JOHN ATKINSON

Pass Laboratories XP-32

LINE PREAMPLIFIER

When I studied physics at university too many years ago to admit, I learned about Occam's razor. Many, *many* more years ago than that, Franciscan friar William of Occam stated that a hypothesis should provide the simplest possible explanation for a phenomenon.

I apply Occam's criterion to my audio system: It should be no more complicated than it need be. The D/A processors I have written about over the past few years—dCS Rossini and Vivaldi, MBL Noble Line N31, PS Audio DirectStream, Weiss DAC502—all have high-precision digital volume controls. I therefore haven't had a conventional preamplifier in my system for a long time, instead connecting the processors' balanced outputs directly to the power amplifiers. Even for LP playback—don't tell Michael Fremer!—I connect the balanced, RIAA-equalized output of my Channel D Seta L phono preamplifier to an Ayre QA-9 A/D converter and send the 24/192 PCM data to the digital processor!

However, when I reauditioned the MBL N31 for my follow-up review in the December 2020 issue,[1] I had a disturbing experience when I set the N31's volume control to its maximum and inserted MBL's N11 line preamplifier[2] between the DAC and the power amplifiers to control volume. As I wrote in my follow-up, "I was *not* expecting an increased sense of palpability to the acoustic

With the XP-32 in the system, each track on Mark Hollis had me sitting transfixed.

1 See stereophile.com/content/mbl-noble-line-n31-cd-player-dac-roon-ready-december-2020.

2 See stereophile.com/content/mbl-noble-line-n11-line-preamplifier.

SPECIFICATIONS

Description Solid-state, three-chassis stereo preamplifier with remote control. Inputs: 5 single-ended (RCA) or balanced (XLR), 1 single-ended (RCA) or balanced (XLR) tape, 1 single-ended (RCA) or balanced (XLR) Pass Thru. Outputs: 3 single-ended line-level (RCA) or line-level balanced (XLR), 1 tape (RCA). Maximum gain: 9.6dB, balanced. Input impedance: 42k ohms, balanced; 22k ohms, single-ended. Output impedance: 50 ohms, balanced; 25 ohms, single-ended. Maximum output: 23V RMS at 0.1% THD. Frequency response: 20Hz–20kHz, ±0.05dB; –2dB at 150kHz. Channel separation: >110dB. Total harmonic distortion: <0.001% at 1V, 1kHz. Residual noise: 500nV RMS. Signal/noise: 150dB ref. max out. Power consumption: 70W.
Dimensions Preamplifier chassis and control unit/power supply (each): 17" (430mm) W × 4" (100mm) H × 12" (300mm) D. Weight (total): 62.5lb (28.4kg). Shipping weight: 78lb (35.45kg).
Finish Instrument Gray.
Serial numbers of units reviewed 37378 & 37379, preamplifier chassis; 37377, control unit/power supply.
Price $17,500. Approximate number of dealers: 20. Warranty: 3 years, limited, transferrable.
Manufacturer
Pass Laboratories Inc., 13395 New Airport Rd., Suite G, Auburn, CA 95602. Tel: (530) 878-5350. Web: passlabs.com.

objects within that soundstage, particularly vocals, but that is what I heard. … [B]ut how can inserting an active device with vanishingly low levels of noise and distortion result in improved sound quality?"

I must have been having a senior moment when I penned those words, because I had forgotten that in my December 2014 review of Ayre Acoustics' KX-R Twenty line preamplifier,[3] I had described the same experience with the original KX-R: "To my astonishment, the sound of my system with a [Logitech] Transporter D/A processor feeding the preamplifier was better than when the DAC fed the power amplifier directly."

As I had previously found that the KX-R's sound quality was equaled by Pass Laboratories' XP-30 three-chassis preamplifier,[4] when I learned that the XP-30 had been replaced by the XP-32 ($17,500), I asked for a review sample.

The '32

The new preamplifier, like the XP-30, was designed by Wayne Colburn, who has been responsible for Pass Labs preamplifiers since the mid-1990s. It looks identical to the XP-30, with each channel's audio circuitry in a separate chassis and the power supply and control circuitry in a third chassis. This last chassis has a rectangular, alphanumeric, blue-fluorescent display in its center, a large volume-control knob to its right, and five control buttons to its left. These controls are duplicated on the aluminum remote control, which also has buttons for channel balance and "Pass Thru." The latter sets the gain to 0dB ("179" on the display) and locks the other controls so that the XP-32 can be used in a home-theater system, where volume is adjusted elsewhere.

