PRODUCTION PARTNER

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REVIEW FROM ISSUE **1 I 2020**

Dante-Interface

Neutrik NA2-IO-DPRO

DANTE-INTERFACE

Neutrik NA2-IO-DPRO

Neutrik's new Dante interface is equipped with line level inputs and complete microphone inputs as well as digital AES/EBU inputs and outputs. How do the network features and audio performance look like?

Copy and measurements: Anselm Goertz | Images: Dieter Stork

Production Partner's issue 4/19 already tested the NA2-IO-DLINE, the first Neutrik-Dante interface from the NA2-IO series.

Just in time for the new year, we received a further model with the NA2-IO-DPRO: while the DLINE is equipped with line level inputs and outputs only, the new DPRO model also features two complete microphone inputs, two line level outputs as well as two inputs and outputs each for digital AES/EBU audio signals.

DPRO Controller for setting the NA2-IO-DPRO. For the inputs and outputs, fine resolution level indicators are included that light up yellow from -18 dBfs and red from -3 dBfs onwards

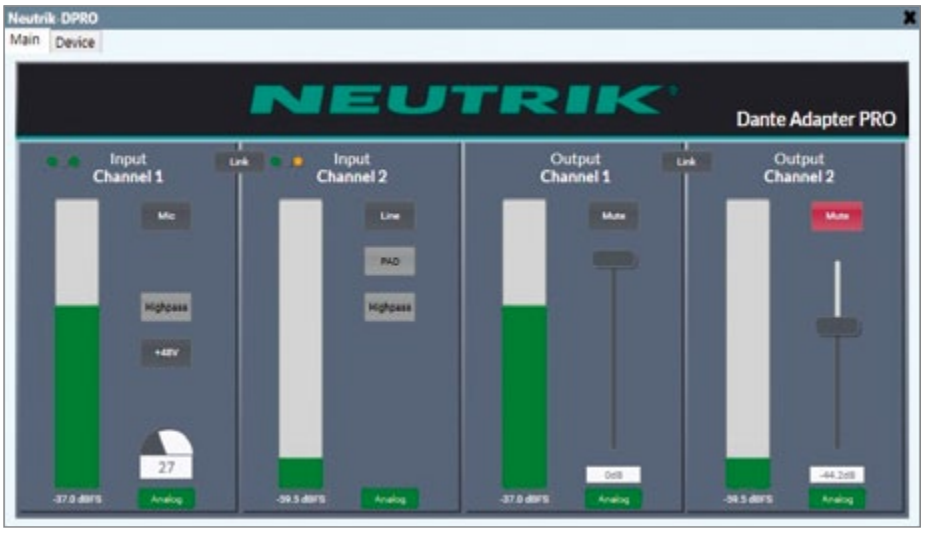
Externally, the DPRO maintains its compact metal housing with a solid rubber coating, which makes the small device slip-resistant and protects it at the same time. On the front panel, the NA2-IO-DPRO features two XLR inputs and outputs, while the primary and secondary network connectors can be found on the rear. When it comes to the Dante module, Neutrik opted for a Broadway chip which – in contrast to the Ultimo X2 featured in the DLINE – also allows a redundant network connection or

Neutrik NA2-IO-DPRO with two analogue inputs and outputs each, which can optionally also be used for digital AES/EBU audio signals on CH2

daisy chaining with 1 Gbps. The supported sample rates are 44.1 k, 48 k, 88.2 k and 96 k. Power is supplied exclusively via PoE with a maximum power consumption of 6 W. If the switch used does not offer PoE, a simple PoE injector according to IEEE 802.3at or af standard can also be used.

The front panel is interesting, as users might miss digital AES/EBU inputs and outputs at first. A closer look, however, reveals that each of the analogue inputs or outputs' CH2 has a double function and is labelled with "ANA/AES". Users do not have to switch or carry out any settings for the respective signal type: a digital AES/EBU source or sink is always assumed to be as such and the device is set accordingly if only CH2 is connected. The signal is not checked in the process; the device only detects if there is a connection only in CH2.

Whether the inputs or outputs expect an analogue or a digital signal is optically indicated by a green or red LED. The digital input is equipped with a Sample Rate Converter (SRC), which accepts all signals up to a sample rate of 216 kHz and adjusts them to the Dante network's respective sample rate. Additional LEDs on the inputs indicate Signal Present, 48 V Phantom Power as well as an active high-pass filter and/or active PAD. There is only one LED at each output for the mute function.



