



TRUST YOUR EARS

LISTEN AND COMPARE :

| 44.1 kHz
| 16-bit

| 96 kHz
| 24-bit

| 192 kHz
| 24-bit

| DSD 2.8 MHz
| 1-bit

| DSD 5.6 MHz
| 1-bit



TRUST YOUR EARS

Das Stockfisch Projekt zum Thema Hochauflösende Audio-Formate

Passionierte Musikliebhaber suchen schon seit langer Zeit nach Möglichkeiten, die zahlreichen digitalen Audio-Formate miteinander zu vergleichen. Das war bisher sehr schwierig, weil es kaum Aufnahmen gab, die unter genormten Bedingungen von der selben Quelle, mit der selben reproduzierbaren Technik in fünf verschiedenen Formaten aufgenommen wurden.

Für unsere Demonstration wählten wir eine große mechanische Walzenspieluhr (Bild 1) und ein analoges Magnettonband (Bild 2) aus. Beide Quellen ließen sich also fünfmal identisch und verlustlos für die Aufnahme abspielen.

Die Walzenspieluhr erzeugt im Nahbereich Signale bis zu ca. 50 kHz. Deshalb entschieden wir uns für DPA 4041-S Mikrofone, die tatsächlich diese hohen Frequenzen erfassen können (Bild 5). Diese Eigenschaft steht im Gegensatz zu fast allen gebräuchlichen Studiomikrofonen, die bei ca. 20 kHz sanft enden. Unsere GORDON mic/preamps (www.gordonaudio.com) verstärkten das Signal auf Line-Pegel.

Das zweite Hörbeispiel kommt von einem analogen Magnettonband. Die Mehrspuraufnahme entstand 1983 auf einer AEG/TELEFUNKEN M-15A 16-Spur (2") (Bild 3), die Stereo-Abmischung erfolgte auf eine TELEFUNKEN M-15A 2-Spur (1/4"). Der Gitarrist Andreas Rohde spielt seine Komposition „My Uncle Oswald“. Wiederveröffentlicht 2016 in der Stockfisch-Serie „Analog Pearls Vol.2“ (SFR357.4802.2).

HAPI A/D Audio Interfaces (Bild 4) von Merging Technologies (www.merging.com) sind derzeit unsere erste Wahl und wandelten die analogen Signale beider Quellen in jeweils fünf digitale Audio-Formate:

16 bit / 44.1 kHz (CD-Audio)

24 bit / 96 kHz

24 bit / 192 kHz

1 bit / 2.8224 MHz (DSD 64 = SACD)

1 bit / 5.6448 MHz (DSD 128)

Zu jeder Aufnahme fertigten wir mit dem Audio-Analyse-Tool MUSICSCOPE (www.xivero.de) ein grafisches Protokoll, das alle relevanten Parameter veranschaulicht.

Wir hoffen, dass Ihnen unser Hörvergleich interessante Erkenntnisse vermittelt: **TRUST YOUR EARS!**

Günter Pauler





TRUST YOUR EARS



The Stockfisch project about „high-resolution audio formats“

Passionate music freaks have been searching for quite a while now for ways to compare digital audio-formats. Up to now, it's been pretty difficult to find recordings from the same source made under standardized conditions using the same, reproducible technology in five different formats.

For our demonstration, we selected a large mechanical 16" cylinder music box (Image 1) and an analog magnetic reel-to-reel tape (Image 2). Both sources were able to be recorded identically and without losses five times.

The 16" cylinder music box generated signals up to 50 kHz at close range. So we decided to use DPA 4041-S microphones that are able to capture such high frequencies (see Image 5). This feature directly contrasts nearly all common studio microphones that stop gently at 20 kHz. Our GORDON preamps (www.gordonaudio.com) amplified the signal up to line level.

The second sound sample originated from an analog reel-to-reel tape. The multi-track recording was made in 1983 on a AEG/TELEFUNKEN M-15A 16-track (2") (Image 3), the stereo mix was done on a TELEFUNKEN M-15A 2-track (1/4"). The guitarist Andreas Rohde is playing his composition "*My Uncle Oswald*". This was published again in 2016 as part of the Stockfisch-Series „Analog Pearls Vol.2" (SFR357.4802.2).

