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Analog Devices, Inc.

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A2B Release Notes

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

Revision List**Table 1: Revision List**

| Document Revision | Date | Description |
|--------------------------|-------------|--------------------------------------|
| V0.1 | 4-Dec-2018 | Updates for Rel19.2.0 |
| V0.2 | 11-Dec-2018 | Addressed review comments |
| V1.0 | 12-Dec-2018 | Approved and Baselined for 19.2.0 |
| V1.1 | 19-Aug-2019 | Updates for Rel19.3.0 |
| V1.2 | 30-Aug-2019 | Review comments addressed |
| V2.0 | 30-Aug-2019 | Approved and Baselined for Rel19.3.0 |
| V2.1 | 13-Jan-2020 | Updates for Rel19.3.1 |
| V3.0 | 17-Jan-2020 | Approved and Baselined for 19.3.1 |
| V3.1 | 21-Feb-2023 | Updates for Rel19.4.4 |
| V3.2 | 16-Mar-2023 | Review comments addressed |
| V4.0 | 16-Mar-2023 | Approved and Baselined for Rel19.4.4 |

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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 Linux ported 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. The purpose of this package is to enable the user to develop A2B application under Linux environment

1.2 Scope

Following components are provided in source form for A2B network management

- Example application along with A2B stack executing in Linux user space
- Command-line tool set for Linux PC mode evaluation

A2B SigmaStudio Plugins are provided in binary form to generate Bus Configuration File (BCF) and Command List Header File.

1.3 Organization of the document

Section 1 to 7 details about the content of the releases, the changes or the features which got added and other known issues/ problems in the release.

Section 8 talks about setting up the hardware and perform a quick demo with the example application.

Section 9 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 | V19.4.4 |
| | | Supported Hardware platform | A2B Evaluation Boards EVAL-AD2428WD1BZ Rev 1.1 (Master) EVAL-AD2425WDZ Rev1.3 (Master), EVAL-AD2425WFZ Rev1.1 (Master), EVAL-AD2425WBZ Rev1.4 (Slave), EVAL-AD2425WCZ Rev1.4 (Slave) EVAL-AD2425WGZ Rev1.1 (Slave) EVAL-AD2428WB1BZ Rev2.0 (Slave), EVAL-AD2428WC1BZ Rev2.1 (Slave) ADSP-SC598 EV-SC598-SOM Rev B ADZS-SC589-MINI |
| | | 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 | SigmaStudio Plugin for A2B (Library file) A2B.dll A2BStack.dll | Version | V19.4.4 |
| | | | SigmaStudio Version 4.6 or higher |
| 3 | Sample A2B Stack Application | Supported target platforms | ADSP-SC589-Mini ADSP SC598 |
| | | Supported tool version | Cross Core Embedded Studio v2.11.0 or later |

3 Supported Features

3.1 Rel19.4.4

Table 3: Supported Features

| Release Number | Release Date | Features Supported |
|----------------|--------------|---|
| Rel19.4.4 | 16-Mar-2023 | Broad market release for AD2428 A2B Transceivers on SC589-Mini and SC598 platforms based on A2B Yocto (release/yocto_2.1.0) Linux |

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 | 16.0.0 | 17-May-2017 | Support for stream-based network design in SigmaStudio A2B plugin A2B Linux software for network configuration and sample demo on SC584 |
| 2 | 17.0.0 | 05-Oct-2017 | Support for Custom node authentication and Flexible node ordering using Super BCF Support for time optimized auto configuration of A2B slave nodes from EEPROM |
| 3 | 18.0.0 | 06-12-2017 | Support for AD2428, AD2427 and AD2426 A2B transceiver variants added. |
| 4 | 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 |
| 5 | 19.2.0 | 12-Dec-18 | Supports configuration of AD2429 & AD2420 A2B Transceivers Added command-line tool set for quick evaluation of A2B network from Linux PC |
| 6 | 19.3.0 | 03-Sep-19 | Supports for 0.1 rev silicon of AD2428. |
| 7 | 19.3.1 | 16-Oct-19 | Broad market release for AD2428 A2B Transceivers |

4 Package Details

The release package contains two **.deb** installers and below are the package contents.

A2B User Application based installer:

/opt/analog/a2b-software/X.Y.Z/

```

├── 2022-03-31-A2BSW00 Click Thru SLA.pdf
├── AE_09_A2B_ReleaseNotes.pdf
├── Docs
│   ├── 2022-03-31-A2BSW00 Click Thru SLA.pdf
│   ├── AE_09_A2B_QuickStartGuide.pdf
│   ├── AE_09_A2B_Scripting_Guide.pdf
│   ├── AE_09_A2B_SigmaStudio_UserGuide.pdf
│   ├── AE_09_A2B_Stack_API_Reference.chm
│   ├── AE_09_A2B_Stack_Linux_UserGuide.pdf
│   └── AE_09_A2B_Stack_UserGuide.pdf
├── GettingStarted.rtf
├── GUI
│   └── x86_x64
│       ├── A2B.dll
│       └── A2BStack.dll
├── manifest.xml
├── Schematics
│   ├── PC
│   ├── SC58x
│   └── SC59x
├── Target
│   ├── a2bstack
│   │   ├── a2bplugin-master
│   │   ├── a2bplugin-slave
│   │   ├── a2bstack
│   │   └── a2bstack-protobuf
│   ├── examples
│   │   └── demo
│   │       ├── a2b-linux
│   │       │   ├── a2b-adsp-sc589_mini-linux
│   │       │   │   ├── a2b-app_Core1
│   │       │   │   ├── a2bapp-linux.bb
│   │       │   │   ├── a2b-app-linux_Core0
│   │       │   │   ├── binaries
│   │       │   │   └── Makefiles
│   │       └── a2b-adsp-sc598-linux
│   │           ├── a2b-app_Core1
│   │           ├── a2bapp-linux.bb
│   │           ├── a2b-app-linux_Core0
│   │           ├── binaries
│   │           └── Makefiles
│   └── app-plugin
└── tools

```

A2B ALSA Driver based installer:

```

/opt/analog/a2b-alsa-driver/X.Y.Z/
├── Docs
│   ├── AE_09_A2B_ALSA_UserGuide.pdf
│   └── COPYING.pdf
├── manifest.xml
├── Yocto
│   ├── a2b-adsp-sc589_mini
│   │   ├── Yocto
│   │   └── Yocto_patchfile.patch
│   └── a2b-adsp-sc598
│       ├── Yocto
│       └── Yocto_patchfile.patch

```

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, SHARC, 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. |
| Yocto | This folder contains the ALSA Driver Source Code and Patch files required for SC589-Mini and SC598 platforms |

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-linux | This folder contains the source files for PAL, application and CCES example A2B demo project on Linux running on ADSP-SC589-MINI and ADSP-SC598. |

5 Package Installation

5.1 Linux

Refer README.pdf for installation instructions of **.deb** packages. These installer packages include User app based method and ALSA Driver patch method of using A2B Software.

The installed files for Linux User App based method are located in *'/opt/analog/a2b-software/X.Y.Z'* and for Linux ALSA patch based method are located in *'/opt/analog/a2b-alsa-driver/X.Y.Z'*.

To uninstall A2B stack software for Linux run the following commands from the command prompt:

```
$ sudo rm -rf /opt/analog/a2b-software/X.Y.Z  
$ sudo rm -rf /opt/analog/a2b-alsa-driver/X.Y.Z
```

6 Known Issues and Workarounds

6.1 Results

The following are the results as part of this release.

- **SC589-Mini** with default 3 Node schematic (AD2428MINI-AD2428WC1BZ-AD2428WB1Z) has been tested for TDM Mode 2 and 8. This includes
 - Audio from Slave 0 (Mic) to Slave 1 (Stereo Out)
 - Audio from Slave 1 (Stereo In) to Target (Stereo Out)
- **SC598** with default 3 Node schematic (AD2428MINI-AD2428WC1BZ-AD2428WB1Z) has been tested for TDM Mode 2 and 8. This includes
 - Audio from Slave 0 (Mic) to Slave 1 (Stereo Out)
 - Audio from Slave 1 (Stereo In) to Target (Stereo Out)

6.2 Limitations

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

- Downstream Audio from Target to Slave nodes is not verified

6.3 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 of 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.

7 Technical Support

7.1 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>

7.2 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.

8 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.

9 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])
- For detailed steps on building the stack and demo application on Linux refer to document '*AE_09_A2B_Stack_Linux_UserGuide.pdf*' (available at [4]). This document explains the steps to run the example Linux demo application on ADSP-SC589-MINI and ADSP-SC598 EZ-Board. It also explains the features of the a2b stack and demo application on Linux.
- For detailed steps on building ALSA driver based stack and demo application on Linux refer to document '*AE_09_A2B_ALSA_UserGuide.pdf*' (available at [7]).
- To customize A2B schematics and diagnose the A2B network using SigmaStudio, refer to document '*AE_09_A2B_SigmaStudio_UserGuide.pdf*' (available at [3]).

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] | a2b-software/X.Y.Z/Docs/AE_09_A2B_QuickStartGuide.pdf |
| [2] | a2b-software/X.Y.Z/Docs/AE_09_A2B_Stack_UserGuide.pdf |
| [3] | a2b-software/X.Y.Z/Docs/AE_09_A2B_SigmaStudio_UserGuide.pdf |
| [4] | a2b-software/X.Y.Z/Docs/AE_09_A2B_Stack_Linux_UserGuide.pdf |
| [5] | a2b-software/X.Y.Z/Docs/AE_09_A2B_Stack_API_Reference.chm |
| [6] | a2b-software/X.Y.Z/Docs/AE_09_A2B_Scripts_Guide.pdf |
| [7] | a2b-alsa-driver/X.Y.Z/Docs/AE_09_A2B_ALSA_UserGuide.pdf |