Keeping the "dirty" control circuits and power supply separated from the actual preamplifier channels minimizes the possibility of RF and other spuriae from contaminating the analog signals. (Pass Labs' XP-22 preamplifier, which Jim Austin favorably reviewed in June 2019,[5] is similar other than having both channels' audio circuitry in one chassis.) Umbilical cables connect each audio chassis to the control chassis, terminated in locking, military-spec, multipin circular connectors rather than the XP-30's rectangular DIN-25 connectors. These must be connected prior to powering up the XP-32. (The power supply has to "see" the audio channel before it will send power to the audio chassis.)

Each audio chassis has five numbered inputs, a dedicated home-theater input, and a tape-loop input, all on both XLR and RCA jacks. (When the XLR is used, a jumper connecting the jack's pin 3 to pin 1 must be removed.) The ground of each RCA input is in parallel with pin 1 of the XLR, and the RCA input feeds a summing junction that, according to the manual, "[maximizes] the patented supersymmetry (X circuit) and preserves the balanced character of the XP-32 from input to output when fed from a single-ended source." There are three outputs, again on both XLRs and RCAs: one main output that follows the volume control setting; a second output whose level can also be adjusted with the channel's front-panel gain control to allow use with power amplifiers of differing sensitivities in multichannel applications; and a unity-gain tape-loop output.

XP-32 vs XP-30

Given that the XP-32 appears identical to its predecessor, other than having a volume control that operates in 0.5dB steps rather the earlier one's 1dB steps, I asked Wayne Colburn what the internal changes were.

"The volume control is single-stage as used in the Xs preamplifier and has more range, with 0.5dB steps; it is quieter

3 See stereophile.com/content/ayre-acoustics-kx-r-twenty-line-preamplifier.

4 See stereophile.com/content/pass-laboratories-xp-30-line-preamplifier.

5 See stereophile.com/content/pass-laboratories-xp-22-line-preamplifier.

MEASUREMENTS

I measured the Pass Laboratories XP-32's performance with my Audio Precision SYS2722 system (see the January 2008 "As We See It"[1]), repeating some tests with the magazine's more-recent APx555 system. The maximum gain was a little higher than the specified 9.6dB for the balanced and unbalanced inputs to the balanced outputs, at 10.2dB. The gain from the unbalanced input to the unbalanced output was 6.5dB. The preamplifier preserved absolute polarity (ie, was noninverting) with both balanced and unbalanced inputs and outputs. (Its XLR jacks are wired with pin 2 hot, the AES convention.)

The XP-32's unbalanced input impedance was close to specification at 20Hz and 1kHz, at 20.3k ohms, but slightly lower at 20kHz, at 17.6k ohms. The balanced input impedance was to specification and twice the unbalanced, as expected. The unbalanced output impedance was a low 38 ohms at 20Hz, and 32 ohms at 1kHz and 20kHz. The balanced output impedance was twice the unbalanced, again as expected, as there are two single-ended stages in series for this output.

The preamplifier's frequency response into high impedances was flat from 10Hz to 20kHz (fig.1, blue and red traces) in both balanced and unbalanced modes, with the ultrasonic rolloff reaching –1dB just above 100kHz. While the XP-30's low frequencies rolled off into 600 ohms, reaching –6dB at 32Hz,[2] the XP-32's response into this demanding load was flat down to 20Hz (fig.1, cyan, magenta traces). Fig.1 was taken with the XP-32's volume control at its maximum setting of "199." Both the frequency response and the superb channel matching were preserved at lower settings of the control. The volume control operated in accurate 0.5dB steps for almost its entire range of operation.

As you'd expect from the use of separate chassis for each channel, the Pass Labs preamp's crosstalk was superbly low, at –130dB in both direc-

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

2 See fig.1 at stereophile.com/content/pass-laboratories-xp-30-line-preamplifier-measurements.

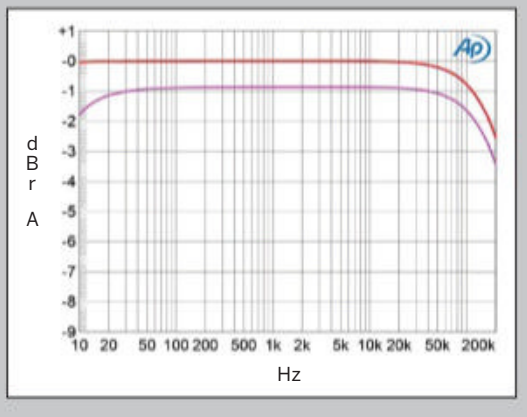

Fig.1 Pass Labs XP-32, balanced frequency response with volume control set to "199" at 1V into: 100k ohms (left channel blue, right red), 600 ohms (left cyan, right magenta) (0.5dB/vertical div.).

