CC80

Engineering Test Report

Test Date: March 17, 2005
Test Engineer: Michael Conrad

DIRECTORY

Introduction

Candeias offers quite new technologies for amplifiers without overall negative feedback, introducing some new technologies like ***LEF*** - Load Effect Free - output stages, ***CI*** - Current Injection - input stages and ***IGM*** - Intelligent Gain Management.

CC75 and **CC80** are general purpose amplifiers with ***LEF*** output stage, that can be used as voltage amplifiers or in ***CI***-mode as a current/voltage converter, and also allow the use of ***IGM***.

For every general purpose amplifier it is difficult to define the specifications, because there is a wide range of applications, and mesurement specifications are related to the application circuit. On the other side: It makes sense to prove our statement: Our advanced amplifier technology is a breakthrough: Achieving unquestionable measurement results without overall negative feedback to get same results for static (measurement) and dynamic (music) signals.

As we use **CC80** in several applications, we picked the analog section of a High End Microphone Amplifier A/D Converter to test some specifications. This amplifier has a limited bandwith for practical reasons, thus the frequency response in this report fits to reasonable limits.
We add some handmade measurements from a test circuit to show **CC80**'s own limitations.
As **CC80** offers ***CI***-Current-Injection, we also show the noise spectrum of a **CC80** in CI-D/A-Converter application.

THD at +6dBu (Input 1 Vrms)

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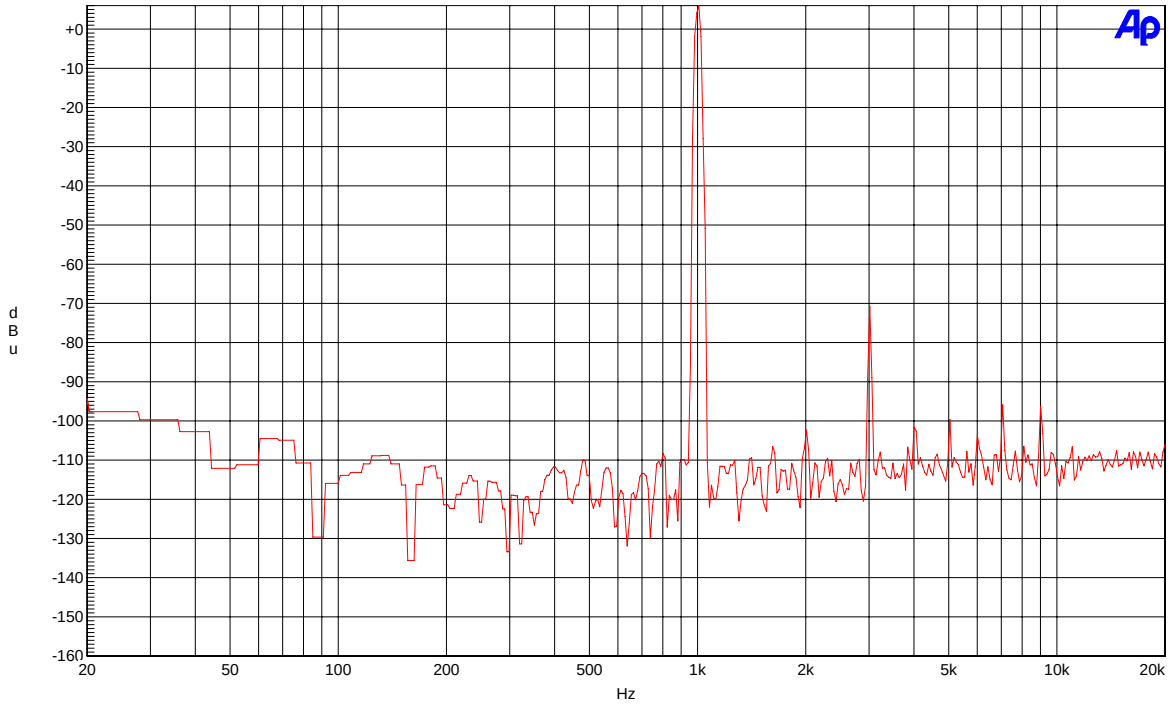

Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Red	Solid	4	FFT.ChA Amplitude	Left	

The FFT (Fast Fourier Transformation) shows the spectrum of a 1 kHz sinewave, the harmonic distortions (THD) and the noise floor.
The input signal is a 1 kHz sinewave of 1 Vrms, amplification is set to an output of +6dBu. This is a high studio level output.
The maximum distortion is K3 at a level of -77dB, this means under 0.015% distortion.

