RM4200D DSP Frame and I/O modules

Specifications

Version: 1.9.0

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RM4200D DSP Frame and I/O modules

Specifications

Version 1.9.0, 22.09.2011

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- Same document: The hand symbol  appears if you move the mouse over the link.
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Please notice, that you need an active internet connection to be able to execute a link to an URL.

The Meaning of Advices in the Text

Warning 	The demands and advices in this fields should be followed **unconditional**, because otherwise hardware and software products, data bases, as well as persons may suffer a loss.
Important 	The demands and advices in this fields should be followed, because these contents are necessary for the proper operation of the DHD systems.
Note 	Recommendations and further information are marked as notes. Sometimes you will also find off-topic content in this field, which is related to the actual topic.
Tip 	Tips are helpful advices, which should make work with DHD systems easier.
Weblink 	In this fields you can find links to websites, which include for example an other manual or the possibility to download a driver for the respective DHD system. Please notice, that you need an active internet connection to be able to execute a link to an URL.
Download 	You can directly open and download a file if the respective link is marked as download link (file link).

General Information

digital reference level:	0 dBFS = digital full scale
analog reference voltage level:	0 dBu = 0.775 V (RMS)
system sampling frequency:	44.1 kHz, 48 kHz (internal or external)
default system sampling frequency:	48 kHz (internal)
headroom:	adjustable 0 dB ... 30 dB
headroom default setting:	9 dB, digital -9 dBFS = 0 dBint, analog 6 dBu = 0 dBint (0 dBint = DSP internal reference level)
maximum analog input level:	18 dBu or 24 dBu (depending on module type)
maximum analog output level:	18 dBu or 24 dBu (depending on module type)
output level default setting:	15 dBu = 0 dBint (0 dBint = DSP internal reference level)
input and master fader setting for measurements:	0 dB
analog source impedance for measurements:	< 40 Ohm
frequency range for measurements:	20 Hz ... 20 kHz (if not stated otherwise)

Note

Please read the RM4200D manual and the RM4200D list of modules for further information on the here listed I/O cards.

Technical Specifications

RM420-111 - Digital In/Out/GPIO Module, 8 ch.

Digital Inputs

input impedance:	110 Ohm (AES3/EBU) or 75Ohm (S/PDIF)
input sensitivity:	> 200mV
input sample rate converters (SRC):	yes, with bypass mode (switchable by configuration software)
SRC input sampling frequency range:	28 kHz ... 100 kHz
SRC passband ripple:	< 0.02 dB
dynamic range (SRC off):	144 dB (unweighted)
signal to noise ratio (SRC off):	144 dB (unweighted)
THD+N (SRC on, 44.1kHz to 48kHz):	< -114 dB / 0.0002% (-1 dBFS test signal)
max. input jitter:	> 40 ns
supported standards:	AES3/EBU or S/PDIF (switchable by configuration software)

Digital Outputs

output impedance:	110 Ohm (AES/EBU) or 75Ohm (S/PDIF)
output level:	3.4 V (into 110 Ohm load)
dynamic range (24 bit, dither off):	144 dB (unweighted)
signal to noise ratio (SRC off):	144 dB (unweighted)
dither:	off, 16, 20, 24 bit (switchable by configuration software)
jitter:	< 2 ns (peak)
supported standards:	AES3/EBU or S/PDIF (switchable by configuration software)

General Purpose Inputs / Outputs (GPI/GPO)

4 GPIs (optocoupler, isolated):	external ON voltage 4 V ... 24 V (DC) without external resistor, internal current limiter to 4 mA current for ON, OFF voltage: 0 V ... + 1.5 V
4 GPOs (electronic relay, isolated):	maximum rated current: 0,2A (resettable fuse), maximum peak switched voltage: 30V AC or DC

Further Information

power consumption:	0,9 W (typical)
connector style:	RJ45
printed circuit board (PCB) revision for this specifications:	r6

Note

All values are typical values, regarding the factory test limits, you can find in the log file example.

RM420-122C - Mic Line/Headphone/GPIO Module, 4 ch.

A/D Converter

input sensitivity:	-64dBu ... 18dBu
gain setting:	max. 70dB in 5 dB steps (0...50 dB analog gain) + 1dB steps (-20 ... +20 dB digital gain)
frequency response:	< 0.1 dB
input impedance:	approx. 8 kOhm
dynamic range:	107 dB (A-weighted)
signal to noise ratio:	104 dB (unweighted)
THD+N:	< -93 dB / 0.002% (-9 dBFS, +6 dBu) < -84 dB / 0.006% (-1 dBFS, +14 dBu)
equivalent input noise:	< -128dBu (150 Ohm source), < -127 dBu (200 Ohm source)
crosstalk:	< -110 dB (1 kHz)
phantom power 48V:	switchable per input channel, unloaded input: 48V +/- 10%
max. input level:	18 dBu (balanced)
common mode rejection:	> 60 dB
converter technology:	24 bit, oversampling sigma-delta

D/A Converter

max. output level (headphones, single ended):	15 dBu
output impedance:	approx. 17 Ohm
load impedance (outputs short circuit protected):	> 80 Ohm

D/A Converter

frequency response:	< 0.3 dB
THD+N:	< -94 dB / 0.002% (-9 dBFS, +6 dBu)
	< -94 dB / 0.002% (-1 dBFS, +14dBu)
crosstalk:	< -110 dB (1 kHz)
dynamic range:	109 dB (A-weighted)
signal to noise ratio:	106 dB (unweighted)
DC offset voltage:	< 10 mV
converter technology:	24 bit, oversampling sigma-delta

General Purpose Inputs / Outputs (GPI/GPO)

2 not isolated analog control inputs to connect external potentiometers for level controlling:	connect 10k ohms linear potentiometer between wiper and GND (left detent), left open right detent of potentiometer
	Note: Do not supply any external voltage!
2 GPIs (not isolated TTL-Inputs):	internal pull up resistor 10k ohms to 5 V for connecting of external push buttons against GND
	maximum voltage 5V DC when used with TTL input signal
4 GPOs (electronic relay, isolated):	maximum rated current: 0,2A (resettable fuse), maximum peak switched voltage: 30V AC or DC

Further Information

power consumption:	3,5 W (typical)
connector style:	RJ45
printed circuit board (PCB) revision for this specifications:	r6

Note

All values are typical values, regarding the factory test limits, you can find in the log file example.

Warning

The wiring of microphone inputs of DHD microphone input modules is not designed to support operation with parallel external phantom power. Using it might result in damages of pre-amplifier or phantom power generator.

RM420-123 - Mic/Line/GPIO Module, 4 ch. iso.

A/D Converter

input sensitivity:	-64 dBu ... 18 dBu
analog gain setting:	max. 70 dB in 5 dB steps (0...50 dB analog gain) + 1dB steps (-20 ... +20 dB digital gain)
frequency response:	< 0.1 dB
input impedance:	approx. 5 kOhm
dynamic range:	111 dB (A-weighted)
signal to noise ratio:	108 dB (unweighted)
THD+N:	< -99 dB / 0.001% (-9 dBFS, +6 dBu) < -89 dB / 0.004% (-1 dBFS, +14 dBu)
equivalent input noise:	< -128 dBu (150 Ohm source), < -127 dBu (200 Ohm source)
crosstalk:	< -120 dB (1kHz)
phantom power 48V:	switchable per input channel, unloaded input: 48V +/- 10%
max. input level:	18 dBu (balanced)
common mode rejection:	> 60 dB
converter technology:	24 bit, oversampling sigma-delta

General Purpose Inputs / Outputs (GPI/GPO)

4 GPIs (optocoupler, isolated):	external ON voltage 4 V ... 24 V (DC) without external resistor, internal current limiter to 4 mA current for ON, OFF voltage: 0 V ... + 1.5 V
4 GPOs (electronic relay, isolated):	maximum rated current: 0,2A (resettable fuse), maximum peak switched voltage: 30V AC or DC

Further Information

power consumption:	3,5 W (typical)
connector style:	SubD-15 female
printed circuit board (PCB) revision for this specifications:	r2

Note

All values are typical values, regarding the factory test limits, you can find in the log file example.

Warning

The wiring of microphone inputs of DHD microphone input modules is not designed to support operation with parallel external phantom power. Using it might result in damages of pre-amplifier or phantom power generator.

RM420-222 - Analog In/Out/GPIO Module, 4 ch.

A/D Converter

max. input level:	18 dBu (balanced)
input impedance:	approx. 10 kOhm
frequency response:	< 0.1 dB
THD+N:	< -99 dB / 0.001% (-9 dBFS, +6 dBu)
	< -94 dB / 0.002% (-1 dBFS, +14 dBu)
crosstalk:	< -110 dB (1kHz)
dynamic range:	110 dB (A-weighted)
signal to noise ratio:	107 dB (unweighted)
common mode rejection:	> 60 dB
converter technology:	24 bit, oversampling sigma-delta

D/A Converter

max. output level (phones, single ended):	18 dBu (balanced)
output impedance:	approx. 25 Ohm
minimum load (outputs short circuit protected):	600 Ohm
frequency response:	< 0.1 dB
THD+N:	< -95 dB / 0.002% (-9 dBFS, +6 dBu)
	< -89 dB / 0.004% (-1 dBFS, +14 dBu)
crosstalk:	< -90 dB
dynamic range:	109 dB (A-weighted)

D/A Converter

signal to noise ratio:	106 dB (unweighted)
DC offset voltage:	< 10 mV
common mode rejection (output impedance):	> 60 dB
common mode rejection (output voltage):	> 40 dB
converter technology:	24 bit, oversampling sigma-delta

General Purpose Inputs / Outputs (GPI/GPO)

4 GPIs (optocoupler, isolated):	external ON voltage 4 V ... 24 V (DC) without external resistor, internal current limiter to 4 mA current for ON, OFF voltage: 0 V ... + 1.5 V
4 GPOs (electronic relay, isolated):	maximum rated current: 0,2A (resettable fuse), maximum peak switched voltage: 30V AC or DC

Further Information

power consumption:	2,4 W (typical)
connector style:	RJ45
printed circuit board (PCB) revision for this specifications:	r7

Note

All values are typical values, regarding the factory test limits, you can find in the log file example.

RM420-223 - Analog In/Out/GPIO Module, 4 ch.

A/D Converter

max. input level:	24 dBu (balanced)
input impedance:	approx. 10 kOhm
frequency response:	< 0.1 dB
THD+N:	< -90 dB / 0.003% (-20 dBFS, +4 dBu)
	< -89 dB / 0.004% (-1 dBFS, +23 dBu)
crosstalk:	< -110 dB
dynamic range:	112 dB (A-weighted)
signal to noise ratio:	109 dB (unweighted)
common mode rejection:	> 60 dB
converter technology:	24 bit, oversampling sigma-delta

D/A Converter

max. output level (phones, single ended):	24 dBu (balanced)
output impedance:	approx. 25 Ohm
minimum load (outputs short circuit protected):	600 Ohm
frequency response:	< 0.15 dB
THD+N:	< -90 dB / 0.003% (-20 dBFS, +4 dBu)
	< -84 dB / 0.006% (-1 dBFS, +23 dBu)
crosstalk:	< -90 dB
dynamic range:	112 dB (A-weighted)

D/A Converter

signal to noise ratio:	109 dB (unweighted)
DC offset voltage:	< 10 mV
common mode rejection (output impedance):	> 60 dB
common mode rejection (output voltage):	> 40 dB
converter technology:	24 bit, oversampling sigma-delta

General Purpose Inputs / Outputs (GPI/GPO)

4 GPIs (optocoupler, isolated):	external ON voltage 4 V ... 24 V (DC) without external resistor, internal current limiter to 4 mA current for ON, OFF voltage: 0 V ... + 1.5 V
4 GPOs (electronic relay, isolated):	maximum rated current: 0,2A (resettable fuse), maximum peak switched voltage: 30V AC or DC

Further Information

power consumption:	2,4 W (typical)
connector style:	RJ45
printed circuit board (PCB) revision for this specifications:	r7

Note

All values are typical values, regarding the factory test limits, you can find in the log file example.

Any Input to Any Output

measured from any analogue or digital input to any analogue or digital output

frequency response:	< 0.2 dB
THD+N	< -80 dB / 0.01% (@ -1 dBFS)
signal to noise ratio:	> 90 dB

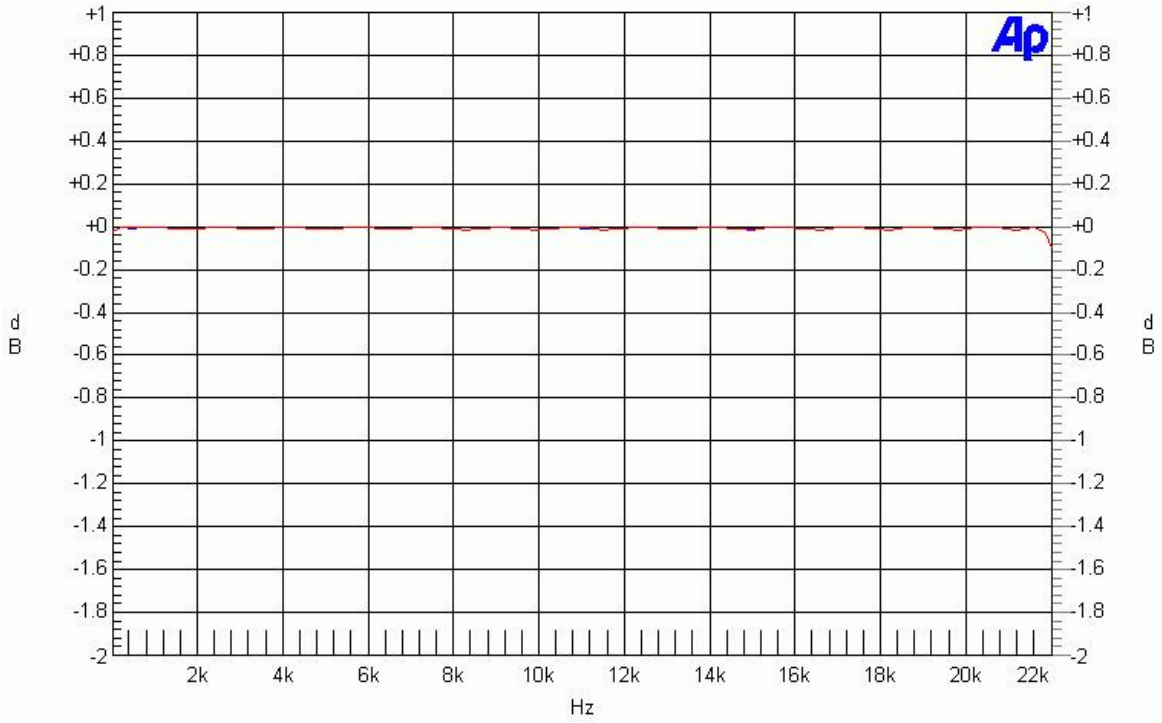
Note

All values are typical values. Measured between modules RM420-111, RM420-123, RM420-222, RM420-223.

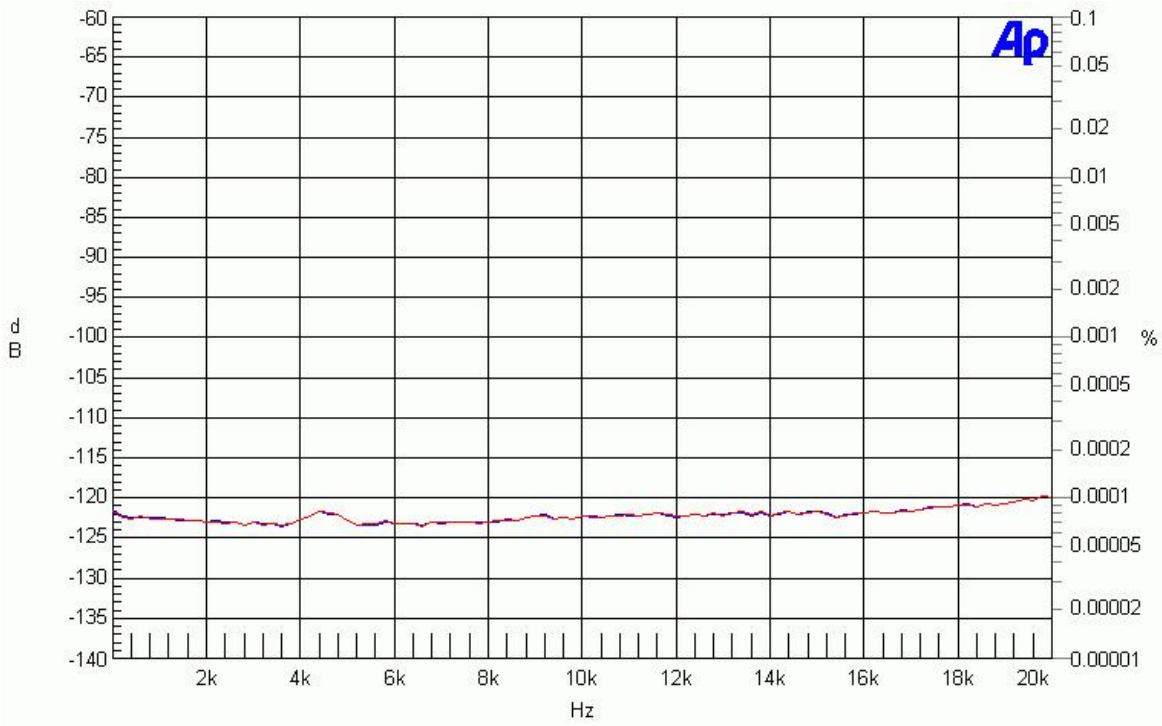
Measurement Plots and Log File Examples

RM420-111 - Digital In/Out/GPIO Module, 8 ch.

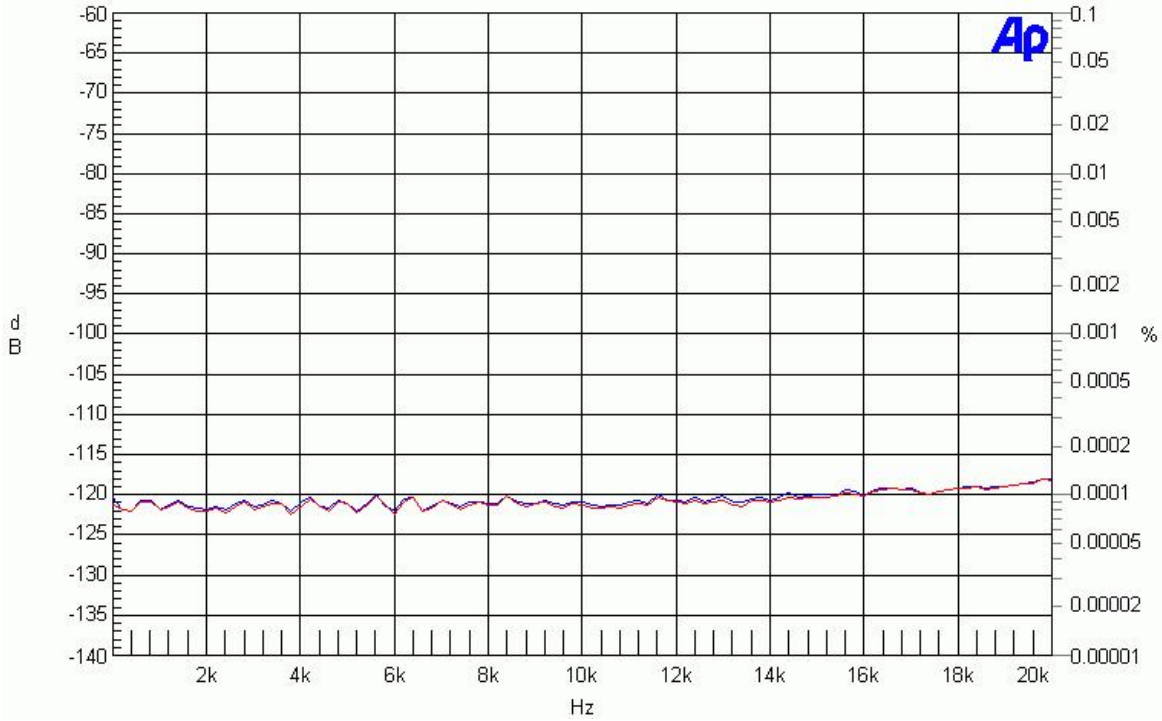
Measurement Plots RM420-111 SRC inputs



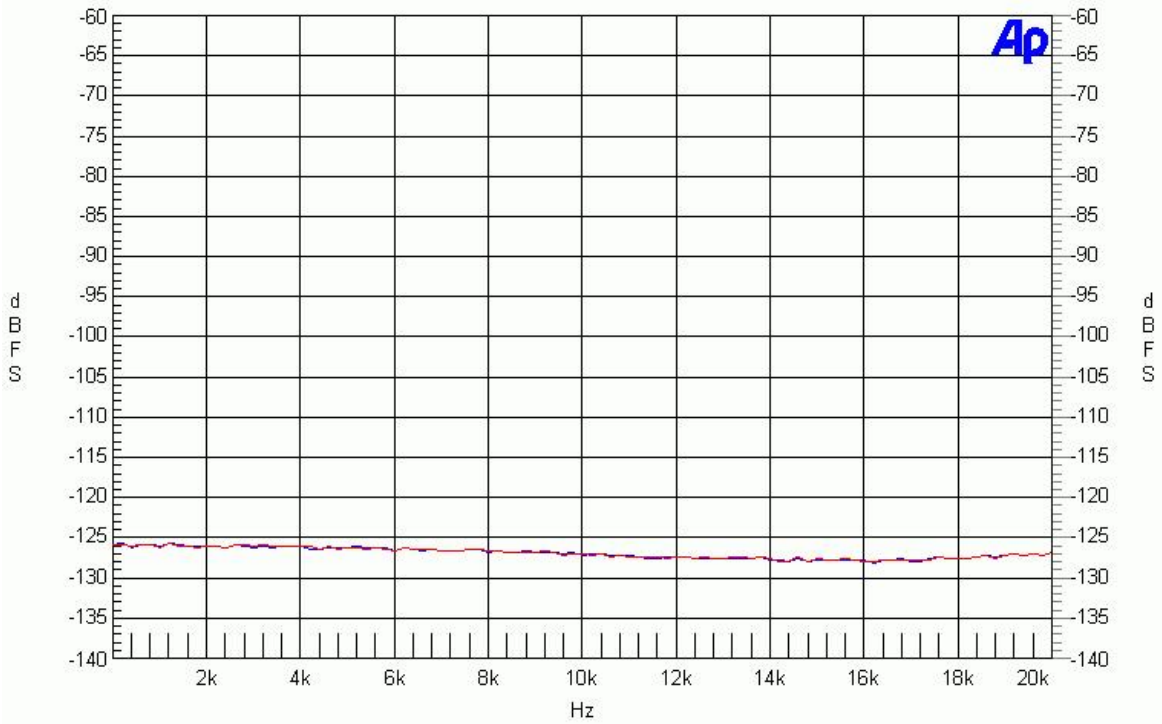
RM420-111 Frequency Response, SRC



RM420-111 THD+N @ -1 dBFS, SRC 48 kHz to 48 kHz



RM420-111 THD+N @ -1 dBFS, SRC 44.1 kHz to 48 kHz



RM420-111 THD+N @ -30 dBFS, SRC 44.1 kHz to 48 kHz

Log File Example

After manufacturing all inputs and outputs of every I/O card are measured. Hence, we can make sure that every module, leaving the production hall, is working correctly. During this process a log file is written. This file is saved by DHD for maintenance purposes.

