Low noise ADC tests
with an Enclustra System-on-Chip

Part I - ADC

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SoC Interest Group Meeting - July 1st, 2020

Spectral Analysis at low freq

- Spectral analysis is a key tool in many research fields

- Extreme low noise is required at low freq, from nearly DC to 100Khz

- Typical application:
  - Material science
  - 1/f noise measurements in semiconductors and detectors
  - Power Supply testing
  - Biomedical devices (EEG, EMG, ECG, …)
  - Seismography
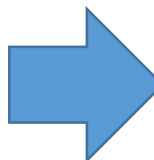 - Vibration analysis
  - High performance audio

AD7768

4 ch analog inputs
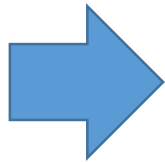
- 24bit $\Sigma-\Delta$
- 256 kSPS
- 108 dB dynamic range
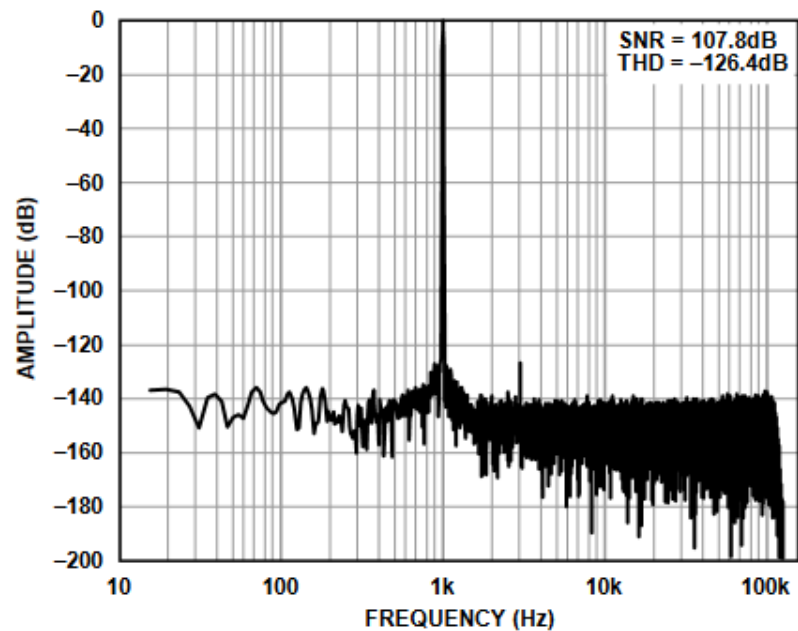- 110.8 kHz maximum input bandwidth (−3 dB BW)
- −120 dB THD

