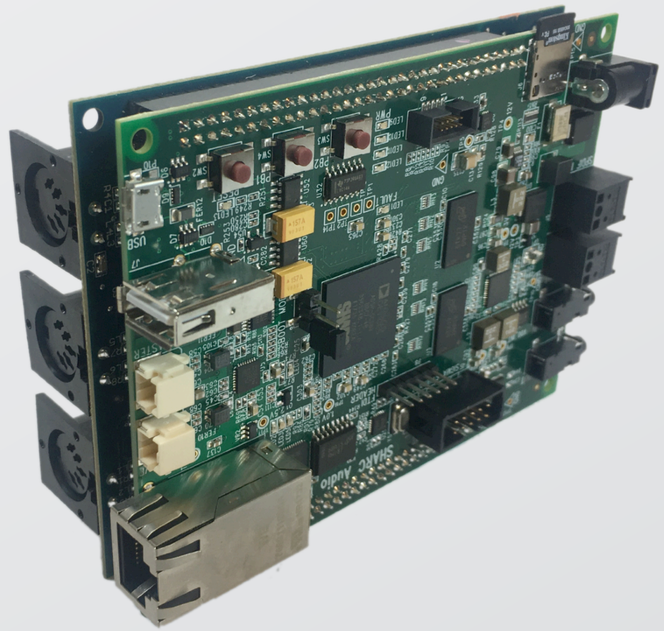
Programmable Audio Workshop
December 1, 2018
GRAME-CNCM, Lyon (France)

Hands-on Running Faust Algorithms on the SHARC Audio Module

Pat Scandalis (moForte)
Raphael Panis



Important Links

- **This Deck:**
  http://www.moforte.com/paw-workshop-faust-on-sharc-audio-module/

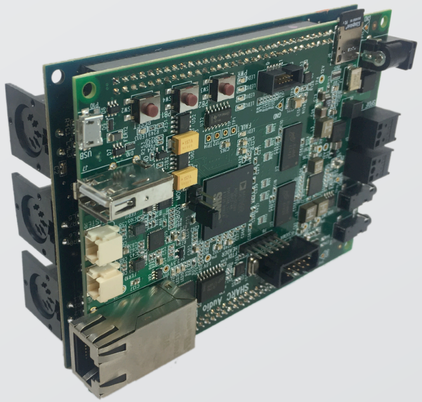
- **CCES Tools: Search for ‘Analog Devices CCES’ or:**
  https://www.analog.com/en/design-center/processors-and-dsp/evaluation-and-development-software/adswt-cces.html

- **SHARC Audio Module WIKI:**
  https://wiki.analog.com/resources/tools-software/sharc-audio-module

- **Current location of the Bare Metal Framework**
  https://analogdevices.box.com/v/yzok6e3jgk5aldvlxeybdabep3oy8y

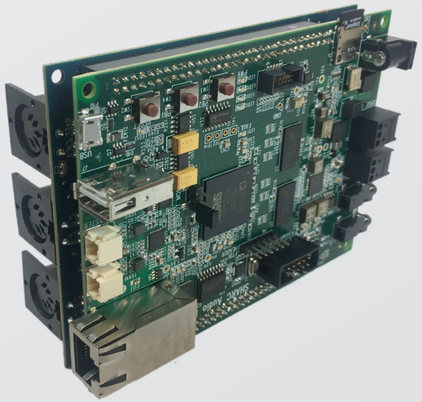
  Password: adisambmsdk

- **The Video of this workshop:**
  https://youtu.be/iUB8ru-76qw



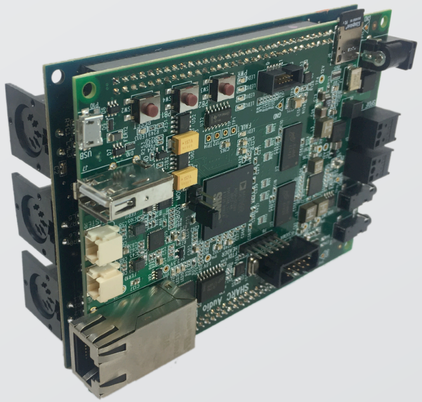
Topics From the Video (1 of 4)

- **Intro, where we are going**
- Video Topics (skip)
- **The SHARC Audio Module**
- **The Audio Project Fin**
- Installing Faust on a Mac or Linux machine (skip)
- **Examples in the Faust installation**
- Installing CCES, the Analog Devices' tool chain, on your PC (skip)
- **Installing the Bare Metal Framework Wizard, and using it for Faust development**