In the following you can find a log file example of an RM420-111 module:

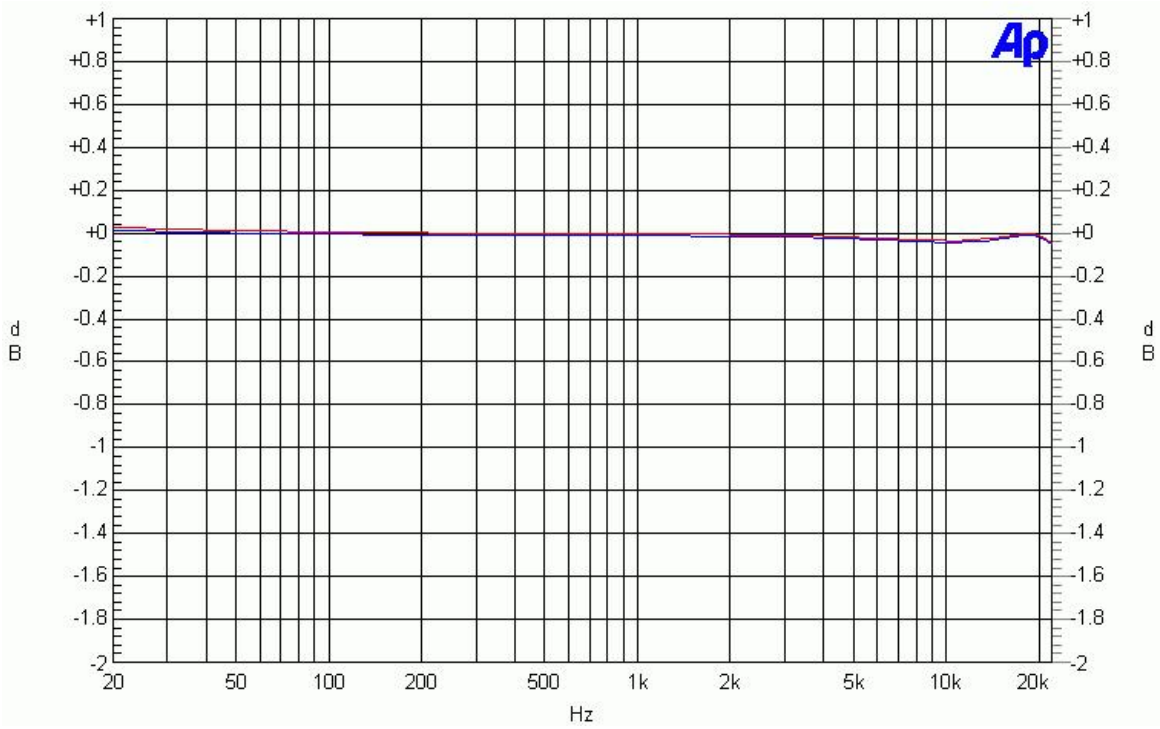
```
03-May-2007 16:23:16
*** Test RM420-111 R6  Production Code 7277 ***
open COM1
=== Test GPO1 ===
=== Test GPO2 ===
=== Test GPO3 ===
=== Test GPO4 ===
=== Test GPI1 ===
=== Test GPI2 ===
=== Test GPI3 ===
=== Test GPI4 ===
=== Test FS Input1 -> SYNC1 ===
=== Test FS Input1 -> SYNC2 ===
=== Test FS Input2 -> SYNC1 ===
=== Test FS Input2 -> SYNC2 ===
=== Test FS Input3 -> SYNC1 ===
=== Test FS Input3 -> SYNC2 ===
=== Test FS Input4 -> SYNC1 ===
=== Test FS Input4 -> SYNC2 ===
================================================
=== Test Input 1-2 SRC off AES/EBU (Pro) 44.1kHz ===
================================================
-- Level 0dB --
 frequency response limit: -0.001 dB .. 0.001 dB
 multitone distortions and noise limit: -136 dBFS
Level(1kHz): L=-0.00 dB,  R=-0.00 dB
Polarity: (+)
Group Delay: L=27.0,  R=27.0 Samples
SNR:  L=130.0 dB,  R=129.5 dB
Input Dynamic:  L=141.0 dB,  R=140.4 dB
================================================
=== Test Input 3-4 SRC off AES/EBU (Pro) 44.1kHz ===
================================================
-- Level 0dB --
 frequency response limit: -0.001 dB .. 0.001 dB
 multitone distortions and noise limit: -136 dBFS
Level(1kHz): L=-0.00 dB,  R=-0.00 dB
Polarity: (+)
Group Delay: L=26.0,  R=26.0 Samples
SNR:  L=130.0 dB,  R=129.4 dB
Input Dynamic:  L=141.0 dB,  R=140.3 dB
================================================
=== Test Input 5-6 SRC off AES/EBU (Pro) 44.1kHz ===
================================================
-- Level 0dB --
 frequency response limit: -0.001 dB .. 0.001 dB
 multitone distortions and noise limit: -136 dBFS
Level(1kHz): L=-0.00 dB,  R=-0.00 dB
Polarity: (+)
Group Delay: L=27.0,  R=27.0 Samples
SNR:  L=129.9 dB,  R=129.5 dB
Input Dynamic:  L=140.9 dB,  R=140.4 dB
================================================
=== Test Input 7-8 SRC off AES/EBU (Pro) 44.1kHz ===
================================================
-- Level 0dB --
 frequency response limit: -0.001 dB .. 0.001 dB
 multitone distortions and noise limit: -136 dBFS
Level(1kHz): L=-0.00 dB,  R=-0.00 dB
Polarity: (+)
Group Delay: L=27.0,  R=27.0 Samples
SNR:  L=130.1 dB,  R=129.3 dB
Input Dynamic:  L=141.1 dB,  R=140.2 dB
====================================
=== Test Output AES/EBU (Pro) 1-2 ===
====================================
-- Level 0dB --
 frequency response limit: -0.001 dB .. 0.001 dB
 multitone distortions and noise limit: -136 dBFS
Level(1kHz): L=-0.00 dB,  R=-0.00 dB
```

```
Polarity: (+)
Group Delay: L=30.0,  R=30.0 Samples
SNR:  L=127.3 dB,  R=126.3 dB
Output Dynamic:  L=138.2 dB,  R=137.2 dB
====================================
=== Test Output AES/EBU (Pro) 3-4 ===
====================================
-- Level 0dB --
 frequency response limit: -0.001 dB .. 0.001 dB
 multitone distortions and noise limit: -136 dBFS
Level(1kHz): L=-0.00 dB,  R=-0.00 dB
Polarity: (+)
Group Delay: L=29.0,  R=29.0 Samples
SNR:  L=127.2 dB,  R=126.3 dB
Output Dynamic:  L=138.2 dB,  R=137.3 dB
====================================
=== Test Output AES/EBU (Pro) 5-6 ===
====================================
-- Level 0dB --
 frequency response limit: -0.001 dB .. 0.001 dB
 multitone distortions and noise limit: -136 dBFS
Level(1kHz): L=-0.00 dB,  R=-0.00 dB
Polarity: (+)
Group Delay: L=29.0,  R=29.0 Samples
SNR:  L=129.2 dB,  R=126.5 dB
Output Dynamic:  L=140.2 dB,  R=137.5 dB
====================================
=== Test Output AES/EBU (Pro) 7-8 ===
====================================
-- Level 0dB --
 frequency response limit: -0.001 dB .. 0.001 dB
 multitone distortions and noise limit: -136 dBFS
Level(1kHz): L=-0.00 dB,  R=-0.00 dB
Polarity: (+)
Group Delay: L=29.0,  R=29.0 Samples
SNR:  L=127.4 dB,  R=126.3 dB
Output Dynamic:  L=138.4 dB,  R=137.3 dB
========================================
=== Test Output SP/DIF (Consumer) 1-2 ===
========================================
-- Level 0dB --
 frequency response limit: -0.001 dB .. 0.001 dB
 multitone distortions and noise limit: -136 dBFS
Level(1kHz): L=-0.00 dB,  R=-0.00 dB
Polarity: (+)
Group Delay: L=30.0,  R=30.0 Samples
SNR:  L=127.0 dB,  R=126.3 dB
Output Dynamic:  L=137.9 dB,  R=137.3 dB
========================================
=== Test Output SP/DIF (Consumer) 3-4 ===
========================================
-- Level 0dB --
 frequency response limit: -0.001 dB .. 0.001 dB
 multitone distortions and noise limit: -136 dBFS
Level(1kHz): L=-0.00 dB,  R=-0.00 dB
Polarity: (+)
Group Delay: L=29.0,  R=29.0 Samples
SNR:  L=127.2 dB,  R=126.4 dB
Output Dynamic:  L=138.2 dB,  R=137.3 dB
========================================
=== Test Output SP/DIF (Consumer) 5-6 ===
========================================
-- Level 0dB --
 frequency response limit: -0.001 dB .. 0.001 dB
 multitone distortions and noise limit: -136 dBFS
Level(1kHz): L=-0.00 dB,  R=-0.00 dB
Polarity: (+)
Group Delay: L=29.0,  R=29.0 Samples
SNR:  L=129.0 dB,  R=126.4 dB
Output Dynamic:  L=140.0 dB,  R=137.4 dB
========================================
=== Test Output SP/DIF (Consumer) 7-8 ===
========================================
-- Level 0dB --
 frequency response limit: -0.001 dB .. 0.001 dB
 multitone distortions and noise limit: -136 dBFS
Level(1kHz): L=-0.00 dB,  R=-0.00 dB
Polarity: (+)
Group Delay: L=29.0,  R=29.0 Samples
SNR:  L=127.4 dB,  R=126.2 dB
Output Dynamic:  L=138.4 dB,  R=137.2 dB
```

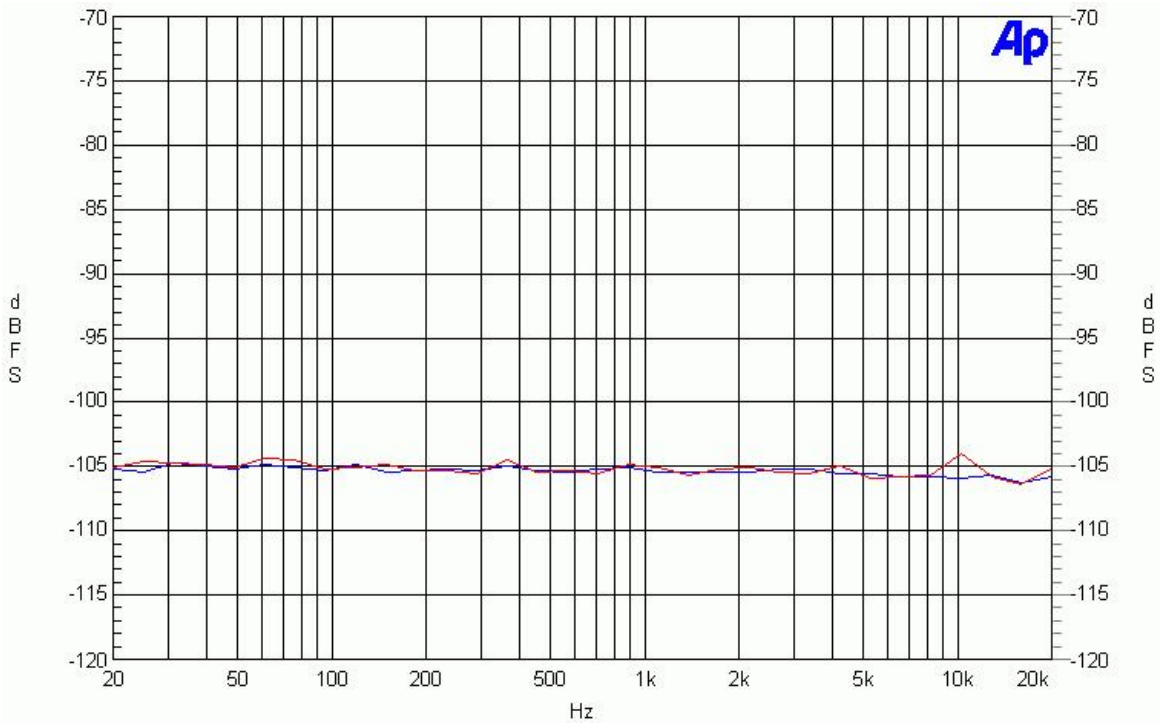
```
=====================================================
=== Test Input 1-2 SRC on SP/DIF (Consumer) 48kHz ===
=====================================================
-- Level 0dB --
 frequency response limit: -0.015 dB .. 0.005 dB
 multitone distortions and noise limit: -95 dBFS
Level(1kHz): L=-0.00 dB,  R=-0.00 dB
Polarity: (+)
Group Delay: L=77.1,  R=77.1 Samples
SNR:  L=77.9 dB,  R=78.0 dB
!!! SNR Fehler (Limit  84.0 dB)
Input Dynamic:  L=88.9 dB,  R=88.9 dB
-- Level 0dB --
 frequency response limit: -0.015 dB .. 0.005 dB
 multitone distortions and noise limit: -95 dBFS
Level(1kHz): L=-0.00 dB,  R=-0.00 dB
Polarity: (+)
Group Delay: L=77.1,  R=77.1 Samples
SNR:  L=85.8 dB,  R=85.8 dB
Input Dynamic:  L=96.8 dB,  R=96.8 dB
=====================================================
=== Test Input 3-4 SRC on SP/DIF (Consumer) 48kHz ===
=====================================================
-- Level 0dB --
 frequency response limit: -0.015 dB .. 0.005 dB
 multitone distortions and noise limit: -95 dBFS
Level(1kHz): L=-0.00 dB,  R=-0.00 dB
Polarity: (+)
Group Delay: L=77.0,  R=77.0 Samples
SNR:  L=93.1 dB,  R=93.1 dB
Input Dynamic:  L=104.1 dB,  R=104.0 dB
=====================================================
=== Test Input 5-6 SRC on SP/DIF (Consumer) 48kHz ===
=====================================================
-- Level 0dB --
 frequency response limit: -0.015 dB .. 0.005 dB
 multitone distortions and noise limit: -95 dBFS
Level(1kHz): L=-0.00 dB,  R=-0.00 dB
Polarity: (+)
Group Delay: L=77.9,  R=77.9 Samples
SNR:  L=94.0 dB,  R=94.1 dB
Input Dynamic:  L=105.0 dB,  R=105.0 dB
=====================================================
=== Test Input 7-8 SRC on SP/DIF (Consumer) 48kHz ===
=====================================================
-- Level 0dB --
 frequency response limit: -0.015 dB .. 0.005 dB
 multitone distortions and noise limit: -95 dBFS
Level(1kHz): L=-0.00 dB,  R=-0.00 dB
Polarity: (+)
Group Delay: L=77.8,  R=77.8 Samples
SNR:  L=92.2 dB,  R=92.2 dB
Input Dynamic:  L=103.2 dB,  R=103.2 dB
==============
=== EEPROM ===
==============
Updated Serialnumber = 17411
************************
*** Test Succsessful ***
************************
03-May-2007 16:23:59
```

RM420-122C - Mic Line/Headphone/GPIO Module, 4 ch.