and more accurate. While the XP-30 had a 1µF polypropylene input cap, the [XP-32's] inputs are DC-coupled and a servo is used after trimming. The XP-32 has a new input circuit that is based on the Xs: it is lower in noise and distortion with greater drive capability. Noise is the most prominent part of THD+N at low levels. By lowering noise we get better resolution and dynamics. … The basic circuit topology is the same, but the plug-in gain modules are unique to the '32 and use some new cascode transistors and higher bias. The transistors used are [matched pairs of] Toshiba FETs on the input and MOSFETs on the output. We have a nice stash of these purchased before they were discontinued. For the basic signal path, these are tough to beat and I consider them the standard, as do other audio engineers.

"The output stage runs a higher class-A bias with auto bias and lower output impedance. After all, why would anybody make a pre that wasn't class-A? The XP-32 can drive long cable runs and low input impedances easily. A servo controls DC offset after it is set by hand and balance-adjusted. The output is still capacitor-coupled even with the servo but can be bypassed with internal jumpers. It is really an interface to other products since I have no guarantee of what it will connect to. While caps still have a sonic signature, they have gotten really good."

I asked Wayne if there had been changes to the power supply: "The new design uses two double-shielded, low-noise toroids in a true dual-mono topology for the gain channels and another transformer and linear power supply dedicated to the control architecture. We changed from the single Plitron [transformer] to the new Avel Lindbergs. … The use of three fully independent power supplies in the control chassis results in dramatically lower radiated noise and far better THD+noise figures in the gain stages.

measurements, continued

tions below 1kHz, and decreasing only slightly, to –120dB at the top of the audioband (not shown). From balanced inputs to balanced output, the XP-32 offered extremely low noise, with no power supply–related spuriae in its output even with the two preamplifier chassis sitting on top of the separate power supply/control unit (fig.2). The wideband, unweighted signal/noise ratio, measured with the unbalanced input shorted to ground but the volume control set to its maximum, was a high 85dB ref. 1V output (average of both channels, which were very similar). Restricting the measurement bandwidth to the audioband increased the S/N to an excellent 94.5dB, while switching an A-weighting filter into circuit further improved this ratio, to 97.2dB.

Figs.3 and 4 respectively plot the percentage of THD+noise in the XP-32's balanced output against the output voltage into 100k ohms and 600 ohms. We usually specify a preamplifier's clipping voltage as being when the THD+N reaches 1%. However, as you can see from this graph, the output voltage stops rising when the THD+N reaches 0.2%. The XP-32's balanced output level at this THD percentage was just below 30V, even into 600 ohms, which is almost an order of magnitude above the maximum level the preamplifier will be asked to deliver

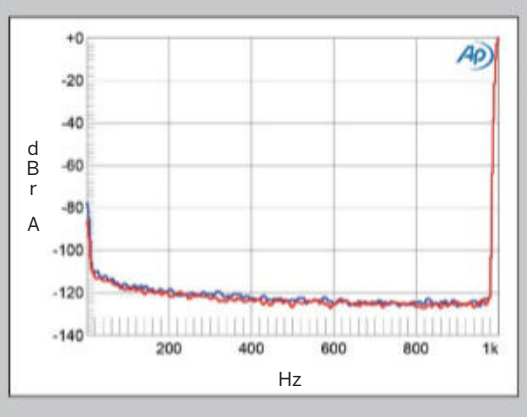

Fig.2 Pass Labs XP-32, balanced spectrum of 1kHz sinewave, DC–1kHz, at 1V into 100k ohms (left channel blue, right red; linear frequency scale).

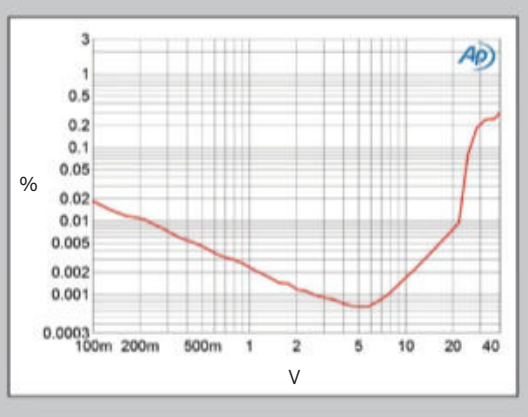

Fig.3 Pass Labs XP-32, balanced distortion (%) vs 1kHz output voltage into 100k ohms.

