

stereophile

SASHA MATSON

MOON by Simaudio 371

STREAMING INTEGRATED AMPLIFIER



The origins of Canadian audio manufacturer MOON, from the company called Simaudio, stretch back to 1980, when audio engineer Victor Sima created his first designs. Sima's company became Simaudio Ltd. in 1990. Simaudio launched the MOON brand in 1997. Simaudio's factory is located in Boucherville, Quebec, across the St. Lawrence River from Old Montreal. Currently helmed by principals Costa Koulisakis and Thierry Dufour, Simaudio has been at the forefront of Canadian audio design and manufacture for 45 years. With only the tiniest exceptions, everything Simaudio does is done at their Boucherville factory.

I'm not sure how consumers got so lucky. Today, even with the chaos tariffs created, customers interested in audio can now choose from a surfeit of products that are better designed and manufactured, do more, and cost less than was the case just a few years ago. This is particularly striking for multifunction integrated units including streaming preamplifiers and integrated amplifiers. In a marketing presentation, Simaudio described the compact, integrated approach as a way of "targeting newcomers to HiFi and bringing people back to HiFi."

This trend toward packing as many audio capabilities as possible into one box has accelerated and spread downward and upward in

quality and price. Some manufacturers that in the past were mainly associated with state-of-the-art separates have gotten onboard, offering high-quality integrated designs, Simaudio included. Even MOON's higher-end North series integrates functions, including the 791 and 891 network player/preamplifiers.

Fly me to the MOON

In one respect, magazine writing staffs are like football teams. Jim Austin attended the MOON 371 launch event last year, and he intended to review it himself. When he became too busy, he handed it off to me so that we could keep the ball moving down the field.

The 371 streaming integrated amplifier is the first product in a new MOON collection called COMPASS. The idea is that (since Simaudio is Canadian) COMPASS points NORTH, which is to say, toward the company's higher-end NORTH collection.

The MOON 371 Network Player/Integrated Amplifier (\$6500) offers built-in Ethernet and Wi-Fi streaming. It can process up to 32/384 PCM and DSD 256 from the major service providers: It's Roon-certified and incorporates Qobuz, Tidal, Spotify, and so on via their "Connect" capabilities or by integrating those services into the Simaudio MiND network music player app.

SPECIFICATIONS

Description Solid state streaming integrated amplifier. Rated output power: 100Wpc into 8 ohms, 200Wpc into 4 ohms (both 20dBW). Analog inputs: two line (XLR, RCA), one phono (on RCA). MM: 47k ohms/100pF, MC: 1k ohms, 0pF, Digital inputs: HDMI-ARC, S/PDIF on RCA, TosLink, two Ethernet on RJ45, USB "Host."

Analog outputs: RCA variable (preamp-out) L, R speaker outputs, 1/4" headphone. Input sensitivity: 0.3-4V for maximum rated output. Input impedance: 9.5k ohms. Gain: 40dB (line). Frequency response: 5Hz-100kHz (+0/-3dB). Crosstalk: -108dB. THD: 0.009% at 1W, 0.003% at 100W. IMD: 0.005%. S/N ratio: 108dB.

Damping factor: 425. Power consumption: 30W at idle, 6W low-power standby.

Dimensions 16.9" (429mm) W x 3.5" (87mm) H x 15.2" (385mm) D. Shipping weight: 20lb (9kg).

Finishes Black, two-tone Silver/Black.

Serial number of unit reviewed 319A22630243-X.

Designed and manufactured in Boucherville, Quebec, Canada.

Price \$6500. Approximate number of US dealers: 59. Warranty: 10 years parts & labor with registration.

Manufacturer Simaudio Ltd., 1345 Newton Rd., Boucherville, Quebec J4B 5H2, Canada. Tel: (450) 449-2212. Web: simaudio.com.



The 371 incorporates a phono stage capable of supporting both MM and MC cartridges, and a color front-panel screen measuring $6\frac{1}{2} \times 2$ ". It utilizes a class-AB output stage capable of producing 100Wpc into 8 ohms or 200Wpc into 4 ohms. All this is packed into a modest-sized anodized aluminum case weighing 20lb. It's available in either black or a two-tone (silver-black) finish. A basic aluminum remote control is included, but customers have the option of pairing the 371 with the fuller-featured, oval-shaped BRM-1 remote control. The only digital playback item not included here is a silver-disc transport.

Upon returning to the city after a few weeks in Woodstock, I retrieved the MOON 371 from a lockup in the mailroom of my NYC apartment building, where Jim had dropped it off days earlier. Inserting it into my New York Apartment System couldn't have been easier. I hadn't planned it that way, but the result was an informal kissing-cousins shootout: The 371 replaced the AVM Inspiration CS 2.3 all-in-one integrated I reviewed in June 2023, which has a similar feature set and an almost identical list price. I plugged in my small Sonus faber speakers, REL subwoofer, Pro-Ject turntable, and the LAN Ethernet cable direct from the modem. In minutes I

was up and running—I should say “running in”: The MOON 371 was a new unit from the factory, so I let it burn in for some days prior to making notes.

MOON has been around long enough to establish a recognizable visual style. The exterior of the 371 conveys this visual signature, with curved, beveled corners and edges, made from anodized extruded aluminum. The left and right “cheeks” of the front panel frame the large display. The sides are recessed heatsinks made from the same materials.

The front panel of the MOON 371 is simple and minimalist in appearance: Only a large multifunction knob toward the right side breaks the smooth surface. A $\frac{1}{4}$ " headphone jack is tucked into one corner, but you really must be looking for it to see it. Six tiny, recessed pushbuttons to the left of the display perform various functions; unless their labels are lit, they are similarly hard to see.

The rear panel of the MOON 371 isn't minimalist at all: The many functions of the 371 require a host of input and output connections. There are three analog inputs, two on RCA (one phono, one line; there's a grounding connection for phono) and one balanced on XLR. There are four digital inputs: S/PDIF via RCA (2) and TosLink

MEASUREMENTS

I performed a full set of measurements on the MOON 371 with my Audio Precision SYS2722 system.¹ As is typical with modern products, when I connected its Ethernet port to my router, the MOON suggested that I update its firmware. I did so; after the update it was running firmware V.1.02 with the MiND module running V.2.07.

Before I started the measurements, I preconditioned the amplifier by operating it at $\frac{1}{8}$ the specified power into 8 ohms

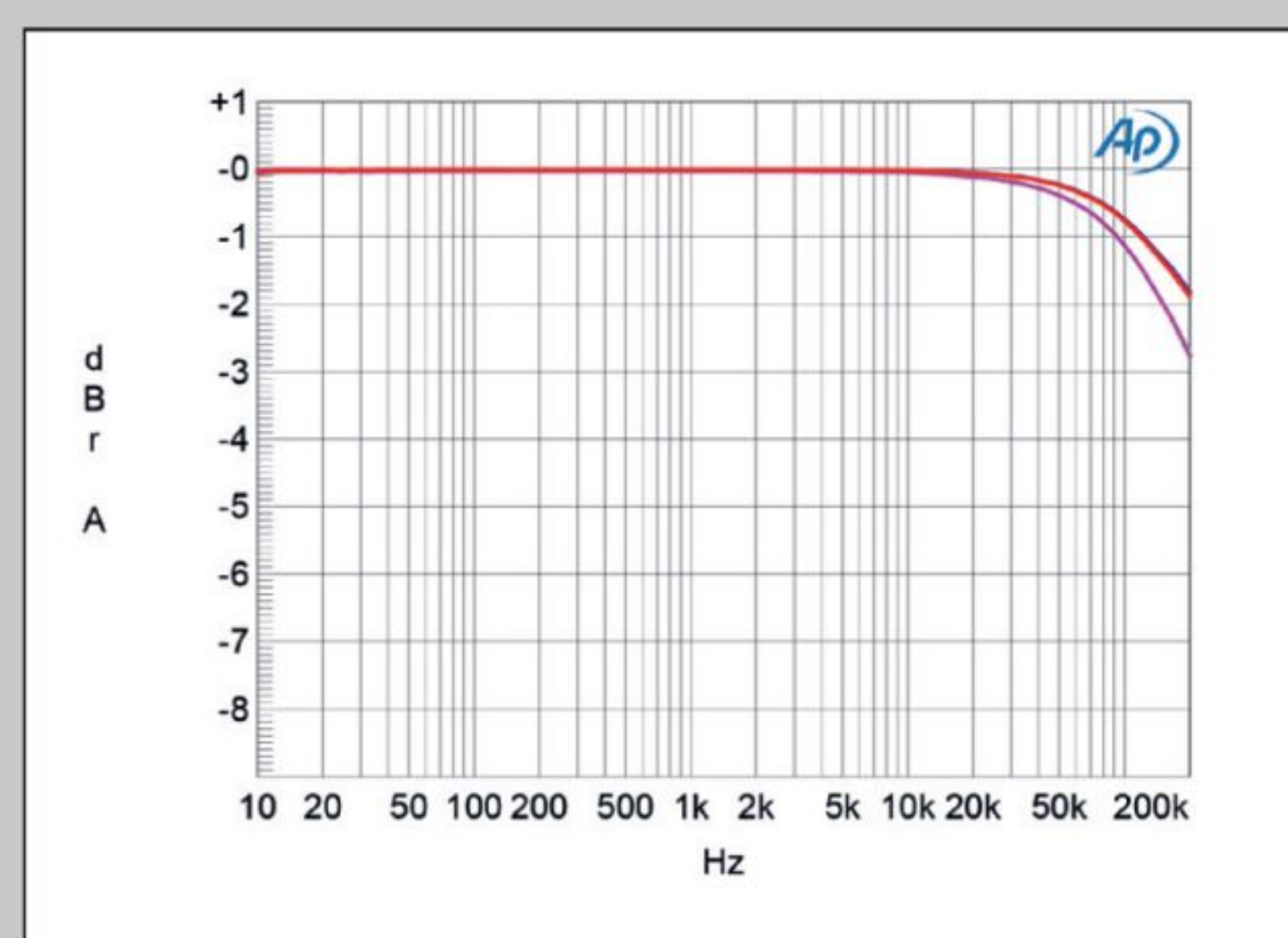


Fig.1 MOON 371, line input, frequency response at 2.83V into 8 ohms (left channel blue, right red) and 4 ohms (left cyan, right magenta) (1dB/vertical div.).

for 30 minutes. At the end of that time, the temperature of the heatsinks on the amplifier's sides was 137.8°F/58.6°C. The temperature of the top panel was lower, at 94°F/37.4°C; still, this amplifier needs plenty of ventilation.

Looking first at the MOON 371's balanced and single-ended line-level inputs, the amplifier preserved absolute polarity, ie, was noninverting, at the loudspeaker, single-ended “Analog” RCA, and headphone outputs. The unbalanced line input impedance was close to the specified 9.5k ohms, at 8k ohms at 20Hz and 1kHz, dropping inconsequentially to 7.5k ohms at 20kHz. The balanced input impedance was 19.2k ohms across the audioband. The volume control operates in accurate 0.5dB steps; with the volume control set to the maximum of “80,” the voltage gain at 1kHz with both types of inputs was 37.5dB from the loudspeaker output into 8 ohms and from the headphone output into 100k ohms. The gain from the RCA output was 6dB, again with both input types.

The RCA output impedance was a use-

fully low 50 ohms from 20Hz to 20kHz; the headphone output impedance was relatively high, at 327 ohms, again from 20Hz to 20kHz. The loudspeaker output impedance was very low, at 0.02 ohm at 20Hz and 1kHz, rising slightly to 0.05 ohm at 20kHz. The modulation of the MOON 371's frequency response due to the Ohm's law interaction between this impedance and the impedance of our standard simulated loudspeaker² was therefore negligible (not shown). The amplifier's response into resistive loads (blue, red, cyan, and magenta traces) was flat in the audioband and -2 dB at 100kHz. Both the very close channel balance and the overall response were preserved at lower settings of the volume control, with the balanced and unbalanced inputs. There was no overshoot or ringing on the MOON 371's reproduction of a 10kHz squarewave into 8 ohms (fig.2).