THD at 0dBu (Input 1 Vrms)

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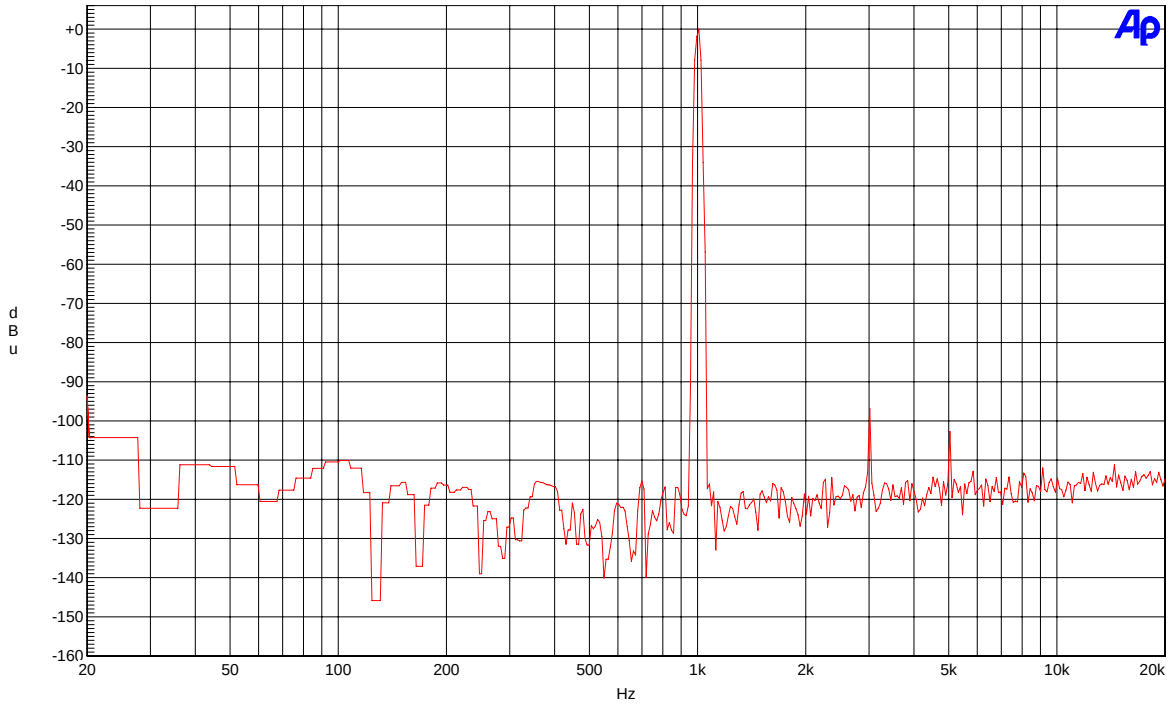

Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Red	Solid	4	FFT.ChA Amplitude	Left	

The FFT (Fast Fourier Transformation) shows the spectrum of a 1 kHz sinewave, the harmonic distortions (THD) and the noise floor.
The input signal is a 1 kHz sinewave of 1 Vrms, amplification is set to an output of 0dBu. This is norm studio level output.
The maximum distortion is K3 at a level of 97dB, this means under 0.0015% distortion!