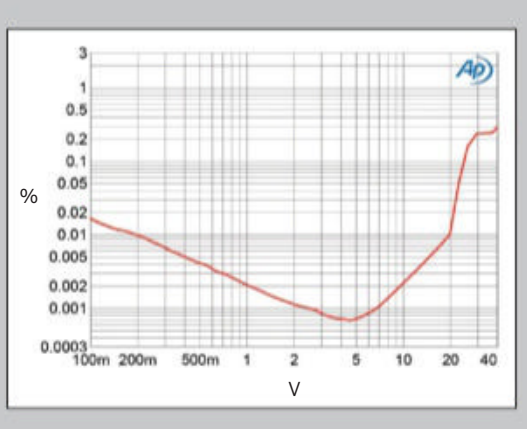

Fig.4 Pass Labs XP-32, balanced distortion (%) vs 1kHz output voltage into 600 ohms.

Power supply regulation in the unit is a bit more complex, with regulators feeding the references. There is one extra stage of RC filtering before the capacitance multipliers. The onboard regulators don't need to reduce ripple; they just fix the voltage. The DC power cable is also improved over the older computer type. I liked the older ones, but they no longer meet current agency approvals."

Listening

After installing the XP-32, I used it for casual listening, internet radio stations and the like streamed with Roon, for a week, before I started serious listening with familiar music.

I started with *Bravo!*, the final recording I made at the Santa Fe Chamber Music Festival in 1998 (16/44.1 ALAC files, Stereophile STPH014-2). As I described in the CD booklet,[6] I had had to close-mike all the instruments due to the fact that I wasn't allowed to turn off the new and noisy climate-control system in Santa Fe's Museum of Fine Arts. I had also recorded the performances with a pair of distant mikes and used those as my reference when I later synthesized the concert hall acoustic with a Lexicon digital reverberation unit and added that to the mix.

Listening to the first work on the album, Mozart's Piano Quartet No.1 in G Minor with Pinchas Zukerman playing the violin part, the XP-32 allowed every detail to be clearly presented. *Very* clearly, because, as the work progressed, I became increasingly aware of something I had never noticed before, even with the DAC feeding the power amplifiers directly: the piano, which had been behind the violin, viola, and cello on the stage, was positioned in front of them in the recorded soundstage.

Musically, this wasn't too odd, as the work could be considered a mini concerto for the piano. After some reflection, I realized what was happening: While I had placed the pair of microphones on the piano relatively close to the soundboard, the spot mikes were around 48" away from the string instruments, as this gave the most accurate representations of their tone. The XP-32's extraordinary transparency was allowing me to hear that enough of the real hall ambience was captured by each instrument's microphone that, when added to by the synthesized reverberation, it pushed the images behind the piano.

I followed the Mozart with another album from 1998 that has been in heavy rotation ever since it was recommended to me by Stephen Mejias a few years ago: the late Mark Hollis's eponymous album (16/44.1 ALAC files ripped from CD, Polydor), which built on his work with the band Talk Talk.

6 See stereophile.com/content/ibravoi-1998-santa-fe-chamber-music-festival-cd-page-2.

measurements, continued

in typical use.

The THD+N was extremely low at output levels of a few volts, so to be sure that the reading was not dominated by noise, I measured how the XP-32's distortion changed with frequency at 4V. The THD+N percentage was extremely low throughout the audioband into both 100k ohm and 600 ohm loads (fig.5), though with a slight increase in the top audio octaves.

I looked at the spectrum of the distortion at a similarly high output level because, at 1V, no distortion harmonics were visible above the noise floor. The result is shown in fig.6; the only harmonic that can be seen is the third harmonic at –114dB (0.0002%). This harmonic rose by only a couple of dB into the current-hungry 600 ohm load. Tested for intermodulation distortion with an equal mix of 19 and 20kHz tones at the same peak voltage level, the second-order difference product at 1kHz lay below –130dB, and the higher-order products were all below –110dB (0.0003%) (fig.7).