QSYS integration of the Neutrik DPRO

All this is set via a corresponding small software, the DPRO controller. The software automatically recognises the associated devices in the network and also allows direct access to the Dante controller. All parameters including Mic/Line, Preamp Gain, PAD, HPF, and phantom power can be set via the interface. When it comes to the outputs, a mute function and faders for the output level are included.

The DPRO is also ready for QSYS as well as for Yamaha's CL and QL mixing consoles. Yamaha will integrate the Neutrik DPRO in the CL and QL consoles' firmware update to v.5.6 in spring 2020. The plug-in for integration into the QSYS Designer software has also been completed and, as of January 2020, is currently being approved by QSC. Neutrik expects a release within the next weeks. There is no need to change the DPRO's firmware itself, everything is already prepared in this respect.

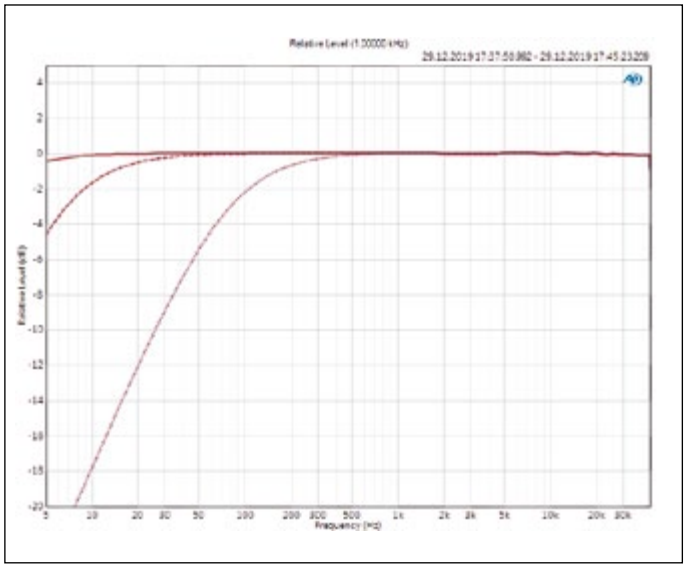
Yamaha CL/QL consoles will also be able to integrate the Neutrik DPRO directly from the console surface in the future

Two network connections on the NA2-IO-DPRO's rear

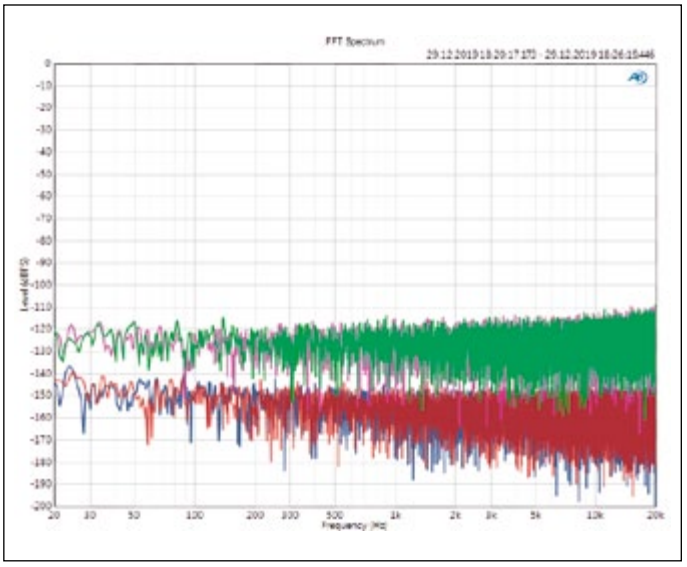
AD section and preamps

All measurements for the Neutrik NA2-IO-DPRO were performed with a sampling rate of 96 kHz. Starting with the analogue inputs, the frequency response, the signal-to-noise ratio and the distortion values or distortion spectra were measured. The latter also includes a measurement of the transient or dynamic intermodulation distortion (also called DIM or TIM), as this measurement is said to correlate well with a test device's sound characteristics.