Channel separation was excellent, at

¹ See stereophile.com/content/measurements-maps-precision.

² See stereophile.com/content/real-life-measurements-page-2.

and HDMI-ARC. Streaming connectivity is via two back-panel Ethernet connections and a hidden Wi-Fi antenna. There is no USB audio input: The two USB-C ports are for connecting a music library on a flash drive or a portable SSD (the one labeled “Host”) and for service. A 12V trigger, a pair of Preamp Outs on RCA, two pairs of high-quality speaker binding posts, a fuse, an IEC power cord connection, and an On/Off rocker switch complete the busy picture. I suggest using speaker cables with banana plugs, since the right speaker connection is just above the phono inputs, which makes spades hard to connect unless you want the cables sticking up.

There are three ways to operate the MOON 371: the front panel buttons and control knob, the supplied remote control, and a dedicated App. Initial setup, I found, is best accomplished from the front panel. Basically, you scroll through input and function options using the big knob and select them with the buttons. Once it is up and running, you can enter information (like names and passwords for Wi-Fi networks) via the MiND app.

In my apartment system setup, I struggled to get Wi-Fi to connect. I don’t know why. (Later, in my house Upstate, I would succeed in connecting to Wi-Fi.) But when I plugged in an Ethernet cable direct from the modem and properly entered the network info, I went straight online. No issues. I have often been advised—and have found myself—that hardwired is the best way to go with streaming audio.

Inside information

Earlier I called the 371’s amplification “class-AB.” That’s not wrong, but it’s not the total picture. To understand the circuit architecture utilized by the MOON 371, we must tackle a few acronyms—like MDCA, which stands for “MOON Distortion-Canceling Amplifier.” This technology was first developed for MOON’s North Collection and has now been adapted (and adopted) for the Compass Collection. Jim Austin explained MDCA in an online post after hearing the 371 demoed in Montreal: “Instead of using conventional feed-

back or feed-forward circuits, MDCA duplicates the signal at the input stage and routes the duplicated signal to a proprietary circuit, which determines the correction required. This

correction signal is then injected back into the audio path.” Simaudio’s 371 specification is impressive: “total harmonic distortion @ 100W: 0.003%. Intermodulation distortion: 0.005%.”

The COMPASS 371 also includes a new kind of power supply called MHP, for “Moon Hybrid Power.” This new power supply can provide a whopping 800W of continuous DC power while reducing harmonics, creating a smooth analog wave, and improving energy efficiency. I asked Product Director Dominique Poupart to explain. “MOON Hybrid Power is a hybrid power supply design that brings together the strengths of both switch-mode and linear technologies, giving the MDCA circuit the ideal conditions to perform at its best. Fine spatial cues and microdetails emerge with greater clar-

With an assist from the MOON 371, our New York apartment was transformed into an early-’60s Nashville gin dispensary.

measurements, continued

>110dB in both directions below 3kHz and still 100dB at the top of the audioband. The wideband, unweighted signal/noise ratio at the loudspeaker outputs, taken with the single-ended line inputs shorted to ground and the volume control set to its maximum, was a good 70dB (average of both channels), ref. 2.83V, which is equivalent to 1W into 8 ohms. This ratio improved to 83.5dB when the measurement bandwidth was restricted to the audioband and to 86.2dB when A-weighted. The spectrum of the MOON 371’s low-frequency noise floor at 1Wpc into 8 ohms, with the volume control set to its maximum, is shown by the red and blue traces in fig.3. There are no supply-related

spurious, and the levels of the random noise components dropped by around 6dB when I set the volume control to “68,” equivalent to -6dB, and increased the level of the input signal so that the output was the same 1Wpc into 8 ohms (green, gray traces).

MOON specifies the 371’s maximum power as 100W into 8 ohms and 200W into 4 ohms, both equivalent to 20dBW. Figs.4 and 5 respectively plot how the THD+noise percentage in the MOON 371’s output varies with power into 8 ohms and 4 ohms with both channels driven. *Stereophile* defines clipping as when the THD+N reaches 1%. The MOON 371 clipped at 135Wpc into 8 ohms (21.3dBW) and at 265Wpc into 4 ohms

(21.2dBW). The FTC’s updated “Amplifier Rule” states that maximum power should also be assessed at frequencies other than 1kHz.³ I therefore repeated the power test with a 20kHz signal. The amplifier clipped at the same 135Wpc into 8 ohms at this frequency as it had at 1kHz.

The downward slope of the traces in figs.4 and 5 indicates that distortion lies beneath the noise floor below waveform clipping. Fig.6 shows how the MOON 371’s THD+N percentage changed with frequency at 20V, which is equivalent to 50W into 8 ohms (blue, red traces) and

³ See stereophile.com/content/ftc-updates-amplifier-rule.

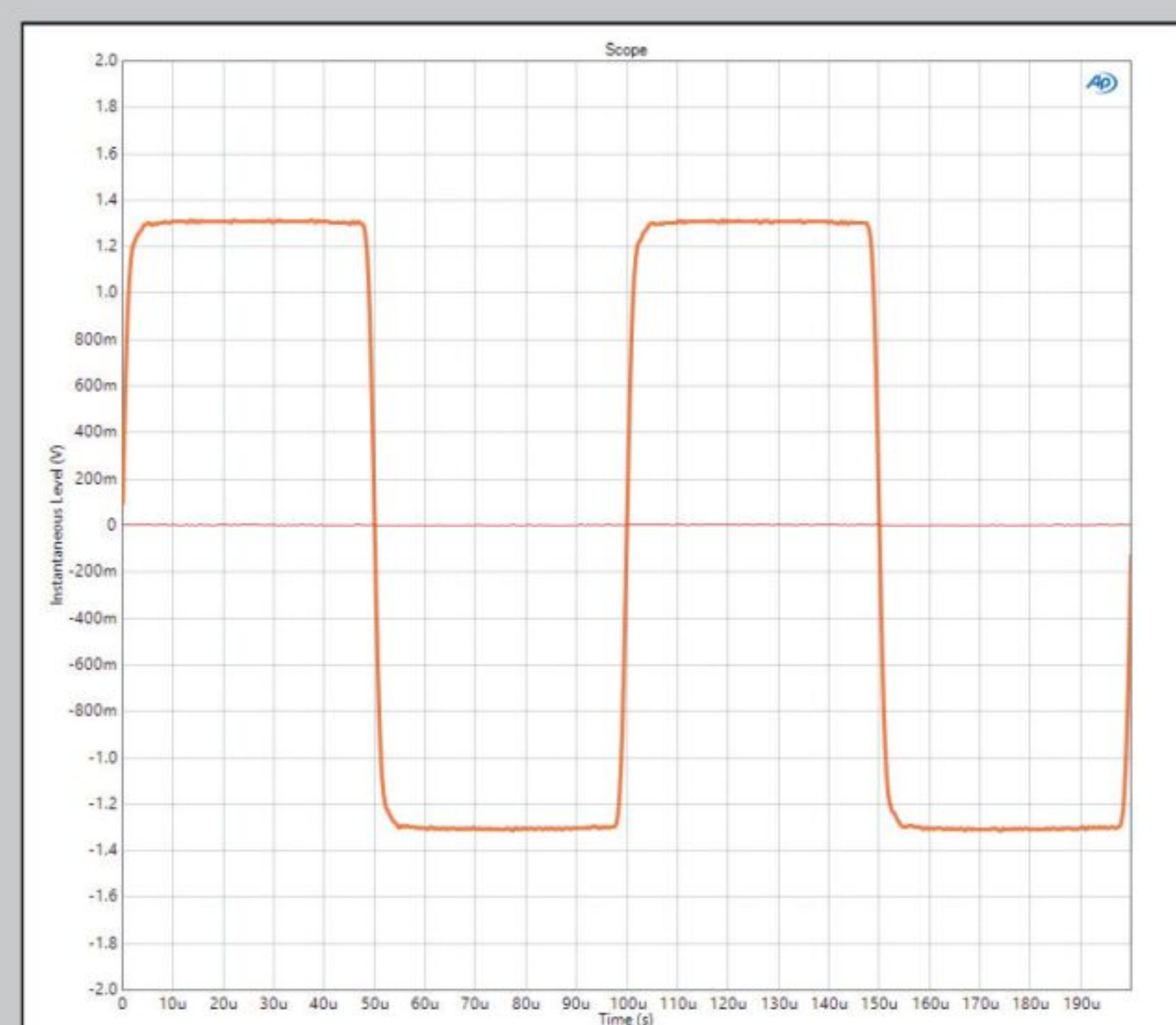


Fig.2 MOON 371, line input, small-signal, 10kHz squarewave into 8 ohms.

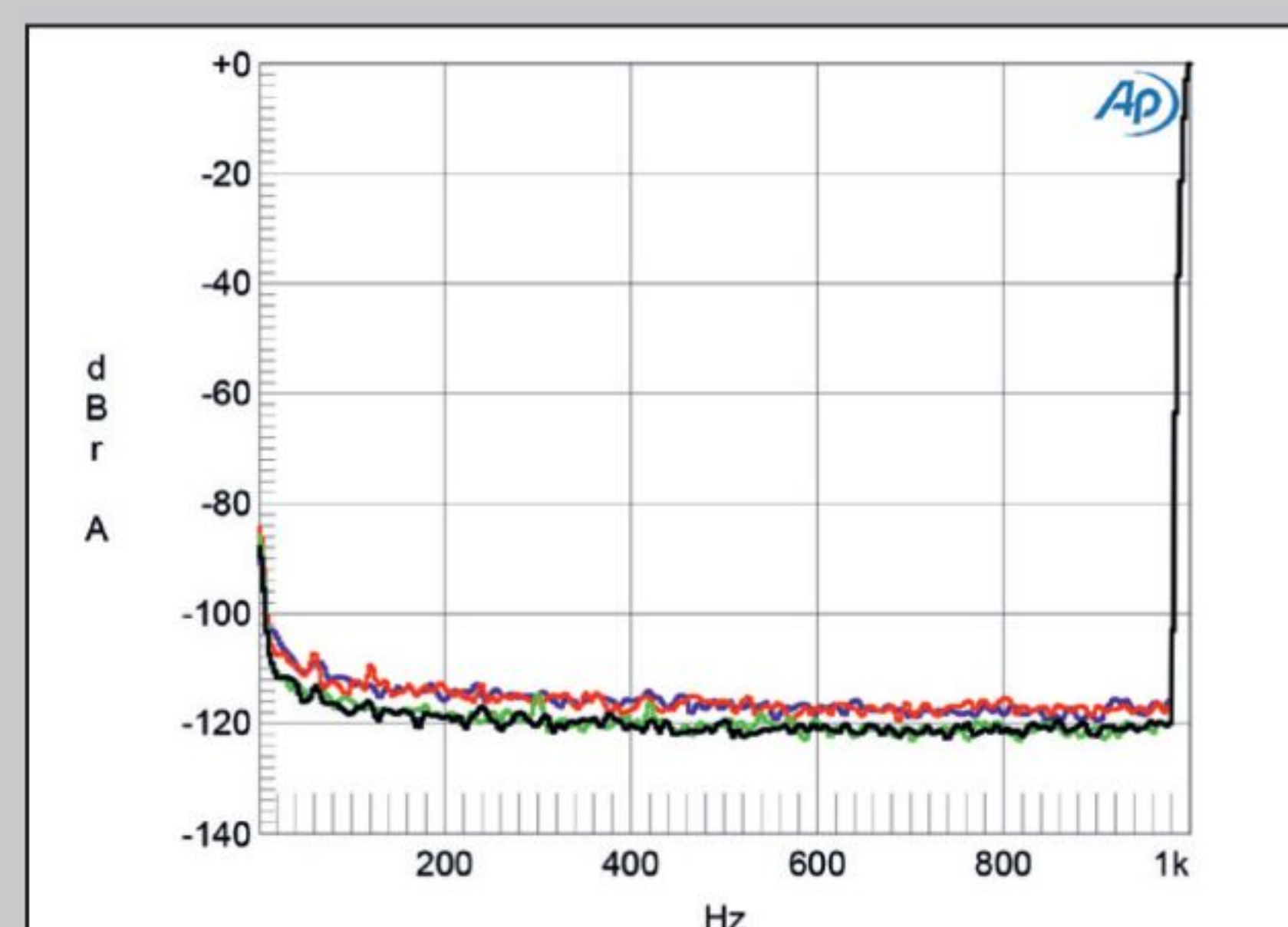


Fig.3 MOON 371, line input, spectrum of 1kHz sine wave, DC–1kHz, at 1Wpc into 8 ohms with volume control set to the maximum (left channel blue, right red) and to -6dB (left green, right gray) (linear frequency scale).