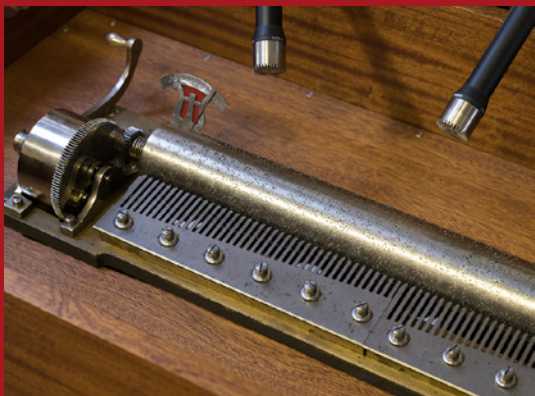
We are presently quite enamoured of HAPI A/D Audio Interfaces (Image 4) of Merging Technologies (www.merging.com). They are able to transfer the analog signals of both our sources into five respective digital audio-formats:

16 bit / 44.1 kHz (CD-Audio)
24 bit / 96 kHz
24 bit / 192 kHz
1 bit / 2.8224 MHz (DSD 64 = SACD)
1 bit / 5.6448 MHz (DSD 128)

For each recording, we have created a graphic protocol using the audio-analysis tool MUSICSCOPE (www.xivero.de). This protocol illustrates all relevant parameters.

We hope that you can gain interesting insights through our listening comparison: **TRUST YOUR EARS!**

Günter Pauler



1

Schweizer Walzenspieluhr von ca. 1890, Tonzungen-Kamm mit 80 Stahlzungen, Holz-Resonanz-Gehäuse 80x28x42 cm, DPA 4041-S Mikrofone

Swiss cylinder music box from around 1890, steel comb with 80 teeth, wooden resonance box 80x28x42 cm, DPA 4041-S microphones



2

TELEFUNKEN M-15A 2-Spur (1/4"), das Andreas Rohde-Original-Mixmasterband aufliegend

TELEFUNKEN M-15A 2-Track (1/4"), with the original Andreas Rohde mix master tape



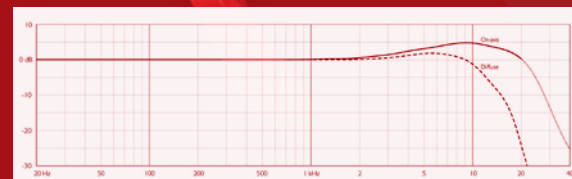
3

AEG / TELEFUNKEN M-15A 16-Spur | 16-Track (2")



4

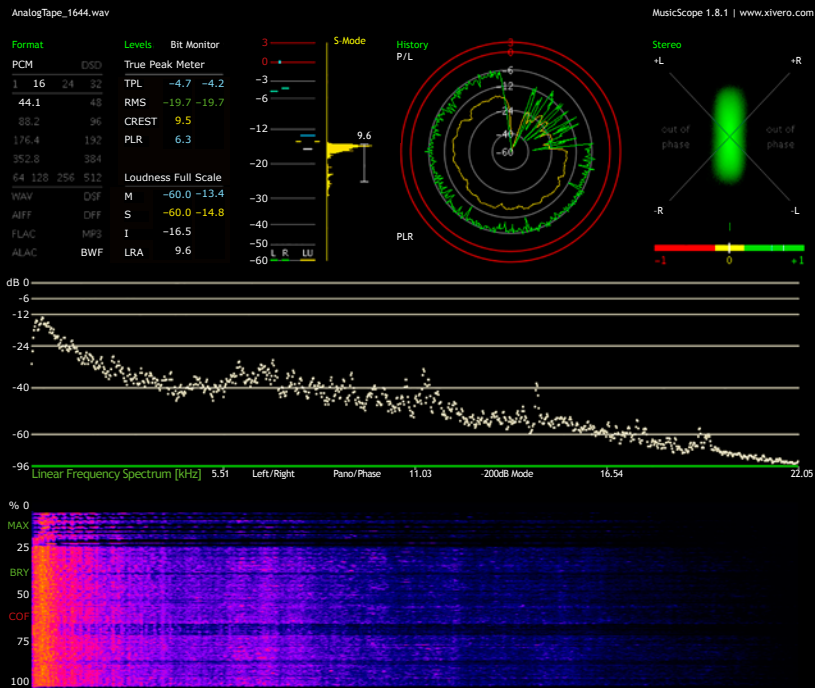
Merging Technologies HAPI-Interface als A/D Wandler | A/D Converter