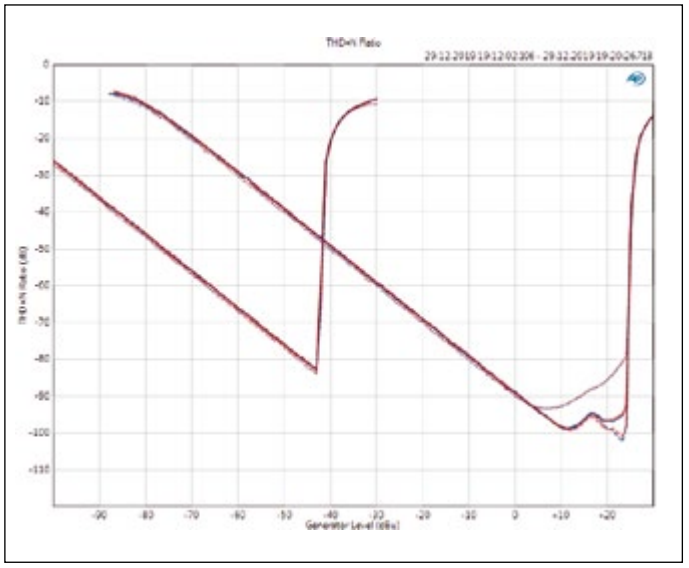
Fig. 1 first shows the two input channels' frequency responses, standardised to 0 dB at 1 kHz. For this, the measurement graphic covers a frequency range from



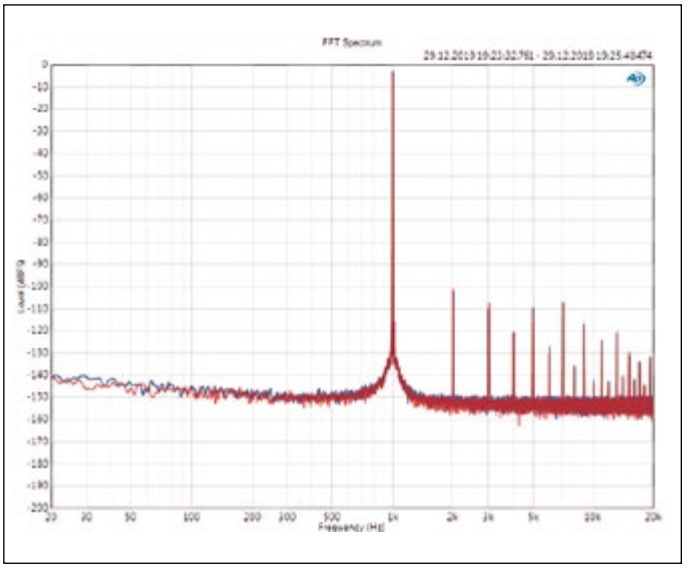
Frequency response of analogue inputs CH1 (blue) and CH2 (red) at minimum gain (solid curves), at maximum gain (dashed) and with 80 Hz high-pass filter. All curves are standardised to 0 dB at 1 kHz (Fig. 1)



Interference spectra of the analogue inputs with sum values of -114 dBfs at minimum gain (red, blue) and of -81 dBfs at maximum gain (green, magenta); both values are linearly weighted (Fig. 2)

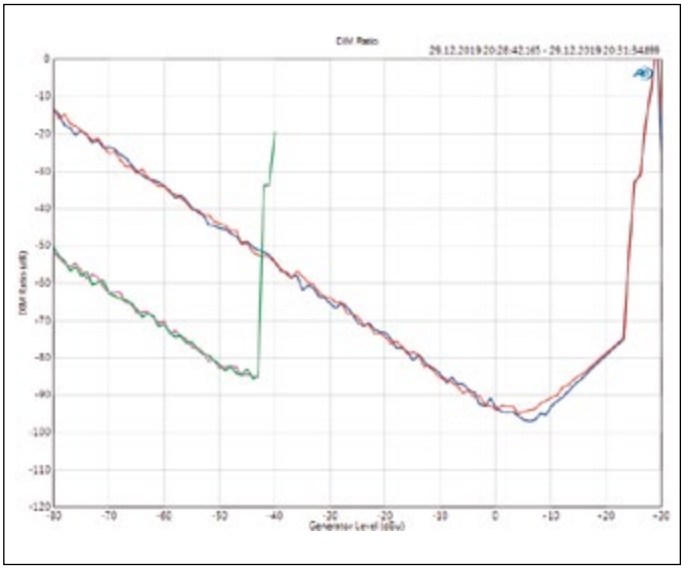


THD+N as a function of the input level for CH1 (blue) and CH2 (red). The clip limit or sensitivity for 0 dBfs is +24.7 dBu input level at minimum gain and -42.1 dBu at maximum gain. Measurement at 1 kHz (solid line), 100 Hz (dashed) and 6.3 kHz (dotted) (Fig. 3)