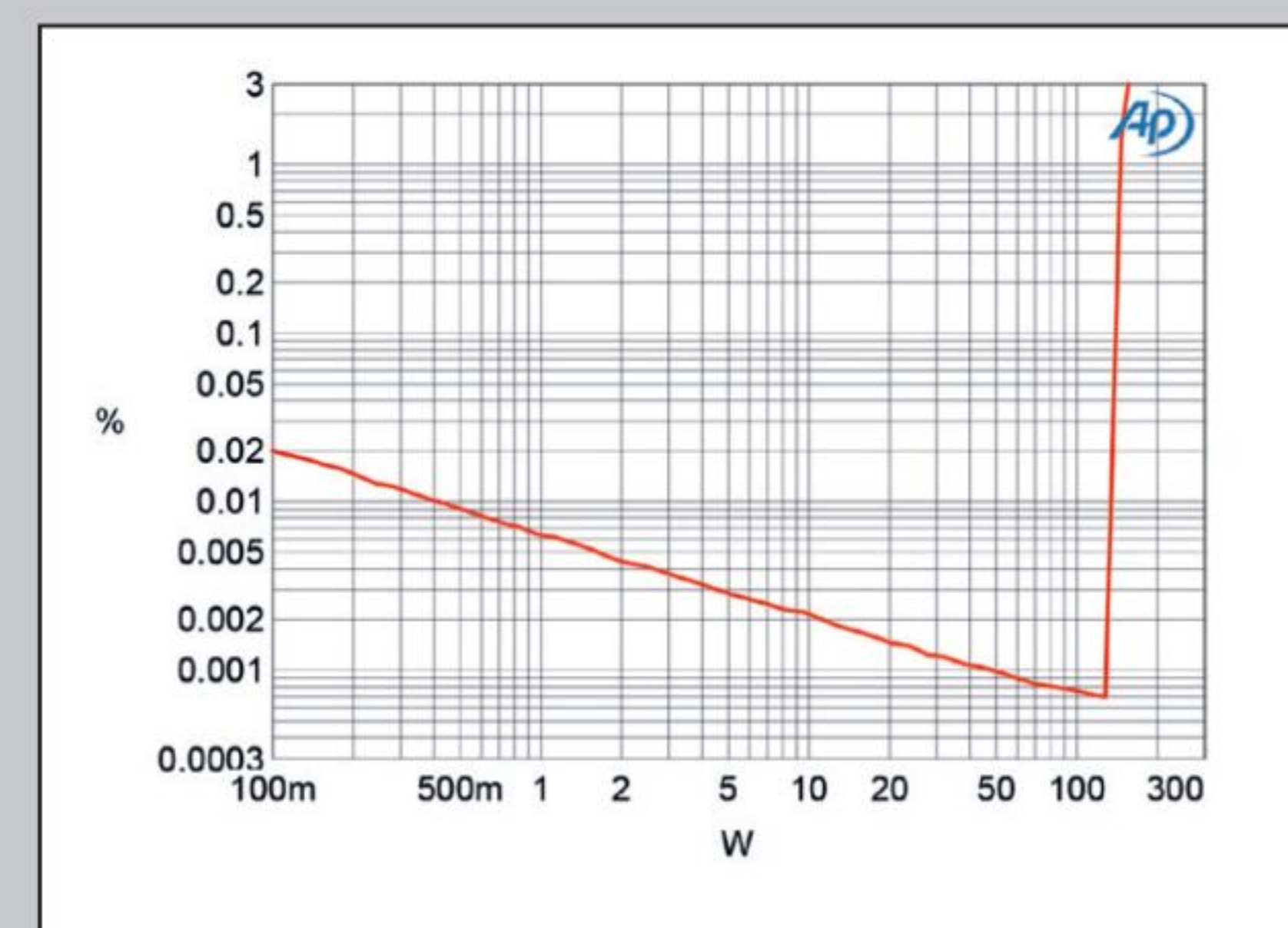


Fig.4 MOON 371, line input, THD+N (%) vs 1kHz continuous output power into 8 ohms.

ity, giving music a cleaner and more unfettered character. The sound acquires a relaxed naturalness and spatial realism.”

The 371’s phono stage is all analog—no digital conversion. It employs fixed loading settings: 47k ohms and 100pF for moving magnet cartridges, 1k ohms and 0pF for moving coil. MM gain is a standard-ish 40dB; MC gain is on the low side

at 60dB; neither the gain nor the loading are optimal for ultralow-output moving coils. Step-up transformers and external MC phono preamplifiers are of course available to those who wish to use their favorite low-output MC with the 371.

Those who keep a music library on a computer will miss having a USB input. Dominique Poupart explained: “We decided not to include a traditional USB-B computer input simply because fewer listeners still use their amplifier or DAC that way. Instead, we chose a USB-C Host input, which serves a more useful purpose today: It lets someone plug in a USB key or small portable drive and play music without involving a computer at all.” Those who store music on their computers can still send it to the 371 over the network.

The digital stage of the MOON 371 employs an ESS ES9039Q2M two-channel converter chip. Simaudio describes the configuration: “A low-jitter picosecond-grade clock is placed in close proximity to



the DAC to minimize phase noise.” Those “critical digital and clock circuits” are powered with separate, dedicated low-noise voltage regulators. The DAC’s analog output stage is optimized “to mate seamlessly with the unit’s internal preamp.”

The MOON 371’s digital filter setting for the DAC is fixed, not variable. “In our experience, products that

offer multiple filter choices often lead users to endlessly toggle settings instead of simply enjoying the music,” Poupart said. Either that, or they ignore them.

The streaming platform bundled into the MOON 371 is called “MiND 2”; the associated app is the MOON MiND Controller. It is available for iOS and Android from the Apple App Store and Google Play. MiND 2 supports multiroom installations.

The Sounds of Music

I got off on the good foot with the first music I heard from the MOON 371. I had plugged in my Pro-Ject Debut Carbon EVO turntable fitted with a Sumiko Olympia moving magnet cartridge. The output level with the Sumiko MM cartridge was fine—no need to crank the volume knob. I grabbed an original copy of Mel Tormé’s first studio album for Verve, *Tormé*, from 1958 (Verve MG V-2105).

measurements, continued

100W into 4 ohms (green, gray traces). The distortion+noise into both loads is very low, though slightly higher in the right channel into 4 ohms (gray trace), with a small rise in the top audio octaves in both channels into both loads.

The distortion signature was primarily the second harmonic; even so, at <math><110\text{dB}</math> (0.0003%) at 50W into 8 ohms (fig.7), it is negligible. Even at the same peak voltage into 4 ohms, intermodulation distortion with an equal mix of 19kHz and 20kHz tones was extremely low in level (fig.8). The difference tone at 1kHz lay at -114dB (0.0002%), and the higher-order products all lay at or below

-100dB (0.001%).

Turning to the MOON 371’s phono input, this can be set with the menu on the front-panel display to moving coil (MC) or moving magnet (MM). To measure the behavior of this input, I connected the ground terminal on the amplifier’s rear panel to the analyzer’s chassis ground. Both phono input modes preserved absolute polarity at all three output types. The MM input impedance is specified as 47k ohms; I measured 43k ohms at 20Hz and 1kHz, and 34.4k ohms at 20kHz. The MC input impedance is specified as 1000 ohms. I measured 980 ohms from 20Hz to 20kHz.

The specified gain for the phono input modes is 40dB in MM mode and 60dB in MC mode. With the volume control set to the maximum, the gain in MM mode was 45.7dB from the RCA output and 77.8dB at the loudspeaker and headphone outputs, which confirms that the power amplifier stage adds around 32.1dB of gain, close to the specified 31dB. The gain in MC mode with the volume control set to the maximum was 20dB greater than it was in MM mode. I examined the phono input’s performance at the headphone output, which mutes the other two pairs of outputs. To avoid clipping the headphone output, I performed these

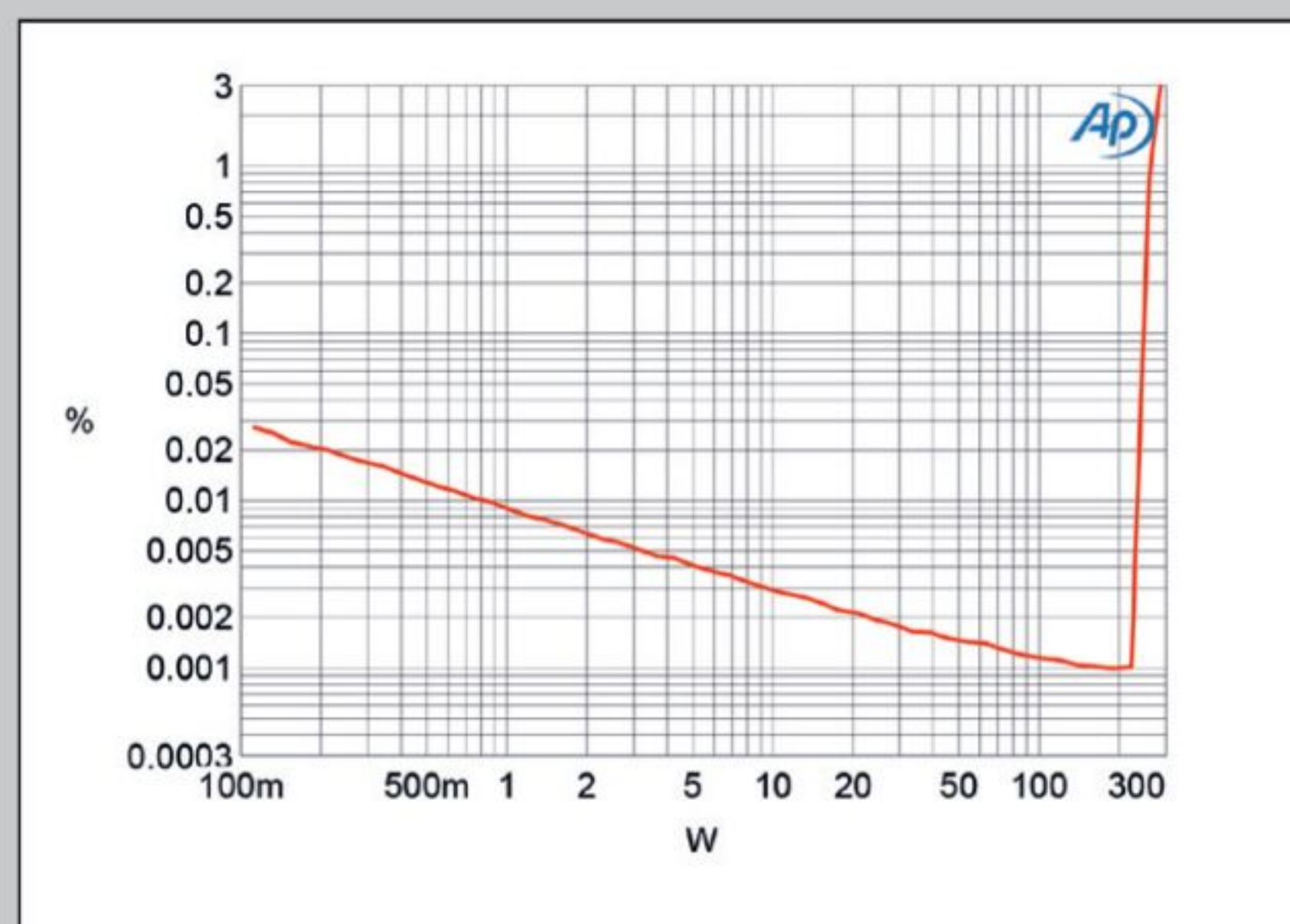


Fig.5 MOON 371, line input, THD+N (%) vs 1kHz continuous output power into 4 ohms.