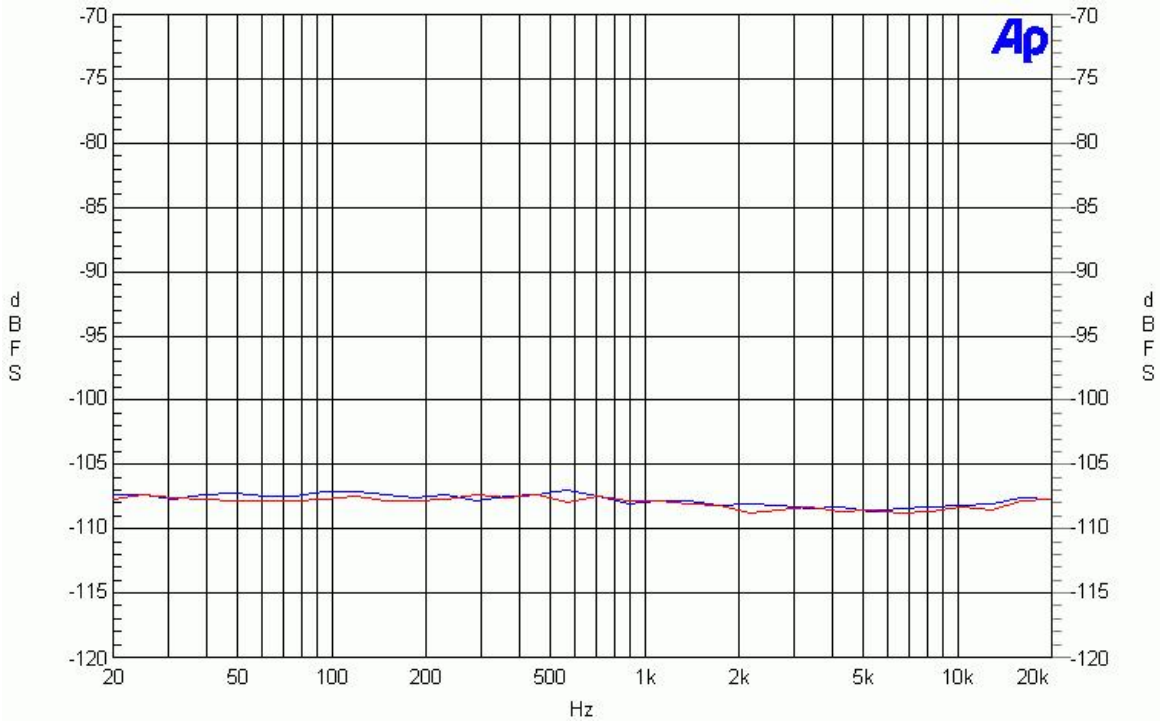
Measurement Plots RM420-122 Input



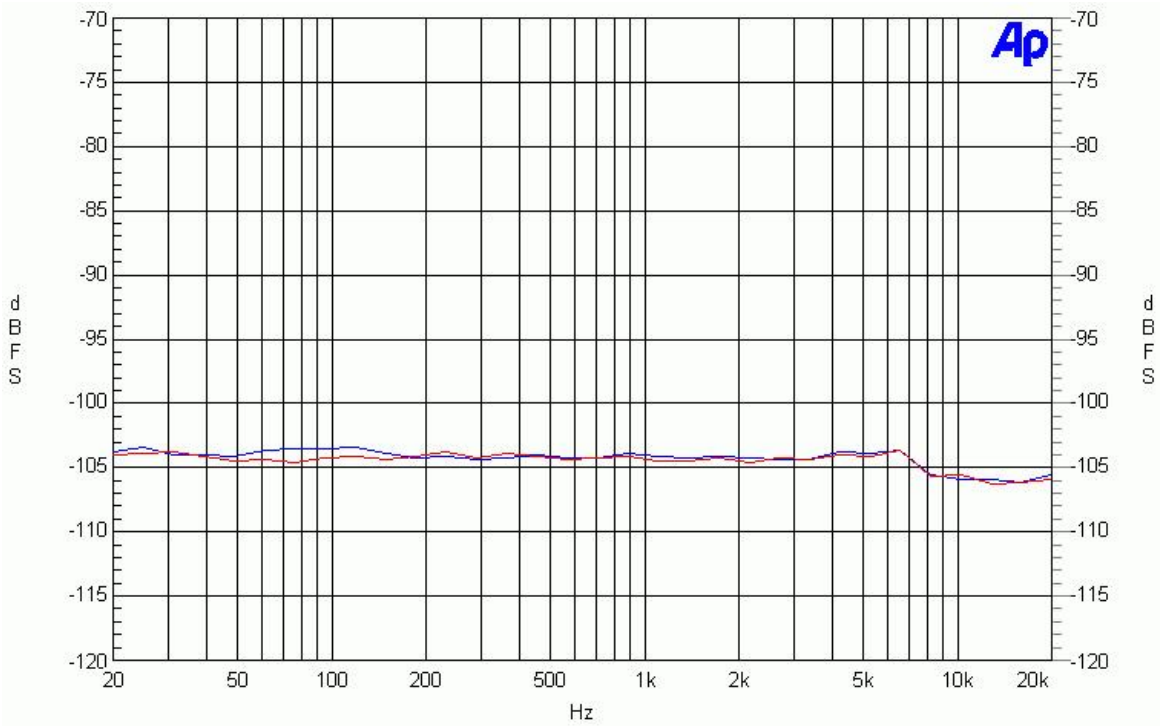
RM420-122C ADC Frequency Response



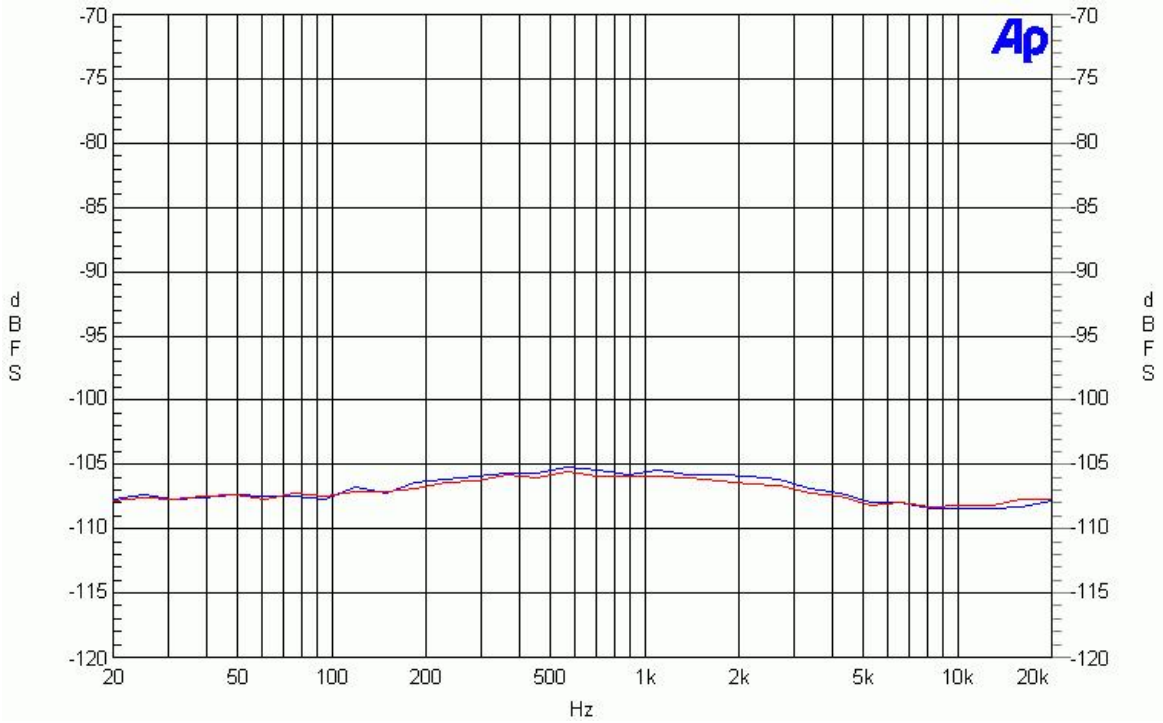
RM420-122C ADC THD+N @ -30 dBFS



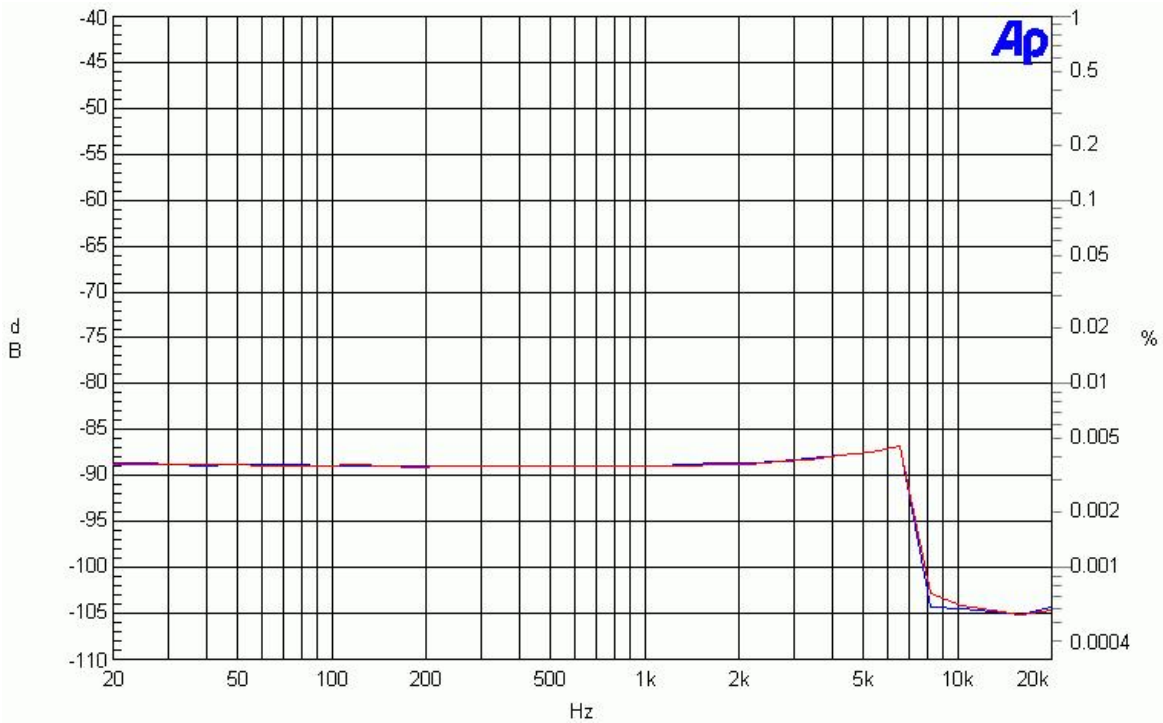
RM420-122C ADC THD+N(A) @ -30 dBFS



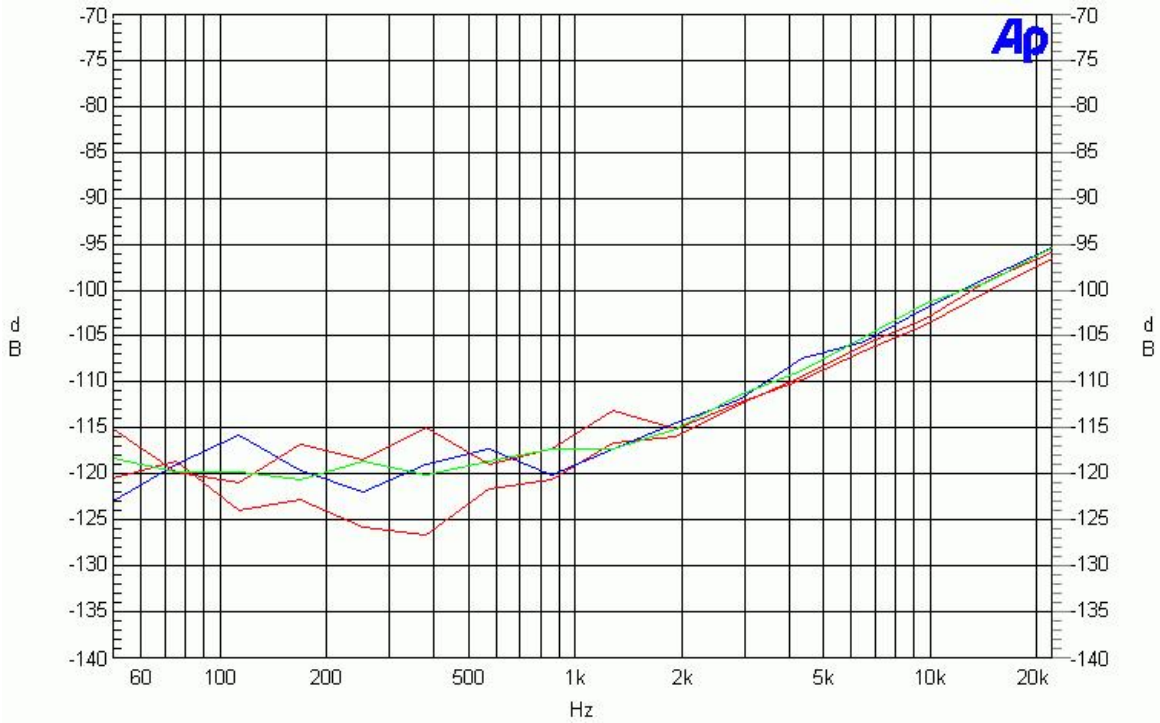
RM420-122C ADC THD+N @ +6 dBu



RM420-122C ADC THD+N(A) @ + 6 dBu

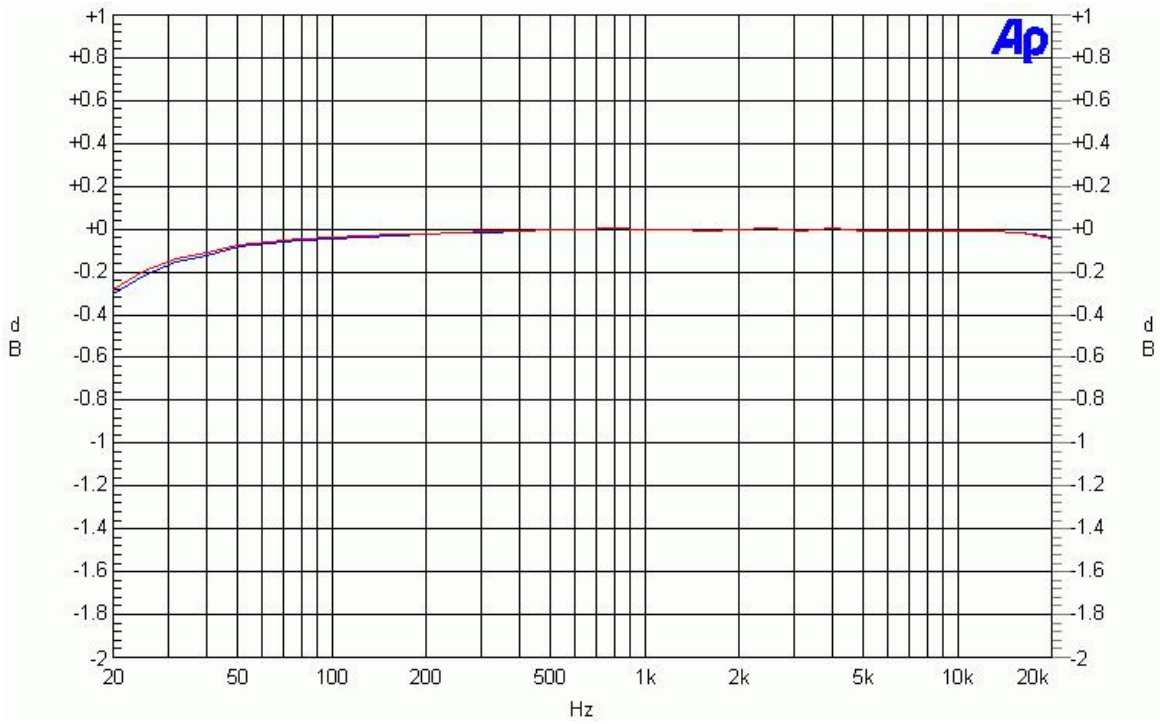


RM420-122C ADC THD+N @ +14 dBu

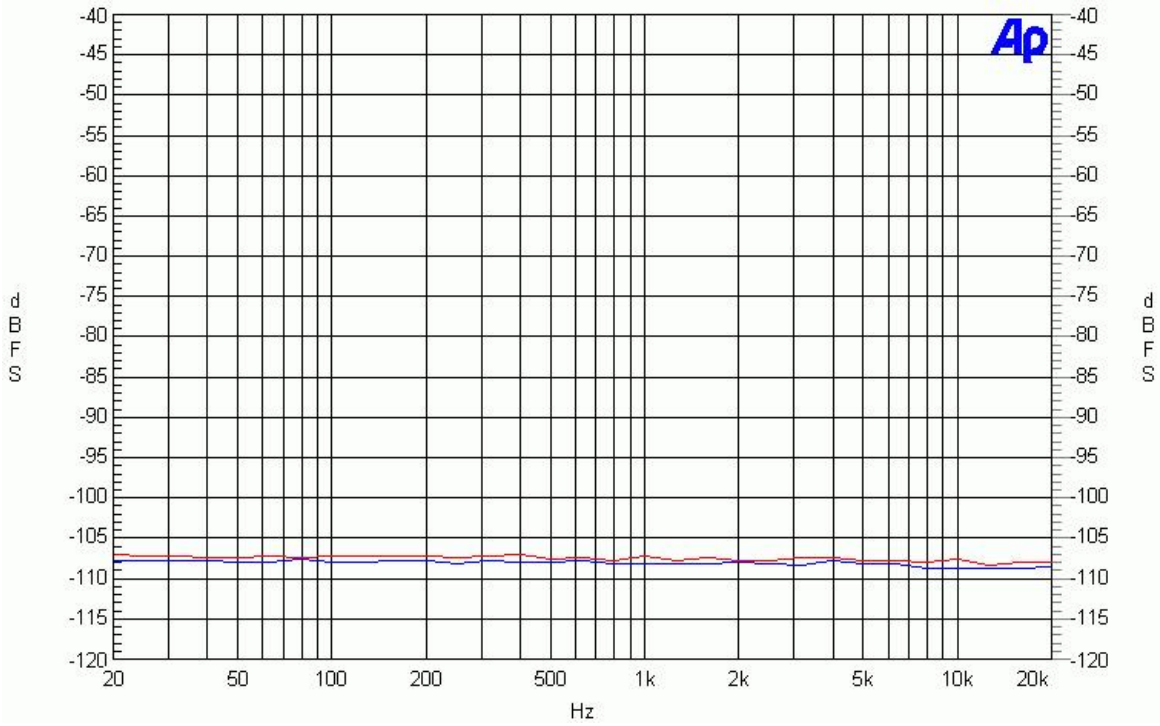


RM420-122C ADC Cross-Talk

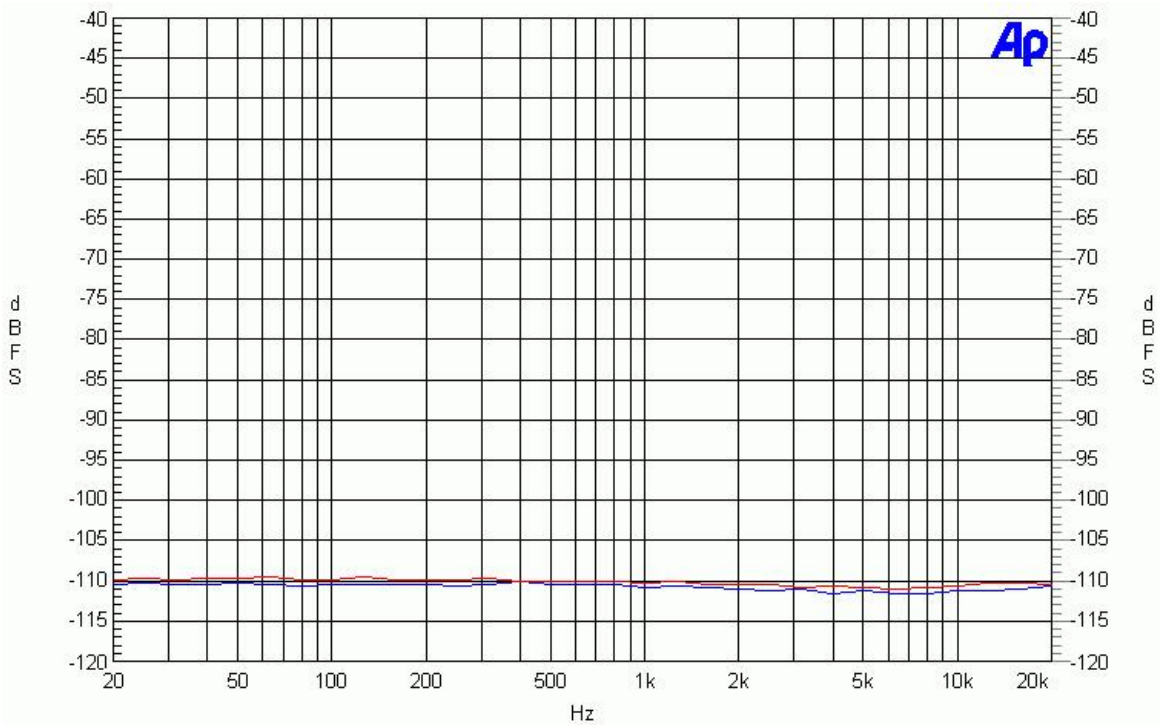
Measurement Plots RM420-122 Output



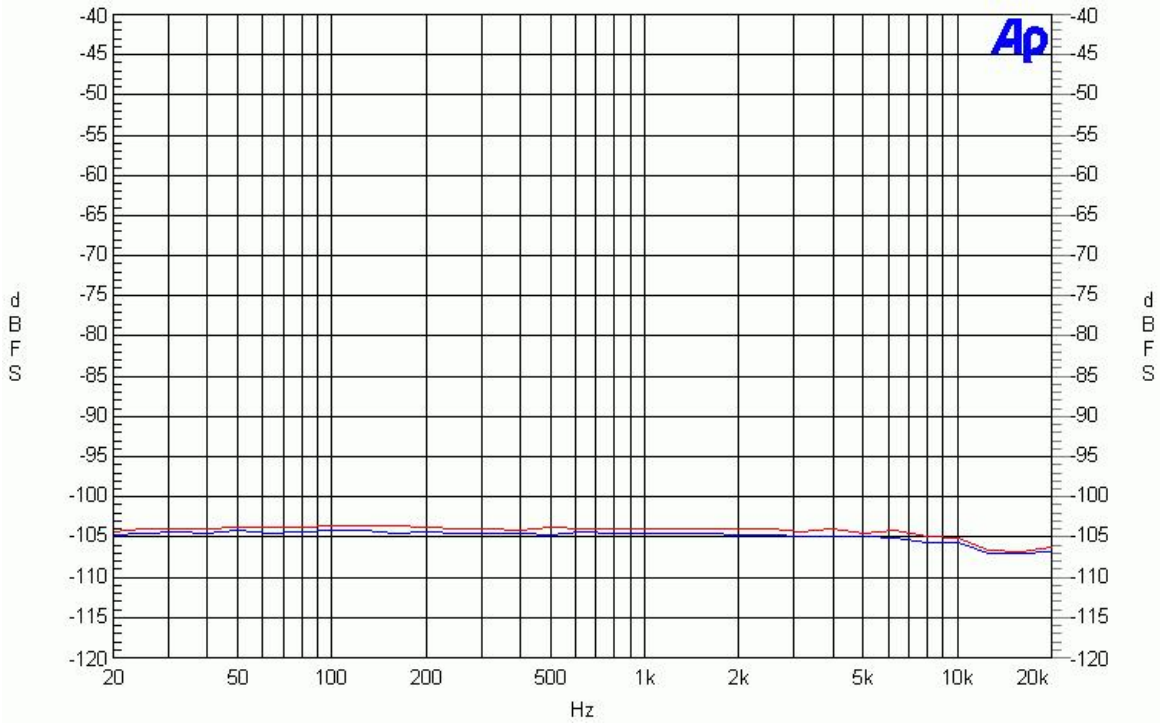
RM420-122C DAC Frequency Response



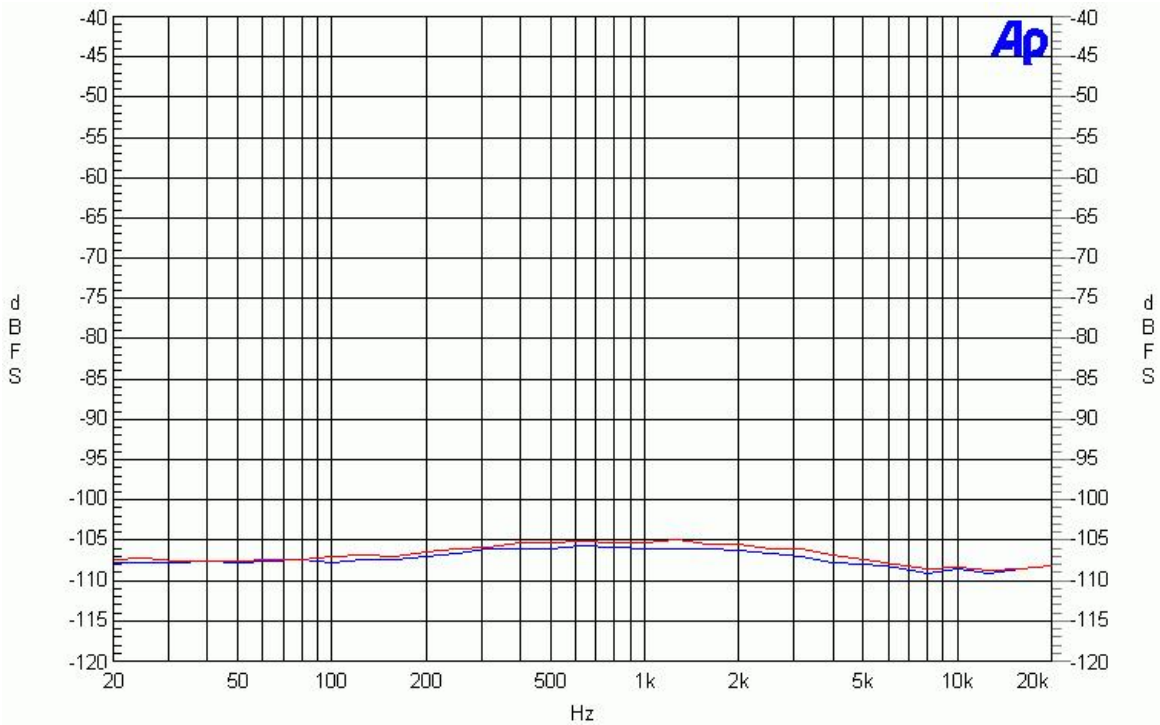
RM420-122C DAC THD+N @ -30 dBFS



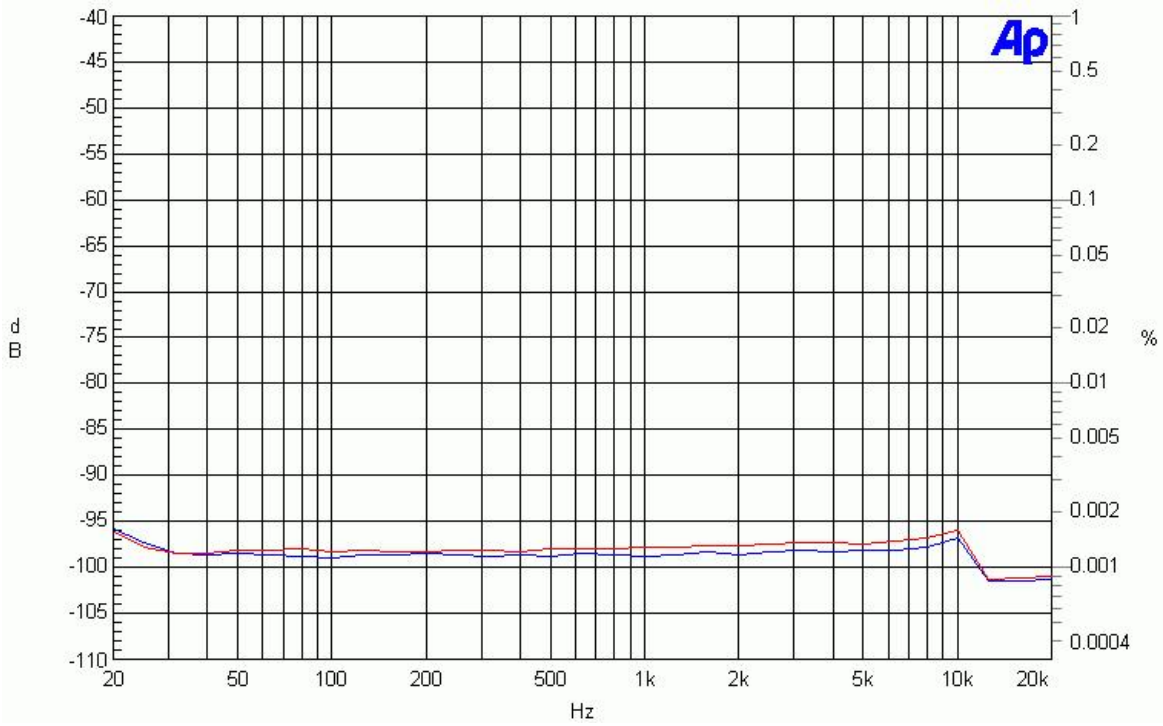
RM420-122C DAC THD+N(A) @ -30 dBFS



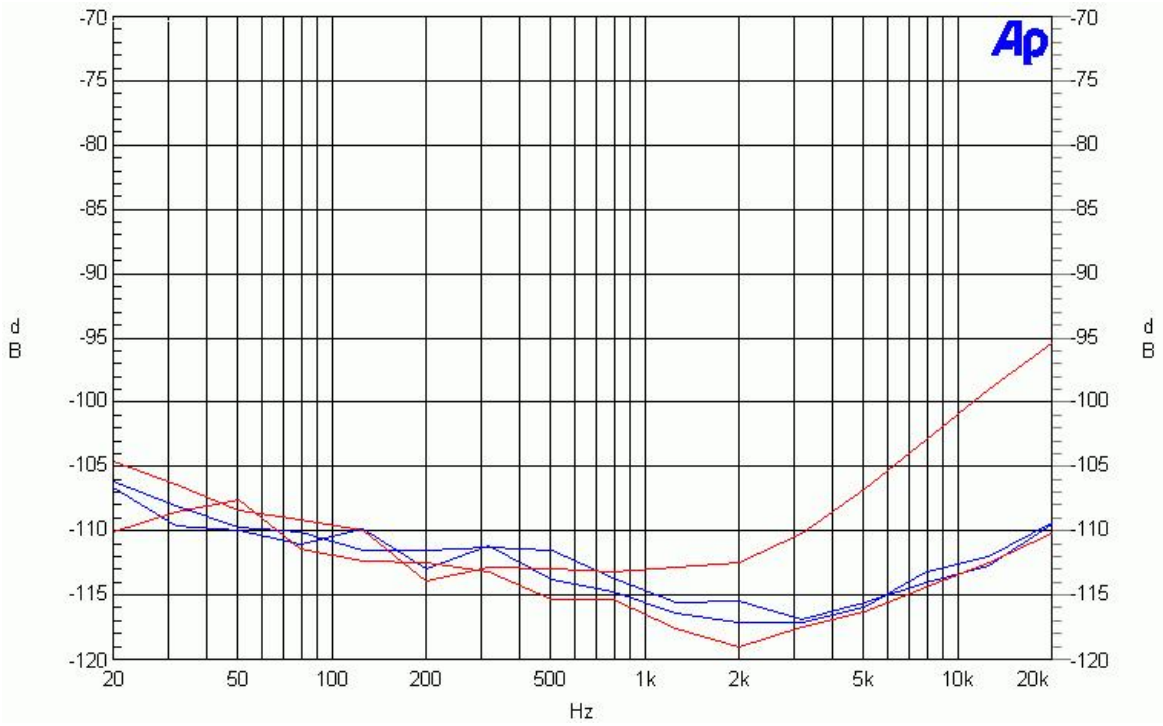
RM420-122C DAC THD+N @ +6 dBu



RM420-122C DAC THD+N(A) @ +6 dBu



RM420-122C DAC THD+N @ +14 dBu, 300Ohm



RM420-122C DAC Cross-Talk

Log File Example

After manufacturing all inputs and outputs of every I/O card are measured. Hence, we can make sure that every module, leaving the production hall, is working correctly. During this process a log file is written. This file is saved by DHD for maintenance purposes.