FUNCTIONAL BLOCK DIAGRAM
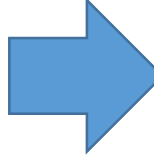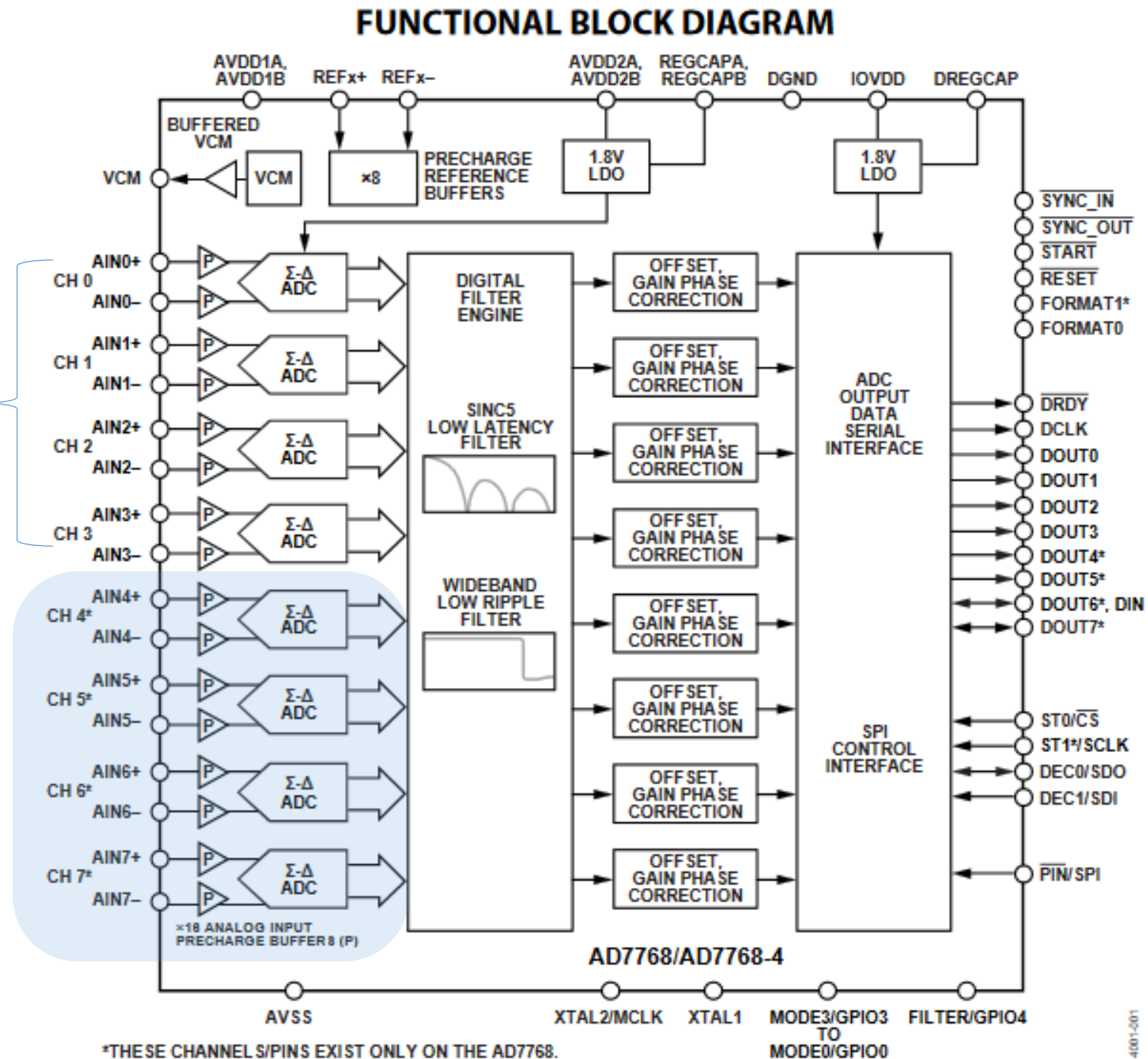
Serial outputs By multiple SPI streams
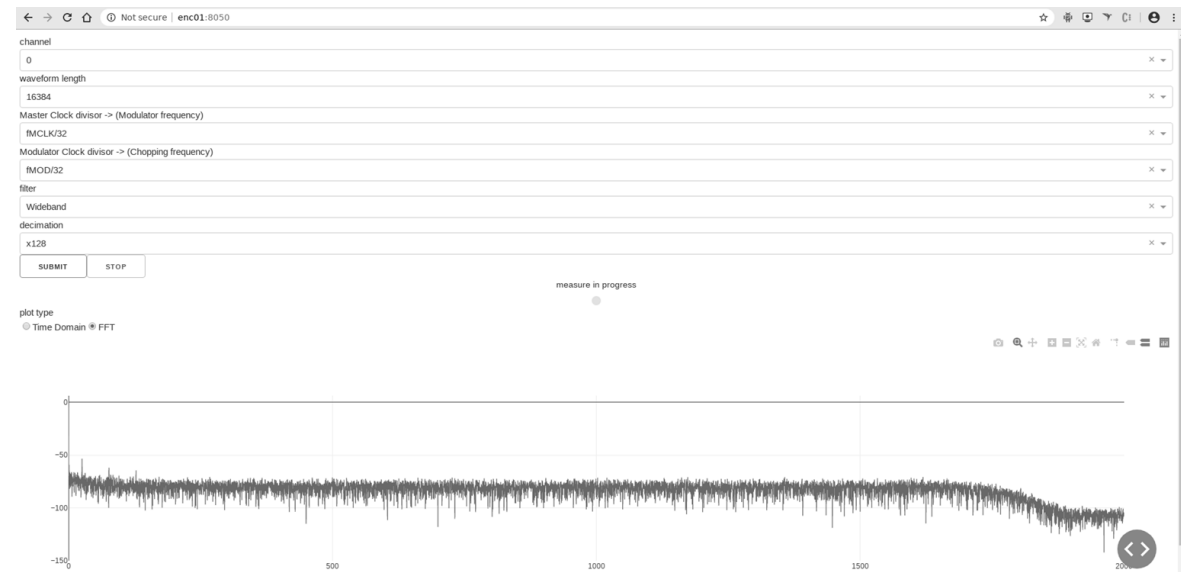
*THESE CHANNELS/PINS EXIST ONLY ON THE AD7768.

Why Zynq ?

