



# BACCH4ADAU Data Sheet

**v1.0.2**

**February 16, 2024**

## 1 Features

- Enables BACCH-SP processing for the ADAU1466 and ADAU1467 DSPs
- Support for 3 preloaded filters
  - XML Cell add-in required
  - Filter Selection
    - Cell GUI enables switching between filters
    - MCU control of parameters enables filter selection
- Low latency implementation: approximately 4.4 msec algorithmic delay
- Highly optimized implementation: less than 350 cycles per sample

## 2 General Description

BACCH Audio for the Analog Devices ADAU1466 and ADAU1467 SigmaDSPs provides the patented BACCH 3D audio BACCH-SP processing technologies as an Add-In for Sigma Studio. The BACCH4ADAU Add-In makes it easy to include BACCH-SP audio processing to a new or existing Sigma Studio project targeting the ADAU1466 and ADAU1467 SigmaDSPs.

The BACCH4ADAU Add-In supports three preloaded filters and provides a cell GUI that enables the Sigma Studio engineer to select the current filter at runtime. An add-in that supports 1 or 2 filters can be generated, please contact [sales@bacch.com](mailto:sales@bacch.com) for additional information.

## 3 Trial Version

A fully functional trial version is available. The trial version allows for the evaluation of BACCH processing in any design. The trial offers full functionality; when starting an image that includes the trial version, silence is output for the first ten seconds, the add-in is fully functional for five minutes, and silence is output after those five minutes.



## 4 Requirements

### 4.1 Software

- Sigma Studio v4.5
- XMLCell.dll add-in for 2 and 3 filter configurations

### 4.2 Hardware

- EVAL-ADAU1466Z and associated requirements, see EVAL-ADAU1466Z\_UG-1135.pdf  
- or -
- EVAL-ADAU1467Z and associated requirements, see EVAL-ADAU1467Z-UG-1134.pdf

### 4.3 SigmaStudio Project

- 48 kHz
- 2 channel block I/O with 512 block size

## 5 Resource Utilization

### 5.1 DSP Compute Utilization

DSP compute resource utilization is calculated in cycles per sample using the Simulation feature of SigmaStudio v4.5 and reflects the difference between a minimal pass-through block schematic and a minimal BACCH add-in block schematic, both having a block size of 512.

Cycles per Sample: < 350 cycles/sample are used by the BACCH-SP Add-In.

### 5.2 Memory Utilization (Words)

#### 5.2.1 One BACCH Filter Configuration

- Static
  - DM0: 9629
  - DM1: 9377
  - PM(Inst): 4522
- Dynamic
  - DM0: 2048
  - DM1: 7168

#### 5.2.2 Two BACCH Filters Configuration

- Static
  - DM0: 9629
  - DM1: 9377



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- PM(Data): 4096
- PM(Inst): 4522
- Dynamic
  - DM0: 2048
  - DM1: 7168

### 5.2.3 Three BACCH Filters Configuration

- Static
  - DM0: 9629
  - DM1: 9377
  - PM(Data): 6144
  - PM(Inst): 4522
- Dynamic
  - DM0: 2048
  - DM1: 7168

## 6 BACCH SigmaStudio Evaluation Project



The BACCH4ADAU SigmaStudio Evaluation Project provides a quick path to loading and evaluating BACCH's performance on the ADAU1466 platform with minimal changes to target the ADAU1467 platform. The project includes the minimum schematic, the XML cell library path file, and XML cells required to use the BACCH4ADAU Add-In. The required XMLCell add-in can be requested from Analog Designs.

## 7 Adding BACCH to a SigmaStudio Project

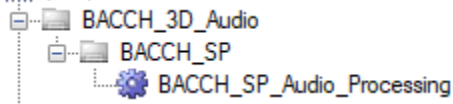
The BACCH Add-In for SigmaStudio can easily be added to a new or existing project.

- 1) Ensure the XMLCell add-in is loaded: use the Add-Ins Browser to validate the XMLCell add-in is loaded
- 2) Load the BACCH\_SP Add-In using the Add-Ins Browser: Using the Add DLL feature of the Add-Ins Browser, navigate to the folder where BACCH4ADAU was extracted, select the BACCH\_SP.dll file, and click OK. Be sure to Save the changes when exiting the Add-Ins Browser.



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- 3) Copy the cells folder and contents plus the xmlcell\_library\_path\_file.xmlfile from BACCH Required Files to your project folder. Rename the xmlcell library path file to that of your project's name, leaving the xml extension.
- 4) 48kHz sample rate and block input and output is required to use the BACCH Add-In. Once setup, use the Block Schematic Tab and add the BACCH\_SP component



- 5) Connect the BACCH\_SP component to the inputs/outputs and set the block size to 512
- 6) Use the SigmaStudio Action=>Link Compile Download option to run the design with BACCH processing. BACCH can be enabled or bypassed and the filter can be changed using the GUI shown above.

## 8 Referenced Documents

- EVAL-ADAU1466Z\_UG-1135.pdf

[https://www.analog.com/media/en/technical-documentation/user-guides/EVAL-ADAU1466Z\\_UG-1135.pdf](https://www.analog.com/media/en/technical-documentation/user-guides/EVAL-ADAU1466Z_UG-1135.pdf)

- EVAL-ADAU1467Z-UG-1134.pdf

<https://www.analog.com/media/en/technical-documentation/user-guides/EVAL-ADAU1467Z-UG-1134.pdf>

- MCUIntegration.pdf

Support Documentation from I45X Presentations