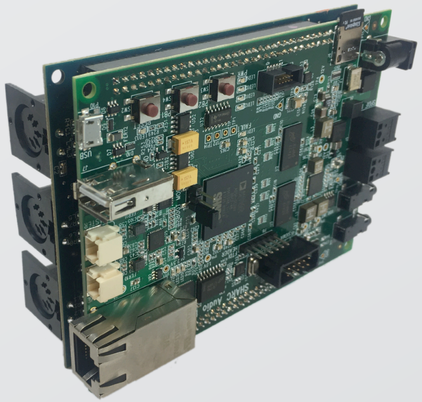
Topics From the Video (2 of 4)

- **Using faust2sam or the Faust Online Editor to compile the algorithms into C++**
- The Faust Online Editor (skip)
- **Typical Workflow**
- **SHARC Audio Module Block Diagram**
- **Using faust2sam to convert the virtualAnalog and effects into C++ files for CCES.**
- **The C++ files that will be inserted into the CCES project.**



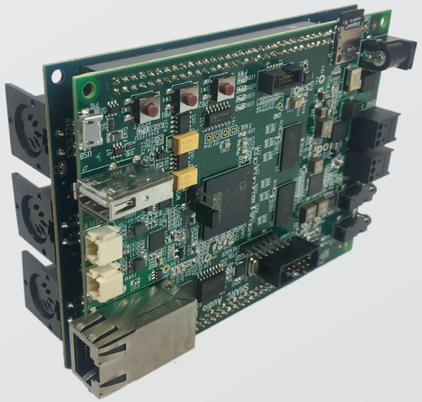
Topics From the Video (3 of 4)

- **Launching CCES**
- **Choosing the project directory for CCES**
- **Using the Bare Metal Framework Wizard to setup the project**
- **A subproject per core.**
- **Inserting the C++ files into the Bare Metal Framework Project**
- **Build Configurations for each subproject**
- Configuring for incremental builds (skip)
- **Doing the debug build**
- **Doing the release build**
- **The Benchtop setup**
- **Setting up the debugging configuration**
- **Running the algorithms with the debugger**



Topics From the Video (3 of 4)

- Booting the SHARC Audio Module without the debugger
- The touchOSC interface for the virtualAnalog synth
- Additional demos
  - Flanger
  - Chorus
  - Reverb
  - Effects Chain
  - Virtual Analog and Effects Chain



FAQs (1 of 2)

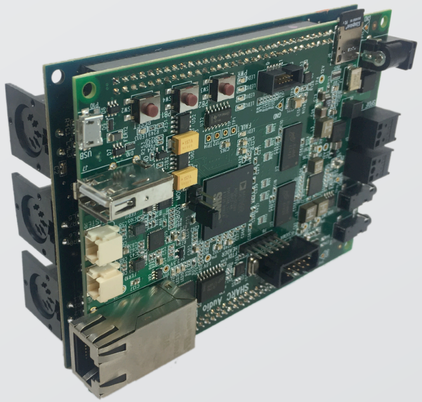
- Q: How can we see how much CPU are used (and for each CORE ?).
  A: There is a profiling tool in CCES

- Q: How can we manage more than one project?
  A: It's best to keep each project in it's own directory

- Q: Is CCES based on Eclipse?
  A: Yes its based on Eclipse and common Eclipse operations work in CCES.

- Q: CORE0 is a classic ARM processor, what can we do with it?
  A: The current Bare Metal Framework (provided by ADI) does not use Linux. Core0 is unused in the current Bare Metal Framework. ADI is considering a Linux Port.

- Q: What can we do (more) with the card: what about the audio I/O of the Audio Project Fin extension board.
  A: The Fin Card is balanced stereo in/out legacy DIN MIDI In/Out. However the current bare metal framework (by ADI) only supports MIDI-In. ADI has received requests to support USB MIDI and is considering it.



FAQs (2 of 2)

- Q: What about A2B option? Is is possible to add more audio I/O with it?
  A: Yes, it is possible to add I/O via A2B. Release product will have support for a number of fixed configuration A2B scenarios, with more information on A2B to come in Q2 2019

- Q: Is there a I2C bus ? (to add senors, display…)
  A: Yes, detail can be found in the SAM Hardware reference manual:
  https://wiki.analog.com/resources/tools-software/sharc-audio-module/hardware/main-board

- Q: Is there some GPIO we can use, to add knobs, sensors.
  A: Yes all of the major functions and GPIO of the board can be accessed via the two multi-pin connectors, with much of the I/O directly available on the prototyping area of the Audio Project Fin. Also, you can design and build your own expander board based on the connectors - documentation can be found in the SHARC Audio Module Hardware Reference Manual:
  https://wiki.analog.com/resources/tools-software/sharc-audio-module/hardware/main-board