RM4200D DSP Frame and I/O modules

Specifications

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Specifications

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Version 1.9.0, 22.09.2011
About this Book

How to Use this Book

The Navigation Tree

You can find the navigation tree on the left-hand-side of the PDF document. Via the entries of this tree you can directly reach the several chapters and sections of this document. Click onto the text or the symbol of an entry to display its content.

If a chapter includes further sections, you will find a plus-symbol in front of the entry in the navigation tree. Either you can click onto this plus-sign or you double click the text or the symbol of the entry to make the sub-branches of the further sections visible.

Search

You can find an alphabetical ordered list of keywords at the end of the document. Please see the page numbers in this index to find the respective keywords in the document.

Moreover, you can use the search function of your PDF reader to seek for any words.

Links

Links are underlined to separate them from the rest of the text. These links can be a connection to other chapters or sections in the same document or to an URL (internet address).

- Same document: The hand symbol appears if you move the mouse over the link.
- URL: The hand symbol with an additional appears if you move the mouse over the link.

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

<table>
<thead>
<tr>
<th><strong>Warning</strong></th>
<th>The demands and advices in this fields should be followed <strong>unconditional</strong>, because otherwise hardware and software products, data bases, as well as persons may suffer a loss.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Important</strong></td>
<td>The demands and advices in this fields should be followed, because these contents are necessary for the proper operation of the DHD systems.</td>
</tr>
<tr>
<td><strong>Note</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Tip</strong></td>
<td>Tips are helpful advices, which should make work with DHD systems easier.</td>
</tr>
<tr>
<td><strong>Weblink</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Download</strong></td>
<td>You can directly open and download a file if the respective link is marked as download link (file link).</td>
</tr>
</tbody>
</table>
## General Information

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital reference level</td>
<td>0 dBFS = digital full scale</td>
</tr>
<tr>
<td>Analog reference voltage level</td>
<td>0 dBu = 0.775 V (RMS)</td>
</tr>
<tr>
<td>System sampling frequency</td>
<td>44.1 kHz, 48 kHz (internal or external)</td>
</tr>
<tr>
<td>Default system sampling frequency</td>
<td>48 kHz (internal)</td>
</tr>
<tr>
<td>Headroom</td>
<td>Adjustable 0 dB ... 30 dB</td>
</tr>
<tr>
<td>Headroom default setting</td>
<td>9 dB, digital -9 dBFS = 0 dBint, analog 6 dBu = 0 dBint (0 dBint = DSP internal reference level)</td>
</tr>
<tr>
<td>Maximum analog input level</td>
<td>18 dBu or 24 dBu (depending on module type)</td>
</tr>
<tr>
<td>Maximum analog output level</td>
<td>18 dBu or 24 dBu (depending on module type)</td>
</tr>
<tr>
<td>Output level default setting</td>
<td>15 dBu = 0 dBint (0 dBint = DSP internal reference level)</td>
</tr>
<tr>
<td>Input and master fader setting for measurements</td>
<td>0 dB</td>
</tr>
<tr>
<td>Analog source impedance for measurements</td>
<td>&lt; 40 Ohm</td>
</tr>
<tr>
<td>Frequency range for measurements</td>
<td>20 Hz ... 20 kHz (if not stated otherwise)</td>
</tr>
</tbody>
</table>

**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
**Technical Specifications**

**D/A Converter**

- **frequency response:** < 0.3 dB
- **THD+N:** < -94 dB / 0.002% (-9 dBFS, +6 dBu)
  < -94 dB / 0.002% (-1 dBFS, +14 dBu)
- **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

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>signal to noise ratio</td>
<td>109 dB (unweighted)</td>
</tr>
<tr>
<td>DC offset voltage</td>
<td>&lt; 10 mV</td>
</tr>
<tr>
<td>common mode rejection (output impedance)</td>
<td>&gt; 60 dB</td>
</tr>
<tr>
<td>common mode rejection (output voltage)</td>
<td>&gt; 40 dB</td>
</tr>
<tr>
<td>converter technology</td>
<td>24 bit, oversampling sigma-delta</td>
</tr>
</tbody>
</table>

### General Purpose Inputs / Outputs (GPI/GPO)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 GPIs (optocoupler, isolated)</td>
<td>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</td>
</tr>
<tr>
<td>4 GPOs (electronic relay, isolated)</td>
<td>maximum rated current: 0.2A (resettable fuse), maximum peak switched voltage: 30V AC or DC</td>
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</table>

### Further Information

<table>
<thead>
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<th>Specification</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
<td>power consumption</td>
<td>2.4 W (typical)</td>
</tr>
<tr>
<td>connector style</td>
<td>RJ45</td>
</tr>
<tr>
<td>printed circuit board (PCB) revision for this specifications</td>
<td>r7</td>
</tr>
</tbody>
</table>

---

**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: \(< 0.2 \text{ dB}\)

THD+N \(< -80 \text{ dB} / 0.01\% @ -1 \text{ dBFS}\)

signal to noise ratio: \(> 90 \text{ dB}\)

