Little Labs IBP Analog Phase Alignment Tool

One simple idea, one powerful box

Review by Paul J. Stamler

Today we’re reviewing the IBP (In Between Phase) from Little Labs. It’s a doohickey—an audio gadget designed to solve a particular problem, but one that can also be made to sit up and do tricks. So what problem is the IBP designed to solve?

What’s the problem?

Many people like to record electric guitars and basses both by miking the cabinet and by taking a direct feed from the instrument (or amp), to separate tracks. The direct feed can be judiciously mixed with the amp/speaker sound for increased clarity, or it can be run back into another amplifier for different tones, a practice known as re-amping.

The problem: Because the miked signal has to travel through the air from the speaker cone to the mic, it's slightly delayed with reference to the direct signal. Mix two signals differing in arrival time, and you get the dreaded "phase cancellation": some frequencies are reinforced, while others cancel, and the resultant frequency response (known from its appearance as "comb filtering") often sounds grubby or thin, and lacks impact.

Another problem

Another problem arises when several instruments are being recorded together; typically the bass or lead guitar sound bleeds into other people's microphones, particularly the drummer's overheads. Whereas the direct-vs-miked-cabinet delay is a millisecond or less, typically the delay between the sound from the amp's own microphone or DI and the leakage is several milliseconds.

These days many of us record or mix on DAWs, or use multitrack digital recorders that let us move tracks around. Can’t we compensate for these delay problems by sliding tracks back and forth until they are synchronized?

Not really, because there’s also phase shift inherent in an amplifier/speaker system, and this phase shift varies with frequency. One needs to compensate for the system's own phase shift (non-linear) as well as the absolute time delay (linear), and just sliding the tracks around won't do that.

Enter the Doohickey

The Little Labs IBP incorporates a phase-shifting network (an "all-pass filter") that can vary from 0° to 180° of phase shift, or 0° to 90° for less extreme adjustments; in the latter position there’s only one stage of phase shifting in-circuit, while the more drastic setting uses two.

Its main circuit is pro line-level: +4 dBu nominal, electronically balanced at the input and transformer-coupled at the output, which is balanced and floating for maximum connection flexibility; you can connect to just about anything, balanced or otherwise.
This includes lower-level circuits; the IBP will plug nicely into a channel strip's insert jack. There's a ground lift to eliminate hum and buzz problems.

While they were at it, the folks at Little Labs included several other bits to aid the recording process. There's an instrument input with extremely high impedance, to avoid loading pickups unduly; the gain of this can be varied (via a screwdriver-adjusted trimpot on the back panel) from 12 to 26 dB. A switch lets you connect the phase-shifting circuit to the instrument input rather than the line-level balanced input.

There's also a buffered output from the instrument input, which is available at all times; in effect, this lets you use the buffer independently of the rest of the box if you like. And there's a high-impedance output, tapped from the phase-shifting section's output transformer, designed to drive an amp when re-amping. (The manual warns you not to re-amp and use the balanced output simultaneously.)

**Flexibility**

If you look at the IBP's block diagram (Figure 1), it's easy to see how flexible the box is, and in how many different ways it can be configured. One of them is particularly worth noticing: with the instrument input switched to the main circuit, the doohickey becomes a direct box (DI), but a DI with a difference.

Unlike most DIs, active or passive, that step an instrument- or line-level signal down to microphone level, the IBP provides a way to make a guitar, bass, keyboard or amp produce a low-impedance, balanced, line-level signal, to be run into a balanced line-level console or recorder input. I find that preferable to losing 20 to 40 dB (mic level) that must be brought back up later at an inevitable cost to sound quality.

**First looks**

The IBP, with its rugged build around a heavy extrusion with a slip-on steel case, comes packed in a tough, molded-plastic case that looks as though it means business. With it comes a chunky inline power transformer with a wall cord and umbilical cable that look like they'll last forever.

On the front, most of the controls' functions are immediately obvious: there's the line/instrument input selector, the ground lift (called "earth lift" in British style), and a bypass for the phase adjustment circuit.

