Evaluation Report for Anadigm® AN221E04

Independently tested at
Cadarn Consulting Ltd

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1. Introduction

An independent audio test house was contracted to test the distortion and noise performance of the Anadigm® AN221E04 Field Programmable Analog Array (FPAA). Tester used was an Audio Precision Audio Analyzer - System 2. For all FFT noise tests, a 1 KHz signal was used and then removed from the measurement by the audio precision instrument.

THD performance is heavily determined by the nature of the circuits that are loaded into the device. A base-line measurement was done with a straight connection from the Anadigm® AN221E04 FPAA input to outputs. This is followed by testing on a typical audio application of a crossover filter (high pass filter and low pass filter) that utilizes most of the chip's resources and gives a conservative measure of total audio performance. Additionally, this demonstrates performance differences inherent in various circuit implementations.

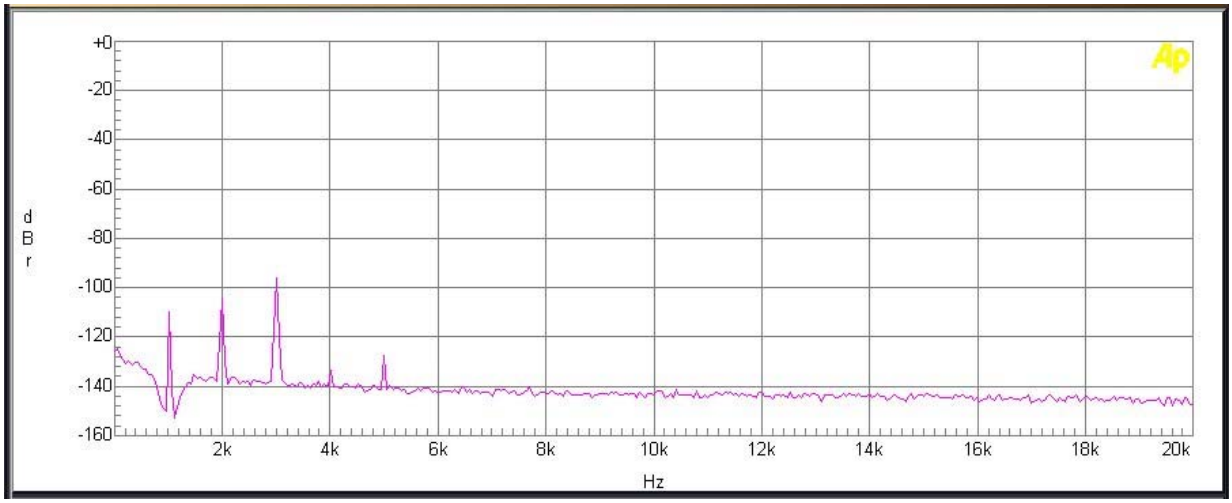
FFT settings:

- Length = 4096
- Averages = 16
- Window = Blackman-Harris
- Trigger = free run (meaning no averages are not synchronous)
- Wave mode = interpolate
- DSP = FFTGEN

2. I/O Interface Performance

Within the FPAA a design was made connecting both inputs to both outputs without any signal processing (no FPAA internal circuitry), to determine the quality of the basic IC interfaces and demo board.

A total noise performance around –96dBu was available from the FPAA.



The plot above shows the FFT obtained by sending 1 KHz sine wave, removing the resulting 1 KHz from the measured output signal

- Input reference 0dBu nominal (0.775V RMS)
- Input signal -12dBu (=0dBr) to avoid PCB I/O distortion dominating the fft readings and hiding the actual FPAA signal processing quality

