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## Little Labs

### Monotor headphone amp

Boutique equipment maker and former studio technician Jonathan Little has built a business around making useful (and small) boxes that solve specific problems in the recording world. Each of his Little Labs products boasts a unique feature set — and a humorous name. With this new *Monotor*, Little has built in the kind of monitoring flexibility often found only in a mastering room, and strapped it to a superb-sounding, high-power headphone amplification system, with one dual-mono amplifier driving a set of paralleled 1/4" and 1/8" headphone jacks, and a second dual-mono amp driving another set of 1/4" and 1/8" jacks. He also added an unbalanced stereo 1/8" aux input on the back, alongside the balanced XLR/TRS Combo jacks that make up the main input, and a loop-through capability on separate TRS jacks, which allows the *Monotor* to bridge out the balanced inputs to the studio's monitoring system (or other destination).

But wait, there's more! On both sides of the volume knob are little holes in the front panel. Stick a paper clip in the left hole, and there's a switch to bypass the left side of the volume potentiometer. The little hole on the right leads to a switch that does the same for the right channel. As the well-written manual explains, this feature is for people using a DAW or DAC with its own high-quality volume control. You can also utilize these switches with the *Monotor* in mono mode for a "more me" cue mix. For example, feed a mono DAW mix to the left channel, bypass the left side of the volume pot, and control its level from the DAW; then feed the singer's mic to the right channel, and leave the volume pot enabled for that side, so that the singer can change that level as desired. Furthermore, the recessed switches should prevent you from accidentally pushing the buttons and subjecting your ears to a full-volume signal, if you've got an unattenuated source feeding the *Monotor*.

And then there is the monitor-mode selector, controlled by a larger knob next to the volume control. The mode selector has six discrete positions: reverse stereo (R/L), regular stereo (L/R), summed mono (L+R), left-channel to both ears (L), right-channel to both ears (R), and difference to both ears (L-R). This last option is immediately useful in the 2016 recording world. If you want an ear-opening experience, use this setting and listen to some originally-mono material via Spotify or other lossy sources. That "digi-hash" you'll hear is made up of artifacts caused by lossy data compression. In a true mono recording that was mastered in true mono (for instance, *The Beatles In Mono* CD box set), you will hear almost no sound in the L-R position, because there is no out-of-phase material in a true mono source.

Back to the *Monotor* details — as with all products from Little Labs, the *Monotor* is a small box built out of heavy-duty materials so it can handle life in a working studio or on the road. The external power supply is about twice as big and more than twice as heavy as the *Monotor* box itself. The manual explains that one of the several capacitors in the power supply is larger and weighs more than a typical USB dongle DAC/headphone amp. Bigger reserve capacitors allow the power supply to deliver more peak power to drive anything plugged into the amp with less distortion.

I asked Little to describe the philosophy behind *Monotor's* design, which he calls "Zen circuit topology." He answered by way of a comparison to more common headphone amp designs:

"The Rupert Neve RNHP, for example, uses a classic-style, three-stage design — basically a buffer at the front end (balanced to unbalanced), a potentiometer with another buffer, and then a driver stage. Another well-regarded design uses a transformer to buffer (balanced to unbalanced), potentiometer with buffer, then a driver stage. Both are similar to a console line-driver output used in classic consoles.

"The *Monotor* is unique in that it is completely passive, including the mono summing circuit, and it uses just a single driver stage for the output to the headphones. If fed a balanced signal, the signal remains balanced throughout the unit, until the final and only active part, the drivers.

"I experimented for a few years with variations of classic designs, using both transformers and multiple stages. I could make them work very well, but I had an idea to do this completely passive — including the mono summing part, which, even if you don't think it's a feature you need, once you have it, you will use it all the time.

"Once I got it all figured out, and built my fourth prototype with this unique single active-stage circuit, I was astonished at the incredible detail in the resulting sound. Obviously, there's much more to it, like the special, super-low-noise voltage regulators I use. I could go on and on, but all that is in the product PDF that you can download from the Little Labs website."

According to Little, the only active component in the circuit is a modern, super-clean, monolithic driver; and the gain level is purposely set somewhat high:

"Despite what a lot of old-school audio guys say — and I am one — there are transistors on a bipolar process that are far more advanced than any discretes available on the market. Also, matching internal capacitances at femtofarad level to preserve the common-mode rejection performance can only be done on a die.

"You might notice with a mic preamp that it comes to life at a certain gain, usually higher. When you have multiple stages, like in a typical headphone amp, you might not be able to run

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those amplification stages in their happy place. The gain on the single-stage *Monotor* is high, but you'll notice it's not the volume so much as it's the *Monotor's* quick, lively performance — even at a low volume. That is the result of gain in its happy place. So that's the Zen thing!"

As I noted in my review of the Hafler HA15 and HA75 headphone amps [*Tape Op* #115], we now live in a music-production world where it's essential to end up with a master that sounds good on traditional headphones, earbuds, and a new generation of devices with active electronics for personalized sound profiles. Making a mix that jumps out of the big soffit monitors and blows your hair back just won't do it anymore, unless it translates very well to earbuds connected to an iPhone. So, an essential part of the mixing and mastering environment today is a good headphone system. Ideally, this means an amplifier that can drive a wide range of headphone designs and impedances, and put minimal sonic fog, noise, or "character" between your sound source and your headphones or earbuds. The *Little Labs Monotor* definitely meets those requirements, and its many monitoring options make it uniquely suited to the pro-audio world.