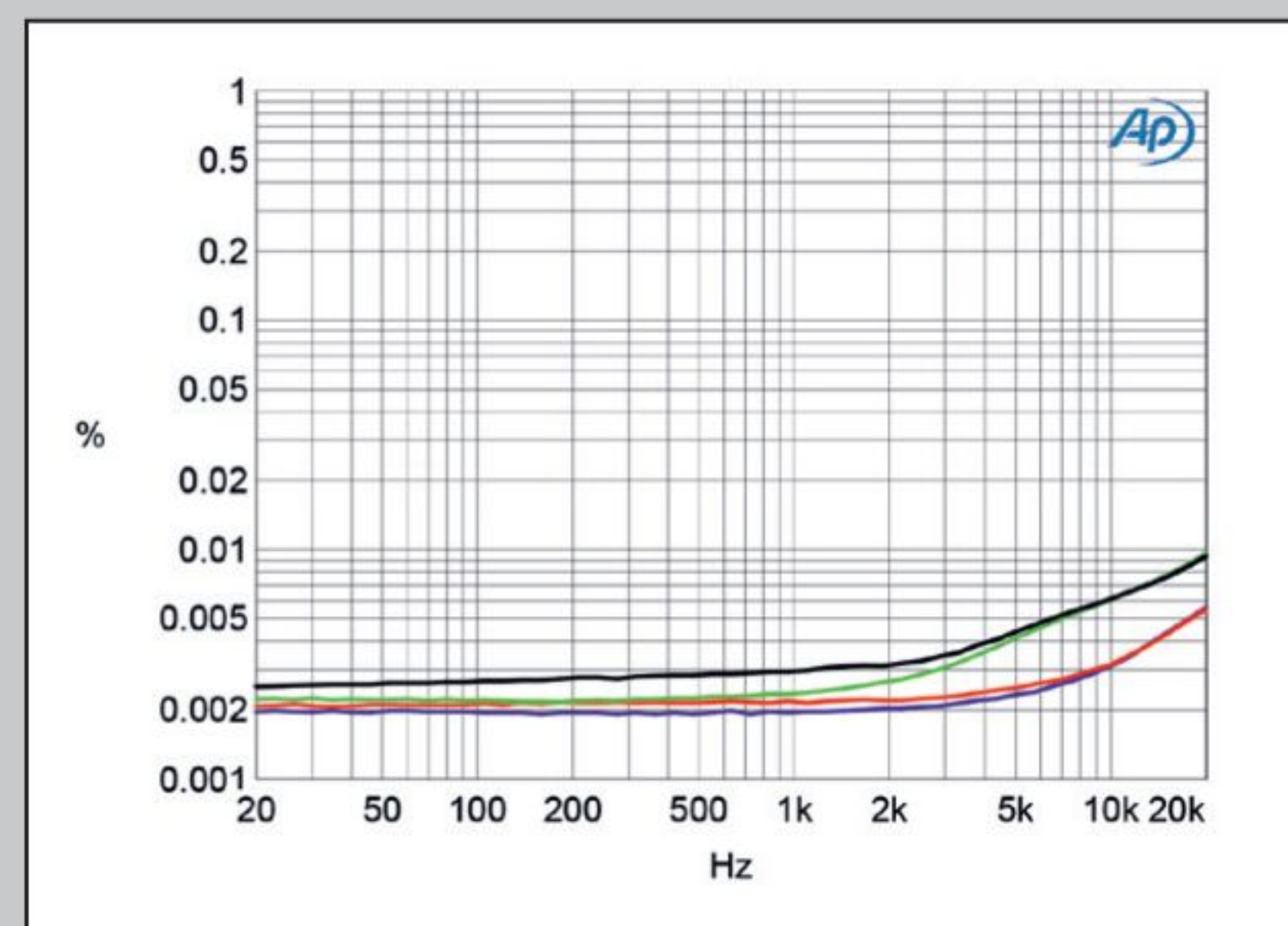


Fig.6 MOON 371, line input, THD+N (%) vs frequency at 20V into 8 ohms (left channel blue, right red) and 4 ohms (left green, right gray).

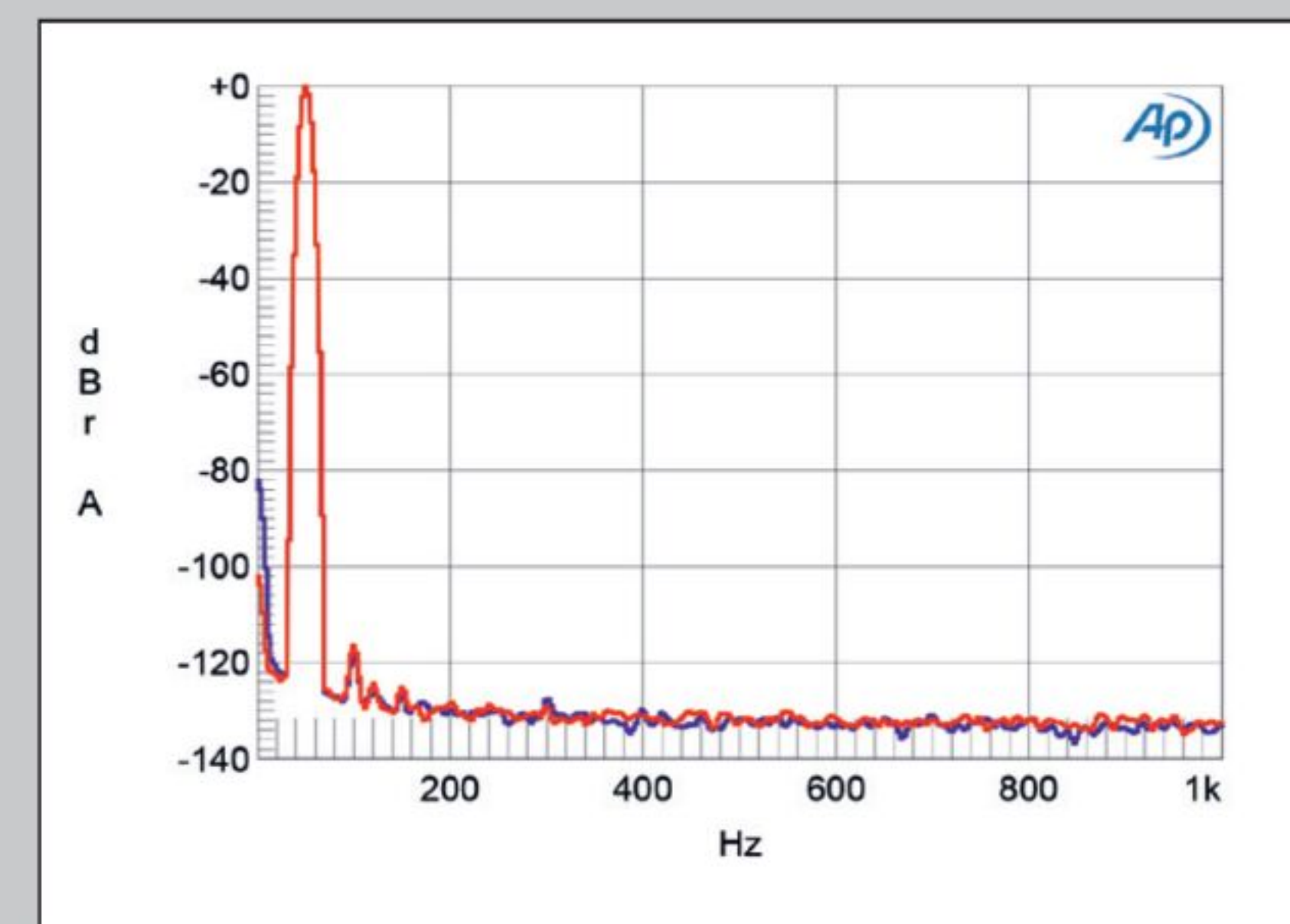


Fig.7 MOON 371, line input, spectrum of 50Hz sine wave, DC-1kHz, at 50Wpc into 8 ohms (left channel blue, right red, linear frequency scale).

The fine Marty Paich arrangements sounded at once detailed and relaxed. The young Mel's velvet vocal tone came across clearly. Listening to "Gloomy Sunday," my initial impression (which never left me over subsequent weeks of listening with different systems) was of a sound that was almost tubelike, in a good way.

Continuing in a similar vinyl vein, I spun another old original LP, which I had picked up in a used book and record store on West 72nd Street in NYC. The MOON 371 is a truth-teller. An old scratchy record is going to sound like an old scratchy record—no aural gauze or bandaid here.

Ray Charles recorded *Have a Smile with Me* in 1964 (ABC-Paramount ABCS-495). What a kick this great, swingin' big-band album is, a combination of great, earthy R&B numbers with some real garbage mixed in—hey, it was 1964! "The Man with the Weird Beard" somehow coexists with "Move It On Over" and "Two Ton Tessie," with great arrangers including Gerald Wilson and Benny Carter.

With an assist from the MOON 371, our New York apartment was transformed into an early-'60s Nashville gin dispensary. I couldn't keep from grinnin' and tappin'.

Using the MOON MiND Controller app on my iPhone, I found the page where streaming services and other input options are listed. That list includes internet radio. I enjoy listening to New York's only surviving classical music station, WQXR. I saved it as a Favorite, to be recalled easily later. Sound quality was excellent. The MiND app displays the resolution of whatever is playing—in this case streaming at 128kbps. That's information I like to know. Volume can be adjusted, and sound muted, via taps on a phone



screen. It isn't a digital volume control: The app adjusts the analog control in the 371. You can use the supplied remote.

Or if you don't mind getting up out of your chair, the weighted front-panel knob is excellent, operating in 1dB increments from 0 to 30, and then in 0.5dB steps up to a numerical maximum of 80. Volume numbers and the Mute function are displayed in nice, large letters and numbers on the front panel screen. I got hooked on the quality of this color display—large enough that I could read it and see album covers from across the small room.

I shipped the 371 to myself in Woodstock. Once I was back Upstate, I inserted the amp into our living room system, swapping out the McIntosh MA252 integrated amplifier that lives there.

measurements, continued

measurements with the volume control set to "68" (-6dB), "56" (-12dB), or "40" (-20dB) depending on which test I was performing.

The MOON 371's RIAA equalization, measured in MM mode (fig.9), was accurate, with very close channel matching. The MOON 371 phono stage's unweighted, wideband S/N ratio in MM mode, measured at the headphone output with the input shorted to ground and the volume set to "68," was a good 67.5dB in both channels ref. 1kHz at 5mV. Restricting the measurement bandwidth to 22Hz–22kHz increased the ratio by 5dB, while the A-weighted ratio was a very good 84.5dB. The S/N ratios in MC mode, ref. 1kHz at 500µV, were around 20dB lower due to the presence of very low-frequency noise

(see later).