5

Typische on- und off-axis Frequenzgang vom DPA 4041-S

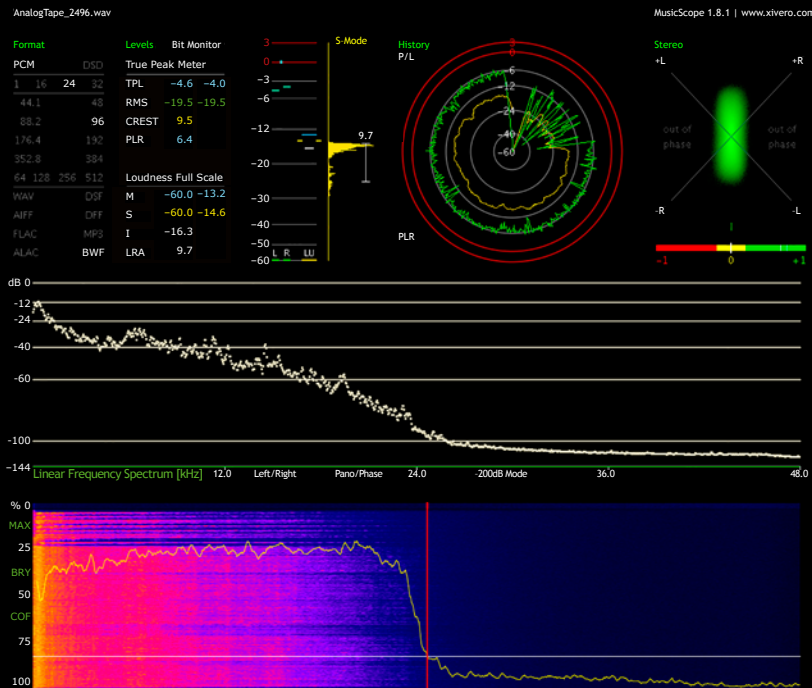
Typical on and off-axis response of a DPA 4041-S



MusicScope report :

Cutoff Frequency : —

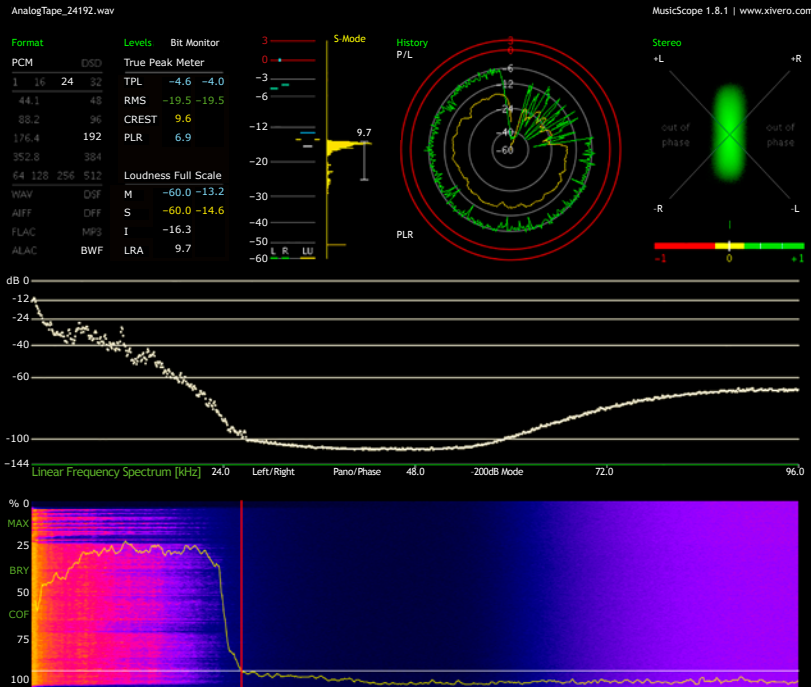
True Peak Level : -4.7 | -4.2 dB



MusicScope report :