To test the sound quality of the *Monotor*, I set up two signal paths: first, fed directly from the line-level outs of my Lynx Hilo interface [*Tape Op* #90], using the *Monotor's* built-in level control; and second, plugged into the line outs of my Benchmark DAC1 HDR with a loop-through to my Benchmark AHB2 power amp [#111] and Amphion Two18 monitors [#108], using the DAC1 HDR's level control. Both the Hilo and DAC1 HDR were connected to my DAW via USB. I listened to material I was working on in the studio, as well as numerous recordings from my digital library, ranging from 24-bit, 96 and 192 kHz high-resolution files; to CD-resolution; to various lossy formats. I used my three go-to headphones: Sennheiser HD 650 (300  $\Omega$  nominal impedance) [#43]; Audio-Technica ATH-M50 (38  $\Omega$ ) [#63, #113]; and AKG K 240 DF (600  $\Omega$ ). I also compared the *Monotor* to the built-in headphone amps in the Hilo and DAC1 HDR.

First of all, let me say that I wish the *Monotor* had the loop-through circuit *after* the stereo-mono-mode selector. It would be great to have those facilities ahead of monitor speakers, too. Yes, they are pretty much standard-issue in a high-end mastering suite, but that kind of monitoring flexibility is not common in the DAW-based home-studio world. I asked Little about that, and he replied:

"I didn't want to add any buffered thing, and it's a tricky balance of parts the way I do it internally so that nothing is compromised. The thru jacks are straight-wire, to tap in-line before a monitor controller or console, and they also allow you to daisy-chain multiple units together. (Four units fit in a 1RU rack space.) However, you can always use one of the *Monotor's* headphone jacks to feed your powered speakers. I do that with my Meridian M20 speakers in my lab at home, and it works great."

I also didn't find the 1/8" aux jack as useful as an input-source switch would have made it for studio use. The signal from this jack is summed with the signal from the main inputs, post monitor-mode selector. So, for example, you could use the aux jack to inject a talkback source into the headphones. Or, you could use it with a portable device to listen to a client's rough mix or to play back songs meant to inspire a tracking or mixing session. But it would have been more useful if one could switch between the mobile device and the master mix out of the DAW. Theoretically, you could just hit "pause" on each source in turn, but what if you want to sync both sources up, and A/B the sound quality of master file to lossy playback?

Another good reason for a switch is, what if the device on the unbalanced aux jack puts out hum, hash, or noise while it's paused, as some smartphones do? But as Little explained, the aux input is a "convenience feature" he was able to add to the *Monotor*, but there wasn't any space left over to incorporate an input selector.

My only other critique is minor — I would prefer a larger level-control knob. It should be the same size as the monitor-mode selector, or at least big enough to get a couple of chubby fingers of a ham-hand on it for a quick adjustment in the middle of a busy session. On the plus side, the volume control is detented, so settings are repeatable, but there are no marks along the arc of movement on the front panel, so writing down a setting would require something like, "5 clicks left of center."

As for sound quality and user experience, I have no complaints or nits to pick. This amplifier sounds fantastic — plain and simple. It sounded at least as clean as the Benchmark DAC1 HDR's built-in amp, and seemed to have a bit more power in reserve, perhaps operating at a more "Zen" place in the power curve. It had more bass punch than the Lynx Hilo's built-in amp, or perhaps less midrange emphasis, but the Lynx could drive those 600  $\Omega$  AKG headphones to painful SPLs — something neither the *Monotor* nor the Benchmark could do. In the end, I thought the *Monotor* was the most direct sonic line to the output of the two converters. No matter what kind of music I listened to, at my normal listening levels (just loud enough to hear details and dynamics, depending on the music, and not loud enough to make my ears ring), the *Monotor* sounded honest and in control of the headphones.

I should mention that, when listening to true mono sources, the average level is louder in the L+R setting versus the L/R or R/L settings. Little explained: "When you add two signals together in mono, they do get louder by 6 dB electronically. I gave that some thought, and rather than compensate for that, I left it how you would hear it if you combined two tracks on a console."

As previously mentioned, the L-R option is extremely useful, perhaps essential for working with lossy file formats. It's important to hear what sorts of artifacts are created, as well as what sound qualities and timbres are lost. My trusty editor and sounding board, Andy Hong, suggested two more great uses for L-R listening: "If you're going to check the mid 'channel' (of a mid/side recording) for mono compatibility, it's nice to be able to hear the side 'channel' (which is L-R) so you understand what you're losing when the mix is folded to mono. Also, hearing the amount of 'stereo-ness' (the difference between the left and right channels) as you work on a mix can provide insight into how you might want to move forward with the mix."

It's very ear-opening (and eyebrow-raising, if not hair-raising) to carefully listen to our work as it streams out of Spotify, Pandora, Apple Music, or Amazon Music. This is what we're up against in the modern world of audio production. What our work will sound like through earbuds over a "digital-stream" is as unknown as how it would sound after it's been cut to lacquer and pressed to vinyl — perhaps even more so in the realm of streaming. Careful production work referencing the listening environment of most of the music-consuming public can take some of the mystery and angst out of the process. With the *Monotor*, Little Labs has provided the audio professional the right tool for this job, and the most transparent-sounding headphone amp I've ever heard.

(\$540 street; [www.littlelabs.com](http://www.littlelabs.com))

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