- FPGA is needed to acquire multiple SPI streams at full speed
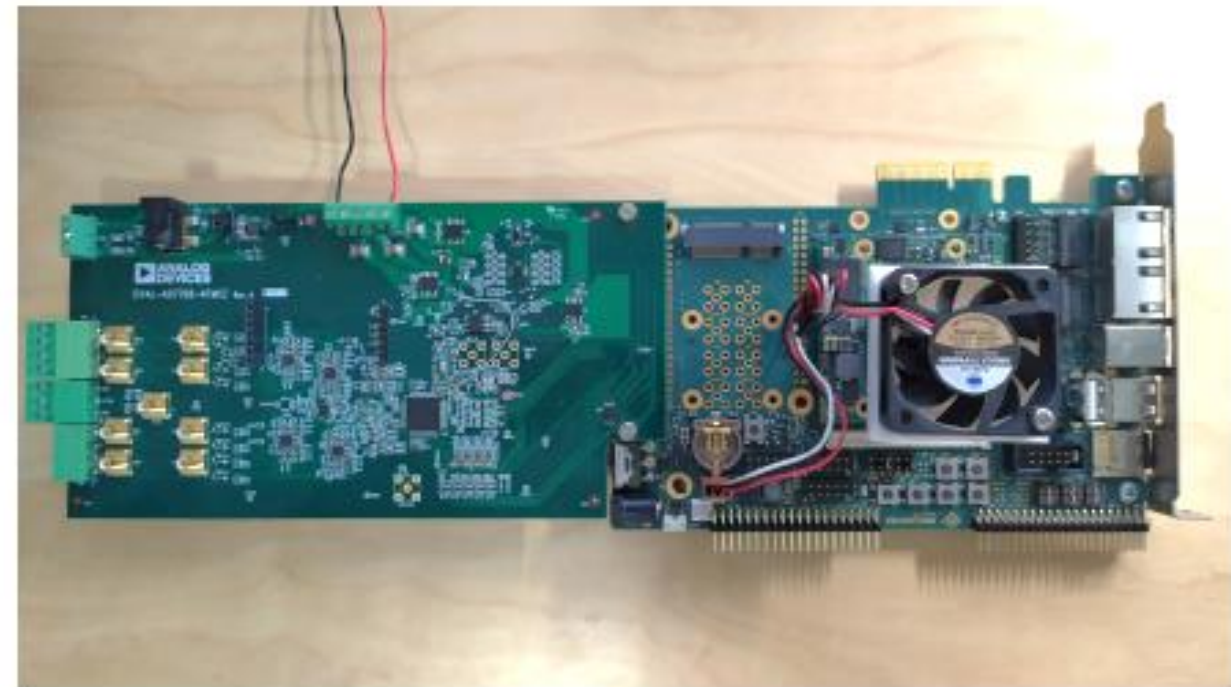- µP is needed to run FFT and PSD *on-the-edge* and move spectra, not raw data
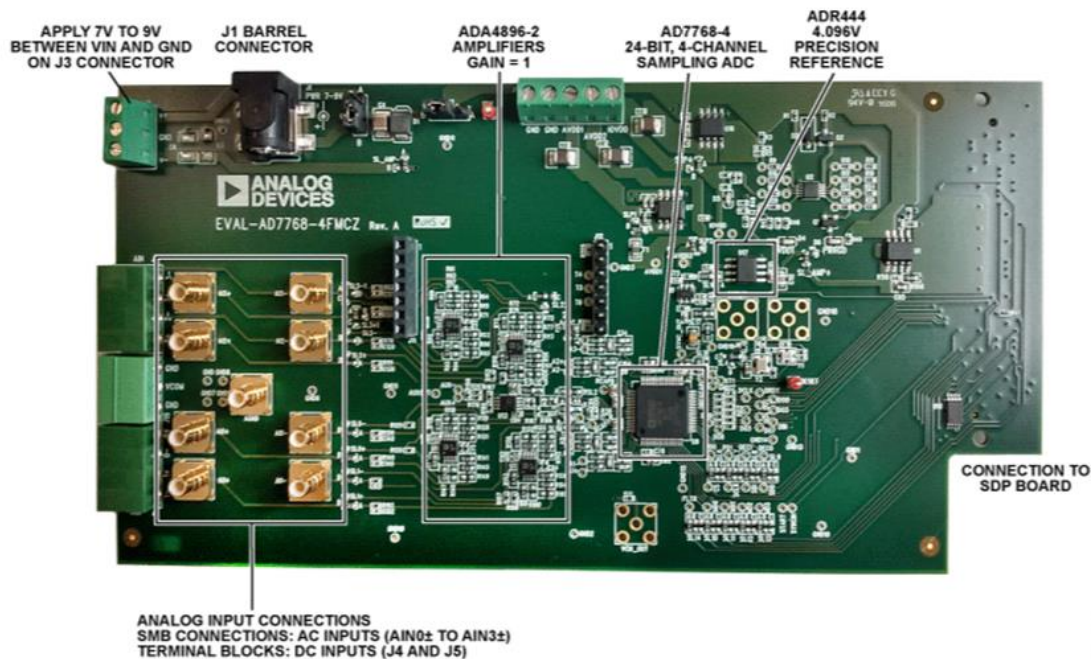

From data sheet

Preliminary FFT, unshielded PCB, unfiltered supply (see Gennaro's Talk)

Testbench

- EVAL-AD7768-4FMCZ from Analog Device
- Mercury+ PE1-300 mother board, Mercury XU5 SoM from Enclustra
- Connection through FMC HPC connector

What's next

- A board integrating Mercury XU5 with AD7768-4 and single-ended analog front-end is presently under design

- COVID emergency halted all the research activities, but software development

- Gennaro will go deeper into details (thanks Gennaro !)

- By the way, while working on AD7768, a new wonderful device has been announced: AD7134. Have a look: just going beyond imagination …