar view does not represent PDM pin data explicitly.
- The Upper bounds value of the sync offset in main-node-settings -> General View -> Audio tab is incorrect.
- SPI Full Duplex Size, SPI Full Duplex Target node and FD Target SSEL functions are not supported.
- SPI based command list is not supported in sequence window.
- Transceiver settings can be refreshed through switching between the tabs within the settings window or through re-open of settings page.
- Transceiver settings of migrated projects to be refreshed before download.
- A2B Project to be link compiled after the opening the project to update Cable length.
- Link Compile is a pre-requisite for any updates to A2B Channel settings
- Custom Node Authentication - 0x00 hexadecimal value is not supported in Number Hex.
- Thrift limitations
    - Bandwidth parameters updated through thrift do not reflect in SigmaStudio+
    - Some of the thrift APIs do not return failures. Out of bound check for thrift parameters are not supported.
- SPI to I2C peripheral errors are not reported.
- In integrated DSP projects, target execution couldn't be verified and warnings are reported.
- Reopening of old schematics(before A2B Plugin Release 1.3.0) with monitor leads to disconnection of links. Presence of monitor between main and sub0 in old schematics leads to loss of stream configuration.
- When last upstream A2B slot is routed to first TDM channel on a Tx pin, then the RESP_CYCS has additional RESP_OFS obligation. This is not updated for Formula B where as Formula A takes care of this.

7.2 Observations

- Very rarely when the application is stressed or when link / link-compile / link-compile-download is pressed, an exception pop-up appears. This can be closed and ignored.

7.3 **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 Main.

- 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.

- USBi Rev 1.4(or lower) cannot be used for AD243x SPI interface. Use aardvark or USBi Rev1.5.
- Re-work is required on AD2430WDZ Rev A to connect SC59x, Contact ADI for further details
- Codec AD1938 available on AD2437WA1NZ(Main) board may produce noise at the DAC channels. Hardware rework is required to fix that.
- Because of the silicon anomaly, AD2428 standard schematic shows a non-zero bit error count on the BERT window even though the audio stream is clear.
- Because of the silicon anomaly, for the network like Eval-AD2433WA1BZ <=> Eval-AD2428WB1BZ <=> Eval-AD2433WB1BZ <=> Eval-AD2428WB1BZ, stream from sub 0 to sub 1 fails when the discovery mode is optimized. However, it will work in simple and modified mode.
- Power to be turned off and turned on for each link compile download on EV-SOM-CRR-EZKIT
- AD2437 is not supposed to be used with any other transceivers part numbers.
- AD2437 Line faults - On shorting Pin 5 to GND and two-step discovery not enabled, discovery timeout error seen instead of critical fault. And the Same observation is for the case when Pins 5 and 4 are reversed between port A and B.
- Continuous press of push buttons on SC59x, generates noise in audio sink of comm-channel application.

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

Refer to 'A2B-SSPlus_QuickStartGuide' (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"A2B-SSPlus_Stack_UserGuide" (available at **[2]**)

To Create A2B schematics and monitor the A2B network using SigmaStudio+, refer to "A2B-SigmaStudio+_UserGuide" (available at **[3]**)

Terminology

Table 7: Terminology

Term	Description
A2B	Automotive Audio Bus
GUI	Graphical User Interface
DLL	Dynamic Link Library
BCF	Bus Configuration File

References

Table 8: References

Reference No.	Description
[1]	A2B-SSPlus_QuickStartGuide
[2]	A2B-SSPlus_Stack_UserGuide
[3]	A2B-SigmaStudio+_UserGuide