There's also a polarity inverter, which flips the signal "upside-down," so what used to go positive now goes negative. This is the equivalent of a 180° phase shift at all frequencies, and in effect adds to the useful range of the phase shifter by enabling it to operate from 180–360°.

There's also a switch that lets you choose between one and two stages of phase shift (0°–90° or 0°–180°, as described above, for fine and coarse adjustment), and it lets you configure one or more of the phase shifter sections to center on low or high frequencies.

On the back, in addition to the balanced input and output XLRs (Neutriks), there are buffer and re-amping outputs (both 1/4" unbalanced jacks) and holes to insert a mini
screwdriver for tweaking the buffer and re-amp gains.

The back of the manual (which is well written, with some fascinating side trips) contains detailed instructions for disassembly, a procedure that is not intuitive—if you want the thing to go back together you’re well advised to follow the directions.

The inside reinforces the "built-like-a-tank" impression. Sparing you the blow-by-blow anatomy, suffice to say that the parts quality is above average for the audio world, and way above average in this price bracket. So are fit and finish; the unit was beautifully built and impeccably assembled.

**First, do no harm**

When testing out a new gadget, two questions are paramount: Does it do its job, and does it screw up the sound in the process? Since the answer to the first question is irrelevant if the answer to the second is unsatisfactory, we’ll tackle the latter question first.

I ran some high-quality signals through the IBP, both in balanced and unbalanced modes, at various levels. It wasn’t perfectly transparent—I could tell when it was in circuit and when it wasn’t—but its effects were errors of omission rather than commission. There was a slight loss of immediacy, a slight decrease in there-ness, but that was it; no added shrillness, no change in the balance, no thinning out of the sound.

To put this into perspective, the IBP affected the sound a lot less than passing the signal through the mix busses of a budget mixing console, and in ways that were far more benign. The slight thickening of sound, in fact, might even come in handy for some applications; I suspect it comes primarily from the output transformer.

I checked the IBP’s overload levels; the instrument input clipped at +19 dBu in when feeding the buffered output, and +18.5 dBu when feeding the main output. This is way higher than anything a passive guitar or bass is going to put out, and you’d be hard-pressed to clip it from the average synth or electric piano. (Connecting the IBP to an amp’s speaker output would presumably require an attenuator.)

The phase shifter’s clipping point varies from +19 dBu to +26 dBu, depending on the setting of the controls; at the worst setting you might run the risk of clipping if you connected it to a nominal +4 dBu output (there’d only be 15 dB of headroom in the IBP), but that’s at an extreme setting. My guess is that you’d have to work pretty hard to overload this box in normal use. With the phase-shifting circuit switched out, the main output overloads at +32 dBu, and there’s no way you’re gonna go that high without something else clipping first.

There’s one thing I wish was different: the buffered output, even set to minimum gain, was 1.2 dB hotter than its input. I’d have liked to see it adjustable all the way down to unity gain, if for no other reason than to make my comparisons easier. Pretty small quibble, but that’s part of my job.

I used the main inputs and outputs in all possible combinations, balanced and
unbalanced, and I have to say that the box didn’t seem to care. The output happily fed a balanced input, floating or anchored, or an unbalanced one, with no apparent problems. I’m beginning to remember why old-school audio designers used output transformers on everything; they certainly increase the number of ways you can connect equipment with impunity.

**The Real Question: Does It Work?**

Yes.

My bass rig is in storage at the moment and almost impossible to extract, so I worked with electric guitar and my favorite Good Little Bad Amp, the Kalamazoo Model 1. In all cases I miked the amp with an Electro-Voice RE200, which is my favorite amp mic among those I own.

For the first go-round I used a Y-connector to plug the guitar into the amp’s input as well as the IBP’s instrument input. Both are extremely high-impedance (10 Megohms for the IBP and only the tube and leakage for the Kalamazoo, which has no input terminating resistor), so I anticipated little loss from loading. I ran the IBP’s line-level output (with the phase shifter bypassed) into a line input of an M-Audio Delta 66; the microphone went through a Project r solid-state preamp to another line input on the interface.

