

audiopraise

Vanity^{PRO}

The Vanity^{PRO} is a multi-channel HDMI digital audio extractor with advanced signal processing built in. It enables the user to turn virtually any compatible HDMI source into a high-quality, up to eight-channel digital audio transport which supports PCM and DSD audio formats.



This heavily engineered audiophile HDMI audio extractor features custom DSD to PCM conversion algorithms and a state-of-the-art jitter reduction system. The result is a reference quality digital audio signal suitable for the most demanding applications of stereo and multichannel digital playback.

KEY FEATURES

- HDMI 2.0a input and output.
- Up to 8-channel 192kHz/24bit PCM and 6-channel DSD64 audio extraction.
- Custom high quality DSD to PCM conversion.
- Advanced jitter attenuation.
- DSD to DoP encoding.
- HDMI Audio status monitoring.
- Multiple options of multi-channel or stereo digital audio outputs. All major formats.
- Synchronization clock outputs.

A unique feature of the product is the configurable output module. It comes in either stereo or eight-channel configuration with different output connectors and signalling levels.



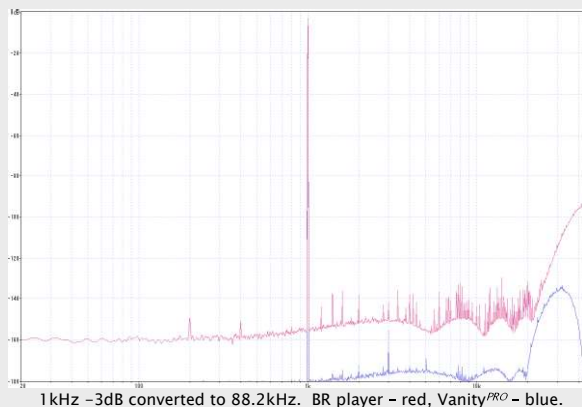
Multi-channel AES/EBU outputs.



Stereo AES/EBU, SPDIF and TOSLINK outputs.

HIGHLIGHTS

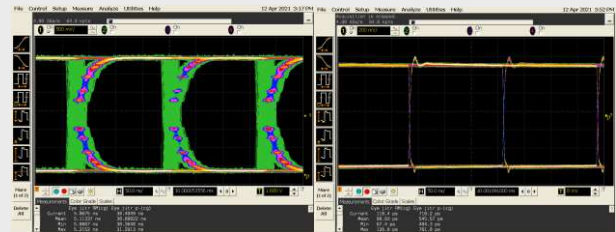
High Quality DSD to PCM Conversion



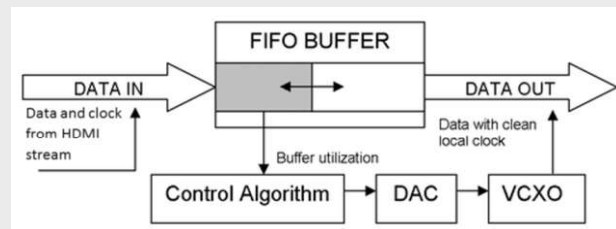
The custom DSD to PCM conversion algorithm preserves maximum quality of high definition SACD recordings. All unwanted ultrasonic noise is attenuated without affecting the audio signal. The user can choose from four conversion characteristics.

The Vanity^{PRO} implements also DSD down-mix algorithm to cover widely used 4.0 speaker configuration in the maximum quality as well as DoP encoding for DSD over PCM playback.

Jitter Reduction and Re-clocking.



Eye diagram of the output S/PDIF signal. Generic HDMI audio extractor – left, Vanity^{PRO} – right.



Audio data from the HDMI interface is buffered in FIFO memory and clocked out with local high precision oscillators. As a result, the output signal is completely isolated from the noisy HDMI domain – interferences from the power supplies, video circuits, etc.