Cutoff Frequency : 24.7 kHz (~93 dB)

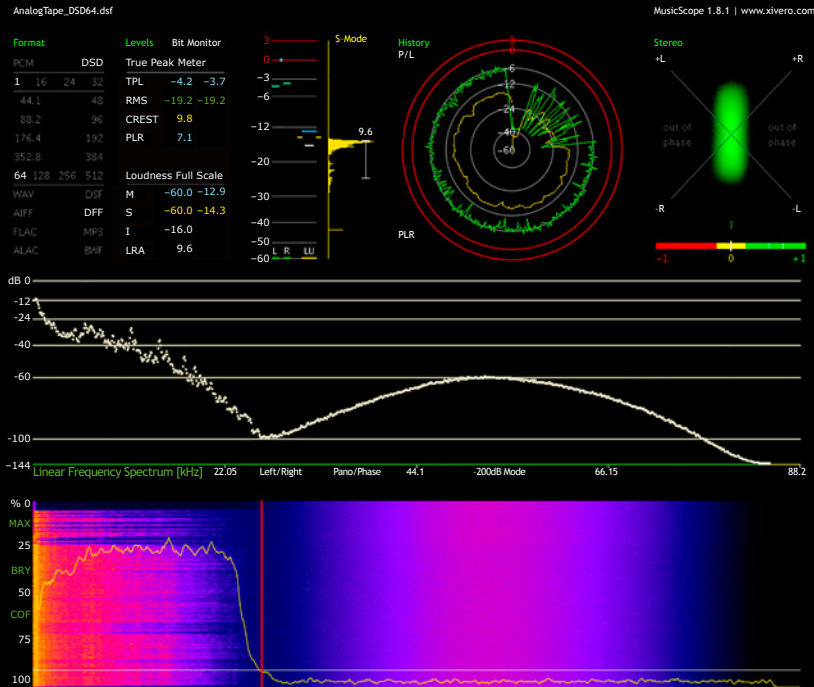
True Peak Level : -4.6 | -4.0 dB



Cutoff Frequency : 26.3 kHz (-94 dB)

Quantization Noise from : 55 kHz
Quantization Noise Peak : 96 kHz (-67 dB)

True Peak Level : -4.6 | -4.0 dB



Cutoff Frequency : 26.3 kHz (-94 dB)

Quantization Noise from : 29 kHz
Quantization Noise Peak : 53 kHz (-60 dB)

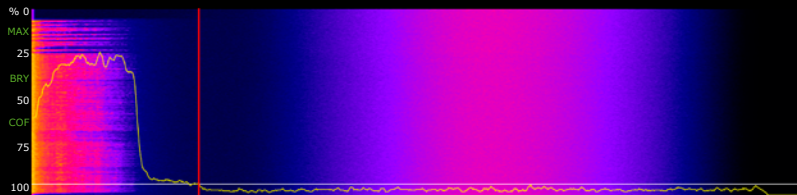
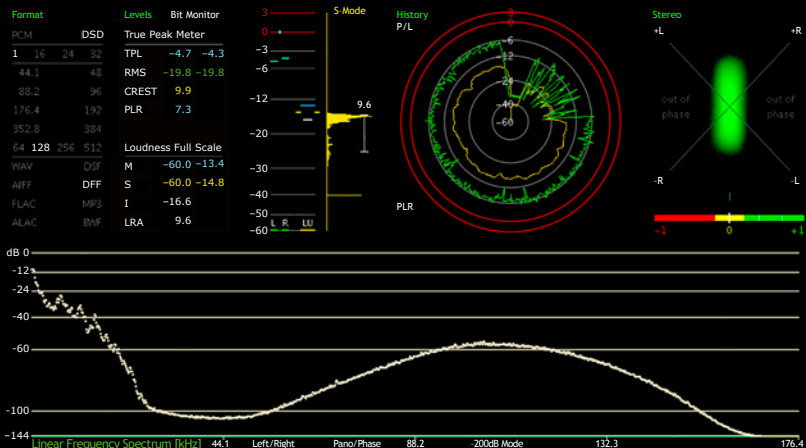
True Peak Level : -4.2 | -3.7 dB