I measured the MOON 371 phono input's overload margins with the volume control set to "40" to make sure I was looking at true input overload rather than output stage clipping. The margins in MM mode were a very good 18.9dB at 20Hz, 18.1dB at 1kHz, and 17.6dB at 20kHz, all ref. 1kHz at 5mV. The margins in MC mode, ref. 500µV at 1kHz, were even larger, at 29.8dB from 20Hz to 20kHz. Harmonic distortion was very low, even at 12dB below the MM input overload voltage (fig.10), as was intermodulation distortion. The difference product at 1kHz with an equal mix of 19kHz and 20kHz tones at a peak level of 100mV, with the volume control set to "56" in MM mode, lay at just

-94dB (0.002%).

I tested the 371's digital conversion via the optical and coaxial S/PDIF inputs and via the Ethernet input using network data played with Roon and the MiND app. The S/PDIF inputs all locked to data with a sample rate of 192kHz. The digital inputs preserved absolute polarity at the speaker, RCA, and headphone outputs.

With the volume control set to the maximum, the output level with a 1kHz tone at -30dBFS was 134.3mV from the RCA output and 5.15V from the headphone output into 100k ohms and from the loudspeaker output into 8 ohms; the last is 16dB below the clipping voltage of 32.9V. Except where noted, I examined the digital inputs'

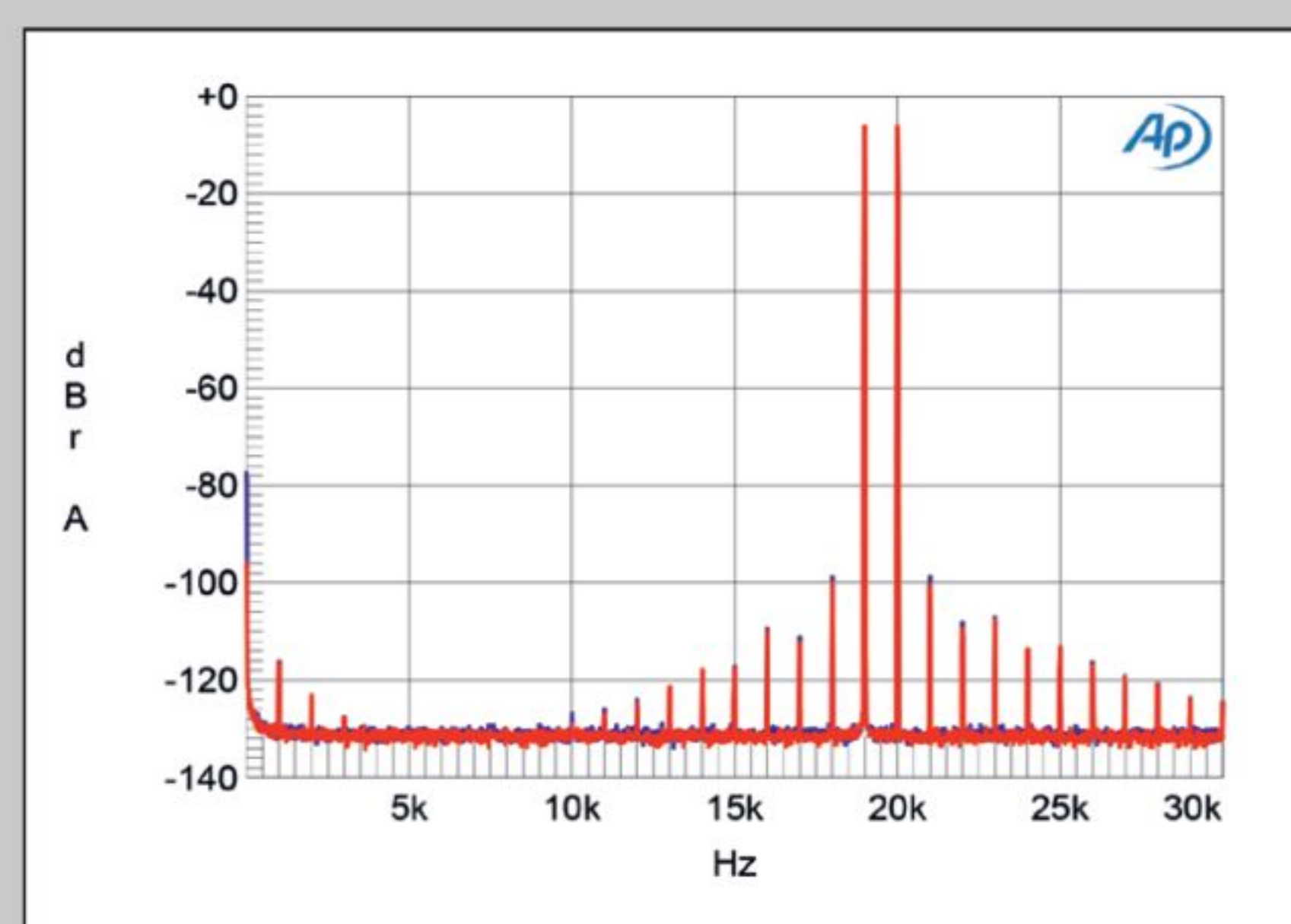


Fig.8 MOON 371, line input, HF intermodulation spectrum, DC–30kHz, 19+20kHz at 100Wpc peak into 4 ohms (left channel blue, right red, linear frequency scale).

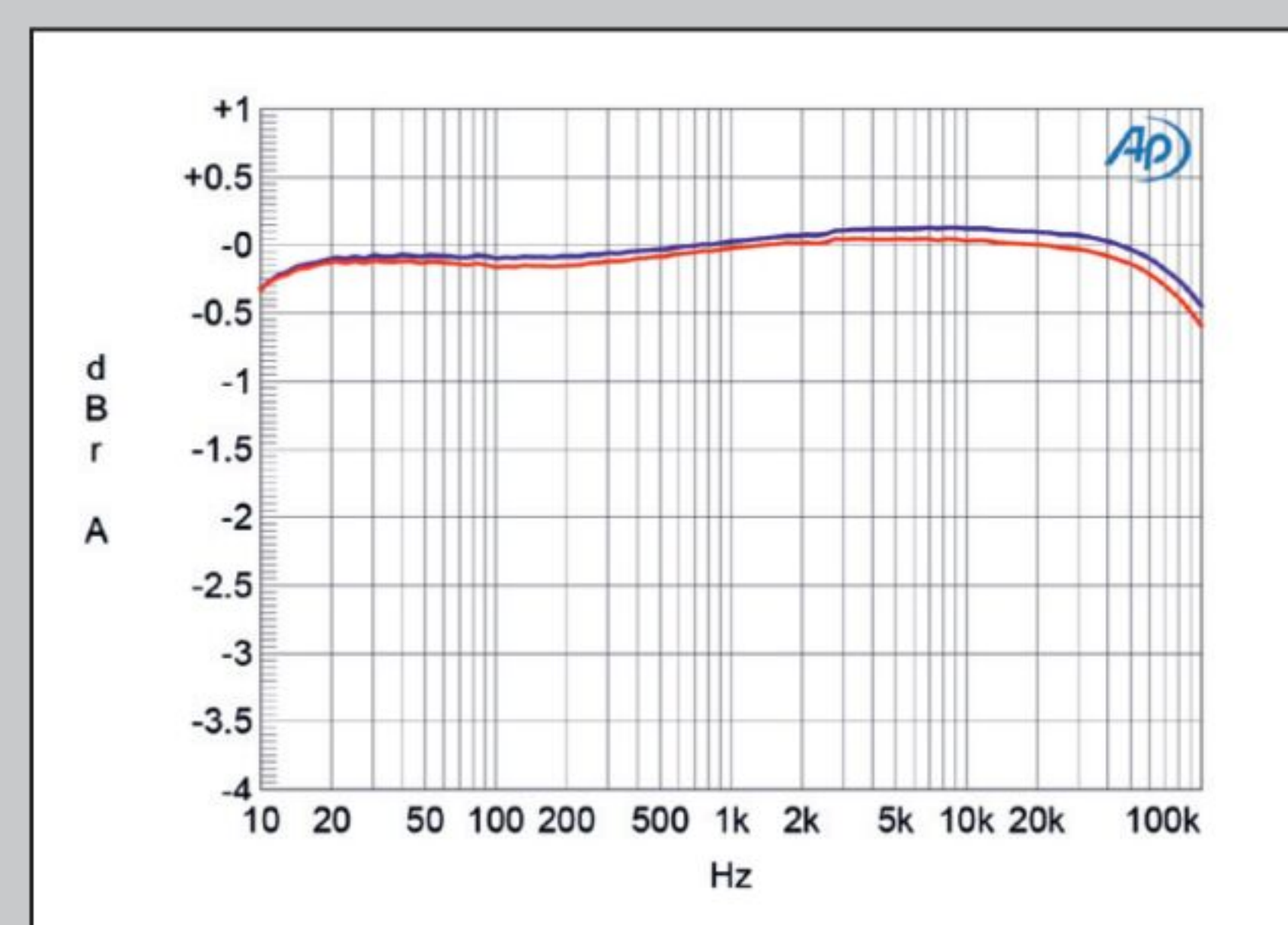


Fig.9 MOON 371, MM phono input, response with RIAA correction (left channel blue, right red) (0.5dB/vertical div.).

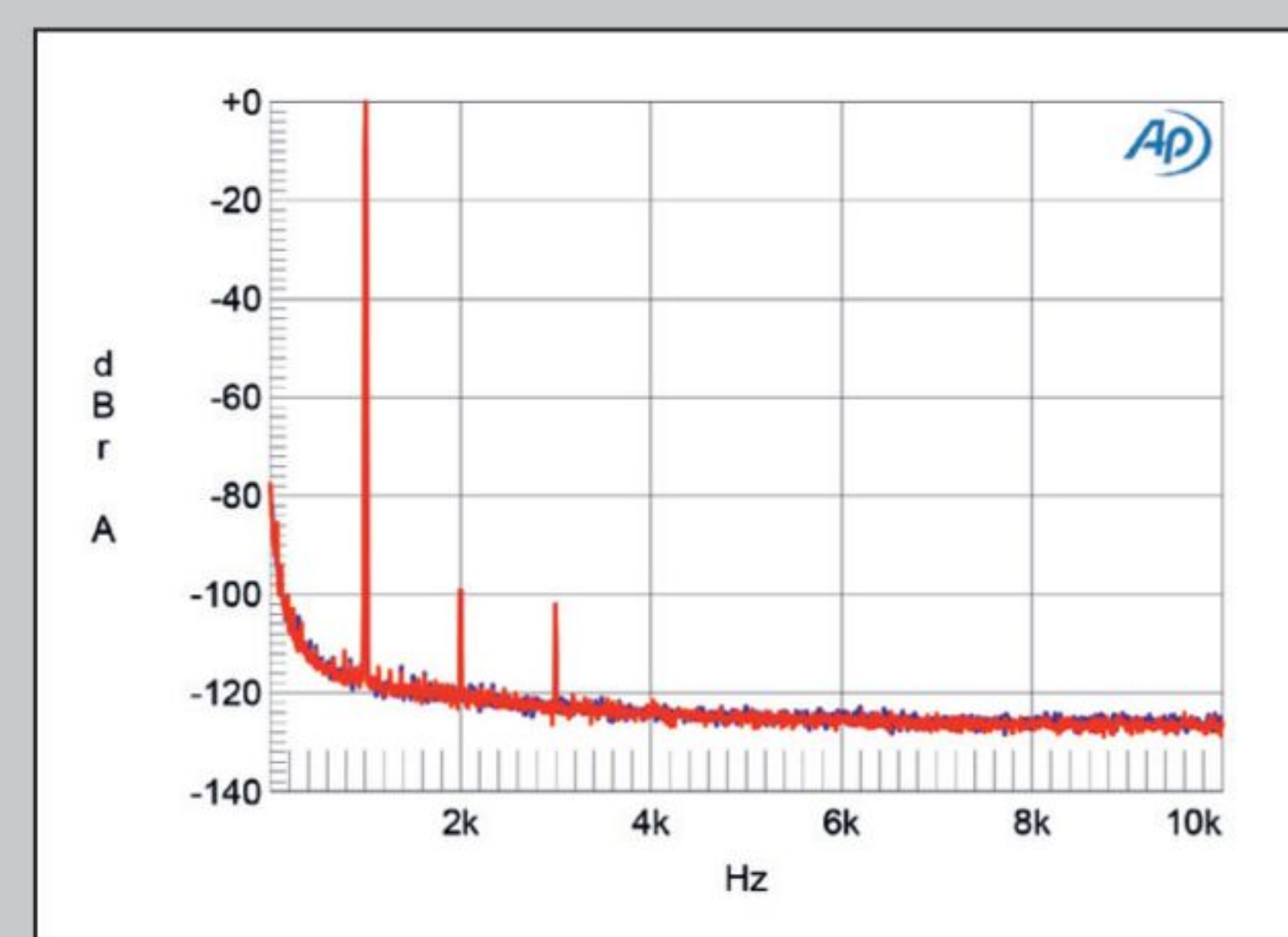


Fig.10 MOON 371, MM phono input, spectrum of 1kHz sinewave, DC–10kHz, at 11mV input (left channel blue, right red, linear frequency scale).