THD at -6dBu (Input 1 Vrms)

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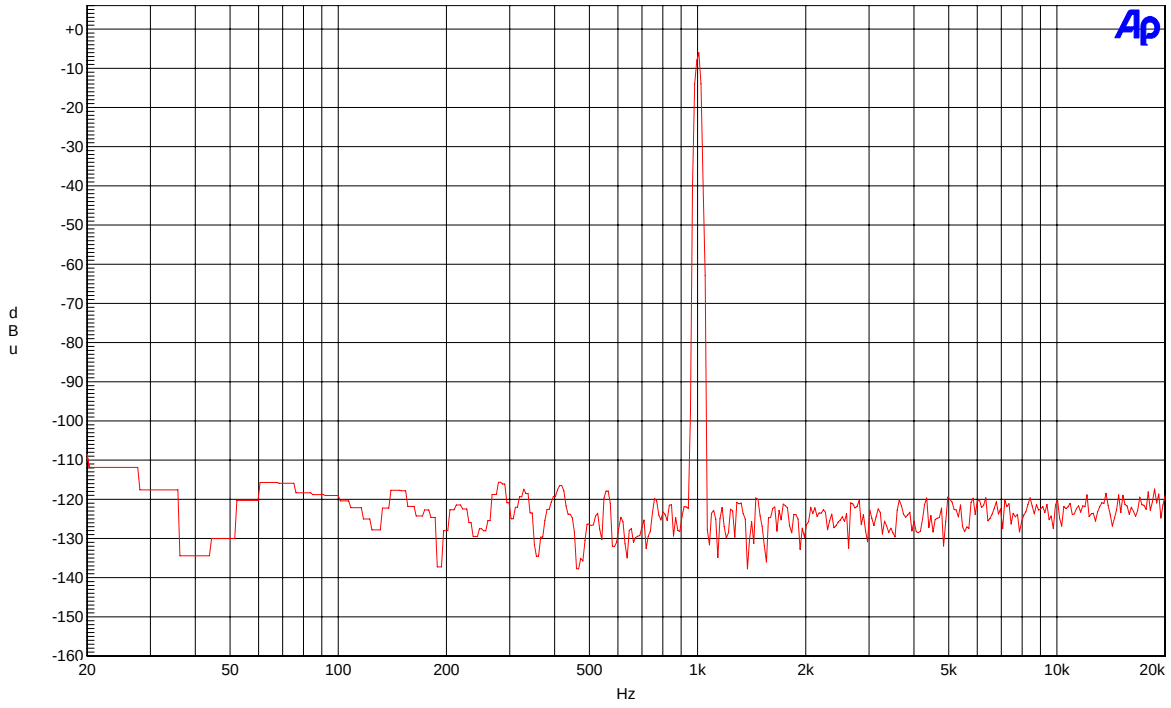

Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Red	Solid	4	FFT.ChA Amplitude	Left	

The FFT (Fast Fourier Transformation) shows the spectrum of a 1 kHz sinewave, the harmonic distortions (THD) and the noise floor.
The input signal is a 1 kHz sinewave of 1 Vrms, amplification is set to an output of -6dBu. This is a medium studio level output.
The distortion can not be detected anymore from the noise of less than -115dB, this means distortions are under 0.0002%!