1 bit / 5.6448 MHz (DSD 128)

Analogband / Analog Tape

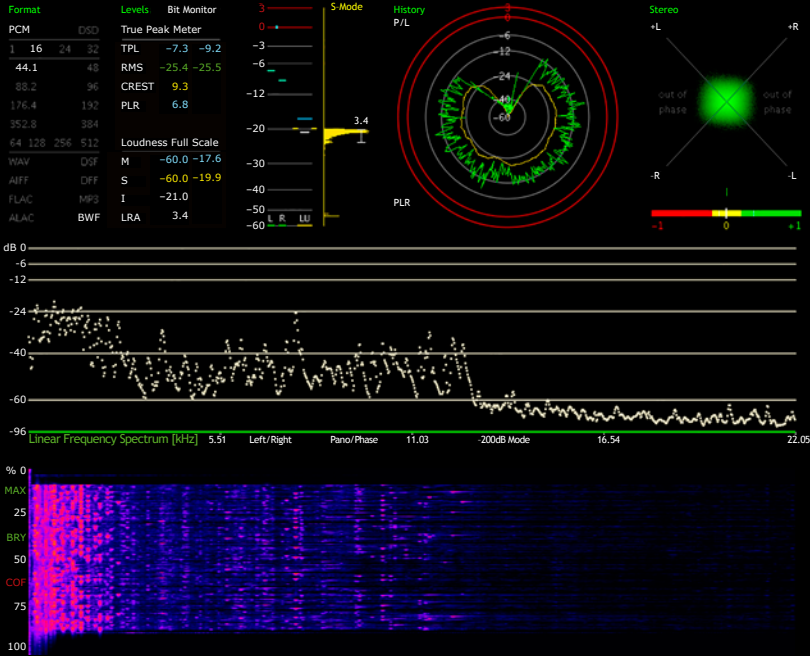
AnalogTape_DSD128.dsf



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MusicBox_1644.wav



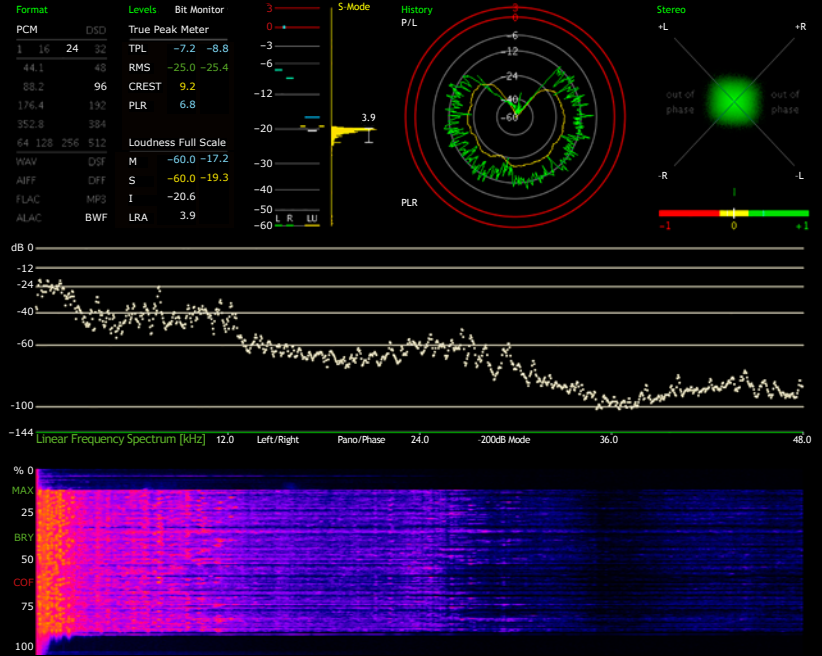
MusicScope report :