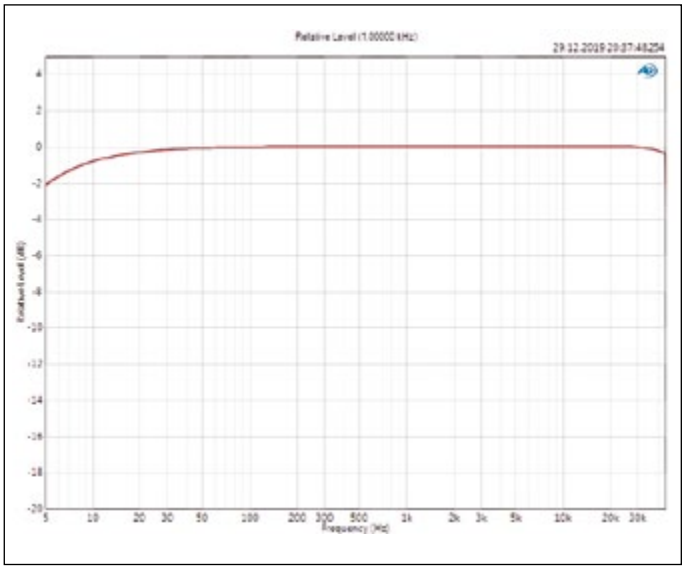


Distortion spectrum at 1 kHz measured via the analogue inputs at minimum gain and with an input level of +21 dBu corresponding to -3 dBfs on the digital side; CH1 (blue) and CH2 (red, Fig. 4)

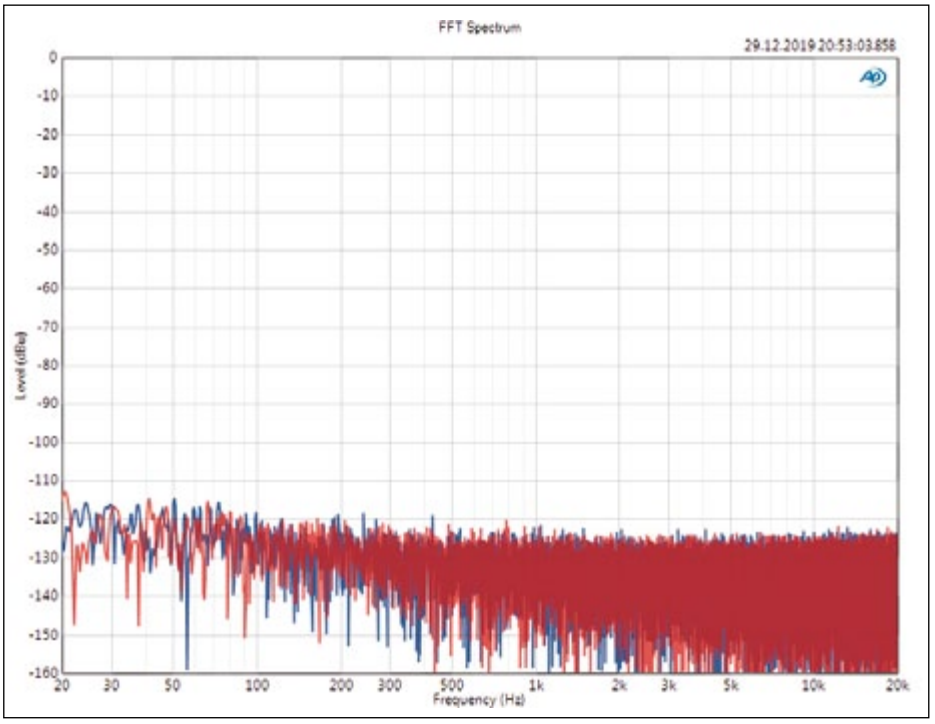
5 Hz to 45 kHz. The measurement was carried out for settings with a minimum gain of 0 dB in the preamp and with a maximum gain of 67 dB. A third series of measurements shows the curve with an active 80 Hz 1st-order high-pass filter (6 dB/Oct). Almost independent of the gain setting, the curves are, as expected, perfectly straight. For a gain setting of 0 dB in mic mode, the analogue input level for 0 dBfs on the digital side is +24.7 dBu. At a maximum gain of +67 dB, the input level for 0 dBfs is -42.1 dBu. In line mode, the 0 dBfs with active PAD are