In the following you can find a log file example of an RM420-122 module:

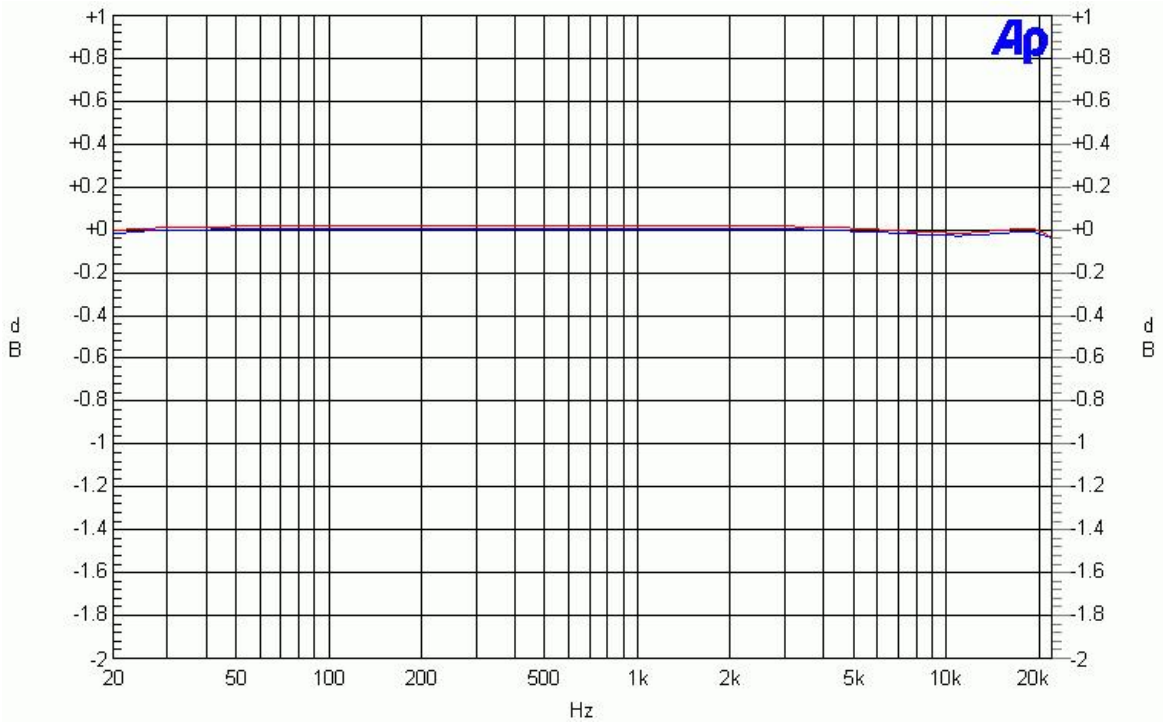
```
03-May-2007 16:09:38
*** Test RM420-122 R6  Production Code 7344 ***
open COM1
=== Voltage VCC3 = 3.3 V ===
=== Voltage VCC2+ = 9.6 V ===
=== Voltage VCC2- = -9.1 V ===
=== Phantom Power Voltage V48 = 51.5 V ===
=== Test GPO1 ===
=== Test GPO2 ===
=== Test GPO3 ===
=== Test GPO4 ===
=== Test GPI1 ===
=== Test GPI2 ===
=== Test Analog Control Input ACI1 ===
=== Test Analog Control Input ACI2 ===
=== Phantom Power Mic1 A=49.9 V, B=49.9 V  ===
=== Phantom Power Mic2 A=50.4 V, B=50.7 V  ===
=== Phantom Power Mic3 A=49.9 V, B=49.9 V  ===
=== Phantom Power Mic4 A=50.4 V, B=50.7 V  ===
====================
=== Test A/D 1-2 ===
====================
-- Level 0dB --
 frequency response limit: -0.2 dB .. 0.1 dB
 multitone distortions and noise limit: -90 dBFS
Level(1kHz): L=-0.32 dB,  R=-0.35 dB
Polarity: (+)
Group Delay: L=63.3,  R=63.3 Samples
SNR:  L=86.6 dB,  R=87.7 dB
-- Dynamic -60dB --
Level(1kHz): L=-60.33 dB,  R=-60.33 dB
SNR:  L=37.2 dB,  R=36.8 dB
Input Dynamic:  L=108.2 dB,  R=107.8 dB
 limit: 105 dB
-- Input Balance --
CMR @ 1kHz:  L=77.2 dB,  R=79.8 dB
 limit: 58 dB
====================
=== Test A/D 3-4 ===
====================
-- Level 0dB --
 frequency response limit: -0.2 dB .. 0.1 dB
 multitone distortions and noise limit: -90 dBFS
Level(1kHz): L=-0.35 dB,  R=-0.36 dB
Polarity: (+)
Group Delay: L=63.3,  R=63.3 Samples
SNR:  L=86.8 dB,  R=87.0 dB
-- Dynamic -60dB --
Level(1kHz): L=-60.32 dB,  R=-60.35 dB
SNR:  L=36.2 dB,  R=36.9 dB
Input Dynamic:  L=107.1 dB,  R=107.9 dB
 limit: 105 dB
-- Input Balance --
CMR @ 1kHz:  L=79.3 dB,  R=77.9 dB
 limit: 58 dB
====================
=== Test D/A 1-2 ===
====================
-- Input Level 0dB --
 frequency response limit: -0.2 dB .. 0.1 dB
 multitone distortions and noise limit: -90 dBFS
Level(1kHz): L=-2.38 dB,  R=-2.36 dB
Polarity: (+)
Group Delay: L=83.4,  R=83.4 Samples
SNR:  L=87.6 dB,  R=87.0 dB
-- Dynamic +20dB Gain --
Level(1kHz): L=17.67 dB,  R=17.65 dB
SNR:  L=77.2 dB,  R=76.8 dB
Output Dynamic:  L=108.2 dB,  R=107.7 dB
 limit: 105 dB
```

```
====================
=== Test D/A 3-4 ===
====================
-- Input Level 0dB --
 frequency response limit: -0.2 dB .. 0.1 dB
 multitone distortions and noise limit: -90 dBFS
Level(1kHz): L=-2.34 dB,  R=-2.28 dB
Polarity: (+)
Group Delay: L=83.4,  R=83.4 Samples
SNR:  L=87.7 dB,  R=88.0 dB
-- Dynamic +20dB Gain --
Level(1kHz): L=17.68 dB,  R=17.76 dB
SNR:  L=77.3 dB,  R=77.4 dB
Output Dynamic:  L=108.3 dB,  R=108.3 dB
 limit: 105 dB
============================
=== Test Mic Gain A/D 1-2 ===
============================
-- Gain +5.0 dB --
Level(1kHz): L=-54.80 dB,  R=-54.78 dB
SNR:  L=41.7 dB,  R=41.3 dB
-- Gain +5.0 dB --
Level(1kHz): L=-54.81 dB,  R=-54.80 dB
SNR:  L=42.5 dB,  R=42.4 dB
-- Gain +10.3 dB --
Level(1kHz): L=-49.51 dB,  R=-49.48 dB
SNR:  L=47.0 dB,  R=46.6 dB
-- Gain +12.3 dB --
Level(1kHz): L=-47.52 dB,  R=-47.50 dB
SNR:  L=49.6 dB,  R=49.6 dB
-- Gain +20.3 dB --
Level(1kHz): L=-39.57 dB,  R=-39.54 dB
SNR:  L=56.7 dB,  R=56.4 dB
-- Gain +25.3 dB --
Level(1kHz): L=-34.55 dB,  R=-34.53 dB
SNR:  L=62.1 dB,  R=61.9 dB
-- Gain +28.1 dB --
Level(1kHz): L=-31.74 dB,  R=-31.72 dB
SNR:  L=64.6 dB,  R=64.6 dB
-- Gain +35.4 dB --
Level(1kHz): L=-24.48 dB,  R=-24.47 dB
SNR:  L=70.5 dB,  R=70.1 dB
-- Gain +40.1 dB --
Level(1kHz): L=-19.70 dB,  R=-19.68 dB
SNR:  L=73.4 dB,  R=72.6 dB
-- Gain +45.4 dB --
Level(1kHz): L=-14.49 dB,  R=-14.48 dB
SNR:  L=75.6 dB,  R=74.3 dB
-- Gain +50.0 dB --
Level(1kHz): L=-9.89 dB,  R=-9.88 dB
SNR:  L=76.9 dB,  R=75.3 dB
-- Equivalent Input Noise at +50 dB: Ch1=-129.9 dBu, Ch2=-128.3 dBu--
 limit: -127 dBu
============================
=== Test Mic Gain A/D 3-4 ===
============================
-- Gain +5.0 dB --
Level(1kHz): L=-54.79 dB,  R=-54.83 dB
SNR:  L=42.0 dB,  R=41.5 dB
-- Gain +10.3 dB --
Level(1kHz): L=-49.46 dB,  R=-49.52 dB
SNR:  L=47.2 dB,  R=46.9 dB
-- Gain +12.3 dB --
Level(1kHz): L=-47.49 dB,  R=-47.53 dB
SNR:  L=49.1 dB,  R=49.1 dB
-- Gain +20.3 dB --
Level(1kHz): L=-39.52 dB,  R=-39.59 dB
SNR:  L=56.8 dB,  R=56.7 dB
-- Gain +25.3 dB --
Level(1kHz): L=-34.49 dB,  R=-34.55 dB
SNR:  L=61.6 dB,  R=61.6 dB
-- Gain +28.1 dB --
Level(1kHz): L=-31.68 dB,  R=-31.74 dB
SNR:  L=64.1 dB,  R=64.2 dB
-- Gain +35.4 dB --
Level(1kHz): L=-24.43 dB,  R=-24.47 dB
SNR:  L=70.1 dB,  R=70.1 dB
-- Gain +40.1 dB --
Level(1kHz): L=-19.61 dB,  R=-19.66 dB
SNR:  L=73.2 dB,  R=73.2 dB
-- Gain +45.4 dB --
```

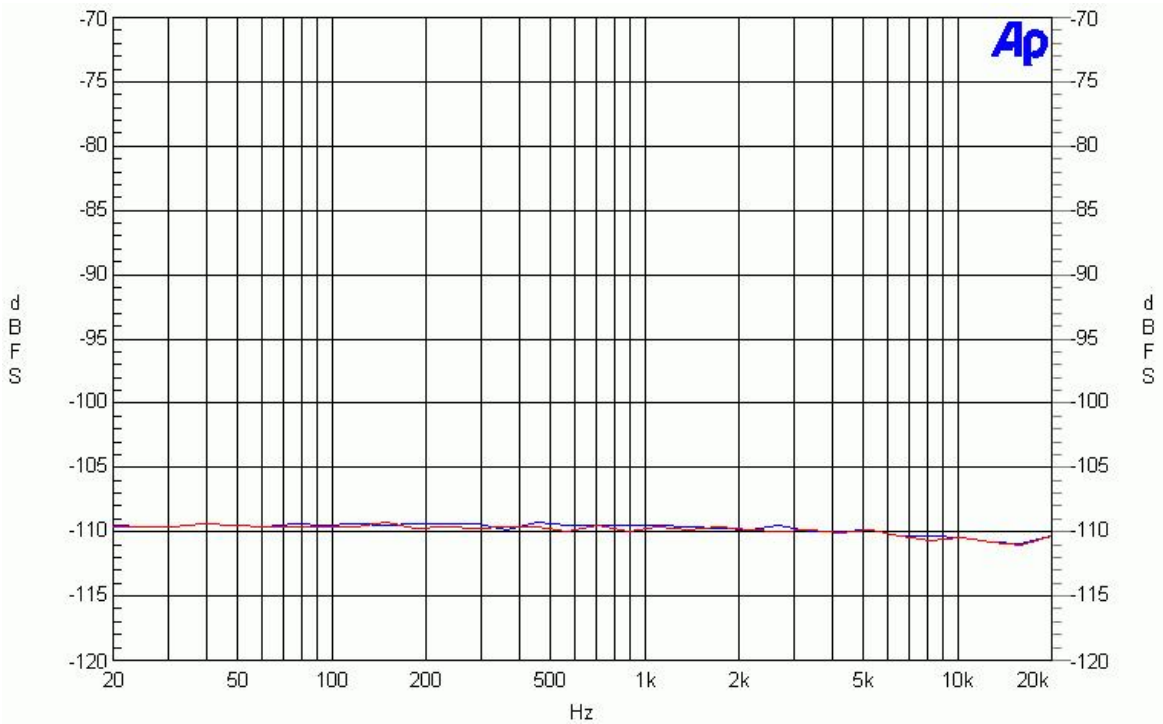
```
Level(1kHz): L=-14.38 dB,  R=-14.44 dB
SNR:  L=75.6 dB,  R=75.6 dB
-- Gain +50.0 dB --
Level(1kHz): L=-9.79 dB,  R=-9.85 dB
SNR:  L=77.0 dB,  R=77.0 dB
-- Equivalent Input Noise at +50 dB: Ch3=-130.0 dBu, Ch4=-130.0 dBu--
 limit: -127 dBu
==============
=== EEPROM ===
==============
Updated Serialnumber = 17510
************************
*** Test Succsessful ***
************************
03-May-2007 16:10:58
```

RM420-123 - Mic/Line/GPIO Module, 4 ch. iso.

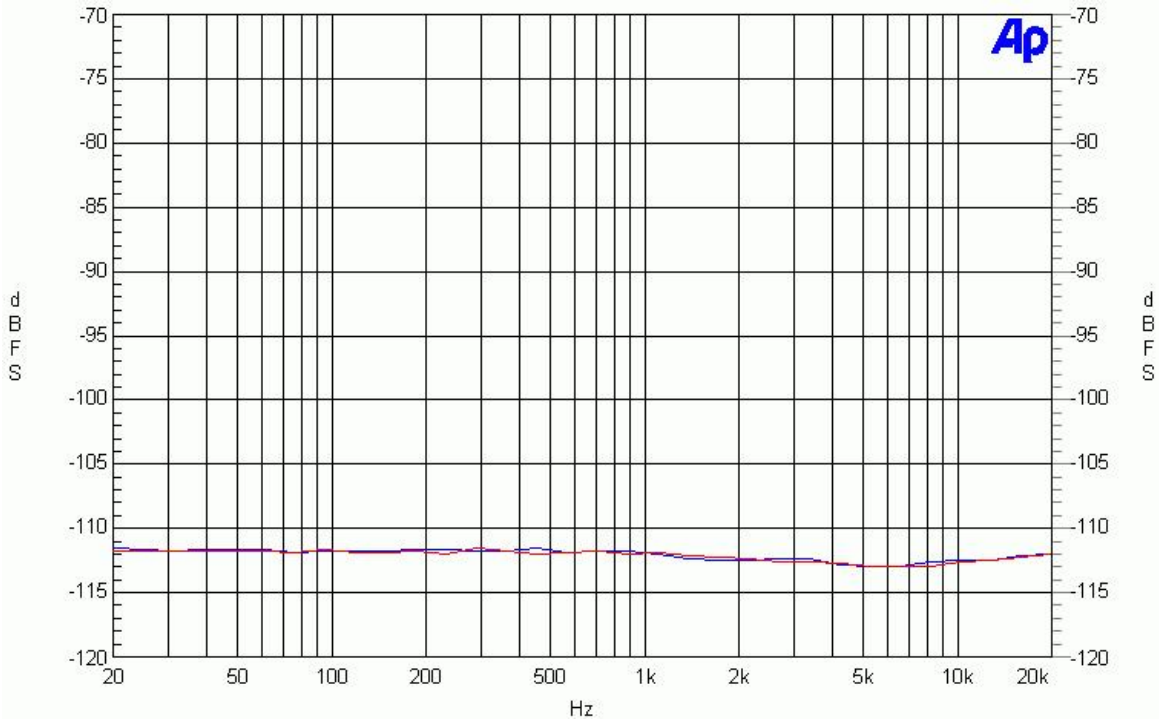
Measurement Plots RM420-123



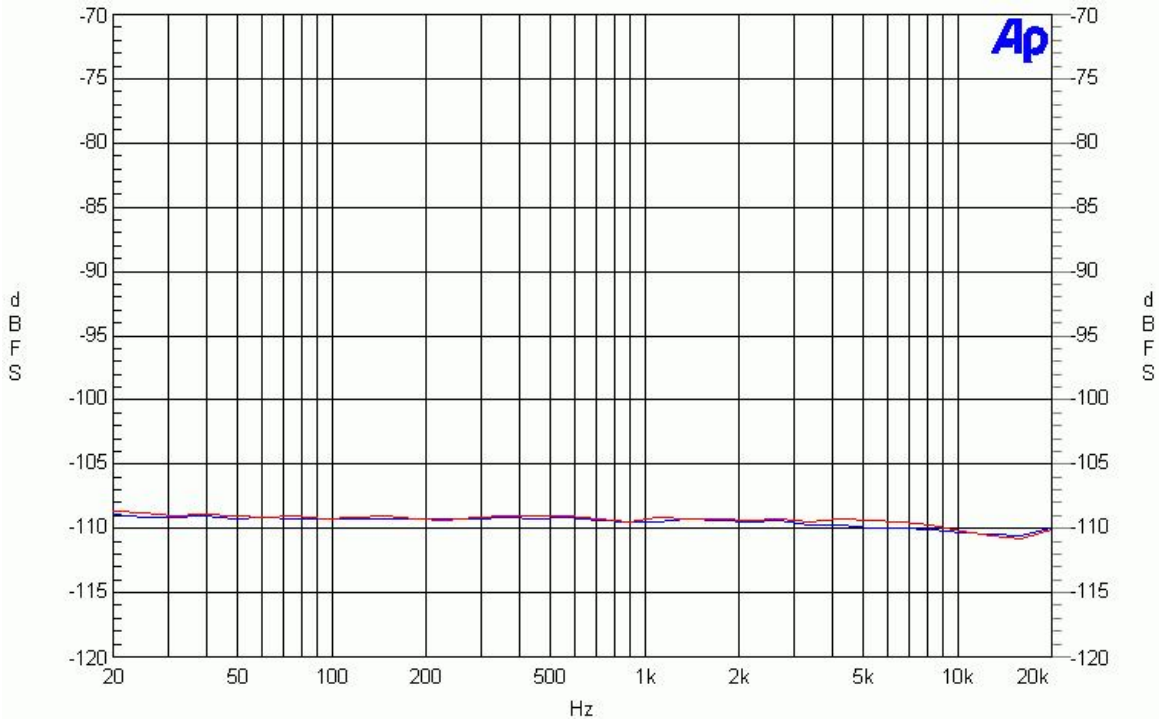
RM420-123 ADC Frequency Response



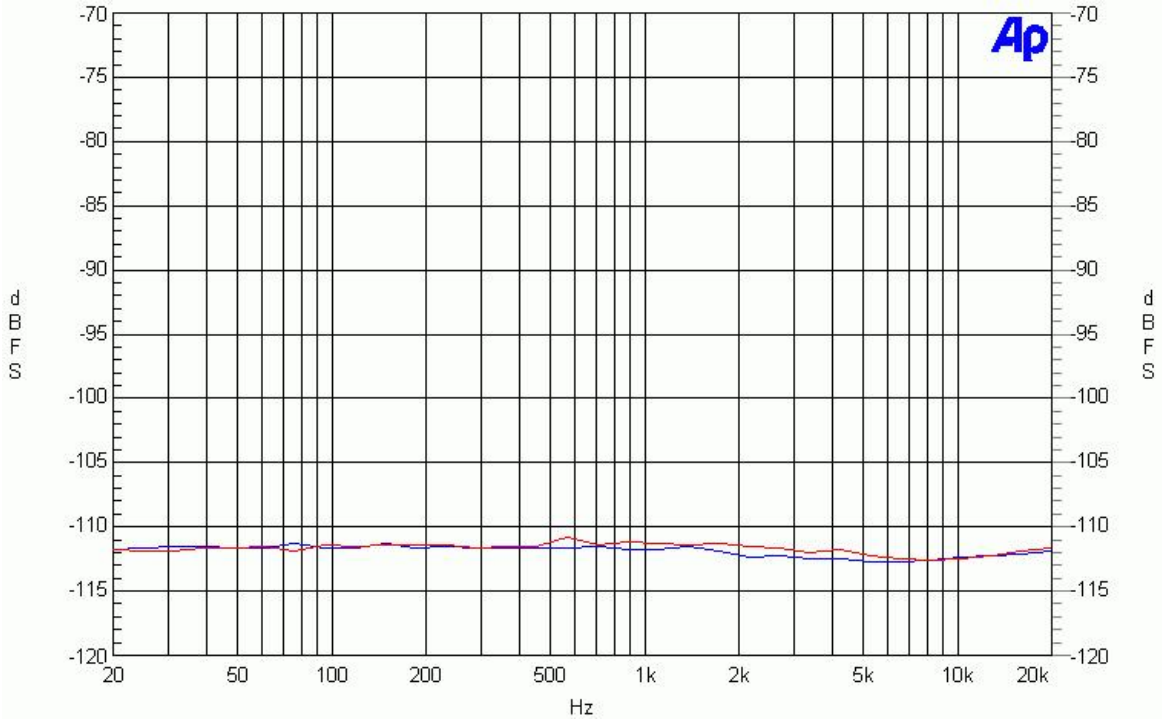
RM420-123 ADC THD+N @ -30 dBFS



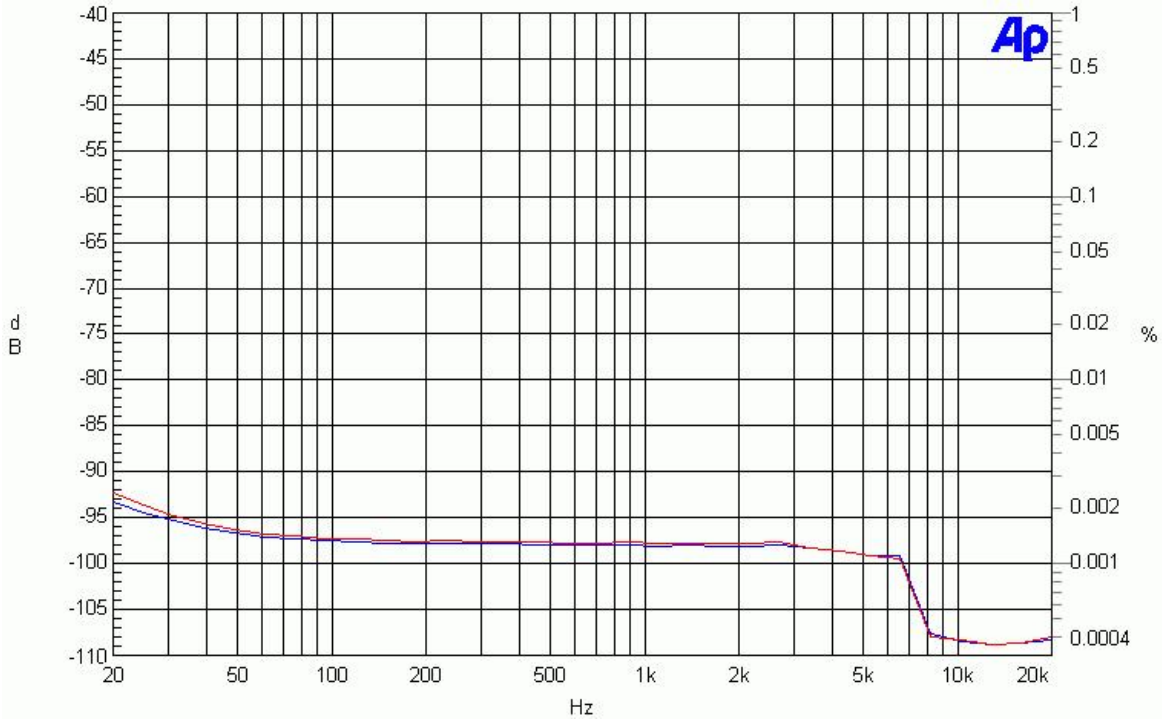
RM420-123 ADC THD+N(A) @ -30 dBFS



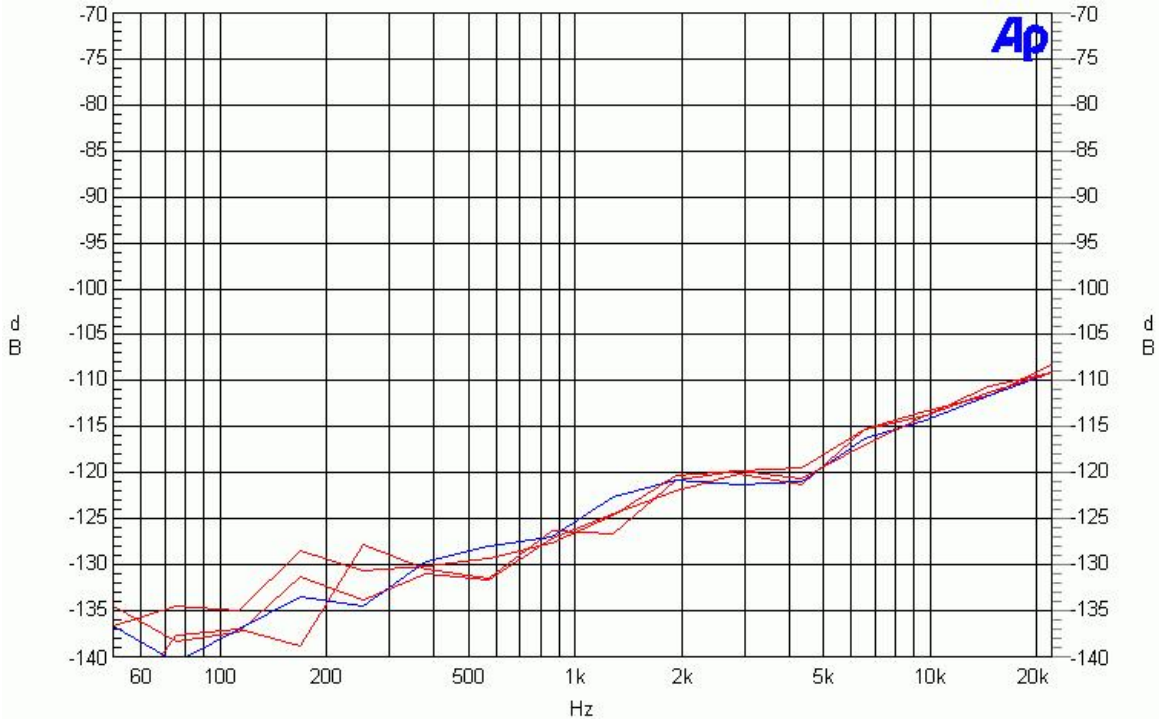
RM420-123 ADC THD+N @ +6 dBu



RM420-123 ADC THD+N(A) @ +6 dBu



RM420-123 ADC THD+N @ +14 dBu



RM420-123 R2 ADC Cross-Talk

Log File Example

After manufacturing all inputs and outputs of every I/O card are measured. Hence, we can make sure that every module, leaving the production hall, is working correctly. During this process a log file is written. This file is saved by DHD for maintenance purposes.