Cutoff Frequency : —

True Peak Level : -7.3 | -9.2 dB



MusicBox_2496.wav



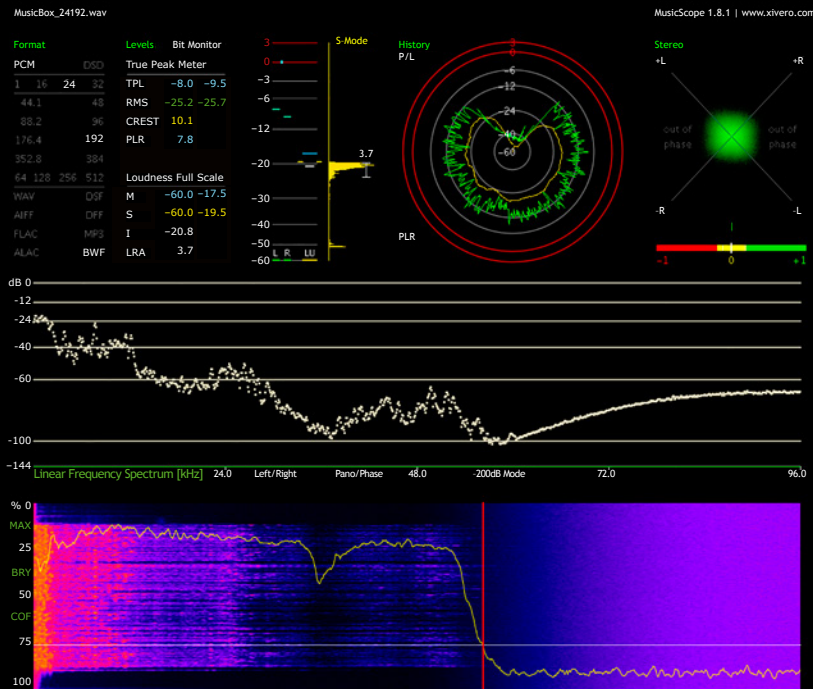
MusicScope report :

Cutoff Frequency : 47 kHz (-90 dB)