Output power is almost identical: The MA252 puts out 100Wpc into 8 ohms. Pricing is similar—however, the McIntosh is a simple integrated: no onboard DAC, no streaming, just three pairs of inputs: balanced and unbalanced line level and an unbalanced MM phono input. The turntable in this system is another Pro-Ject, with the Sumiko MM cartridge that came with it.

The loudspeakers in this system are a step up from my New York City speakers, but they're still small: Harbeth P3ESR XDs placed on actual, built-in bookshelves. They're musical as all get out, but sensitive they are not: Harbeth's stated sensitivity is a low-to-middling 83dB/2.83V/1m. To get proper results from the P3ESRs, you need to partner them with a suitable amplifier.

The 371 proved more than suitable: It sounded great with this system! An aspect I immediately noticed was the level of soundstaging detail that the MOON 371 brought to the table. I heard more room sound than I have been hearing with the McIntosh integrated. Detail and textures were superb, no trace of grain or etch.

One recording illustrated these sonic virtues in spades: *Sergei Rachmaninoff—Piano Concerto No.3*. This superlative remastering, by *Stereophile's* own Tom Fine, from the recently issued CD box set of Antal Dorati's recordings for Mercury in London (CD, Mercury/Eloquence 484 7015), just blew the roof off the sucker, as George Clinton would say. Pianist Byron Janis lobbed musical hand grenades right and left—and I mean WAY right and left: The MOON 371 created a soundstage that was very wide and deep, the piano sounding *big* and impactful, as it darn well should with this piece—all from a pair of actual bookshelf speakers! I experimented with a loudspeaker cable swap, replacing AudioQuest Rocket 11 cabling with the bit more upscale AudioQuest Robin Hood Zero. The MOON 371 resolved and highlighted subtle but noticeable differences; the latter cables seemed to transmit more dB, through these inefficient smallish Harbeth speakers, with enhanced textures.

measurements, continued

behavior at the headphone output with the volume control set to "44" (-18dB) to avoid overloading the output stage.

The MOON 371's impulse response with PCM data sourced from Roon (fig.11) revealed that the review sample's reconstruction filter is a long minimum-phase type, with all the ringing following the single sample at 0dBFS. The magenta and red traces in fig.12 show the ultrasonic rolloff of the MOON 371's digital inputs with white noise

data sampled at 44.1kHz. The traces reach full stop-band attenuation at 24kHz, just above half the sample rate, which is indicated by the vertical green line. The aliased image at 25kHz of a 19.1kHz tone at 0dBFS (cyan, blue) is suppressed by 100dB, and the harmonics associated with the 19.1kHz tone all lay at or below -90dB (0.003%). The digital frequency response with data sampled at 44.1kHz, 96kHz, and 192kHz (fig.13) was flat in the audioband with a sharp rolloff just

below half of each sample rate.

An increase in bit depth from 16 to 24, with dithered data representing a 1kHz tone at -90dBFS and the volume control set to "68" (-6dB), dropped the MOON 371's noise floor by 18dB (fig.14), which implies a measured resolution of 19 bits. With undithered data representing a tone at exactly -90.31dBFS, the waveform was symmetrical, with negligible DC offset, and the three DC voltage levels described

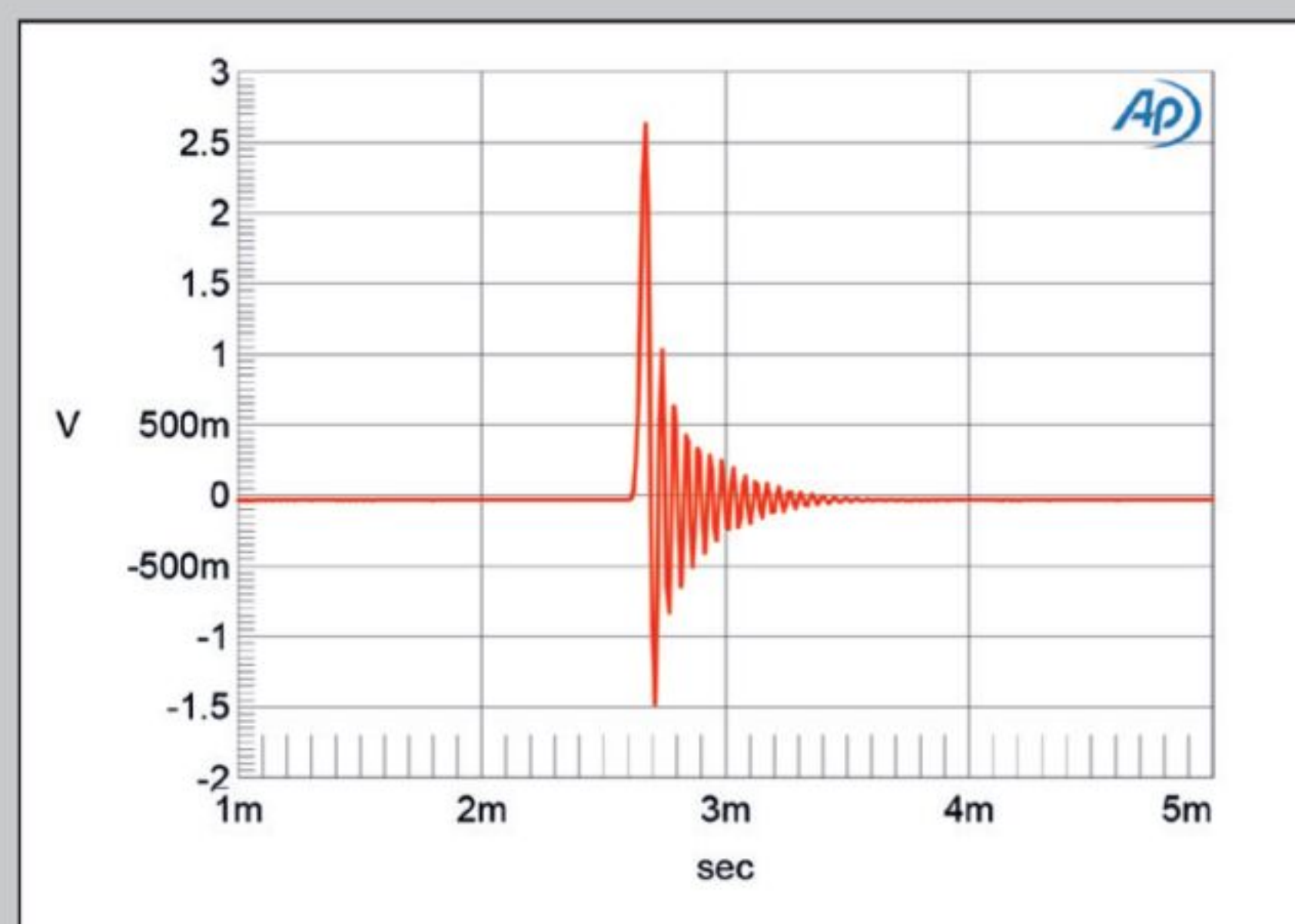


Fig.11 MOON 371, digital inputs, impulse response (one sample at 0dBFS, 44.1kHz sampling, 4ms time window).

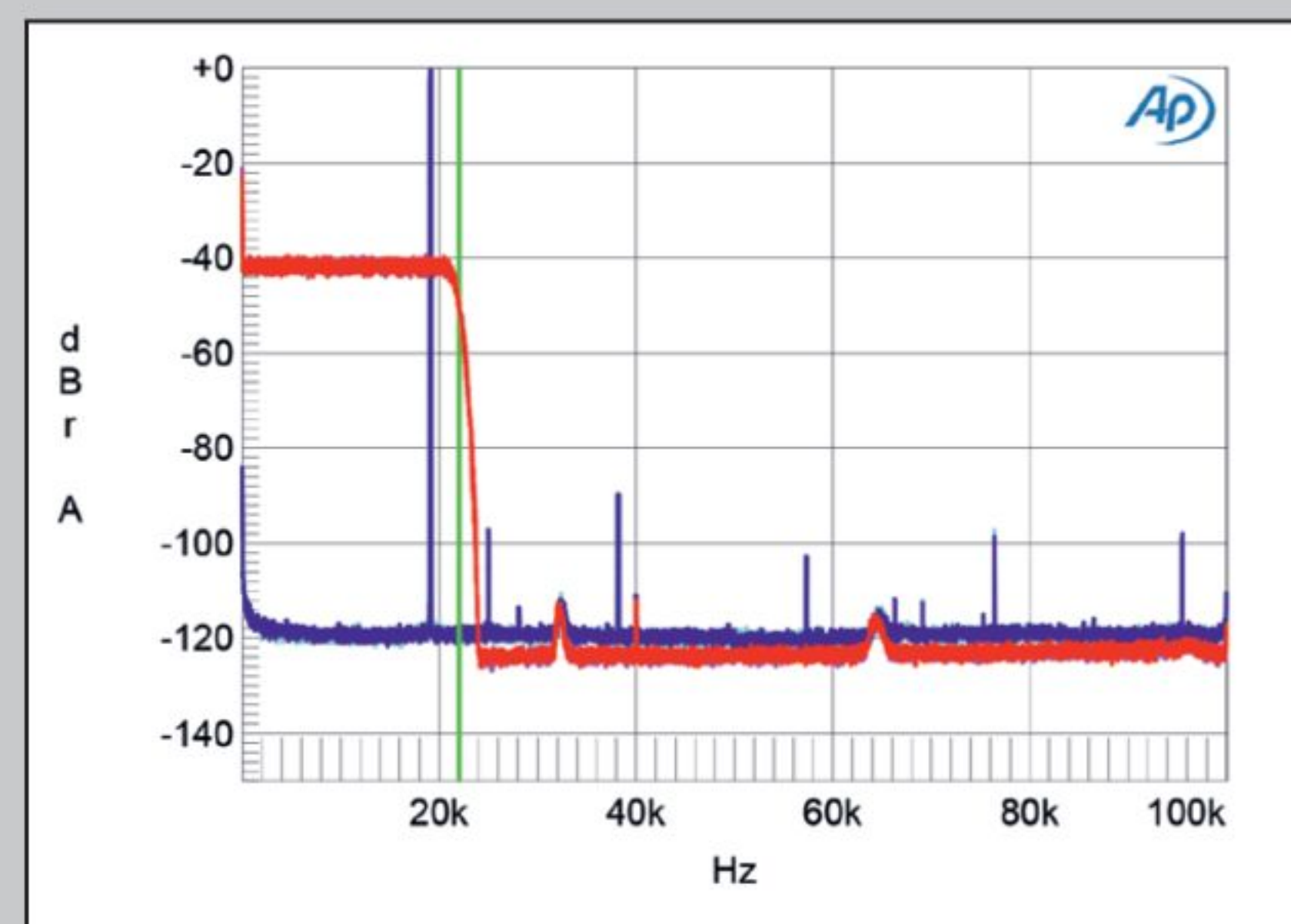


Fig.12 MOON 371, digital inputs, wideband spectrum of white noise at -4dBFS (left channel red, right magenta) and 19.1kHz tone at 0dBFS (left blue, right cyan) with data sampled at 44.1kHz (20dB/vertical div.).