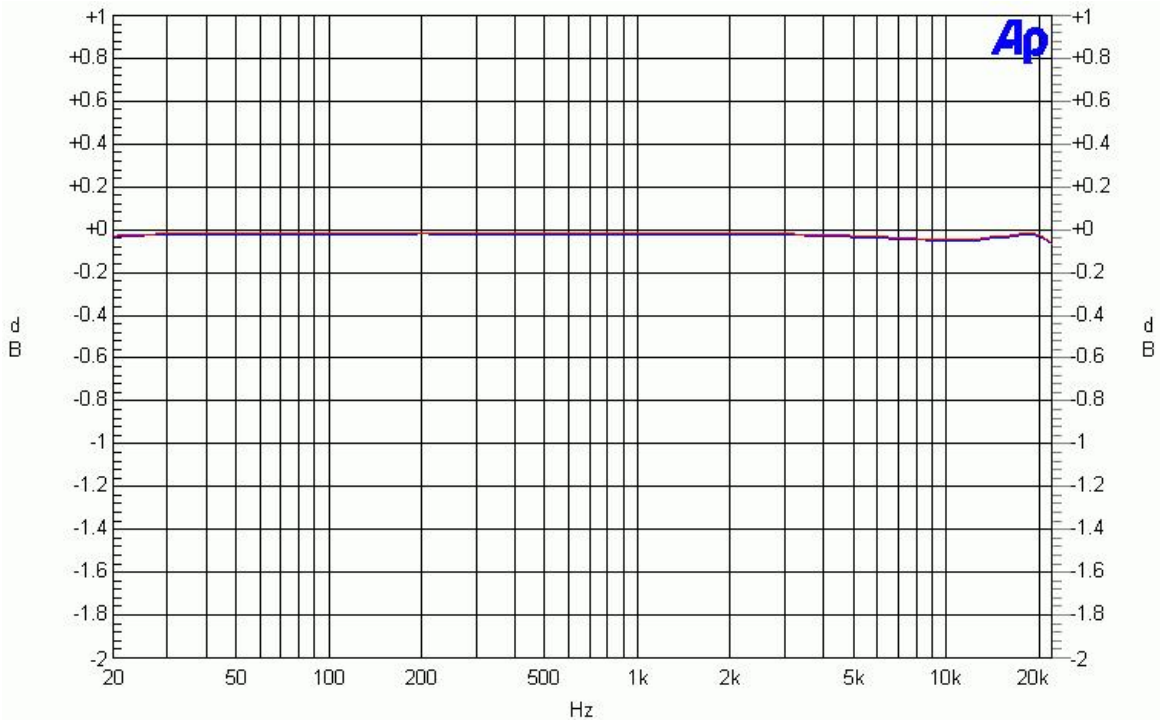
In the following you can find a log file example of an RM420-123 module:

```
03-May-2007 16:42:20
*** Test RM420-123 R2  Production Code 6729 ***
open COM1
=== Voltage VCC3 = 3.3 V ===
=== Voltage VCC1V2 = 1.26 V ===
=== Voltage VCC2V5 = 2.55 V ===
=== Phantom Power Voltage V48 = 54.9 V ===
=== Test GPI1 ===
=== Test GPI2 ===
=== Test GPI3 ===
=== Test GPI4 ===
=== Test GPO1 ===
=== Test GPO2 ===
=== Test GPO3 ===
=== Test GPO4 ===
=== Phantom Power Mic1 A=49.9 V, B=49.9 V  ===
=== Phantom Power Mic2 A=50.1 V, B=49.9 V  ===
=== Phantom Power Mic3 A=49.9 V, B=49.9 V  ===
=== Phantom Power Mic4 A=49.9 V, B=49.9 V  ===
====================
=== Test A/D 1-2 ===
====================
-- Level 0dB --
 frequency response limit: -0.15 dB .. 0.1 dB
 multitone distortions and noise limit: -90 dBFS
Level(1kHz): L=-0.41 dB,  R=-0.25 dB
Polarity: (+)
Group Delay: L=64.3,  R=64.3 Samples
SNR:  L=78.9 dB,  R=75.4 dB
!!! SNR Fehler (Limit  79.0 dB)
-- Level 0dB --
 frequency response limit: -0.15 dB .. 0.1 dB
 multitone distortions and noise limit: -90 dBFS
Level(1kHz): L=-0.41 dB,  R=-0.25 dB
Polarity: (+)
Group Delay: L=64.3,  R=64.3 Samples
SNR:  L=83.8 dB,  R=81.8 dB
-- Level +5dB --
 frequency response limit: -0.15 dB .. 0.1 dB
 multitone distortions and noise limit: -90 dBFS
Level(1kHz): L=4.88 dB,  R=4.99 dB
Polarity: (+)
Group Delay: L=64.3,  R=64.3 Samples
SNR:  L=86.9 dB,  R=87.3 dB
-- Dynamic -60dB --
Level(1kHz): L=-60.41 dB,  R=-60.23 dB
SNR:  L=40.6 dB,  R=40.7 dB
Input Dynamic:  L=111.5 dB,  R=111.6 dB
 limit: 109 dB
-- Input Balance --
CMR @ 1kHz:  L=103.1 dB,  R=104.8 dB
 limit: 60 dB
====================
=== Test A/D 3-4 ===
====================
-- Level 0dB --
 frequency response limit: -0.15 dB .. 0.1 dB
 multitone distortions and noise limit: -90 dBFS
Level(1kHz): L=-0.52 dB,  R=-0.63 dB
Polarity: (+)
Group Delay: L=64.4,  R=64.4 Samples
SNR:  L=76.9 dB,  R=78.7 dB
!!! SNR Fehler (Limit  79.0 dB)
-- Level 0dB --
 frequency response limit: -0.15 dB .. 0.1 dB
 multitone distortions and noise limit: -90 dBFS
Level(1kHz): L=-0.52 dB,  R=-0.63 dB
Polarity: (+)
Group Delay: L=64.4,  R=64.4 Samples
SNR:  L=86.6 dB,  R=87.5 dB
```

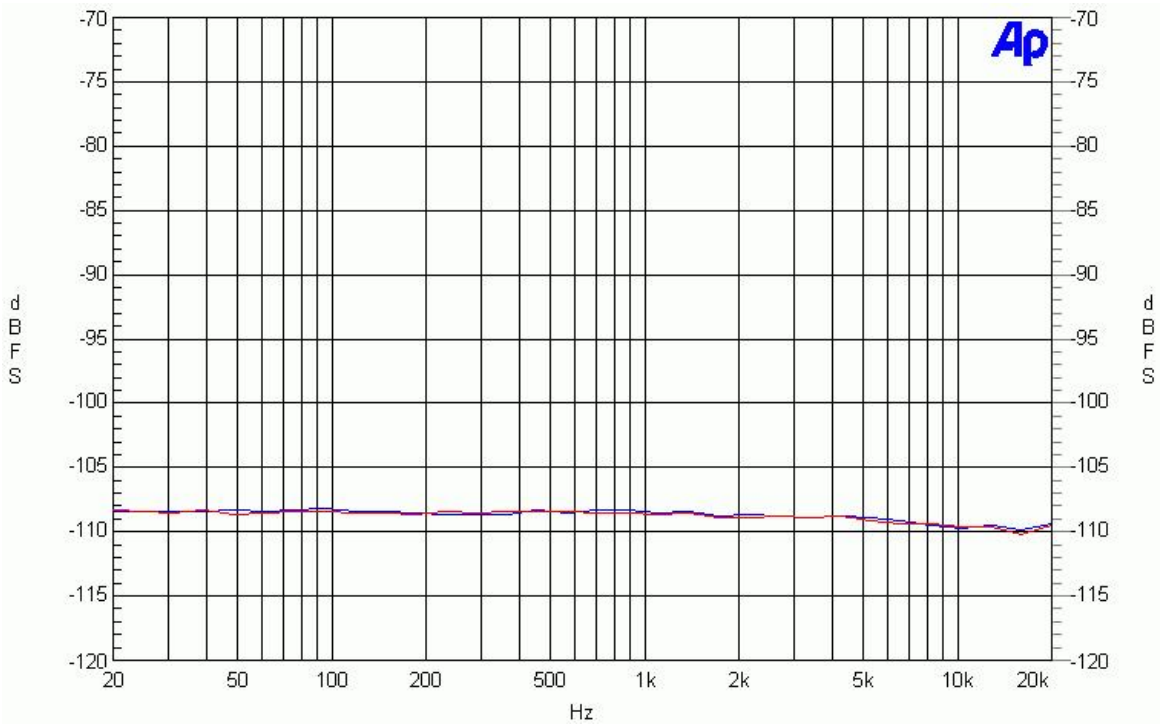
```
-- Level +5dB --
 frequency response limit: -0.15 dB .. 0.1 dB
 multitone distortions and noise limit: -90 dBFS
Level(1kHz): L=4.77 dB,  R=4.66 dB
Polarity: (+)
Group Delay: L=64.4,  R=64.4 Samples
SNR:  L=86.0 dB,  R=86.0 dB
-- Dynamic -60dB --
Level(1kHz): L=-60.50 dB,  R=-60.64 dB
SNR:  L=40.6 dB,  R=40.6 dB
Input Dynamic:  L=111.6 dB,  R=111.6 dB
 limit: 109 dB
-- Input Balance --
CMR @ 1kHz:  L=103.6 dB,  R=105.7 dB
 limit: 60 dB
==================================
=== Test Mic +60dB Gain A/D 1-2 ===
==================================
Level(1kHz): L=0.26 dB,  R=0.41 dB
Polarity: (+)
Group Delay: L=64.3,  R=64.3 Samples
SNR:  L=73.0 dB,  R=75.2 dB
!!! SNR Fehler (Limit  74.0 dB)
Level(1kHz): L=0.26 dB,  R=0.41 dB
Polarity: (+)
Group Delay: L=64.3,  R=64.3 Samples
SNR:  L=75.6 dB,  R=75.5 dB
-- Equivalent Input Noise at +60 dB: Ch1=-128.6 dBu, Ch2=-128.5 dBu--
 limit: -127 dBu
==================================
=== Test Mic +60dB Gain A/D 3-4 ===
==================================
Level(1kHz): L=0.18 dB,  R=0.04 dB
Polarity: (+)
Group Delay: L=64.4,  R=64.4 Samples
SNR:  L=75.6 dB,  R=75.6 dB
-- Equivalent Input Noise at +60 dB: Ch3=-128.6 dBu, Ch4=-128.6 dBu--
 limit: -127 dBu
==============
=== EEPROM ===
==============
Updated Serialnumber = 16179
************************
*** Test Succsessful ***
************************
03-May-2007 16:43:00
```

RM420-222 - Analog In/Out/GPIO Module, 4 ch.