Noise and IGM - Intelligent Gain Management

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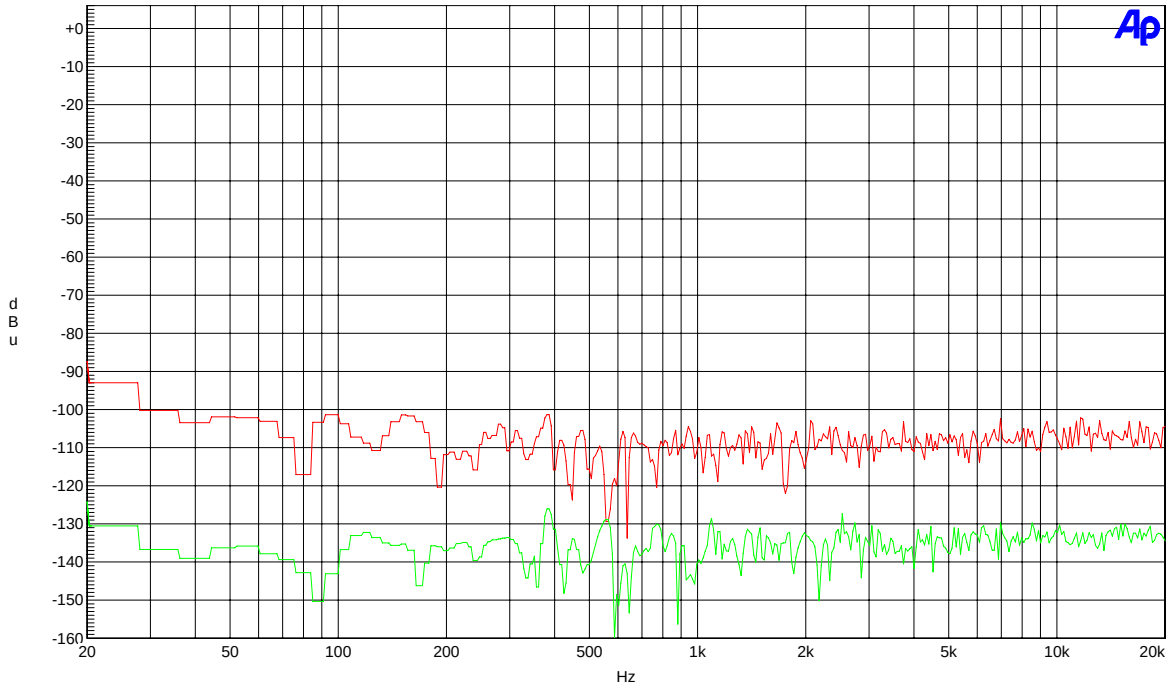

Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Red	Solid	4	FFT.ChA Amplitude	Left	
2	1	Green	Solid	1	FFT.ChA Amplitude	Left	

The noise of the upper red graph is related to a 1 Vrms signal amplified to + 10 dBu. Noise is about 115dB under a +10dBu signal.
The lower green graph shows the effect of reducing volume by IGM - Intelligent Gain Management: Not only input noise is reduced. There is no voltage amplification after volume control. The result: Noise is now at about -130dBu, or 140dB under a +10dBu signal!

Noise in CI-D/A-Converter Application

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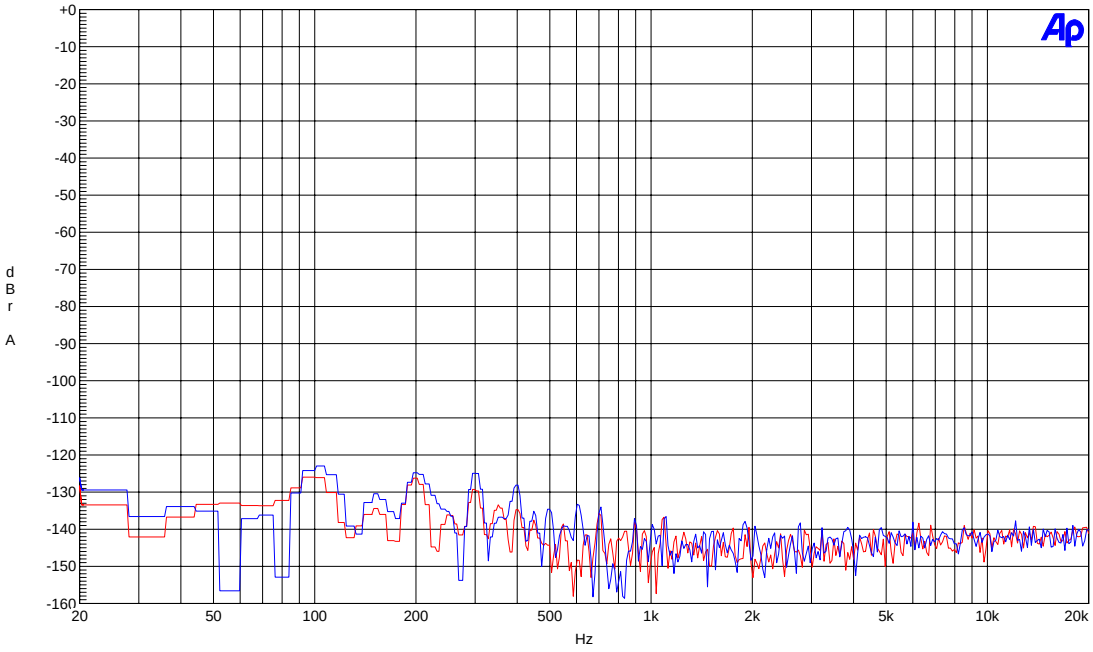

Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Red	Solid	4	FFT.ChA Amplitude	Left	
1	2	Blue	Solid	4	FFT.ChB Amplitude	Left	

Noise of a CI- (Current-Injection) -D/A-Converter with a specialized Version of CC80. Above 700 Hz noise is at about -140dB.
(The small distortions of -125 to -135dB at 100, 200, 300, 400, 500, 600, 700 Hz are power supply influences.)

Frequency Response 10 Hz to 40 kHz

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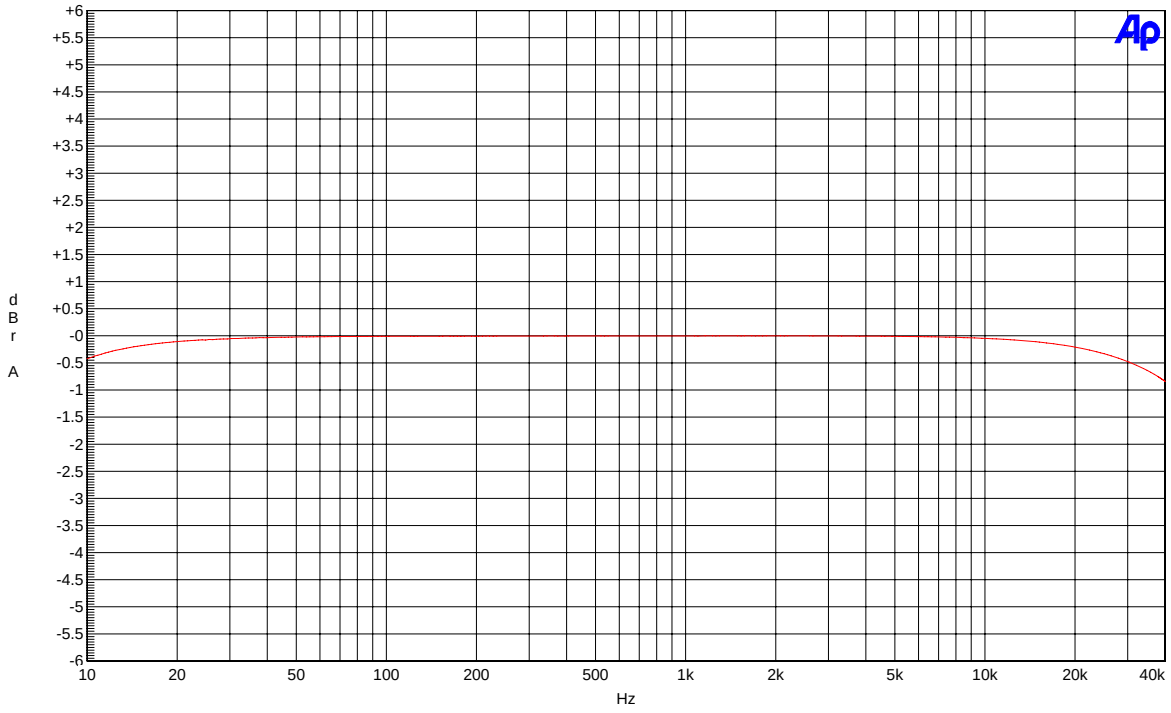

Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Red	Solid	4	Analyzer.Level A	Left	

DAC-THD-SN-Freq.ats2

The frequency response here is shown over the usefull range of our Audio Precision ATS2 measurement system and the band limitations of the Microphone-Amp-A/D-Converter.
At 10 Hz the signal is just 0.4 dB down, at 40 kHz - 0.8 dB.
CC80 itself has a larger bandwidth:
CC80 on a test board, measured by a scope:
-1dB at 4 Hz, -3dB at 3 Hz (due to CC80's offset correction).
-1dB at 70 kHz, -3dB at 140 kHz.

Frequency Response 20 Hz to 20 kHz

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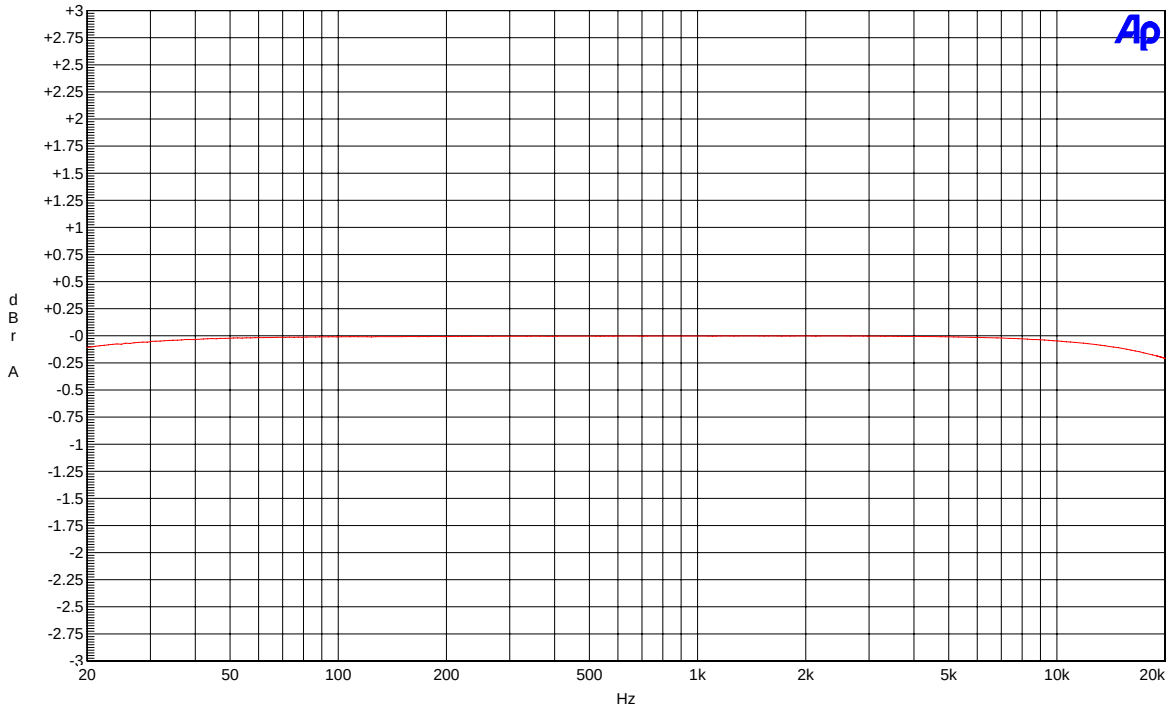

Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Red	Solid	4	Analyzer.Level A	Left	

DAC-THD-SN-Freq.ats2

The frequency response here is shown over the audio range in a bandwidth limited Microphone amplifier and at a measurement system limited to 50 kHz.
At 20 Hz the signal is less than 0.15 dB down, at 20 kHz - 0.24 dB.
CC80 itself is even more linear.
On a testboard the deviation at 20 Hz and 20 kHz is too low for accurate measurement by an oscilloscope.