The XP-32 offered superb measured performance, better than that of the XP-30 and the more recent, two-chassis XP-22.[3] **—John Atkinson**

3 See stereophile.com/content/pass-laboratories-xp-22-line-preamplifier-measurements.

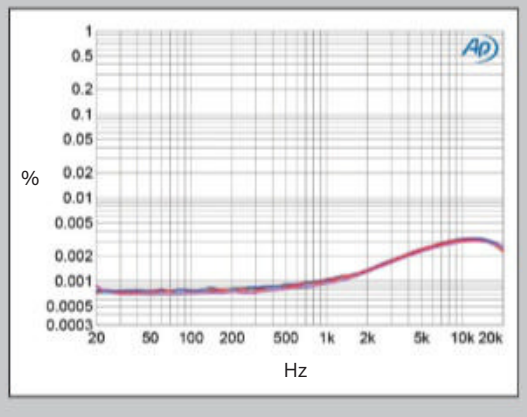

Fig.5 Pass Labs XP-32, balanced distortion (%) vs frequency at 4V into: 100k ohms (left channel blue, right red), 600 ohms (left cyan, right magenta).

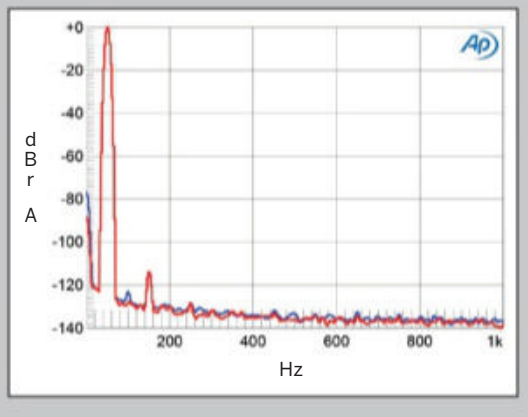

Fig.6 Pass Labs XP-32, balanced spectrum of 1kHz sinewave, DC–1kHz, at 4V into 100k ohms (left channel blue, right red; linear frequency scale).

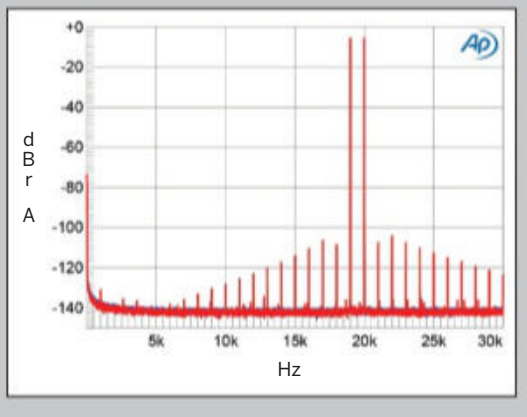

Fig.7 Pass Labs XP-32, balanced HF intermodulation spectrum, DC–30kHz, 19+20kHz at 4V into 100k ohms (left channel blue, right red; linear frequency scale).

With engineer Phill Brown, Hollis constructed carefully layered, atmospheric soundscapes, his plaintive vocals centered in front of double bass. Piano, acoustic guitar, and ostinato percussion are placed farther back in the soundstage with occasional solo-instrumental interjections at the sides.

When you stand in front of a truly great painting, the more you look the more you see. With the XP-32 in the system, each track on *Mark Hollis* had me sitting transfixed. The more I listened, the more I heard.

Some products appear to retrieve more detail from recordings by emphasizing high frequencies or transients, as if a spotlight was shining on the sound. This was not the case with the Pass Labs. Its superb retrieval of recorded detail was not accompanied by undue emphasis in the treble or longer-term listening fatigue. I played the MQA-encoded 24/48k FLAC file of "My Funny Valentine" from Radka Toneff's restored *Fairytales* album (Odin 9561), with Roon performing the first unfolding and the Grimm MU1 that I review elsewhere in this issue upsampling the 24/96 data to 24/192. I had only been intending to play this one track, but, entranced by the sound, I played the entire album. This is the only track on *Fairytales* that had been originally recorded in analog, but even with the XP-32's transparency, I couldn't perceive any sonic discrepancy between this track and the ones that had been recorded digitally.

Roon's Radio function followed Toneff with "How Do You Stop," from Joni Mitchell's overlooked—overlooked by me, that is—1994 album *Turbulent Indigo* (16/44.1k MQA-encoded FLAC, unfolded by Roon to 24/88.2 and upsampled by the MU1 to 24/176.4, Tidal/Reprise). Putting to one side the argument about whether a 16-bit PCM recording has enough spectral space beneath the music's noise floor to pack the 2Fs and 4Fs data, this track sounded magnificent, with Joni sounding natural, superb depth on the chiming electric guitars, and the bass guitar both rich and well-defined. Wondering how much of what I was hearing was due to the Grimm's upsampling and how much to the XP-32's transparency, I switched off the upsampling, so that the DAC was receiving 24/88.2 data. The soundstage flattened, with less reverb apparent on the guitars and a slight edge now apparent to Joni's voice. The sound was still very good, but it had lost some of that magnificence. The XP-32 was readily letting me hear the improvement of the MU1's upsampling algorithm.