3. Crossover Filter Testing

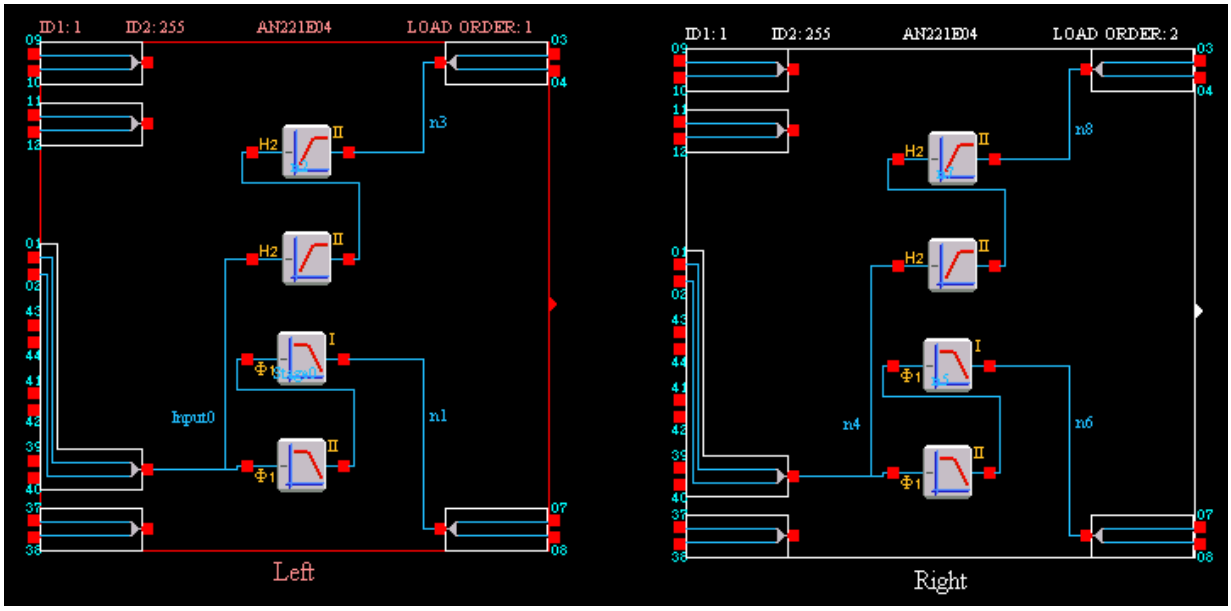
For this test measurements are taken from one channel of the circuit below, represented as an AD2 file from AnadigmDesigner®2. The test is for the left circuit, using a total of 8 poles contained in a single FPAA. Both output 1 and 2 are plotted.

2-Way 24dB/8ve Stereo 5 KHz Crossover Frequency

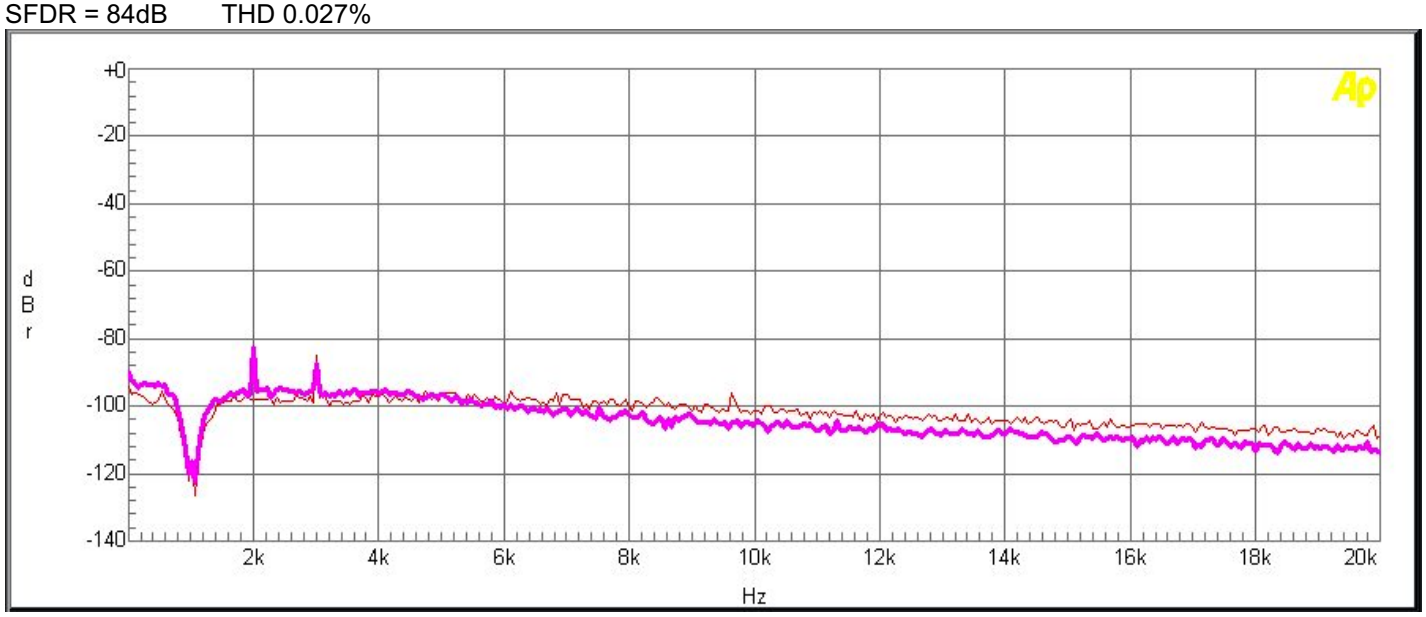
The following design is a dual chip design using 4 biquad filters per chip/channel. The design has one input and two outputs per chip.