I also tried removing the Y-connector, and connecting the IBP’s buffered output to the input of my guitar amp. Here I noticed an interesting phenomenon: the guitar amp sounded better when driven by the buffer than when the guitar ran straight in.

Now, I’m not used to that. I’ve heard very few boxes that go between the guitar and amp which improve the sound; usually, I like the sound of the guitar-and-amp alone, and only put up with stomp boxes when I really need the effects they generate, which isn’t often. (Cost-benefit analysis, audio style.) But the IBP made the combo sound more interesting, with increased clarity and transient bite, and a more detailed treble without harshness.

Why this should happen, I don’t know; the complex interface between guitar pickups, cords, and amplifiers is mysterious, and we don’t always know why something sounds the way it does. (Just possibly, the high-impedance pickups could be doing interesting things to the input stages of the OPA-604.) But, with this guitar and this amp, I liked what the IBP did to the sound.

Back on the subject: I listened to the tracks through a passive summing circuit, routing one of them back through the IBP and playing with the phase controls. There’s no question that, with the phase shifting circuit bypassed, the summed signal lacked the punch and impact of the miked amplifier on its own; the added detail from the DI track was vitiated by the overall murk, as the phase-shift problems draped a wet blanket over the sound. Sliding the tracks back and forth in the computer didn’t help.

Then I turned on the phase shifter and started twiddling. It took some doing, and I found it useful to go in and out of bypass; in the end, though, I found a combination of
settings that gave me just what I was looking for, and sounded a lot like the amp sounds in the room. (I also, by the by, found a bunch of settings that were "wrong" but very interesting—the IBP, used in this way, makes a dandy special-effects box.)

I tried using the IBP for re-amping, but was disappointed; the sound from the amplifier was mushy and not very pleasant. Then again, this amplifier's inputs are slightly peculiar; I'd hesitate to generalize on the basis of one experiment. I'm not much of a re-amper anyway; your mileage may vary considerably.

Finally, I tried something outside the envelope, and not explicitly recommended by Little Labs. I wondered whether the IBP could correct the common problem created when one records a vocalist playing an acoustic guitar, and the voice leaks into the guitar mic(s). Since the distance from mouth to guitar mic is much greater than from mouth to vocal mic, this can produce some nasty phase problems, with the bottom richness dropping out of the voice. So I loaded a couple of tracks from a recent Sephardic session into the DAW and routed one through the IBP.

It didn't really work. After much futzing I managed to get a sound that was considerably improved over the original, but it still wasn't right. Going into the DAW and sliding the track, in this case, did the trick; I lined up the two signals and got precisely the sound I was after.

I guess that shows Jonathan Little was on the money when he talked about the uses of the IBP vs. sliding tracks. In the case of the phase-shifted rabbi, there was no additional shift from an amplifier and speaker cabinet, only the linear delay caused by different microphones. The IBP was clearly designed to compensate for that added shift as well as the straight delay.

**What Do You Get?**

First off, the IBP does what it's designed for: it makes combining direct feeds and miked amplifier cabinets a much more usable technique, and it does so without mangling the sound.

For lagniappe, you get a *very* good DI—uniquely in the current market, one that works at line level. You get an isolation box or balanced/unbalanced converter of high quality, and the chance to add a little transformer thickening as an effect. You get a re-amp circuit. By setting the phase shifter "wrong," you get an effects box good for hours of messing around. And you get the only instrument buffer in living memory to make my guitar/amp combination sound better.

With all those things, you get a high standard of construction, and component choices more typical of high-end equipment than sub-$500 boxes. (I still can't get over the heft of the power and output transformers.) This box is clearly built for the long haul.

That's some doohickey. If you need any of the bonus functions outlined above, run right out; you're not likely to find them done better at any reasonable price. As for the main function—the phase shifter—there's nothing on the market that does what this little box does in hardware, nor software either that I know about. If you like combining DI and a
miked amp, or have problems with amp sound leaking into places where it shouldn’t be, then this doohickey’s for you.

Enjoy!

Price: $XXX


Paul J. Stamler (stamler@recordingmag.com) is out of the hospital and back to eating chicken curry, thanks very much.