Comparing

I had two high-performance preamplifiers on hand with which to compare the Pass XP-32: the MBL N11 ($14,600) and the Benchmark LA4 ($2599) that had so impressed Kal Rubinson when he reviewed it in January 2020.[7]

First up was the MBL, with sound pressure levels matched within 0.5dB at the listening position. (The N11 was set to its unity gain condition, which limits the maximum gain and which reviewer Jason Victor Serinus had preferred.) With the MBL N31 DAC in front of the preamplifier and the Parasound monoblocks behind it, the back-to-front soundstage on my Mozart Piano Quartet recording was as apparent as it had been on the XP-32, with as much image depth. The tonal balance, however, was a tad warmer and the presentation of acoustic objects within the soundstage was a little more—and how I hate using this word—palpable. For example, toward the end of the Joni Mitchell track, a high tenor voice appears in the center of the stage, floating slightly behind and slightly above Joni.

ASSOCIATED EQUIPMENT

Digital sources Roon Nucleus+ & Grimm MU1 music servers; Ayre Acoustics C-5xe^{MP} universal player; MBL N31 CD player/DAC; PS Audio DirectStream D/A processor. Ayre Acoustics QA-9 A/D converter.
Preamplifiers Benchmark LA4, MBL Noble Line N11.
Power amplifiers Parasound Halo JC 1+ monoblocks.
Loudspeakers KEF LS50 and LS50 Meta, Sonus Faber Lumina III.
Cables Digital: AudioQuest Vodka (Ethernet), DH Labs (1m, AES/EBU with Ayre C-5xe^{MP}); Canare 110 ohm (AES/EBU, 15', with Grimm MU1). Interconnect: AudioQuest Wild Blue (balanced). Speaker: AudioQuest K2. AC: AudioQuest Dragon Source & High Current, manufacturers' own.
Accessories Celestion 24" loudspeaker stands; Target TT-5 equipment racks; Ayre Acoustics Myrtle Blocks; ASC Tube Traps, RPG Abffusor panels; AudioQuest Niagara 5000 Low-Z Power/Noise-Dissipation System (amplifiers) and AudioQuest Niagara 1000 Low-Z Power/Noise-Dissipation System (source components). AC power comes from two dedicated 20A circuits, each just 6' from breaker box.
Room 20' (left side), 25' (right side) × 16' × 8'. —John Atkinson

The MBL pushed this voice a little farther back than it had been with the Pass Labs, as well as a touch higher. A close-run thing, but like I said, more *palpable*.

Next up was the Benchmark. While the LA4 is considerably less expensive than the Pass XP-32 and MBL N11, its measured performance is on par with that of those two technical high-fliers. After an evening of warming up, the Benchmark had a somewhat upfront presentation in my system. Even with sound pressure levels matched, it sounded as if it was slightly louder than both the other preamplifiers. Detail like the reverberation on my Mozart recording was fully apparent with the LA4, but, paradoxically, soundstage depth was slightly more restricted than with the XP-32. The images of the Mozart's violin, viola, and cello were well-defined laterally but were more in the plane of the piano image than behind it, as I had heard with the Pass Labs preamplifier. The Benchmark's reduction in soundstage depth was also apparent with Joni Mitchell's unfolded and upsampled "How Do You Stop." The LA4 is an excellent preamplifier, especially considering its price, but it was outclassed by the XP-32.

Summing up

A great preamplifier will allow through so much information, so much of the music, that the shortcomings of lesser speakers and amplifiers can be forgotten. The Pass Labs XP-32 satisfies that definition. It joins the Ayre KX-R Twenty, MBL N11, and, of course, the XP-30 in the ranks of great preamplifiers. I will miss the XP-32 when it goes back to the manufacturer at the end of the review period and return to my simpler, preamplifier-less system. But for the final two months of 2020's *annus horribilis*, I was privileged to enjoy my music library with more detail and correspondingly increased enjoyment than I expected, courtesy of the XP-32. ■

7 See stereophile.com/content/benchmark-la4-line-preamplifier.