Key points

- Dual chip 24dB/8ve active crossover solution
- Easily designed using AnadigmFilter® tool
- Full software parametric control of quality factor (Q), corner frequency (F) and gain (G).
- Excellent frequency performance and linearity



SFDR = 84dB THD 0.027%



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- Input reference 0dBu nominal (0.775V RMS)
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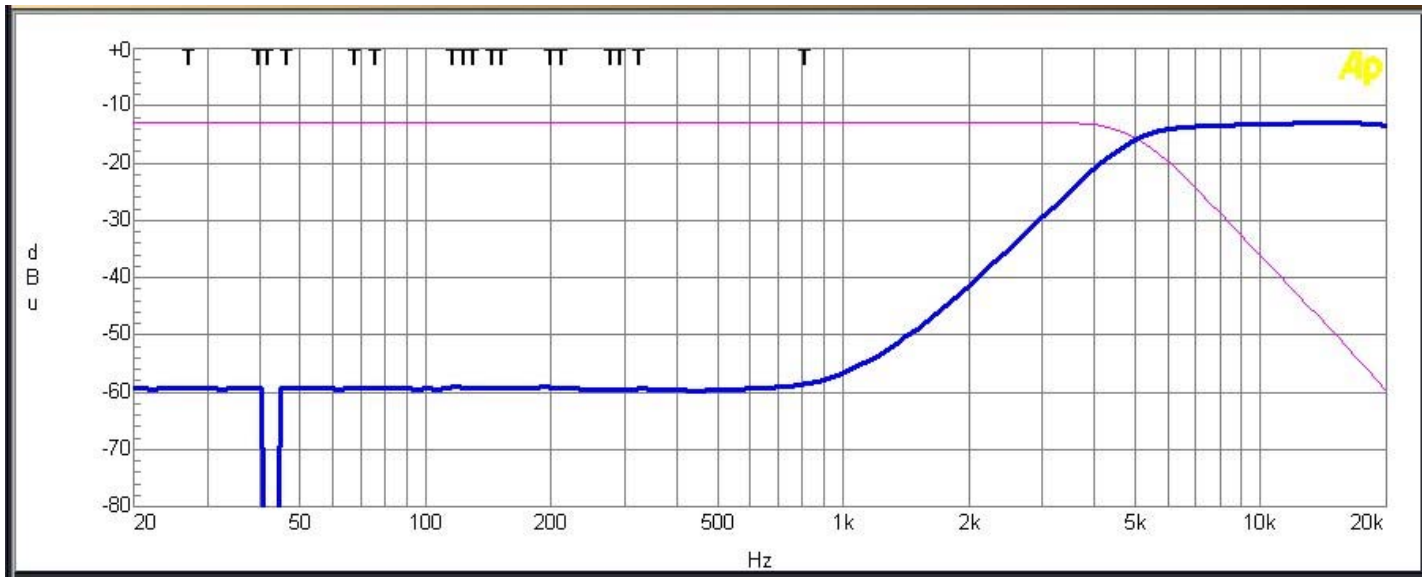
The plot below shows filter frequency response obtained for the same 24dB/8ve crossover for one (left) channel, again sending 1 KHz sine wave, removing the resulting 1 KHz from the measured output signal.

- High pass filter in red, low pass filter in purple, crossover point is at 5 KHz
- Signals are referred to 0dBu (0.775V RMS)



Notes

1) Notch at 40Hz is an anomaly of the audio precision tester
2) High pass attenuation of -60dB is an anomaly of the audio precision tester