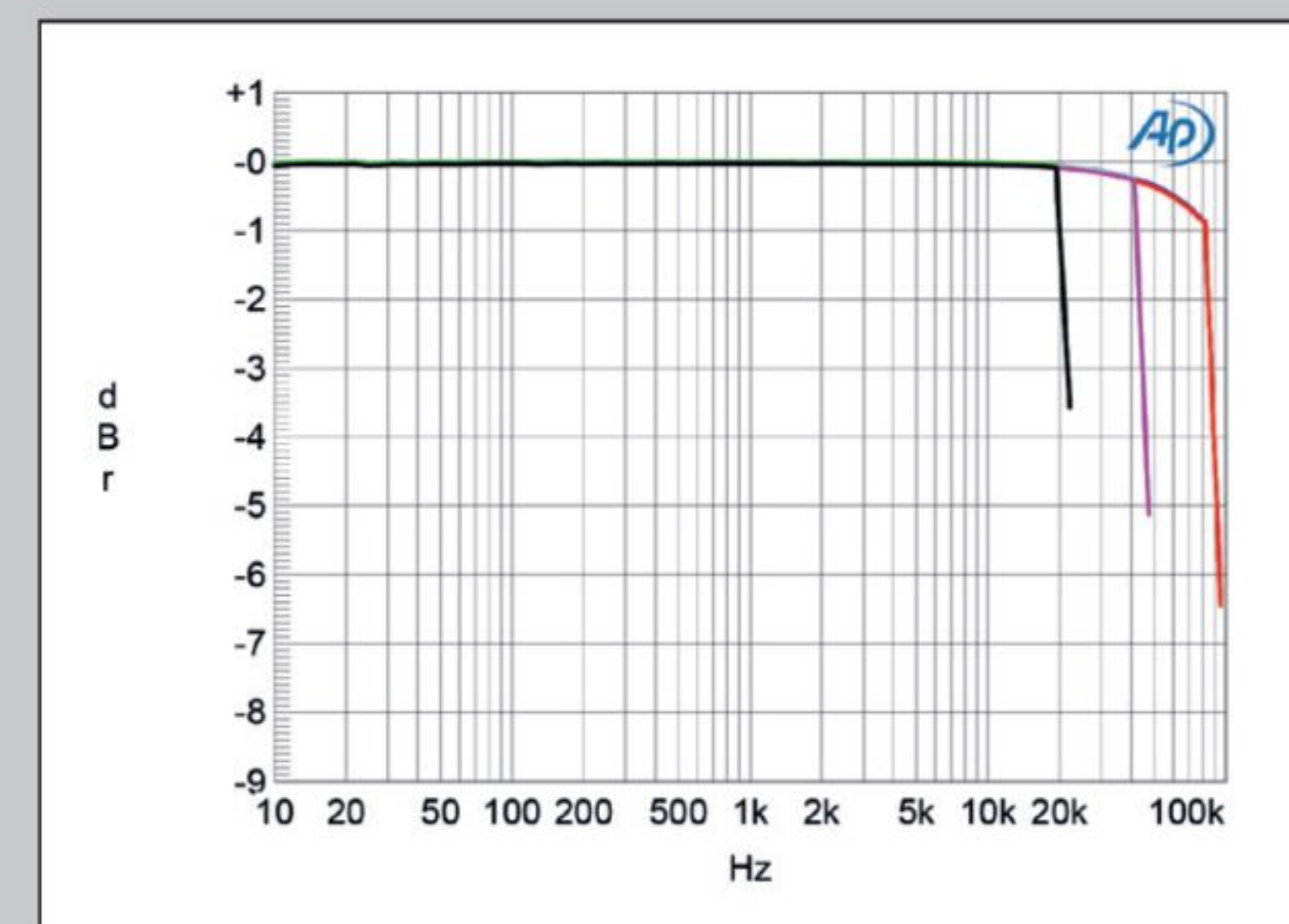


Fig.13 MOON 371, digital inputs, frequency response at -12dBFS with data sampled at: 44.1kHz (left channel green, right gray), 96kHz (left cyan, right magenta), and 192kHz (left blue, right red) (1dB/vertical div.).



Time for some jazz. I spun a newly purchased LP, *French Postcard* from sax man Bennie Wallace.

Time for some jazz. I spun a newly purchased LP, *French Postcard* from sax man Bennie Wallace (LP, Back Country Jazz Records BCJ-001). This fine 180gm pressing finds Wallace in a bossa mood: Two of the tracks are by Carlos Jobim. Bennie and I go way back, since we both work with producer Joe Harley. The album was recorded by engineer James Farber at New York's Sear Sound, same as my most recent album. To top it off, it was mastered to vinyl by Kevin Gray (ditto). But Wallace is one up on me, as this album was "recorded direct to two-track analog tape." I haven't done that in a while.

The MOON 371 laid on me great breathy, gorgeous sound from Bennie's tenor sax and fine, firm upright bass from Peter Washington. BackCountry Jazz—the outfit behind the label—is based in Greenwich, Connecticut. It promotes jazz education and concerts. This is their first LP. Check it out.

Next—the final stop of my review train—was my Reference System in the back room. Now the MOON 371 was called on to punch above its weight class, in terms of price and actual weight. The separate components in my reference setup all retail for more than the all-in-one MOON 371 does: the McIntosh MC462, a solid state hunk of an amplifier that weighs 115lb; the two-box McIntosh C12000 preamplifier; and the Bricasti M21 DAC.

The 371 said, "Bring it on!" and I did so. I hooked it up to my Wilson WATT/Puppies, got the Wi-Fi running, and plugged in my CD transport and my VPI HW-40 turntable fitted with a Lyra Etna λ Lambda cartridge. I started with a heaping helping of Bill Evans:

measurements, continued

by the data were clearly defined (fig.15). With undithered 24-bit data (not shown), the MOON 371 output a relatively clean sine wave.

Intermodulation distortion with 24-bit data representing an equal mix of 19 and 20kHz tones, each at -6dBFS , was low in level, the difference product at 1kHz lying at -114dB (0.0002% ; not shown). Aliased images of the two tones were present, but their levels were below -100dB .

When the MOON 371 was fed 16-bit optical or network J-Test data, the

odd-order harmonics of the undithered low-frequency, LSB-level squarewave all lay at the correct levels (fig.16). (As J-Test data peaks at -3dBFS , the volume control was set to "44" for this test, which is why the random noise floor is higher in this graph than it is in fig.14.) With 24-bit J-Test data (not shown), no jitter sidebands were present, and the central spectral spike that represents the high-level tone at one-quarter the sample rate was appropriately narrow.

As a conventional integrated, the

MOON 371's measured performance with its analog line-level inputs and the digital inputs was very good. The phono input also did well on the test bench in both in moving magnet and moving coil modes, though low-frequency noise in MC mode was higher in level than I expected.⁴—**John Atkinson**

⁴ Unfortunately, when I tried to repeat the overload margin and S/N ratio testing in MC mode, the amplifier turned itself off and wouldn't turn on again. (The fuse on the rear panel was intact.) It is possible, therefore, that something failed while I was performing these tests.

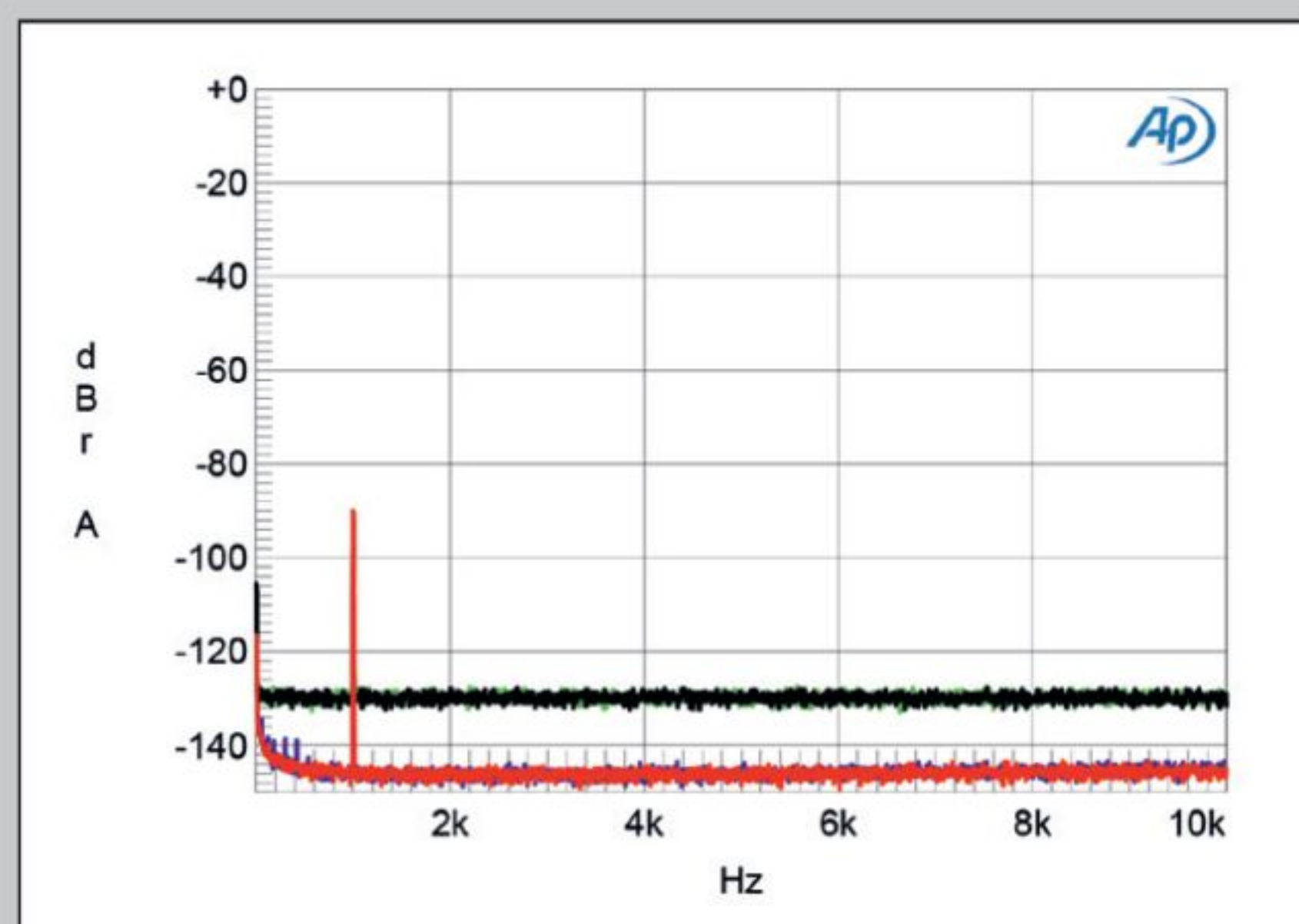


Fig.14 MOON 371, digital inputs, spectrum with noise and spurs of dithered 1kHz tone at -90dBFS with: 16-bit data (left channel green, right gray), 24-bit data (left blue, right red) (20dB /vertical div.).