Transient intermodulation distortion (TIM) of the analogue inputs as a function of the input level at minimum (red, blue) and maximum (green, magenta) gain (Fig. 5)



Frequency response of analogue outputs CH1 (blue) and CH2 (red). The curves are standardised to 0 dB at 1 kHz. The maximum output level is +24 dBu for 0 dBfs on the digital side (Fig. 6)



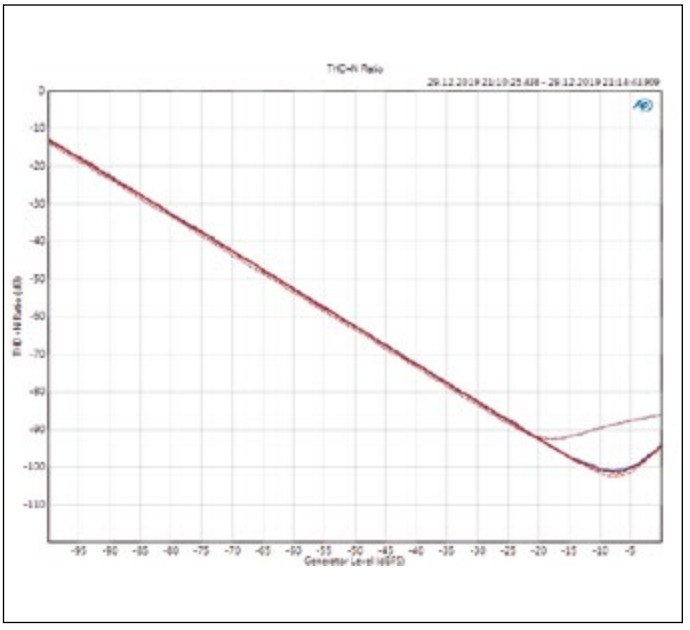
Interference spectrum at the analogue outputs with a total level of -88 dBu or -91 dBu with A-weighting. The maximum output level is +24 dBu, which results in an S/N of 112 dB or 115 dB, respectively (Fig. 7))

also reached at +24.7 dBu – at +8.7 dBu without PAD. The noise level measurements provide a signal-to-noise ratio of 114 dB evaluated linearly, of 116 dB A evaluated at 0 dB gain and of 81 dB or 84 dBA at a maximum gain of 67 dB. Together with the sensitivity of -42 dBu, this results in an EIN (Equivalent Input Noise) of -123 dBu. With A-weighting, it is -126 dBu.

For the distortion measurements, the harmonic distortions were first measured as THD+N (total harmonic distortions and noise). Fig. 3 shows the curves as a function of the input level measured for frequencies of 100 Hz, 1 kHz and 6.3 kHz in microphone mode for the two gain settings of 0 and 67 dB. The clip limits are then +24.7 dBu and -42.1 dBu respectively. At 0 dB gain, very good distortion values of about -100 dB are achieved. Only at 6.3 kHz does the curve begin to rise slightly at about 20 dB below the clip limit. At maximum gain, the curves are congruent regardless of the frequency and fall to a minimum of -83 dB. Considering the high amplification, this is also a very good value.

In addition to the harmonic distortions value as a whole, their spectral composition is also interesting. The even harmonics (k2, k4, ...) are said to have a more positive effect on the sound than the odd harmonics (k3, k5, ...). Important for the tonal characteristics is also the fast decrease of harmonics towards higher orders. Both are not quite achieved here. On the other hand, all harmonic distortion components are 100 dB or more below the fundamental wave, where it is open to serious discussion whether this can have any effect on the sound at all. Probably not.

The last measurement with a graphical display for the input section concerns the transient intermodulation distortion (TIM), in which a 15 kHz sine wave is superimposed with a steep-edged 3.15 kHz rectangle. The resulting intermodulations are evaluated. Fig. 5 shows the values again as a function of the analogue input level, which were also measured here for gain settings of 0 dB and +67 dB. In both settings, the NA2-IO-DPRO delivers good to very good results, especially again considering the high gain.