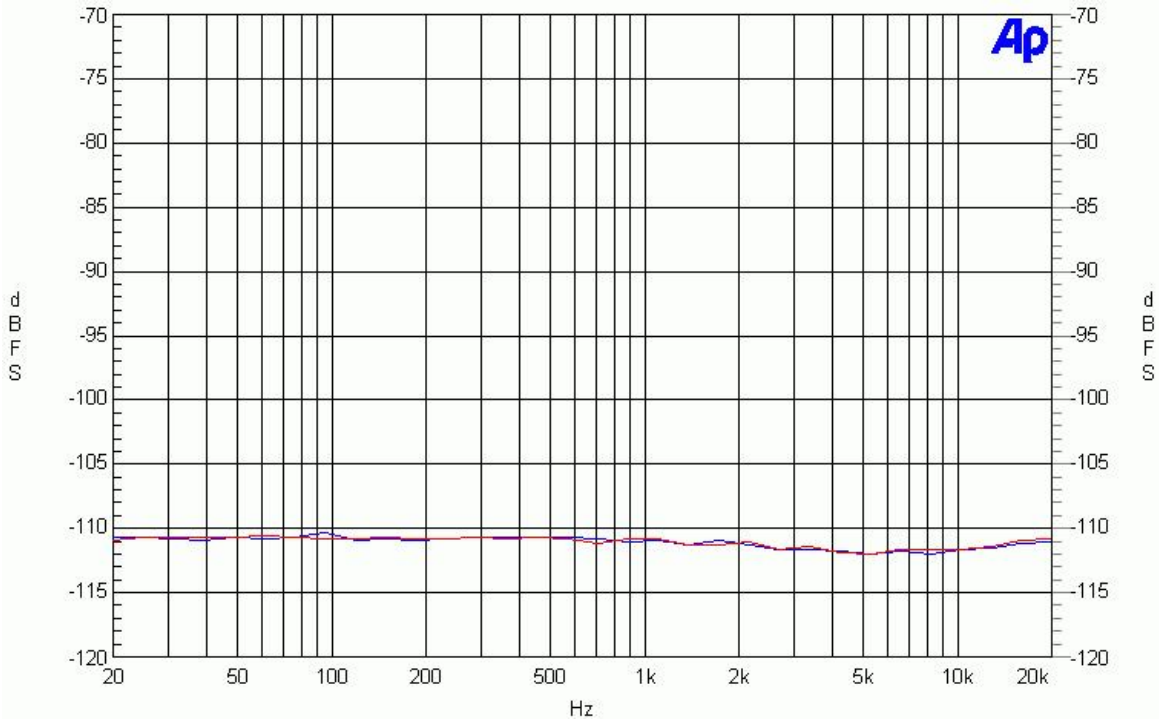
Measurement Plots RM420-222 Inputs



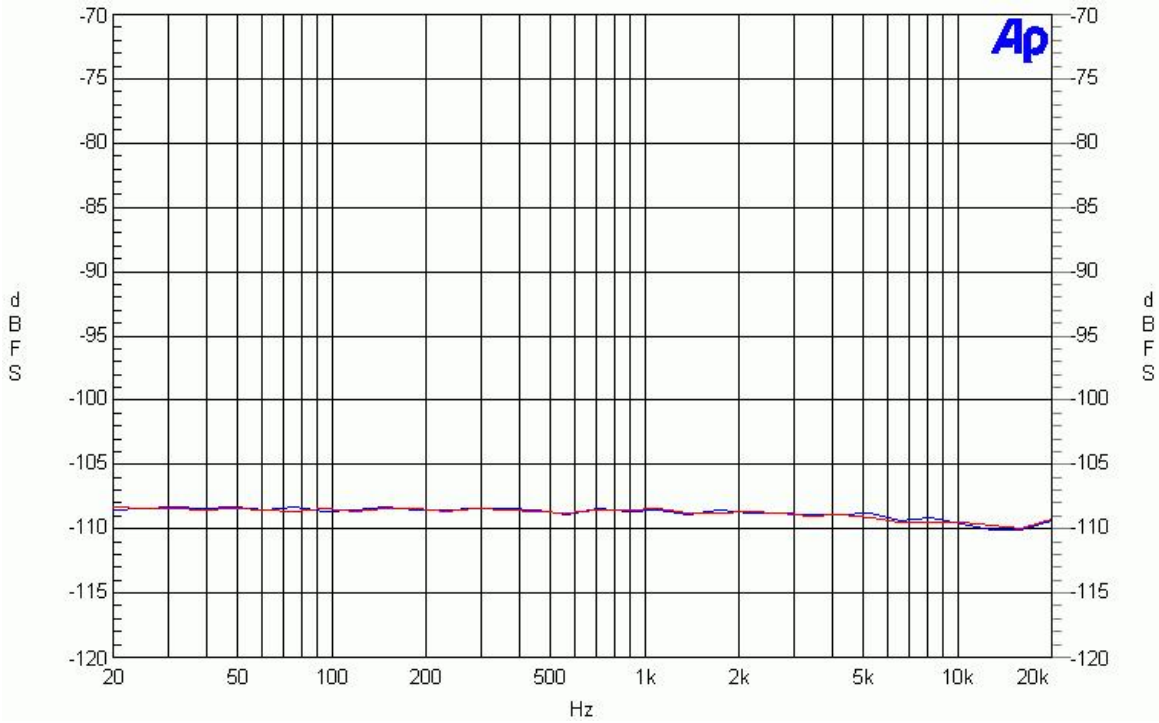
RM420-222 ADC Frequency Response



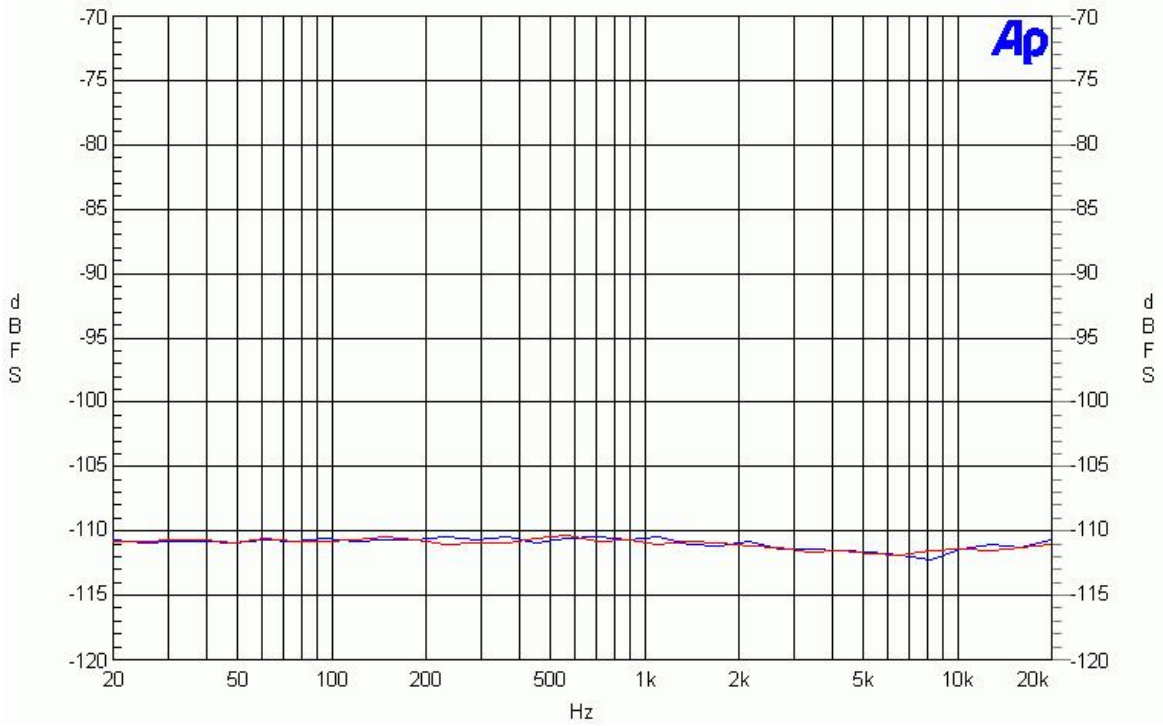
RM420-222 ADC THD+N @ -30 dBFS



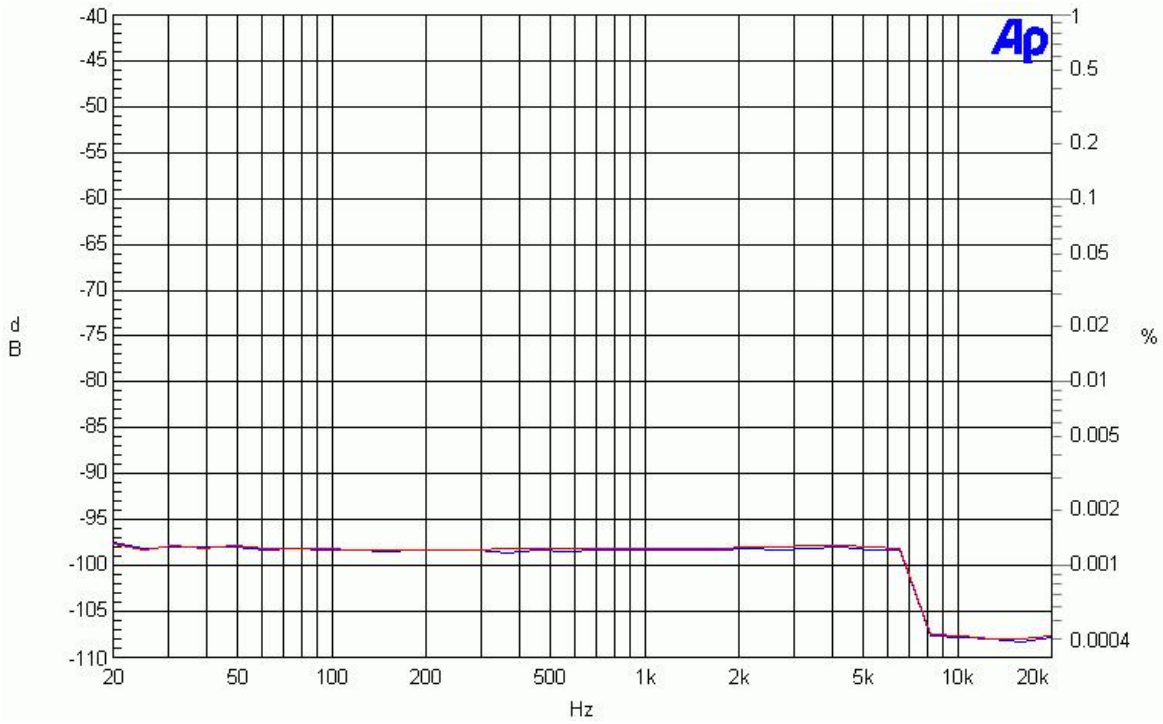
RM420-222 ADC THD+N(A) @ -30 dBFS



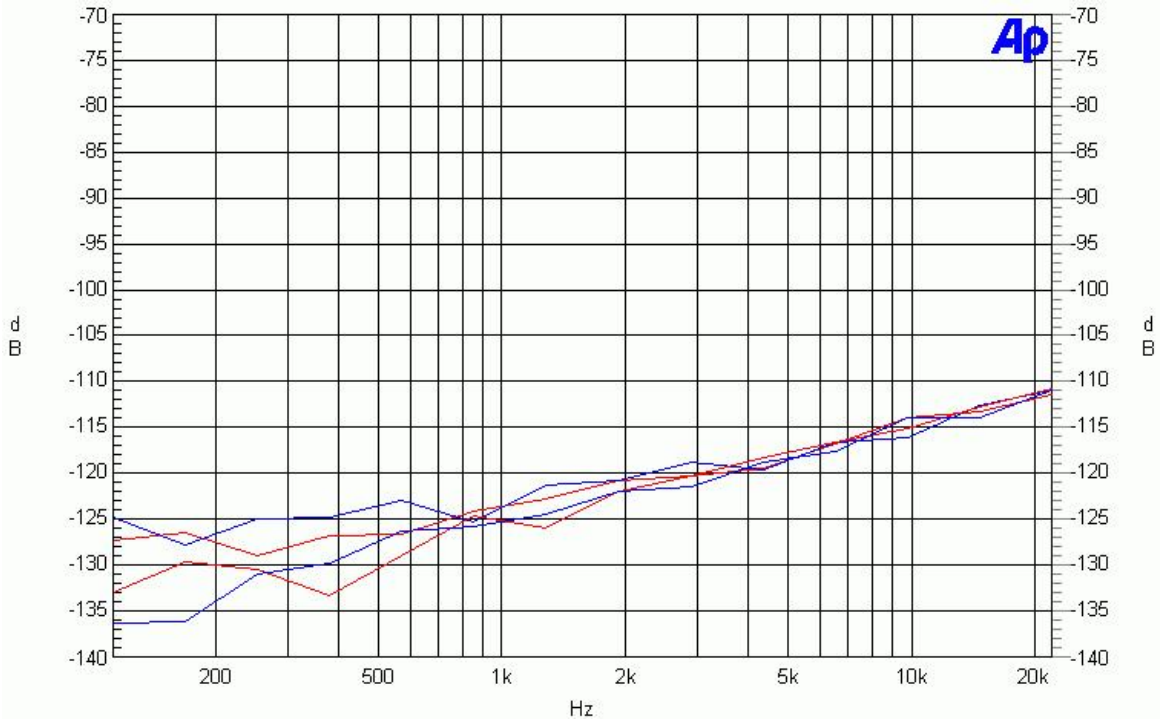
RM420-222 ADC THD+N @ +6 dBu



RM420-222 ADC THD+N(A) @ +6 dBu

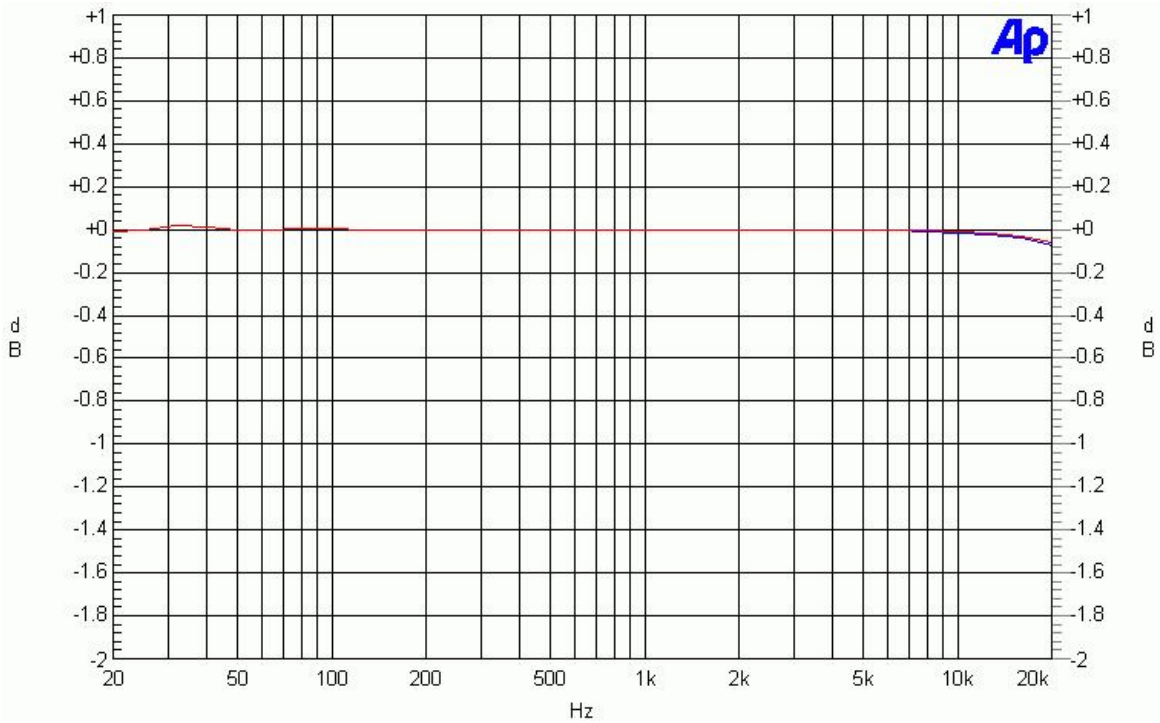


RM420-222 ADC THD+N @ +14 dBu

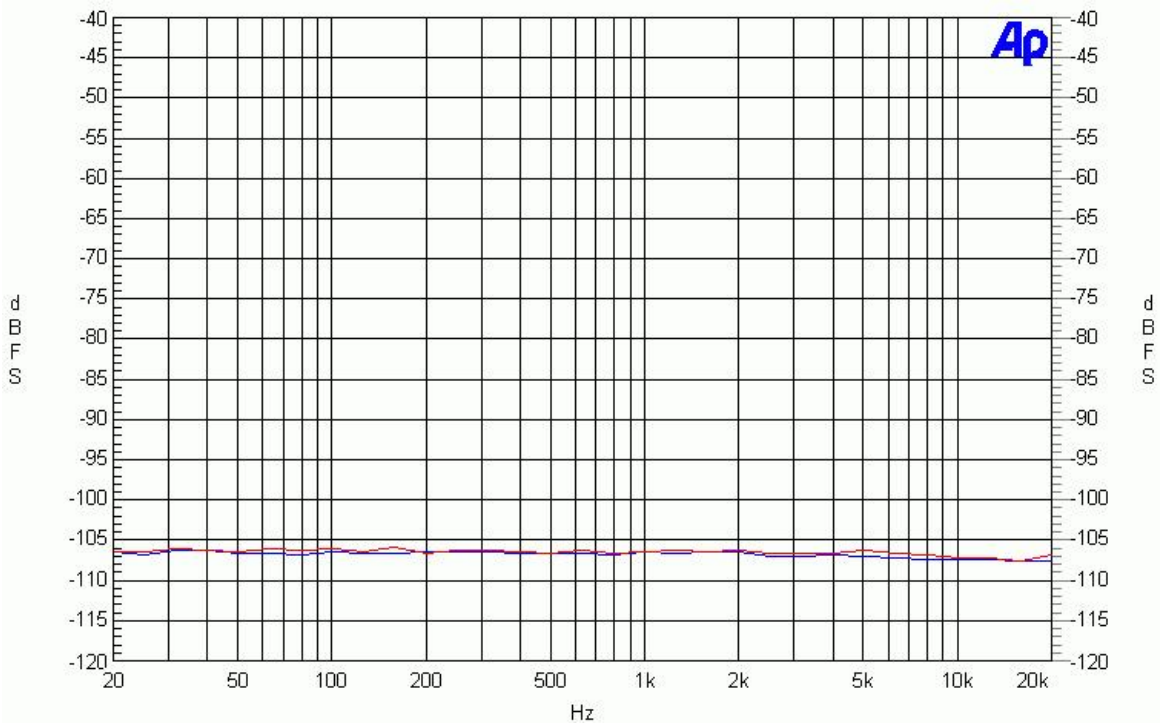


RM420-222 ADC Cross-Talk

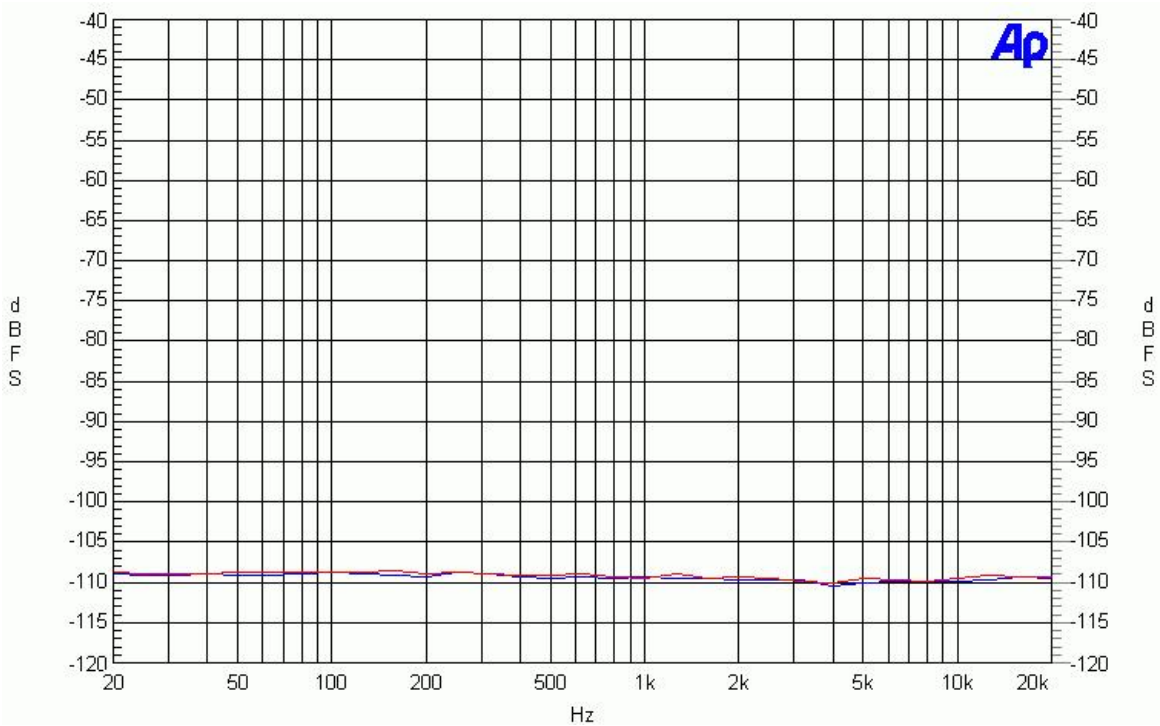
Measurement Plots RM420-222 Outputs



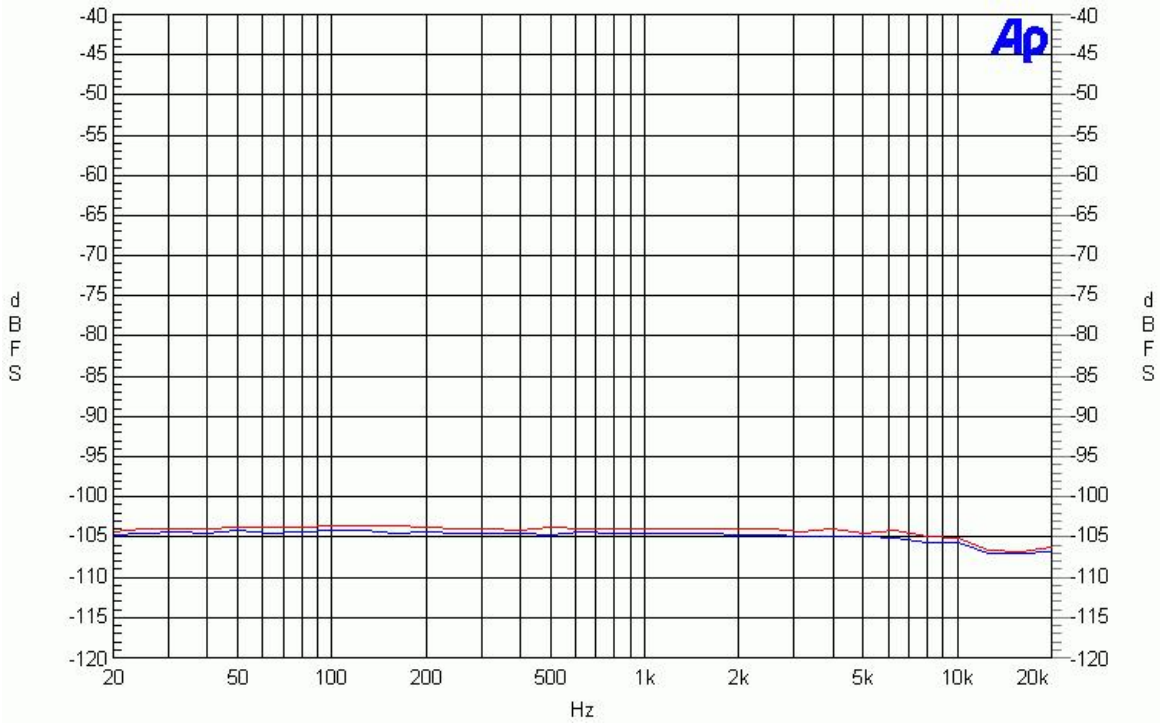
RM420-222 DAC Frequency Response



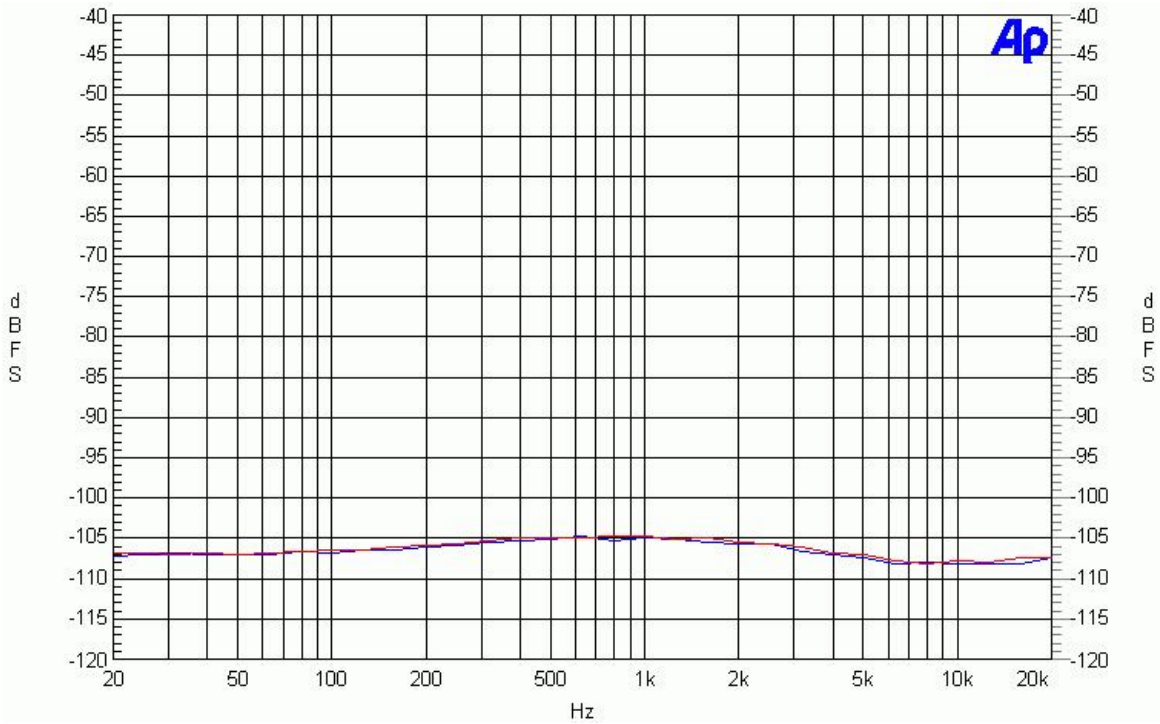
RM420-222 DAC THD+N @ -30 dBFS



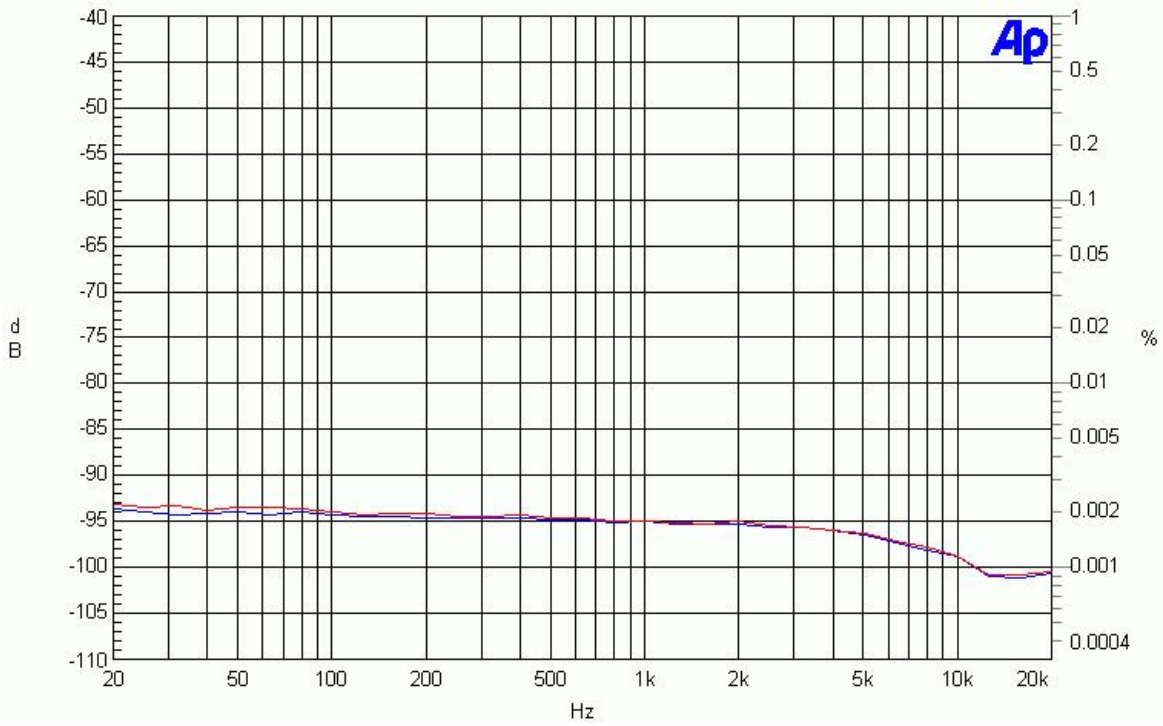
RM420-222 DAC THD+N(A) @ -30 dBFS



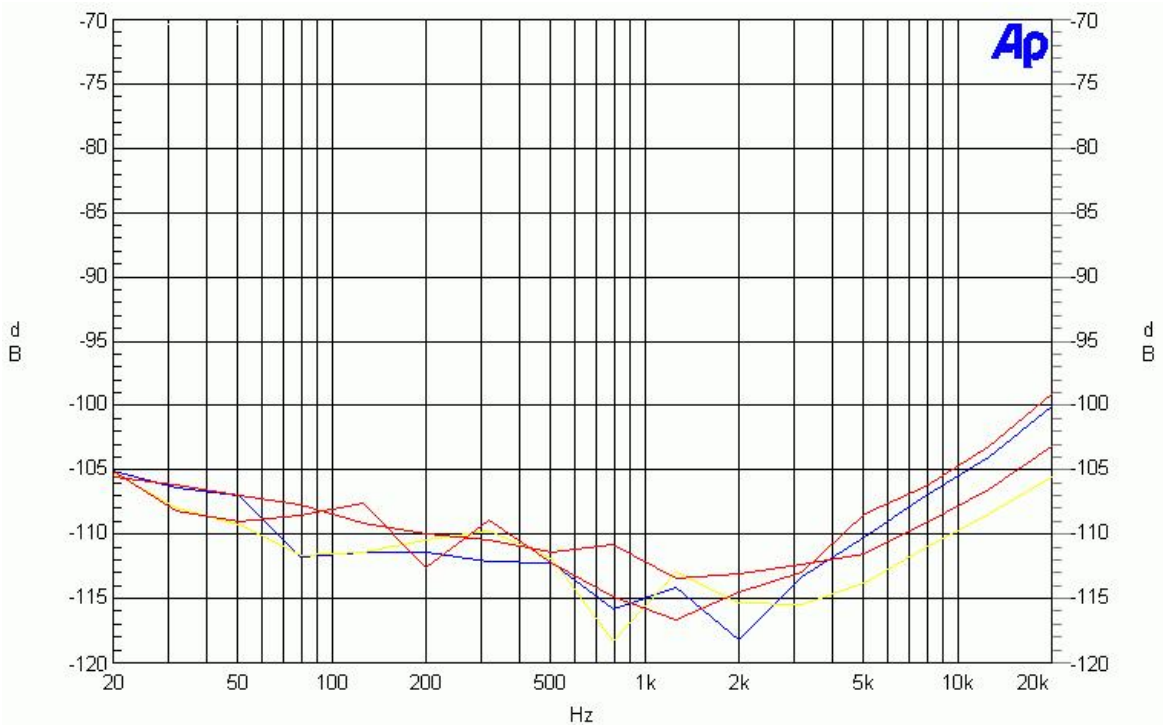
RM420-222 DAC THD+N @ +6 dBu



RM420-222 DAC THD+N(A) @ +6 dBu



RM420-222 R7 THD+N @ +14 dBu



RM420-222 DAC Cross-Talk

Log File Example

After manufacturing all inputs and outputs of every I/O card are measured. Hence, we can make sure that every module, leaving the production hall, is working correctly. During this process a log file is written. This file is saved by DHD for maintenance purposes.