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

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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
open GPO1
open GPIO2
open GPIO3
open GPIO4
open GPI1
open GPI2
open GPI3
open GPI4
open SPI Input1 -> SYNC1
open SPI Input1 -> SYNC2
open SPI Input2 -> SYNC1
open SPI Input2 -> SYNC2
open SPI Input3 -> SYNC1
open SPI Input3 -> SYNC2
open SPI Input4 -> SYNC1
open SPI Input4 -> SYNC2
open SPI Input1-2 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=26.0, R=26.0 Samples
SNR: L=130.0 dB, R=129.5 dB
Input Dynamic: L=141.0 dB, R=140.4 dB
-- 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=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 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=129.9 dB, R=129.5 dB
Input Dynamic: L=140.9 dB, R=140.4 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
```

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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 0 dB --
frequency response limit: -0.001 dB .. 0.001 dB  
multitone distortions and noise limit: -136 dBFS  
Level (1 kHz): 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 0 dB --
frequency response limit: -0.001 dB .. 0.001 dB  
multitone distortions and noise limit: -136 dBFS  
Level (1 kHz): 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=140.2 dB, R=137.5 dB

--- Test Output AES/EBU (Pro) 7-8 ---

-- Level 0 dB --
frequency response limit: -0.001 dB .. 0.001 dB  
multitone distortions and noise limit: -136 dBFS  
Level (1 kHz): 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=138.4 dB, R=137.3 dB

--- Test Output SP/DIF (Consumer) 1-2 ---

-- Level 0 dB --
frequency response limit: -0.001 dB .. 0.001 dB  
multitone distortions and noise limit: -136 dBFS  
Level (1 kHz): 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 0 dB --
frequency response limit: -0.001 dB .. 0.001 dB  
multitone distortions and noise limit: -136 dBFS  
Level (1 kHz): 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 0 dB --
frequency response limit: -0.001 dB .. 0.001 dB  
multitone distortions and noise limit: -136 dBFS  
Level (1 kHz): 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 0 dB --
frequency response limit: -0.001 dB .. 0.001 dB  
multitone distortions and noise limit: -136 dBFS  
Level (1 kHz): 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

--- EEPPROM ---

Updated Serialnumber = 17411

*** Test Successfull ***

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
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
----------
```
Measurement Plots and Log File Examples

--- 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(lkHz): 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(lkHz): L=17.48 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(lkHz): L=-54.80 dB, R=-54.78 dB
SNR: L=41.7 dB, R=41.3 dB
--- Gain +5.0 dB --
Level(lkHz): L=-54.51 dB, R=-54.80 dB
SNR: L=42.5 dB, R=42.4 dB
--- Gain +10.3 dB --
Level(lkHz): L=-49.51 dB, R=-49.48 dB
SNR: L=47.0 dB, R=46.6 dB
--- Gain +12.3 dB --
Level(lkHz): L=-47.52 dB, R=-47.50 dB
SNR: L=49.6 dB, R=49.6 dB
--- Gain +20.3 dB --
Level(lkHz): L=-39.57 dB, R=-39.54 dB
SNR: L=56.7 dB, R=56.4 dB
--- Gain +25.3 dB --
Level(lkHz): L=-34.55 dB, R=-34.53 dB
SNR: L=62.1 dB, R=61.9 dB
--- Gain +28.1 dB --
Level(lkHz): L=-31.74 dB, R=-31.72 dB
SNR: L=64.6 dB, R=64.6 dB
--- Gain +35.4 dB --
Level(lkHz): L=-24.48 dB, R=-24.47 dB
SNR: L=70.5 dB, R=70.1 dB
--- Gain +40.1 dB --
Level(lkHz): L=-19.70 dB, R=-19.68 dB
SNR: L=73.4 dB, R=72.6 dB
--- Gain +45.4 dB --
Level(lkHz): L=-14.49 dB, R=-14.48 dB
SNR: L=75.6 dB, R=74.3 dB
--- Gain +50.0 dB --
Level(lkHz): 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(lkHz): L=-54.79 dB, R=-54.83 dB
SNR: L=42.0 dB, R=41.5 dB
--- Gain +10.3 dB --
Level(lkHz): L=-49.46 dB, R=-49.52 dB
SNR: L=47.2 dB, R=46.9 dB
--- Gain +12.3 dB --
Level(lkHz): L=-47.49 dB, R=-47.53 dB
SNR: L=49.1 dB, R=49.1 dB
--- Gain +20.3 dB --
Level(lkHz): L=-39.52 dB, R=-39.59 dB
SNR: L=56.8 dB, R=56.7 dB
--- Gain +25.3 dB --
Level(lkHz): L=-34.49 dB, R=-34.55 dB
SNR: L=61.6 dB, R=61.6 dB
--- Gain +28.1 dB --
Level(lkHz): L=-31.68 dB, R=-31.74 dB
SNR: L=64.1 dB, R=64.2 dB
--- Gain +35.4 dB --
Level(lkHz): L=-24.43 dB, R=-24.47 dB
SNR: L=70.1 dB, R=70.1 dB
--- Gain +40.1 dB --
Level(lkHz): L=-19.61 dB, R=-19.66 dB
SNR: L=73.2 dB, R=73.2 dB
--- Gain +45.4 dB --

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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 Successful ***************************
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 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 VCCV5 = 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=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=111.3 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 Successful ****************************
D3-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
Measurement Plots RM420-222 Outputs

RM420-222 ADC Cross-Talk

RM420-222 DAC Frequency Response
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:

```plaintext
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=63.1, 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=-60.31 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=67.2 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 +2dB 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: -80 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 Successfull ***************************
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 Cross-Talk

RM420-223 DAC Frequency Response

Measurement Plots RM420-223 Outputs
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
```
55 RM4200D DSP Frame and I/O modules - Specifications

-- Level 0dB (Input max. 21 dBu) --
  frequency response limit: -0.5 dB .. 0.1 dB
  multitone distortions and noise limit: -92 dBFS
Level (kHz): 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 (kHz): 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 (kHz): 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: -0.5dB .. 0.1 dB
  multitone distortions and noise limit: -90 dBFS
Level (kHz): 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 (kHz): 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 (kHz): 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 (kHz): 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 (kHz): 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 (kHz): 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 (kHz): 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 (kHz): L=0.64 dB, R=0.58 dB

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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 Successful ***
******************************
03-May-2007 15:36:07
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