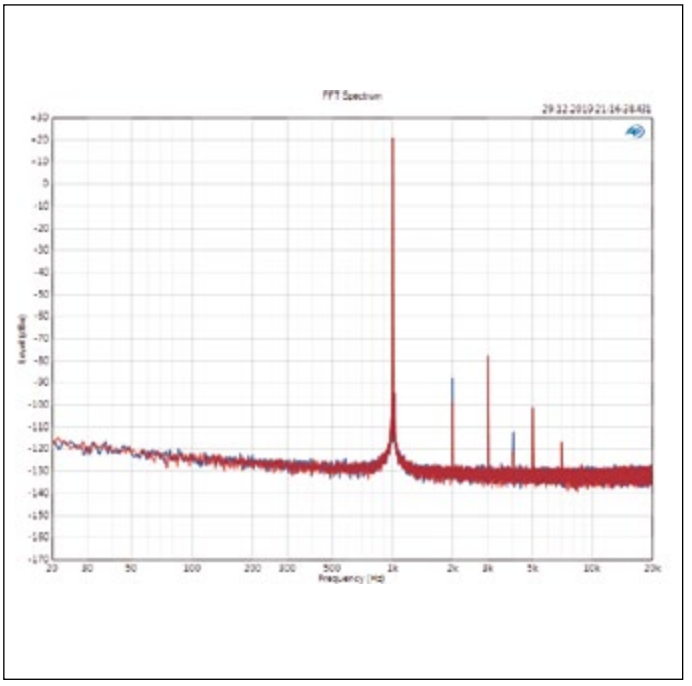
THD+N of the DA converters with amplifiers as a function of the output level. 0 dBfs on the digital side correspond to an analogue output level of +24 dBu. Measurement at 1 kHz (solid line), 100 Hz (dashed) and 6.3 kHz (dotted) (Fig. 8)

Measurements Neutrik NA2-IO-DPRO

RRP in € incl. tax	**840 €**
Sample rate	44,1 / 48 / 88,2 / 96 kHz
Dante module	**Broadway**
Number of analogue/ digital inputs:	2/2
Input sensitivity	+24.7... -42.1 dBu
S/N* @ min. gain	114 dB
S/N* @ max. gain	81 dB
IN* @ max. gain:	123 dBu
CMRR @ 1 kHz	72 dB
CTC @ 1 kHz	92 dB
Number of analogue/ digital outputs	2/2
Max. output	+24 dBu
S/N* rel. to max. output	112 dB
CTC @ 1 kHz	>100 dB
Internal resistance	150 Ω (symmetrical)

* All noise level values 20 Hz to 20 kHz unweighted

** In case of different values for the channels, the lower value is shown in the summary



Distortion spectrum at 1 kHz for a level of +21 dBu (-3 dBfs) at the analogue outputs; displayed in absolute values in dBu (Fig. 9)

DA section and amplifier

When it comes to the output, the DACs with the subsequent analogue amplifiers are responsible for the signal trans-mission. The NA2-IO-DPRO interface's maximum output voltage is +24 dBu. In contrast, the noise level measured at the analogue outputs is linearly weighted at -88 dBu and at -91 dBu with A-weighting, resulting in a S/N of 112 dB or 115 dB with A-weighting when it comes to the noise component. Fig. 7's interference spectrum consists exclusively of white noise and is completely free of mono-frequency components. Also flawless is the frequency response of the NA2-IO-DPRO's outputs. The curves in Fig. 6 are perfectly straight. When it comes to distortion, the DACs and the subsequent amplifiers in principle offer comparable measurements as were made for the ADCs. Fig. 8 and 9 show the THD+N curves as a function of level at 100 Hz, 1 kHz, and 6.3 kHz as well as the FFT spectrum at 1 kHz. The FFT spectrum was measured 3 dB below full scale and thus at an output level of +21 dBu. The diagram shows the results in dBu. For the largest harmonic (k3) with a level of -79 dBu, this therefore results in a distortion of -100 dB. For both measurements, the Neutrik interface therefore achieves very good values.

Summary

With the NA2-IO-DPRO, Neutrik launches another Dante interface that offers everything one could wish for – with line level inputs and complete microphone inputs as well as digital AES/EBU inputs and outputs. Thanks to the Audinate Broadway chip, primary and secondary network interfaces are now also available and data can be transmitted with up to 1 Gbps. All this is contained in a very solidly constructed, tiny enclosure and delivers a consistently good to very good performance. For a list price of 840 €, the NA2-IO-DPRO is a Dante interface that can be used in all kinds of situations. ■ [11630]