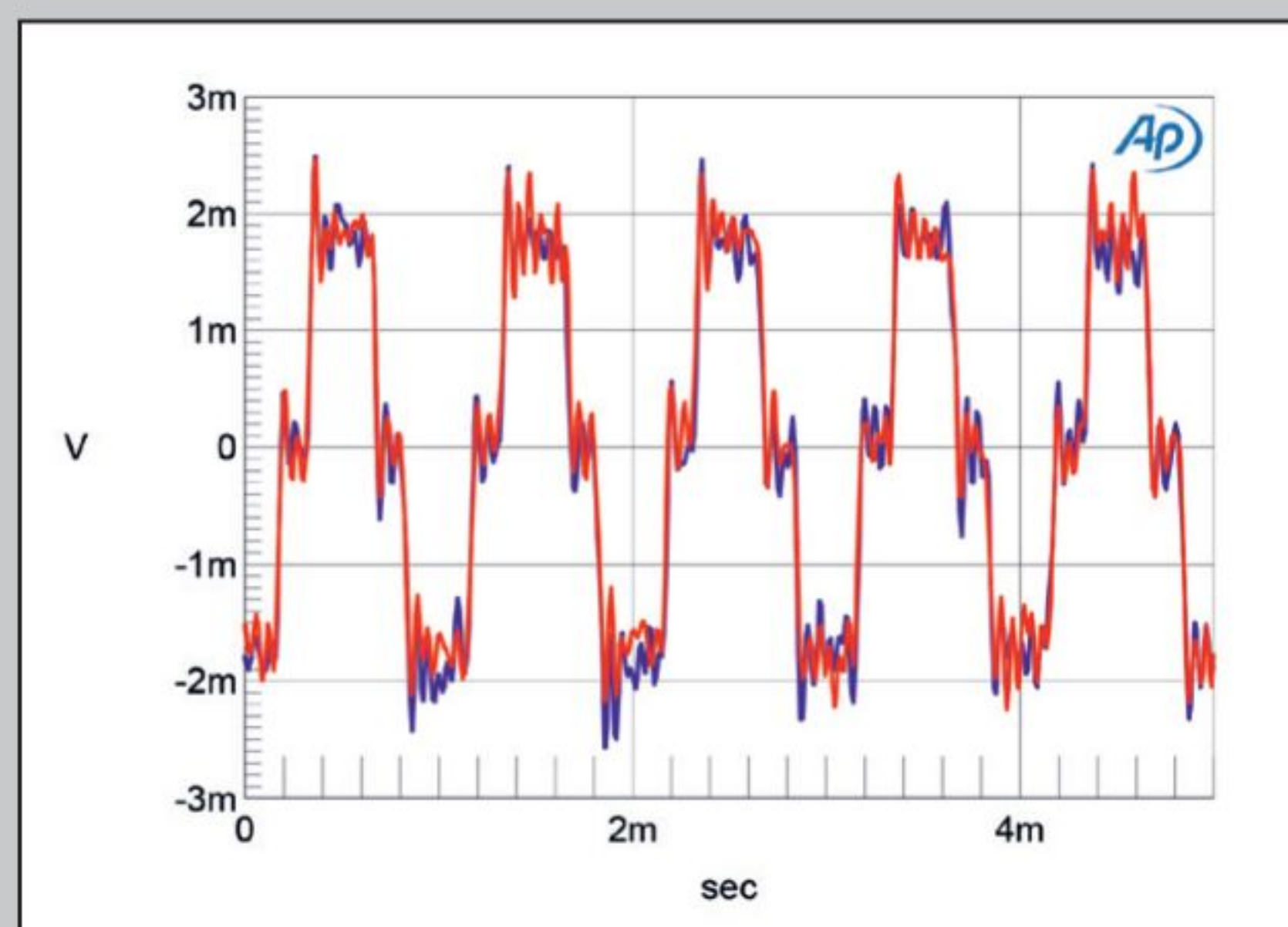


Fig.15 MOON 371, digital inputs, HF intermodulation spectrum, DC–30kHz, 19+20kHz at 0dBFS peak (left channel blue, right red, linear frequency scale).

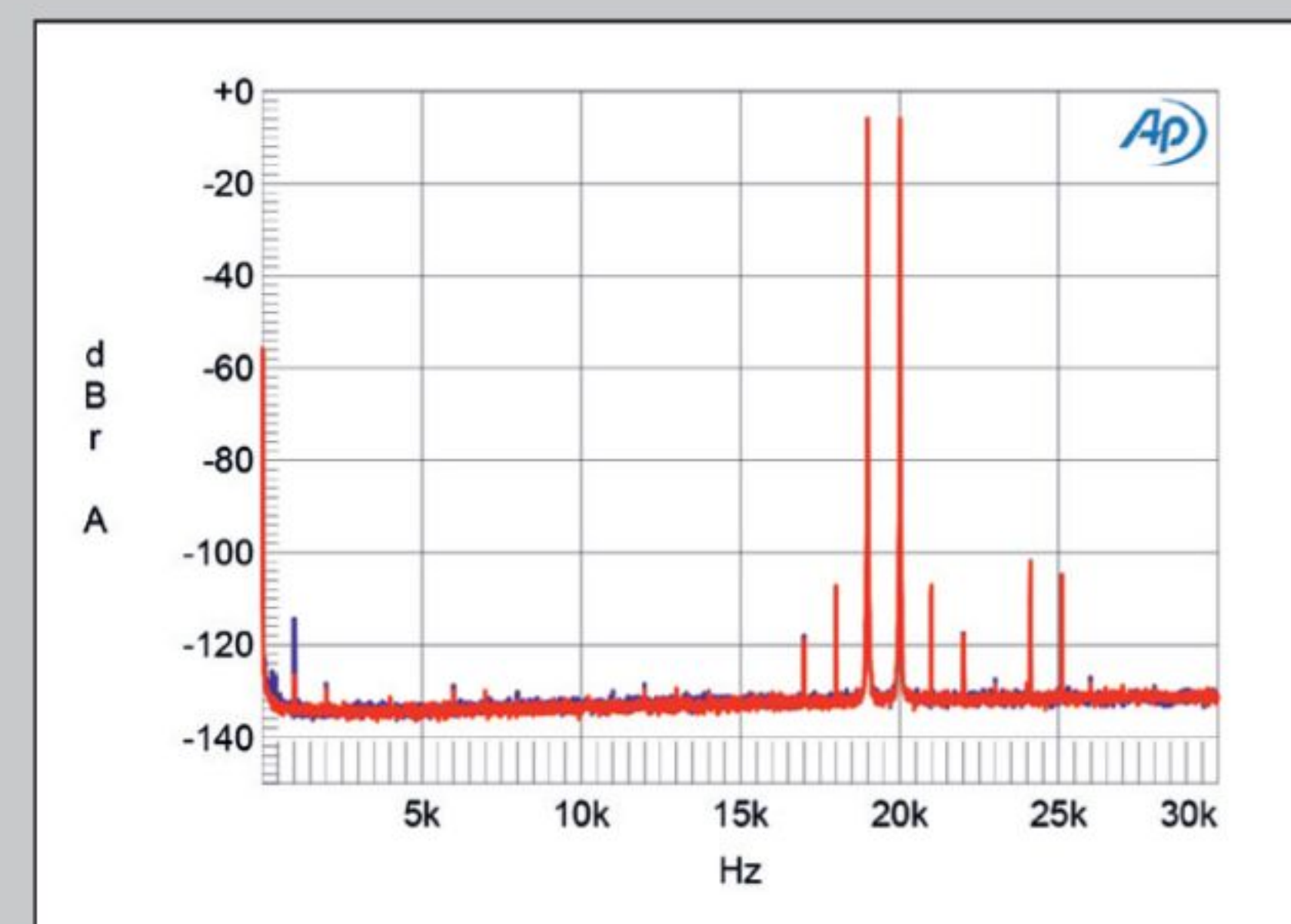


Fig.16 MOON 371, high-resolution jitter spectrum of analog output signal, 11.025kHz at -6dBFS , sampled at 44.1kHz with LSB toggled at 229Hz: 16-bit TosLink S/PDIF data (left channel blue, right red). Center frequency of trace, 11.025kHz; frequency range, $\pm 3.5\text{kHz}$.



ASSOCIATED EQUIPMENT

Analog sources VPI HMW-40 turntable, VPI 12" Fatboy tonearm, w/Lyra Etna λ Lambda cartridge, Ortofon Bronze Cadenza cartridge. Pro-Ject Classic EVO turntable, w/Sumiko Amethyst cartridge.

Digital sources MacBook Air running Tidal, Roon, Qobuz. Bricasti M21 DAC, Musical Fidelity M1 CDT transport, Pro-Ject CD Box RS 2 T.

Preamplification McIntosh C12000.

Power amplifiers McIntosh MC462 Quad Balanced Stereo Amplifier, McIntosh MA252 Integrated Amplifier.

Integrated amplifiers AVM Inspiration CS 2.3, McIntosh MA252.

Loudspeakers Wilson Audio Specialties WATT/Puppy, Harbeth P3ESR, Sonus faber Toy.

Cables Digital: AudioQuest Diamond AES3, Coffee USB; Interconnects: AudioQuest Fire, Sky; Speaker: AudioQuest Firebird, Robin Hood, Rocket 11; AC: AudioQuest Dragon.

Accessories AudioQuest Niagara 7000 power conditioner, Mapleshade equipment rack, Audiodesksysteme Vinyl Cleaner Pro, VPI Periphery Ring Clamp.—**Sasha Matson**

Haunted Heart: the Legendary Riverside Studio Recordings (24/192 FLAC, Riverside-Craft/Qobuz). Listening via Wi-Fi to this extraordinary music provided deep-river pleasure. Evans's piano seemed to hover in space right in front of me. The newly remastered Scott LaFaro's bass playing sounded f--ing awesome! He always does, but this was something else. Three versions of "Blue in Green" are included in this collection. Choose any one: a heartbreaker. I forgot about stereos and reviewing and equipment.

During the time I was auditioning the 371, we lost another one: Bobby Weir. Growing up as I did in Berkeley in the 1960s, my homies and I viewed the members of the Grateful Dead as our big brothers—as role models. I'll never forget the night my pal Allen managed to get us kicked out of the Carousel Ballroom in San

Francisco, which the Dead briefly ran themselves and ran into the ground before Bill Graham took it over and renamed it The Fillmore West.

So there we sat, on the sidewalk at 2am, feedback wafting out a second-floor window where the ballroom was located, above a car dealership, waiting for someone's mom to come pick us up. The Dead would record the same program there during two weekends in February and March 1969 with one of the first 16-track machines from Ampex. The results are IMO still some of the best-sounding live rock recordings ever made. And they sound spectacular with the Plangent tape process applied to the vinyl remasterings from Rhino in recent years.

I cued up February 27, the first night of four. This is the version of "Dark Star" and "St. Stephen" correctly used for the *Live/Dead* release. OMG: There's Phil Lesh! We shared a music teacher at Berkeley High School, Mr. Hansen, though Phil was some years my senior. Phil studied trumpet; I took clarinet. And there's Bobby Weir, a cherub. Bob's unique, inventive rhythm guitar supported Garcia and pushed him on. The MOON 371 brought it all back, in all its colors and magnificent sonics—particularly the unique attack of Phil Lesh's bass. He always got such a great sound. Now they're gone.

Move over Rover

The part of the hi-fi market tagged "all-in-one" is getting crowded. The MOON by 371 Network Player/Integrated Amplifier is a standout. The parts quality is first-rate; Simaudio sources custom capacitors and builds their own circuit boards at their Boucherville, Quebec, facility. The visual design is simple and elegant. The feature list is comprehensive. The performance is outstanding. Icing on the cake? A 10-year warranty for registered buyers.

But the really delicious aspect of this French-Canadian *prix fixe* menu is the quality of the sound. Achieving low distortion figures, and a high damping factor, aids in creating an unusually black, low, and uncluttered noise floor. This has the effect of releasing the music into space as it would happen in live performance. *Merci MOON.* ■