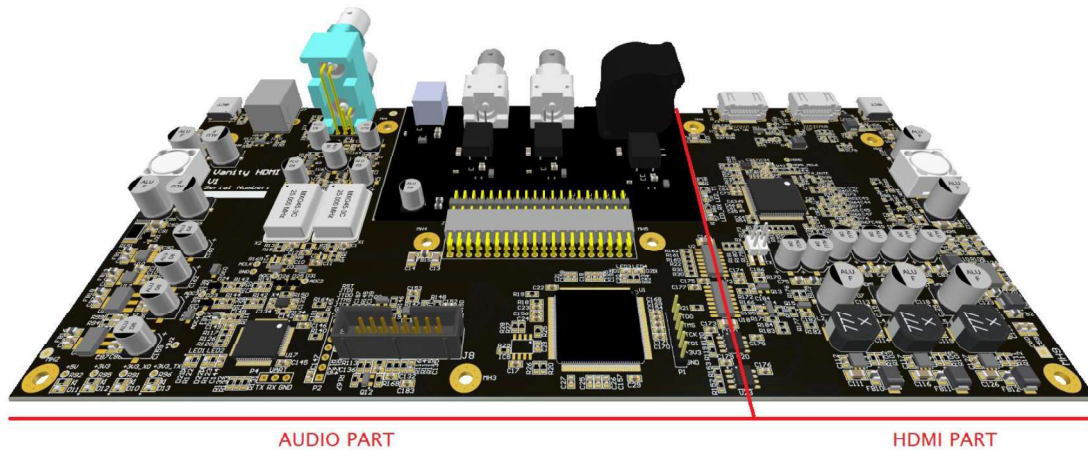
HDMI Audio

HDMI is great for video, but could it be made great for audio too? HDMI is the primary method of transporting AV signals in the consumer environment. It works great with high resolution audio and video, but it has never found its way into the hi-fi world.

Apart from some non-technical reasons, one of the biggest issues associated with HDMI audio is quality of the clock recovered from the HDMI stream and electrical noise associated with it. Despite many improvements in the newest HDMI receiver devices, the recovered clock always suffers from high levels of phase noise. While this is usually not an issue in consumer audio – home theatres, sound bars, etc., in the discipline of critical listening the imperfections of HDMI audio are instantly noticeable. Also, HDMI audio is notoriously known to be sensitive to various forms of electro-magnetic interference, cabling quality, ground loops and in the hi-fi world generally considered as inferior when compared to dedicated digital audio transport methods such as SPDIF, AES/EBU or proprietary links based on the I²S bus.

There is usually nothing wrong with the audio data itself, provided the receiver can take advantage of all the digital formats and sampling rates available on the source side. It is mainly the way the audio data is packed and interleaved with the video data in a high frequency digital signal and eventually recovered on the HDMI receiver (sink) side. There are many cheap HDMI audio extractors in the market, and some of them being able to output digital audio via S/PDIF up to 192kHz sampling rate. But they still don't come even close to a good digital transport in terms of audio quality.

How is the Vanity^{PRO} different from all the other HDMI audio extractors? It basically addresses all the imperfections associated with the HDMI audio, one by one, with a ton of extra features the others don't have. As an example, the Vanity^{PRO} galvanically isolates the HDMI part from the sensitive audio and clock circuits to eliminate any noise and interferences associated with video transmission and HDMI signalling. Both isolated parts have their own power connections.