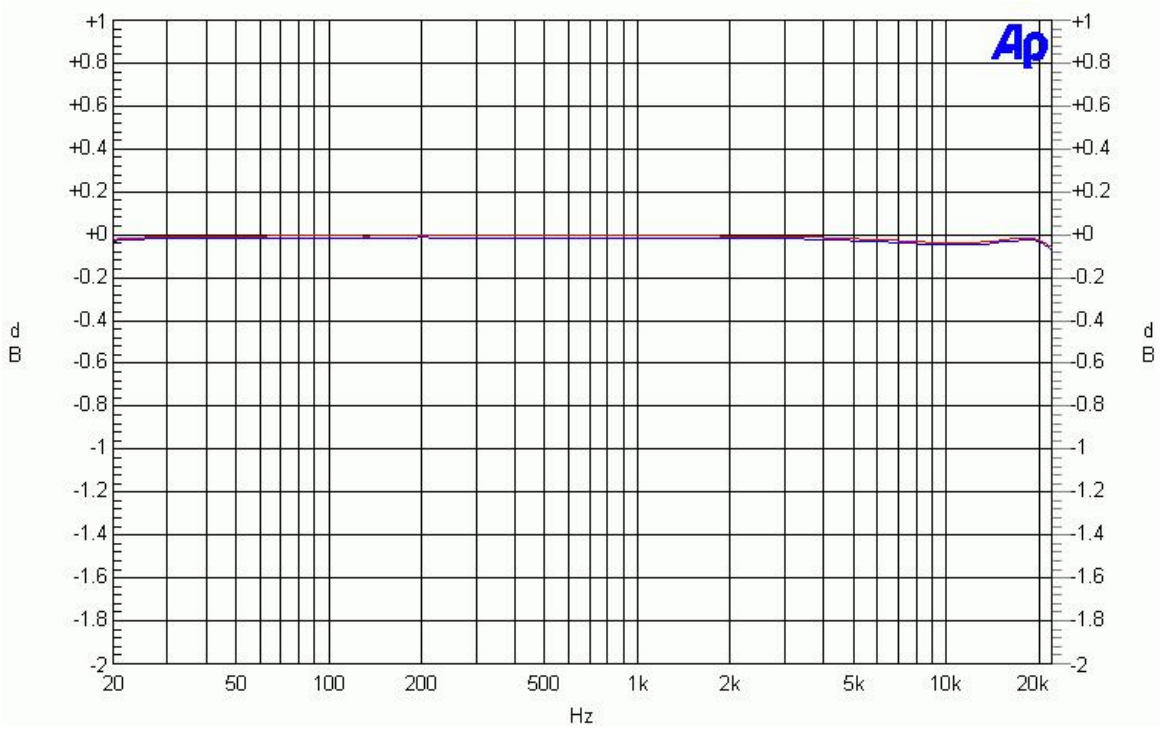
In the following you can find a log file example of an RM420-222 module:

```
03-May-2007 15:37:21
*** Test RM420-222 R7  Production Code 7324 ***
open COM1
=== Test GPO1 ===
=== Test GPO2 ===
=== Test GPO3 ===
=== Test GPO4 ===
=== Test GPI1 ===
=== Test GPI2 ===
=== Test GPI3 ===
=== Test GPI4 ===
=== Voltage VCC2+ = 9.7 V ===
=== Voltage VCC2- = -9.5 V ===
=== Voltage VCC3 = 3.3 V ===
====================
=== Test A/D 1-2 ===
====================
-- Level 0dB --
 frequency response limit: -0.5 dB .. 0.1 dB
 multitone distortions and noise limit: -90 dBFS
Level(1kHz): L=-0.31 dB,  R=-0.31 dB
Polarity: (+)
Group Delay: L=63.3,  R=63.3 Samples
SNR:  L=88.6 dB,  R=88.7 dB
-- Dynamic -60dB --
Level(1kHz): L=-60.31 dB,  R=-60.29 dB
SNR:  L=39.7 dB,  R=39.7 dB
Input Dynamic:  L=110.7 dB,  R=110.7 dB
 limit: 108 dB
-- Input Balance --
CMR:  L=67.2 dB,  R=67.4 dB
 limit: 56 dB
====================
=== Test A/D 3-4 ===
====================
-- Level 0dB --
 frequency response limit: -0.5 dB .. 0.1 dB
 multitone distortions and noise limit: -90 dBFS
Level(1kHz): L=-0.29 dB,  R=-0.31 dB
Polarity: (+)
Group Delay: L=63.3,  R=63.3 Samples
SNR:  L=89.1 dB,  R=89.3 dB
-- Dynamic -60dB --
Level(1kHz): L=-60.27 dB,  R=-60.31 dB
SNR:  L=39.7 dB,  R=39.6 dB
Input Dynamic:  L=110.7 dB,  R=110.5 dB
 limit: 108 dB
-- Input Balance --
CMR:  L=70.4 dB,  R=65.8 dB
 limit: 56 dB
====================
=== Test D/A 1-2 ===
====================
-- Input Level 0dB --
 frequency response limit: -0.5 dB .. 0.1 dB
 multitone distortions and noise limit: -88 dBFS
Level(1kHz): L=0.12 dB,  R=0.19 dB
Polarity: (+)
Group Delay: L=83.4,  R=83.4 Samples
SNR:  L=87.4 dB,  R=87.3 dB
-- Dynamic +20dB Gain --
Level(1kHz): L=20.16 dB,  R=20.19 dB
SNR:  L=76.4 dB,  R=76.6 dB
Output Dynamic:  L=107.4 dB,  R=107.6 dB
 limit: 106 dB
-- Output Balance --
CMR:  L=58.0 dB,  R=66.7 dB
 limit: 40 dB
====================
=== Test D/A 3-4 ===
```

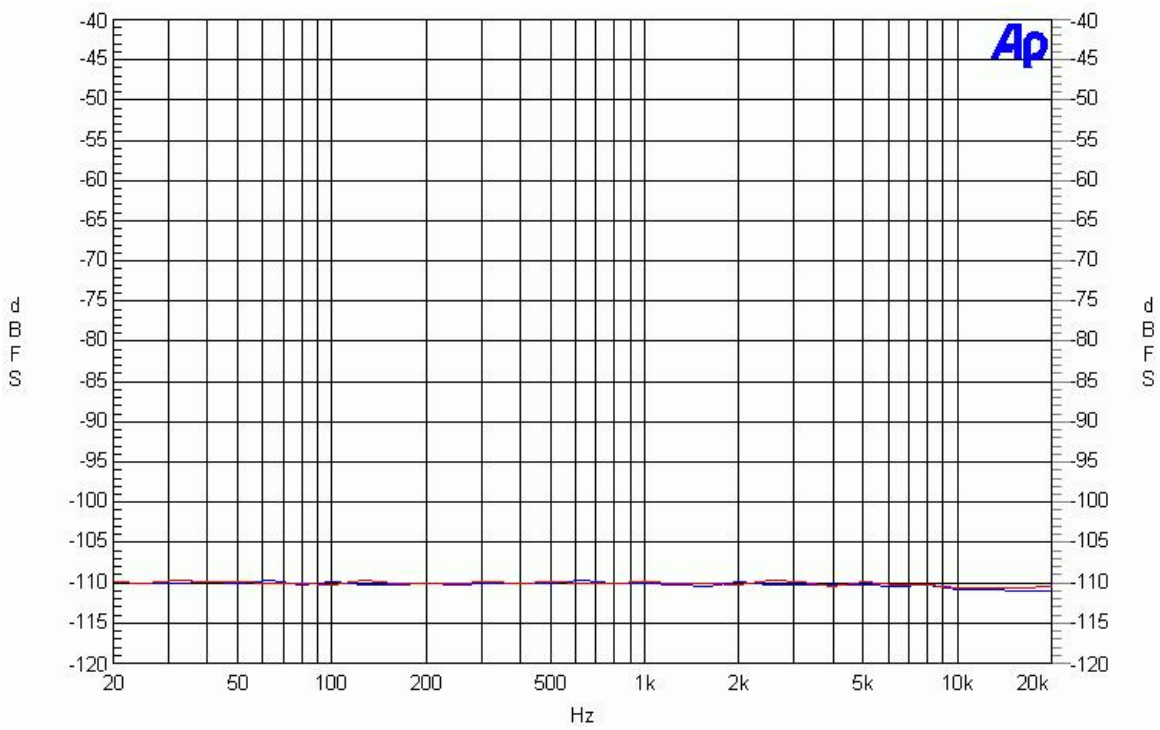
```
====================
-- Input Level 0dB --
 frequency response limit: -0.5 dB .. 0.1 dB
 multitone distortions and noise limit: -88 dBFS
Level(1kHz): L=0.22 dB,  R=0.18 dB
Polarity: (+)
Group Delay: L=83.4,  R=83.4 Samples
SNR:  L=87.2 dB,  R=88.1 dB
-- Dynamic +20dB Gain --
Level(1kHz): L=20.23 dB,  R=20.21 dB
SNR:  L=77.0 dB,  R=76.8 dB
Output Dynamic:  L=108.0 dB,  R=107.7 dB
 limit: 106 dB
-- Output Balance --
CMR:  L=56.6 dB,  R=73.3 dB
 limit: 40 dB
==============
=== EEPROM ===
==============
Updated Serialnumber = 17672
************************
*** Test Succsessful ***
************************
03-May-2007 15:37:51
```

RM420-223 - Analog In/Out/GPIO Module, 4 ch.