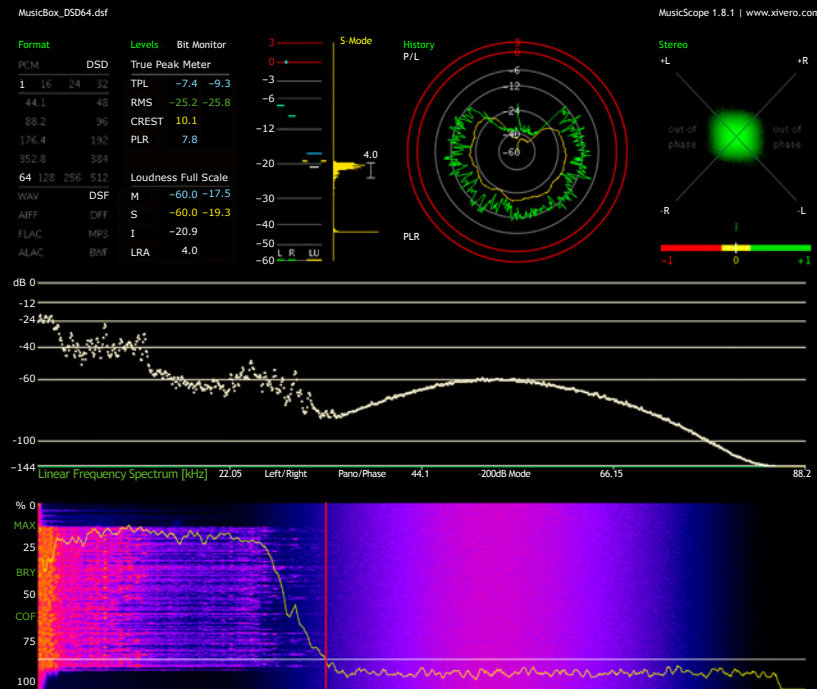
True Peak Level : -7.2 | -8.8 dB

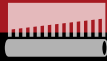


PCM 24 bit / 192 kHz
Walzenspieluhr / Cylinder Music Box



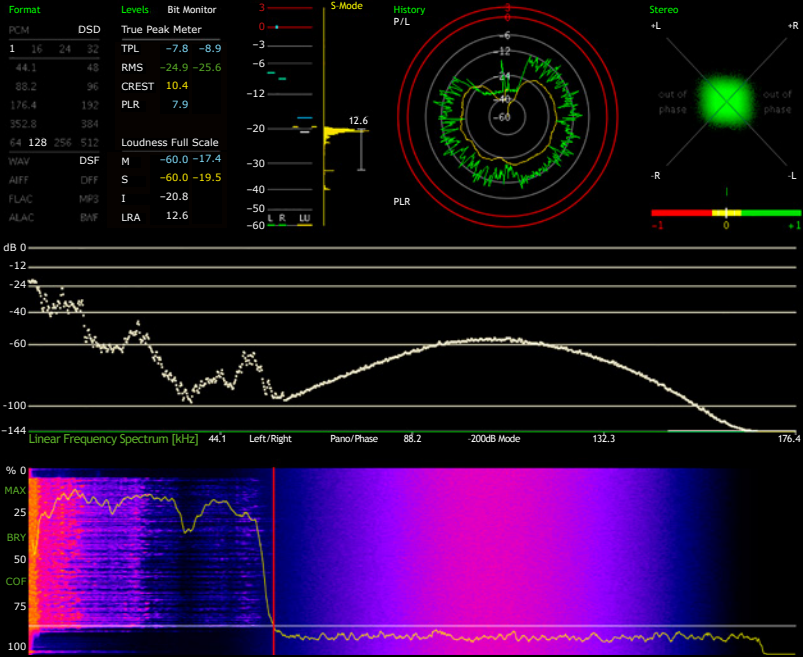
1 bit / 2.8224 MHz (DSD 64 = SACD)
Walzenspieluhr / Cylinder Music Box





1 bit / 5.6448 MHz (DSD 128)
Walzenspieluhr / Cylinder Music Box

MusicBox_DSD128.dsf



MusicScope report :

Cutoff Frequency : 56.4 kHz (-92 dB)

Quantization Noise from : 56 kHz
Quantization Noise Peak : 108 kHz (-57 dB)

True Peak Level : -7.8 | -8.9 dB

Produced and recorded by Günter Pauler
Mastered by Hans-Jörg Maucksch at Pauler Acoustics

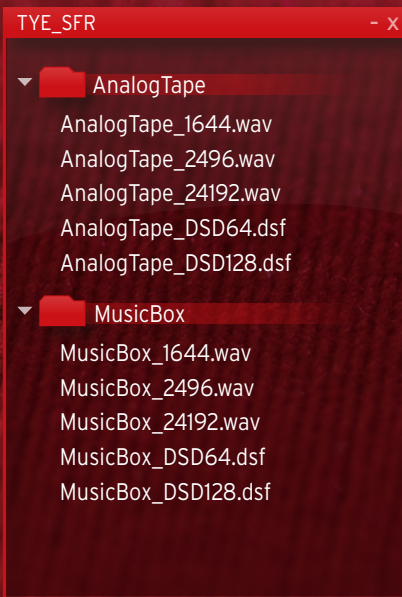
Mastering monitors: B&W Bowers & Wilkins 801 D

Bat photography by Michael Schmitz

Graphic design by Emre Meydan



www.stockfisch-records.de



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