AUDIO PART

HDMI PART

Synchronization Outputs

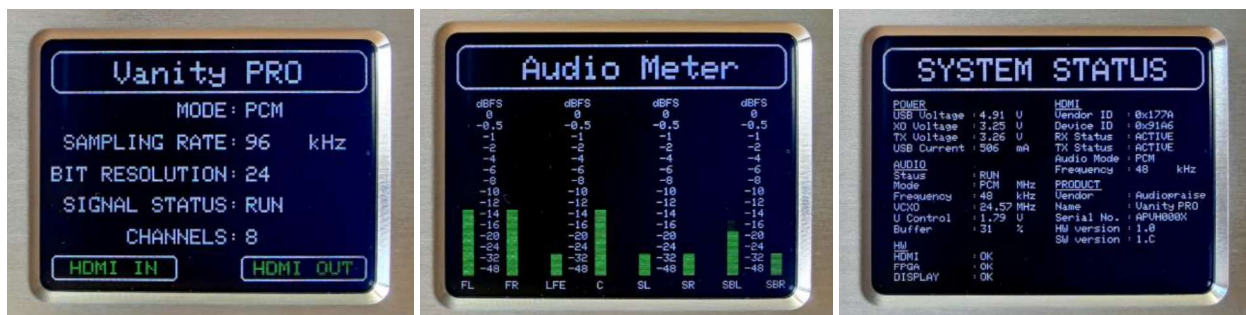
For enhanced clocking capabilities, the Vanity^{PRO} has a Word-clock and Super-clock outputs to synchronize DACs or other hi-fi or studio equipment.

Programmable Platform

The Vanity^{PRO} is built on a completely programmable processing and control platform utilizing a medium size FPGA and a 32-bit processor. New features and functionality can be added at any time and the firmware can be upgraded by the user through an easy-to-use PC app.

Graphical User Interface

For easy configuration and audio monitoring the unit is equipped with a large RGB screen which has adjustable brightness and timeout function. Navigation is implemented using a rotary encoder. There is also a stand-by LED in the front panel with adjustable brightness.



SPECIFICATIONS

HDMI

- Version 2.0a
- 1x input and 1x output for pass-through

Digital audio outputs

- 8 or 2 channel (stereo) output module options
- 4xBNC/RCA/XLR for 8-channel output
- 1xXLR + 1xBNC + 1xRCA + 1x TOSLINK for 2-channel output
- protocols: S/PDIF (IEC958 / EIAJ CP1201), AES/EBU and TOSLINK
- optional multichannel I2S output module with CMOS 3.3V levels
- transformer isolated outputs
- output impedance: 75Ω for BNC/RCA and 110Ω for XLR
- linear PCM 16/24 bits
- supported sampling rates: 44.1 / 48 / 88.2 / 96 / 176.4 / 192kHz

S/PDIF Re-clocking

- 2x custom low jitter on-board VCXO
- digitally controlled frequency tuning, $f_c \ll 1\text{Hz}$
- ultra-low-noise power regulators for VCXO and TX circuits

High Quality DSD to PCM Conversion

- custom developed Zero Alias Linear Phase Filter
- 37bit arithmetic / 47bit accumulator
- output sample rates: 88.2kHz / 176.4kHz
- 4 selectable DSD to LPCM filter characteristics
- full precision 4.0 DSD down-mix option
- DoP v1 output encoding of raw DSD

Full Precision Volume Control

- less than 0.001dB gain error
- bit accurate volume bypass at 0dBFS
- TPDF dithering
- PCM and DSD level matching, outputs PCM and DSD at the same levels

Synchronization outputs

- Word-clock output: BNC, 50Ω impedance, 44.1 / 48 / 88.2 / 96 / 176.4 / 192kHz
- Super-clock output: BNC, 50Ω impedance, 22.5792MHz or 24.576MHz

User Configurable Functionality

- DSD to LPCM output sampling rate: 88.2kHz / 176.4kHz
- DSD to LPCM output bit depth settings: 16 / 24bit
- PCM and DSD output level matching enable / disable
- dedicated DSD 4.0 down-mix enable / disable
- DoP v1 output encoding enable / disable
- 4 user selectable DSD to LPCM filter characteristics
- Adjustable output gain (volume) with 1dB step

HDMI and Audio Monitoring & System Diagnostics

- Monitoring of HDMI stream parameters
- 8-channel audio level metering
- Comprehensive system health diagnostics

Power

- separate power for HDMI and audio sides via USB-C connectors
- 2x DC input 5V / 1A

Dimensions & Weight

- w/d/h: 266/183/65 mm, including the output connectors
- weight: 1 kg