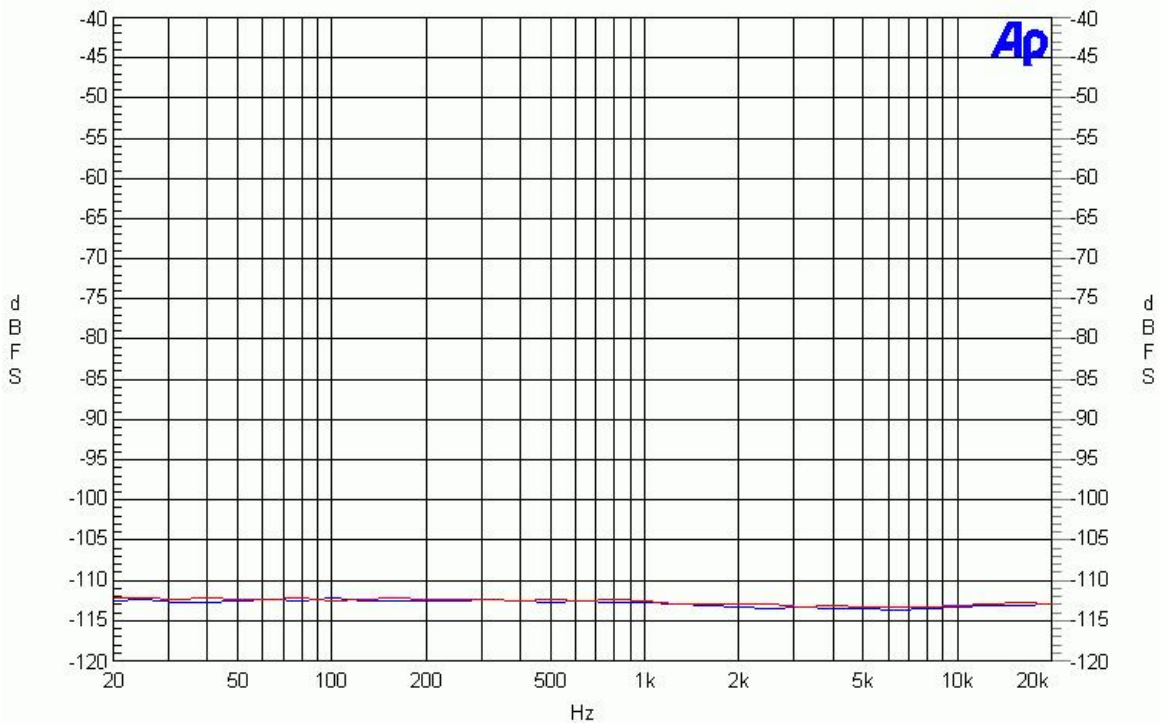
Measurement Plots RM420-223 Inputs



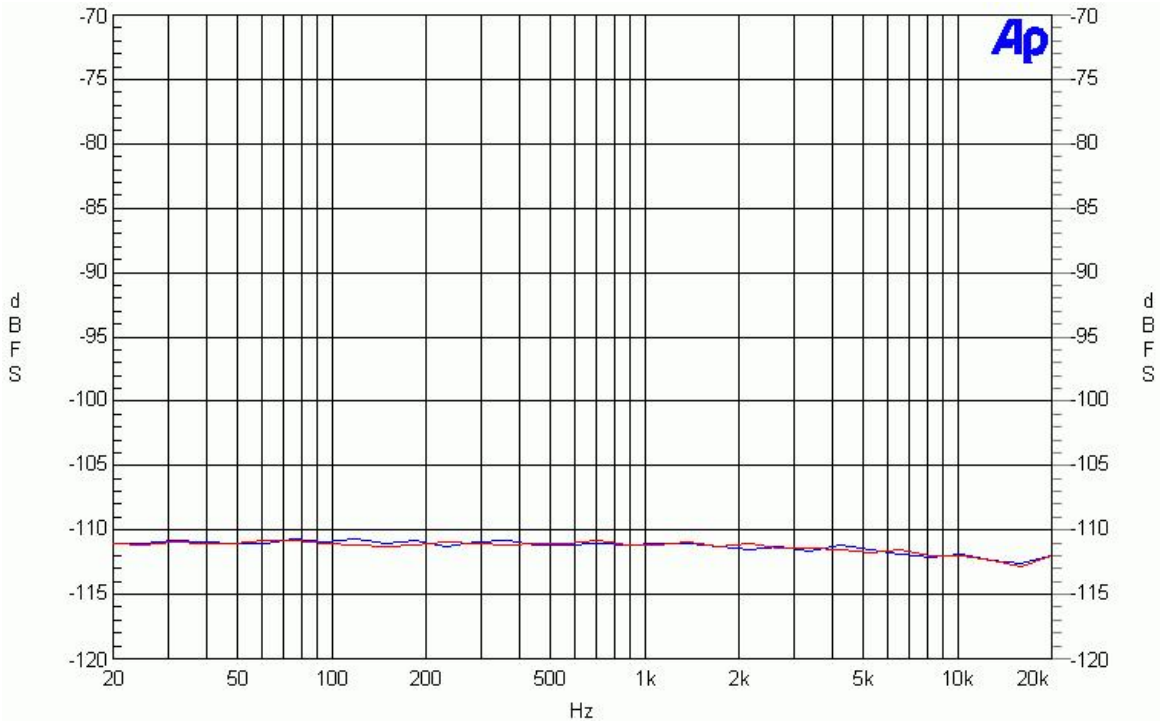
RM420-223 ADC Frequency Response



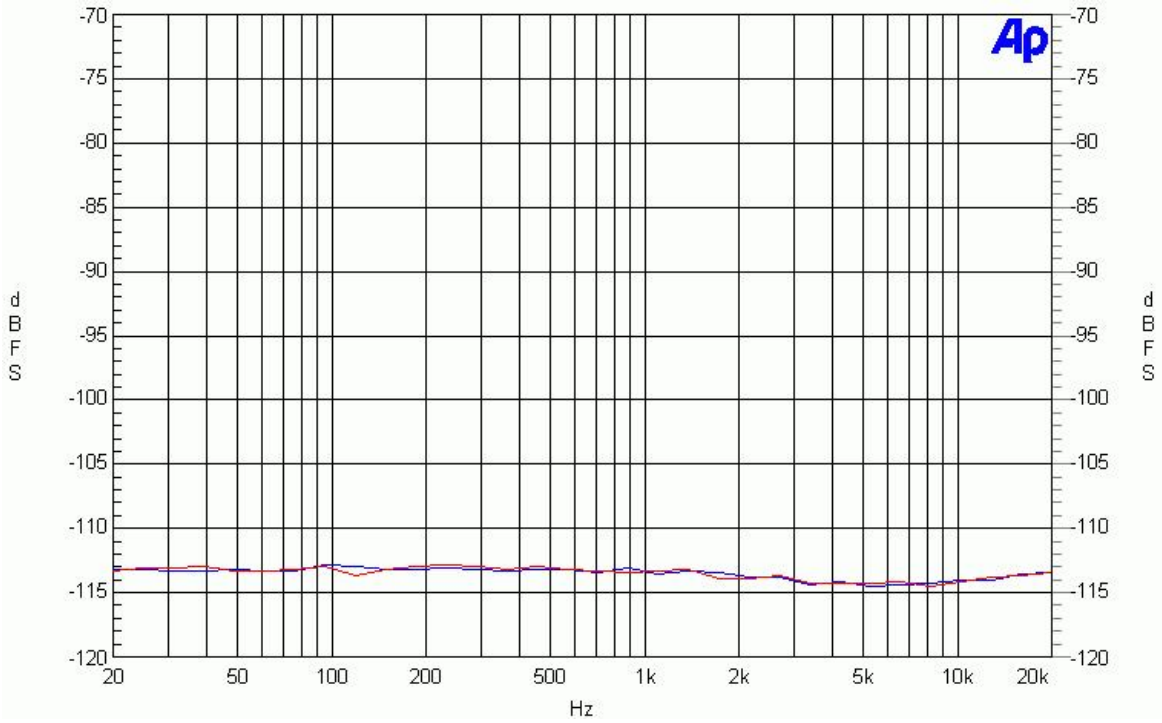
RM420-223 ADC THD+N @ -30 dBFS



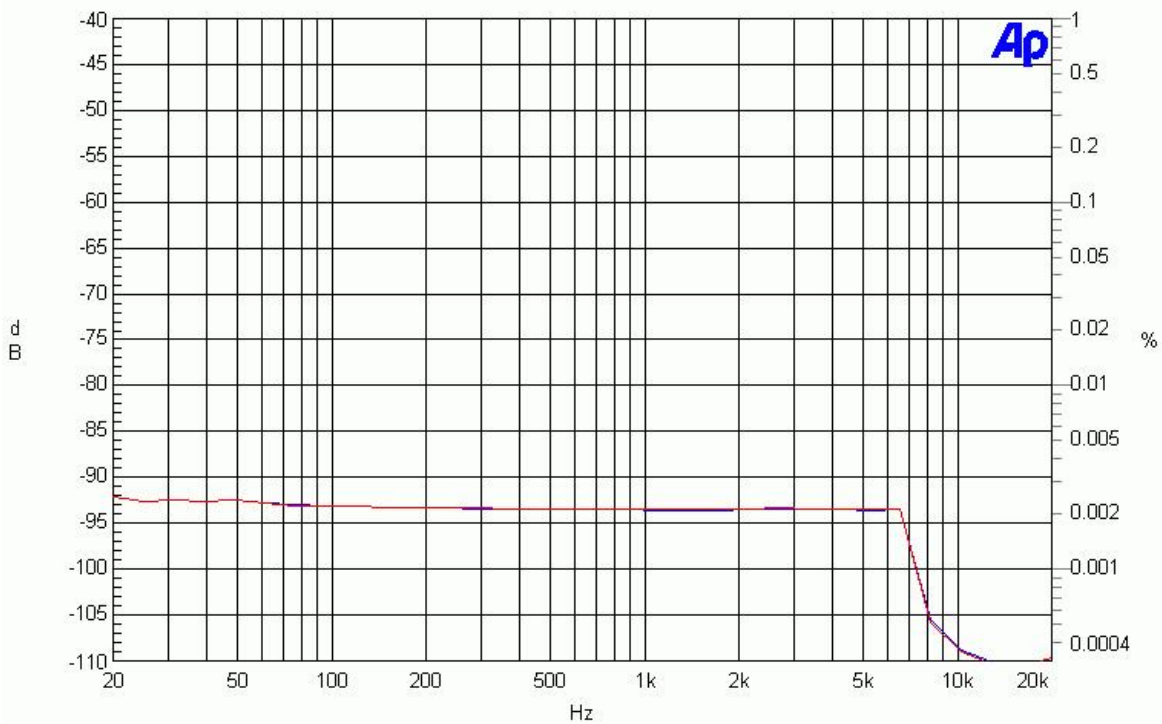
RM420-223 ADC THD+N(A) @ -30 dBFS



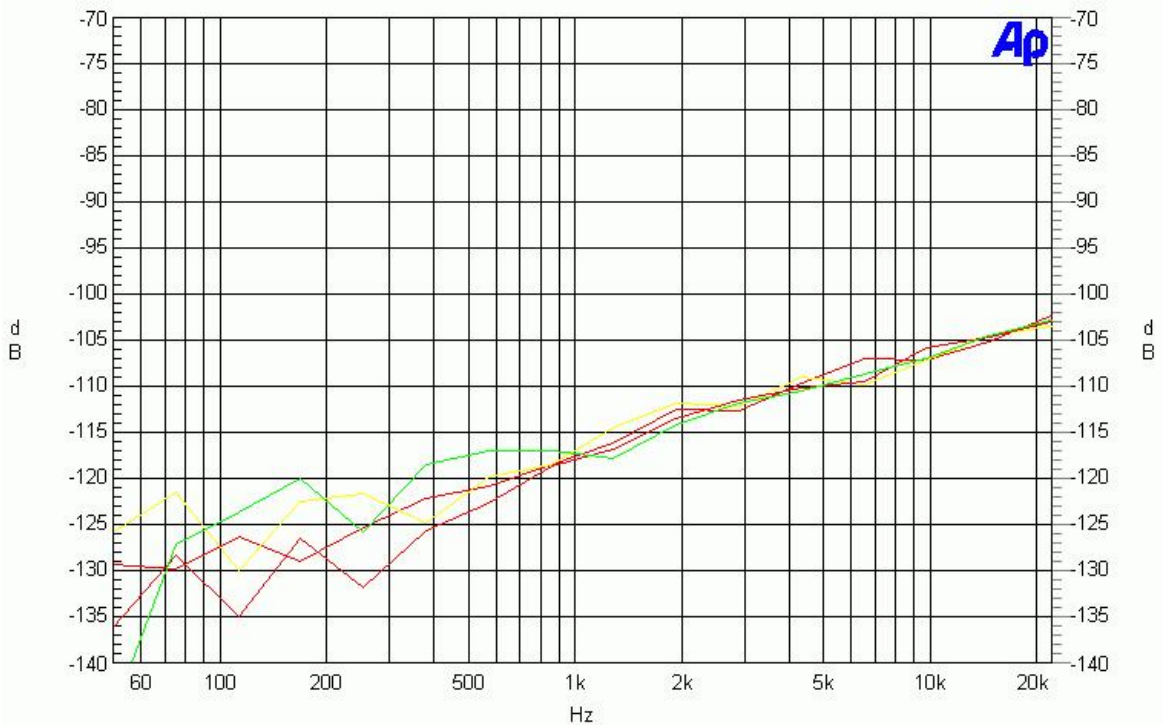
RM420-223 ADC THD+N @ +4 dBu



RM420-223 ADC THD+N(A) @ +4 dBu

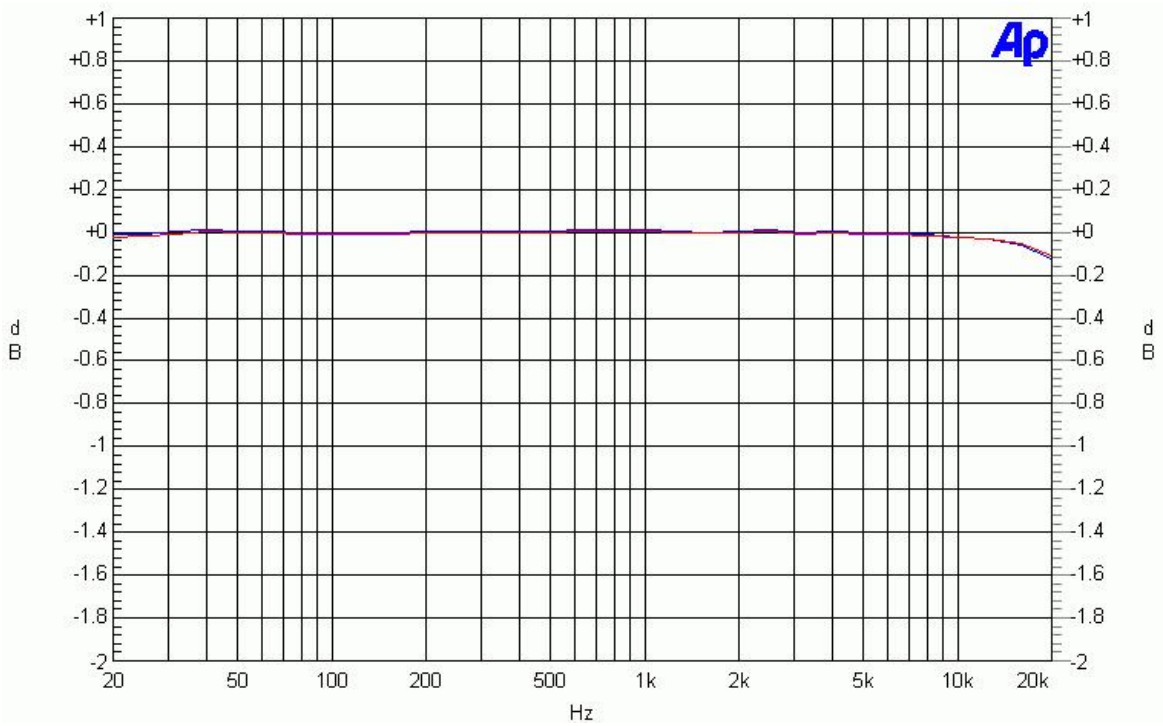


RM420-223 ADC THD+N @ +23 dBu

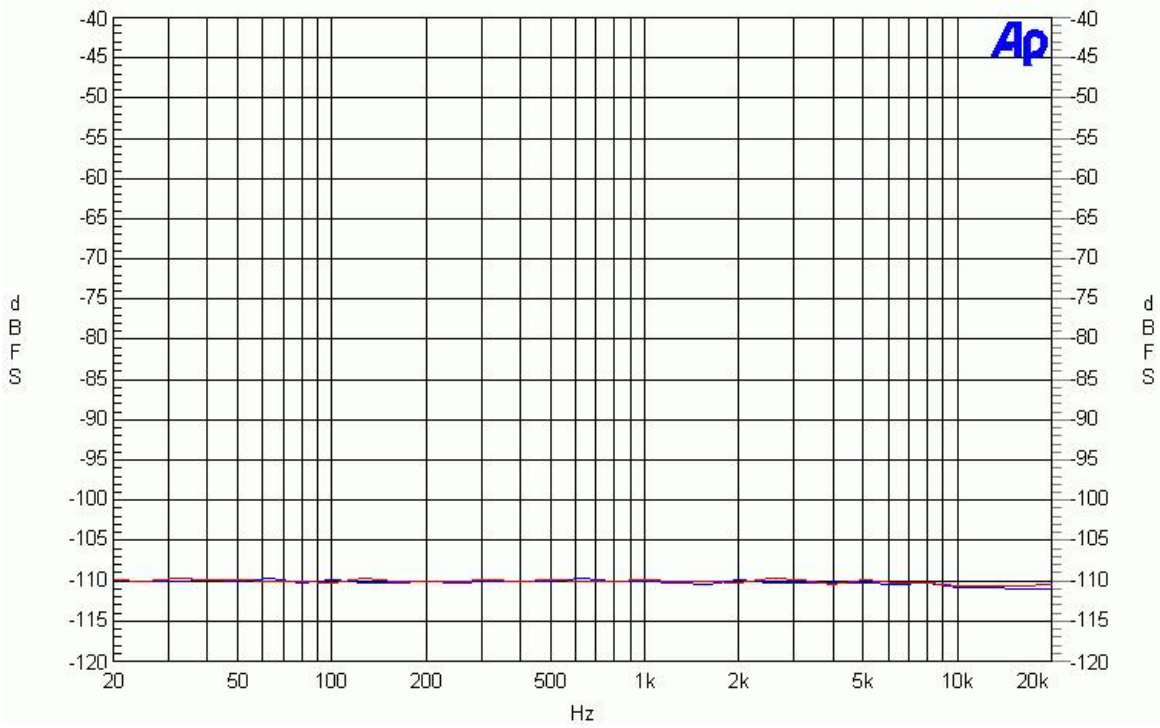


RM420-223 ADC Cross-Talk

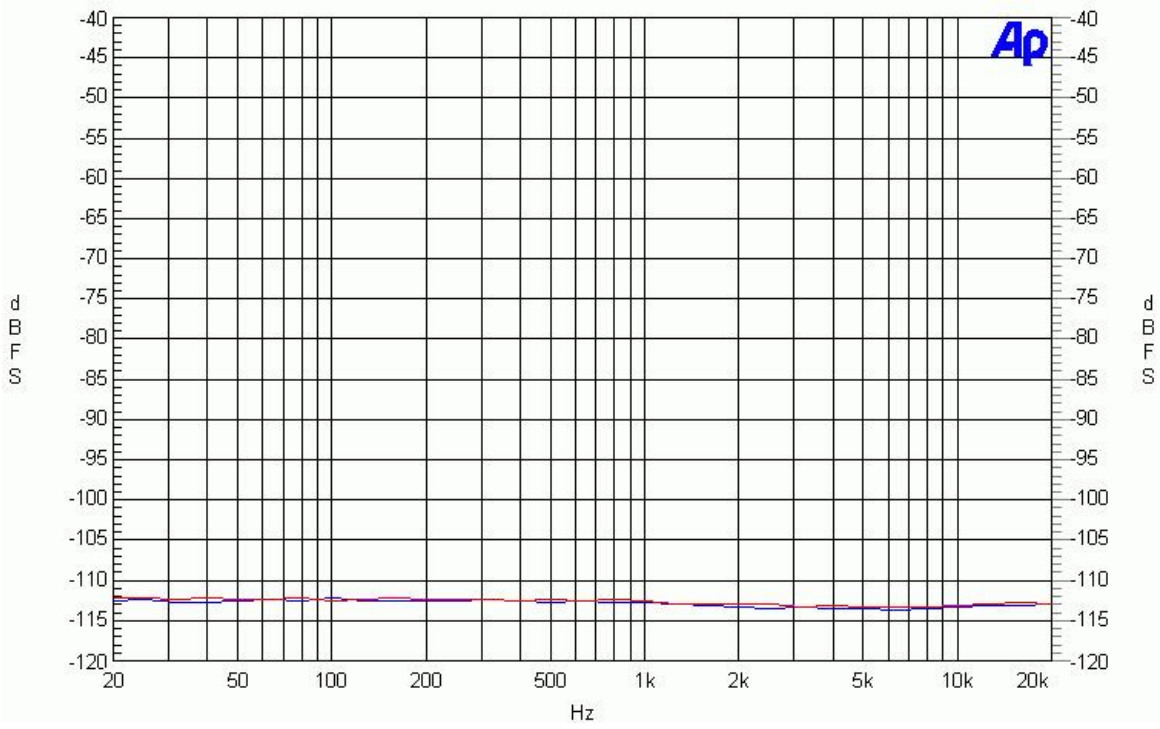
Measurement Plots RM420-223 Outputs



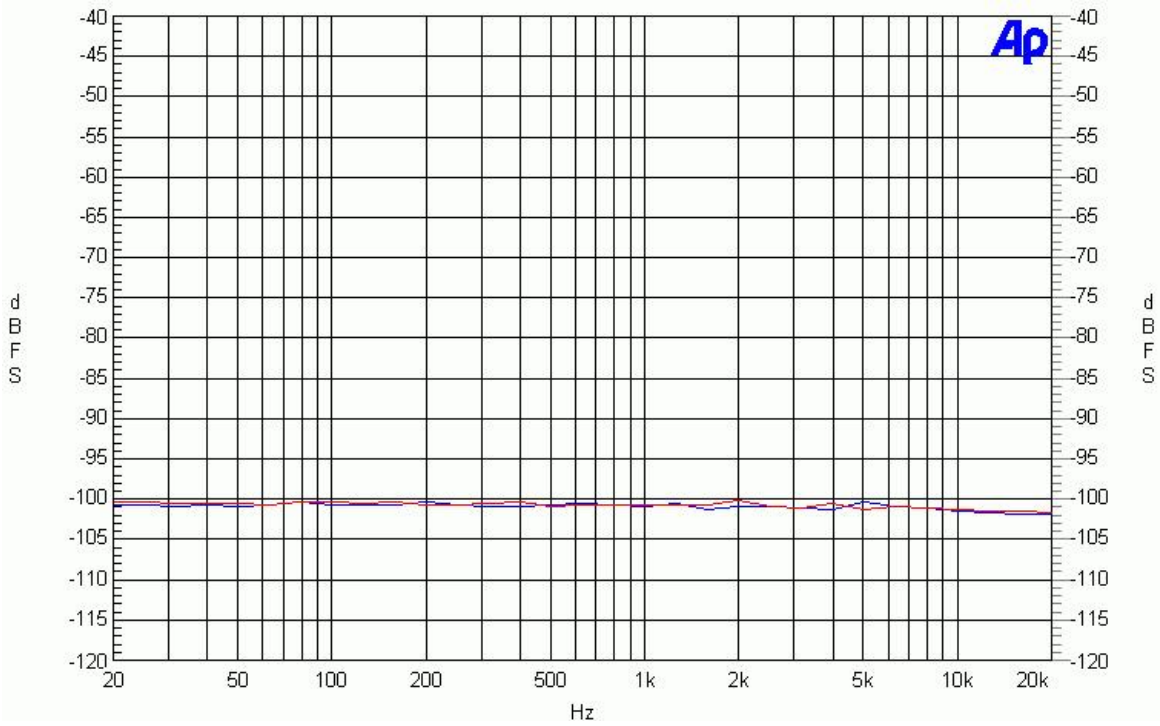
RM420-223 DAC Frequency Response



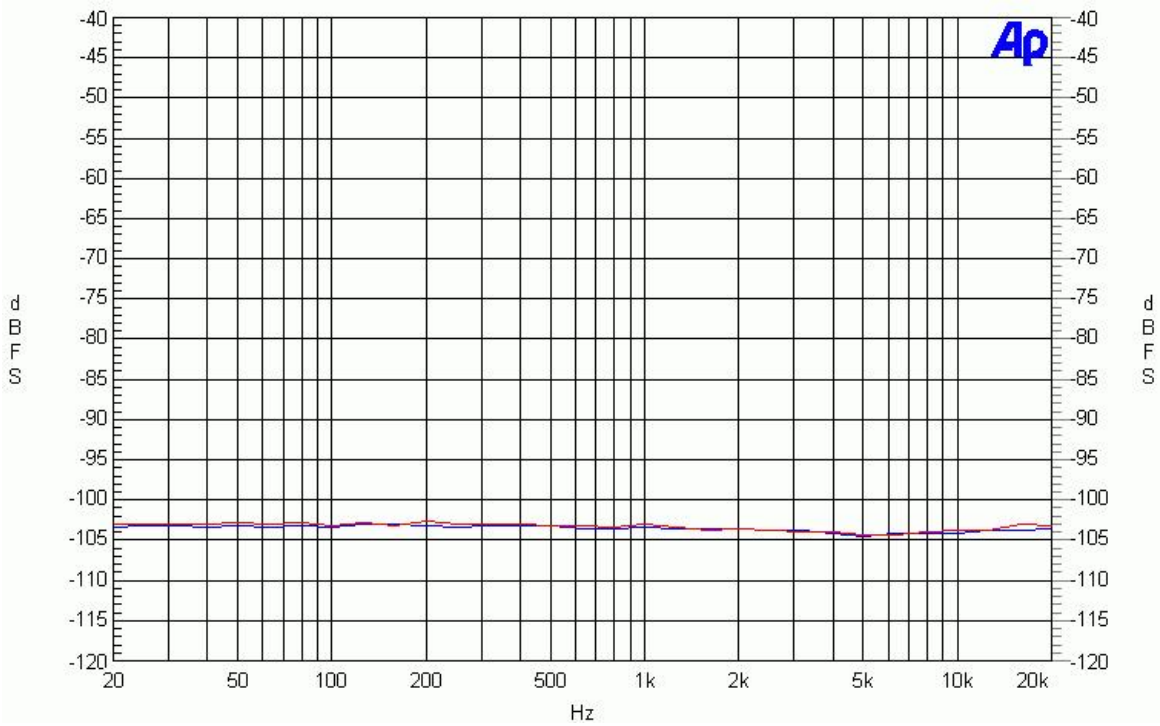
RM420-223 DAC THD+N @ -30 dBFS



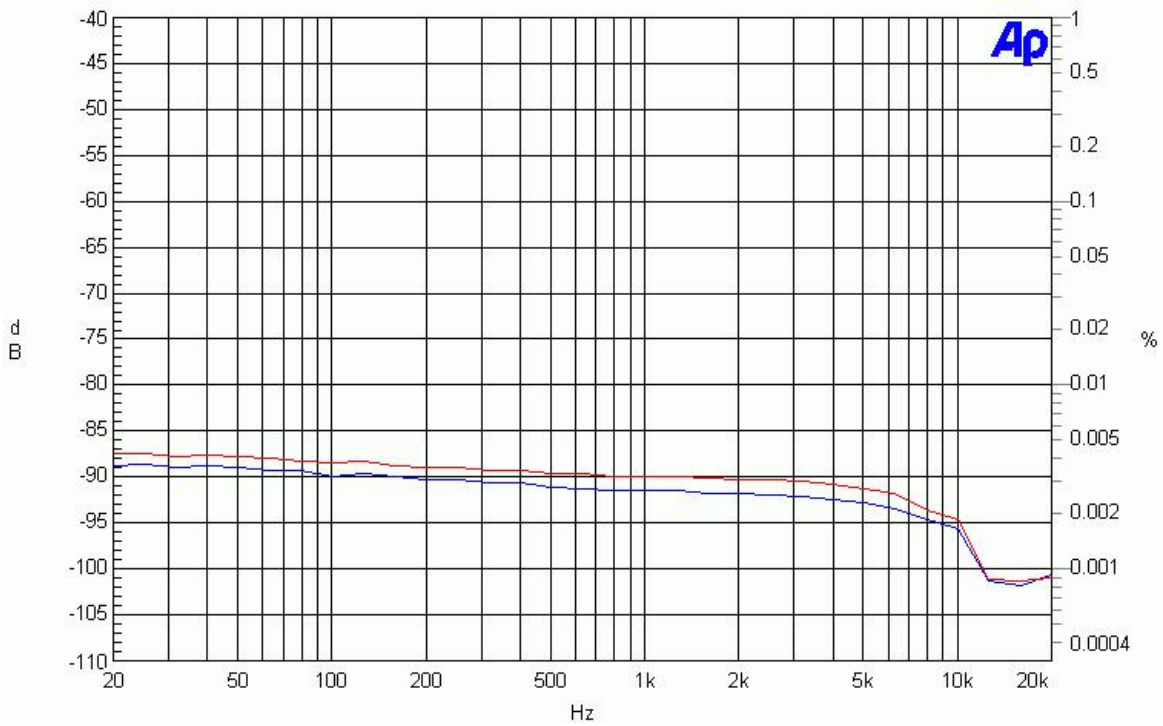
RM420-223 DAC THD+N(A) @ -30 dBFS



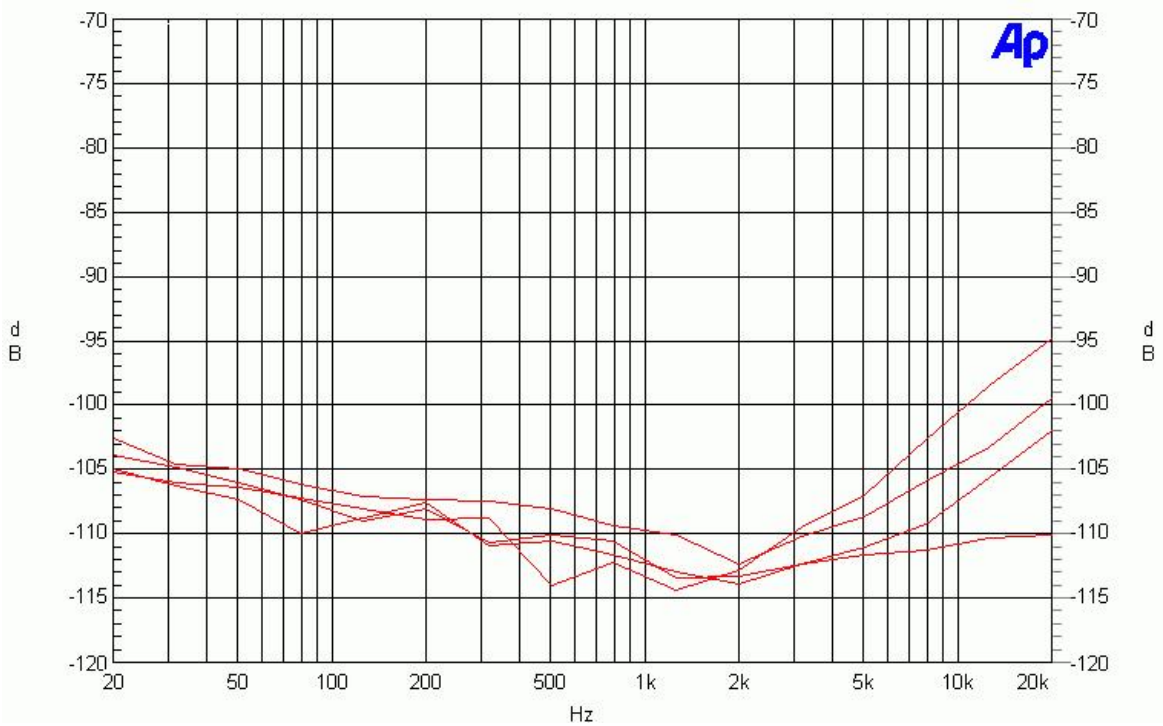
RM420-223 DAC THD+N @ +4 dBu



RM420-223 DAC THD+N(A) @ +4 dBu



RM420-223 DAC THD+N @ -1 dBFS



RM420-223 DAC Cross-Talk

Log File Example

After manufacturing all inputs and outputs of every I/O card are measured. Hence, we can make sure that every module, leaving the production hall, is working correctly. During this process a log file is written. This file is saved by DHD for maintenance purposes.

In the following you can find a log file example of an RM420-223 module:

```
03-May-2007 15:35:05
*** Test RM420-223 R3  Production Code 7131 ***
open COM1
=== Test GPO1 ===
=== Test GPO2 ===
=== Test GPO3 ===
=== Test GPO4 ===
=== Test GPI1 ===
=== Test GPI2 ===
=== Test GPI3 ===
=== Test GPI4 ===
=== Voltage VCC15+ = 14.4 V ===
=== Voltage VCC15- = -13.8 V ===
=== Voltage VCC3 = 3.3 V ===
====================
=== Test A/D 1-2 ===
====================
-- Level 0dB (Input max. 15 dBu) --
 frequency response limit: -0.5 dB .. 0.1 dB
 multitone distortions and noise limit: -92 dBFS
Level(1kHz): L=2.73 dB,  R=2.73 dB
Polarity: (+)
Group Delay: L=63.4,  R=63.4 Samples
SNR:  L=89.3 dB,  R=89.5 dB
-- Level 0dB (Input max. 18 dBu) --
 frequency response limit: -0.5 dB .. 0.1 dB
 multitone distortions and noise limit: -92 dBFS
Level(1kHz): L=-0.52 dB,  R=-0.52 dB
Polarity: (+)
Group Delay: L=63.3,  R=63.3 Samples
SNR:  L=89.3 dB,  R=89.5 dB
-- Level 0dB (Input max. 21 dBu) --
 frequency response limit: -0.5 dB .. 0.1 dB
 multitone distortions and noise limit: -92 dBFS
Level(1kHz): L=-3.29 dB,  R=-3.29 dB
Polarity: (+)
Group Delay: L=63.3,  R=63.3 Samples
SNR:  L=88.9 dB,  R=89.2 dB
-- Level 0dB (Input max. 24 dBu) --
 frequency response limit: -0.5 dB .. 0.1 dB
 multitone distortions and noise limit: -92 dBFS
Level(1kHz): L=-6.63 dB,  R=-6.63 dB
Polarity: (+)
Group Delay: L=63.3,  R=63.3 Samples
SNR:  L=88.2 dB,  R=88.2 dB
-- Dynamic -60dB --
Level(1kHz): L=-60.52 dB,  R=-60.50 dB
SNR:  L=39.4 dB,  R=39.4 dB
Input Dynamic:  L=110.4 dB,  R=110.3 dB
 limit: 108 dB
-- Input Balance --
CMR:  L=67.8 dB,  R=71.8 dB
 limit: 58 dB
====================
=== Test A/D 3-4 ===
====================
-- Level 0dB (Input max. 15 dBu) --
 frequency response limit: -0.5 dB .. 0.1 dB
 multitone distortions and noise limit: -92 dBFS
Level(1kHz): L=2.73 dB,  R=2.73 dB
Polarity: (+)
Group Delay: L=63.4,  R=63.4 Samples
SNR:  L=89.1 dB,  R=89.4 dB
-- Level 0dB (Input max. 18 dBu) --
 frequency response limit: -0.5 dB .. 0.1 dB
 multitone distortions and noise limit: -92 dBFS
Level(1kHz): L=-0.53 dB,  R=-0.52 dB
Polarity: (+)
Group Delay: L=63.3,  R=63.3 Samples
SNR:  L=89.0 dB,  R=89.3 dB
```

```
-- Level 0dB (Input max. 21 dBu) --
 frequency response limit: -0.5 dB .. 0.1 dB
 multitone distortions and noise limit: -92 dBFS
Level(1kHz): L=-3.30 dB,  R=-3.29 dB
Polarity: (+)
Group Delay: L=63.3,  R=63.3 Samples
SNR:  L=88.5 dB,  R=88.8 dB
-- Level 0dB (Input max. 24 dBu) --
 frequency response limit: -0.5 dB .. 0.1 dB
 multitone distortions and noise limit: -92 dBFS
Level(1kHz): L=-6.65 dB,  R=-6.63 dB
Polarity: (+)
Group Delay: L=63.3,  R=63.3 Samples
SNR:  L=88.1 dB,  R=88.0 dB
-- Dynamic -60dB --
Level(1kHz): L=-60.51 dB,  R=-60.52 dB
SNR:  L=39.4 dB,  R=39.4 dB
Input Dynamic:  L=110.3 dB,  R=110.3 dB
 limit: 108 dB
-- Input Balance --
CMR:  L=71.5 dB,  R=74.0 dB
 limit: 58 dB
====================
=== Test D/A 1-2 ===
====================
-- Level 0dB (Input max. 15 dBu) --
 frequency response limit: -0.5 dB .. 0.1 dB
 multitone distortions and noise limit: -90 dBFS
Level(1kHz): L=-2.82 dB,  R=-2.91 dB
Polarity: (+)
Group Delay: L=83.4,  R=83.4 Samples
SNR:  L=86.4 dB,  R=85.6 dB
-- Level 0dB (Input max. 18 dBu) --
 frequency response limit: -0.5 dB .. 0.1 dB
 multitone distortions and noise limit: -90 dBFS
Level(1kHz): L=0.24 dB,  R=0.16 dB
Polarity: (+)
Group Delay: L=83.4,  R=83.4 Samples
SNR:  L=88.0 dB,  R=86.8 dB
-- Level 0dB (Input max. 21 dBu) --
 frequency response limit: -0.5 dB .. 0.1 dB
 multitone distortions and noise limit: -90 dBFS
Level(1kHz): L=3.06 dB,  R=2.97 dB
Polarity: (+)
Group Delay: L=83.4,  R=83.4 Samples
SNR:  L=88.2 dB,  R=87.1 dB
-- Level 0dB (Input max. 24 dBu) --
 frequency response limit: -0.5 dB .. 0.1 dB
 multitone distortions and noise limit: -90 dBFS
Level(1kHz): L=5.66 dB,  R=5.58 dB
Polarity: (+)
Group Delay: L=83.4,  R=83.4 Samples
SNR:  L=87.5 dB,  R=86.8 dB
-- Dynamic +20dB Gain --
Level(1kHz): L=20.28 dB,  R=20.16 dB
SNR:  L=72.6 dB,  R=73.7 dB
!!! SNR Fehler (Limit  75.0 dB)
Output Dynamic:  L=103.6 dB,  R=104.7 dB
 limit: 106 dB
-- Dynamic +20dB Gain --
Level(1kHz): L=20.28 dB,  R=20.16 dB
SNR:  L=78.0 dB,  R=77.7 dB
Output Dynamic:  L=109.0 dB,  R=108.7 dB
 limit: 106 dB
-- Output Balance --
CMR:  L=59.9 dB,  R=63.6 dB
 limit: 40 dB
====================
=== Test D/A 3-4 ===
====================
-- Level 0dB (Input max. 15 dBu) --
 frequency response limit: -0.5 dB .. 0.1 dB
 multitone distortions and noise limit: -90 dBFS
Level(1kHz): L=-2.44 dB,  R=-2.49 dB
Polarity: (+)
Group Delay: L=83.4,  R=83.4 Samples
SNR:  L=87.5 dB,  R=86.7 dB
-- Level 0dB (Input max. 18 dBu) --
 frequency response limit: -0.5 dB .. 0.1 dB
 multitone distortions and noise limit: -90 dBFS
Level(1kHz): L=0.64 dB,  R=0.58 dB
```

```
Polarity: (+)
Group Delay: L=83.4,  R=83.4 Samples
SNR:  L=89.4 dB,  R=88.0 dB
-- Level 0dB (Input max. 21 dBu) --
 frequency response limit: -0.5 dB .. 0.1 dB
 multitone distortions and noise limit: -90 dBFS
Level(1kHz): L=3.45 dB,  R=3.39 dB
Polarity: (+)
Group Delay: L=83.4,  R=83.4 Samples
SNR:  L=88.6 dB,  R=88.0 dB
-- Level 0dB (Input max. 24 dBu) --
 frequency response limit: -0.5 dB .. 0.1 dB
 multitone distortions and noise limit: -90 dBFS
Level(1kHz): L=6.05 dB,  R=5.98 dB
Polarity: (+)
Group Delay: L=83.4,  R=83.4 Samples
SNR:  L=87.3 dB,  R=87.5 dB
-- Dynamic +20dB Gain --
Level(1kHz): L=20.65 dB,  R=20.61 dB
SNR:  L=71.8 dB,  R=73.6 dB
!!! SNR Fehler (Limit  75.0 dB)
Output Dynamic:  L=102.8 dB,  R=104.5 dB
 limit: 106 dB
-- Dynamic +20dB Gain --
Level(1kHz): L=20.65 dB,  R=20.61 dB
SNR:  L=77.7 dB,  R=78.0 dB
Output Dynamic:  L=108.7 dB,  R=109.0 dB
 limit: 106 dB
-- Output Balance --
CMR:  L=56.2 dB,  R=62.3 dB
 limit: 40 dB
==============
=== EEPROM ===
==============
Updated Serialnumber = 17190
************************
*** Test Succsessful ***
************************
03-May-2007 15:36:07
```

Index

M

O

R

T