

# Pendulum Audio

## *PL-2 peak limiter*

In an era when excessive digital peak-limiting has become a standard, it's a surprise that the Pendulum Audio *PL-2* peak limiter is the only standalone, brickwall analog peak limiter in existence. While there may be plenty of compressor/limiters, they're really not the same thing as the *PL-2*. The only other box that's similar is another Pendulum product, the Quartet II recording channel, which was released first and has the same brickwall limiter built-in. It was not long after the Quartet II's release that need and demand forced the development of the *PL-2* as a standalone unit.

The *PL-2* is a 1RU-height, stereo peak limiter. There are detented controls for input, output, and *ceiling*, which sets the amount of peak limiting. The lower the ceiling, the more limiting takes place. Also, there are switches for bypass, link, and JFET/MOSFET modes. It's a very simple unit to operate.

One of the unique features of the *PL-2* is that it's able to do its peak limiting without flattening the tops of waveform peaks. Designer Greg Gualtieri does not reveal the secret for how he achieves this. When the audio passes through the *PL-2* below the ceiling threshold, absolutely nothing happens to the signal. But if a peak hits the ceiling, nearly instantly, the *PL-2* will lower the level of that peak, preventing audible distortion in the resulting signal. Therefore, if the peak is a transient rather than a steady state signal, you can turn up the overall level after limiting. This is one of the methods mastering engineers use to make albums louder.

The two modes for the peak limiting circuit, MOSFET and JFET, have different effects on the harmonics of a signal and therefore sound different. Deciding which sounds better isn't always easy, even when the difference is clear. MOSFET tends to sound a little softer to me, while JFET usually sounds a little punchier, as if it had a slower attack. While you'd think that JFET would sound better on something that you'd want punchy like a rock track, my taste consistently varies on a case-by-case basis. Sometimes when I expect MOSFET to sound better because it's a soft track, JFET sounds better. There's simply been no pattern for me.

Brickwall limiters are most commonly associated with mastering, but the *PL-2* can also be used in tracking. I know that one popular application is drum overheads, but that's not something that I usually favor. My main tracking application was to put it in front of a compressor to prevent the compressor from overreacting to peaks. I consistently ended up with fewer compression artifacts working this way, and in some instances, I was able to compress more aggressively without hearing it.

One of the most important things to mention about the *PL-2* is that it pretty much has no sonic signature. It doesn't color the sound like most devices, and that makes it even easier to use during tracking, mixing, or mastering, because you can add it to the signal path without having any tonal effect.

How does the *PL-2* compare to a Waves L2 (*Tape Op* #30) in mastering? I don't own an L2, but my friend Mark Christensen does, so I brought it to his mastering room. I invited Greg from Pendulum Audio to attend also. For any skeptics about the impartiality of having a manufacturer present, I can tell you that Greg made a point of only observing and did not influence our shootout, even when we realized there wasn't a straightforward way to do it and were struggling to figure out how to make it a perfectly accurate comparison. The analog and digital nature of each device made a direct comparison impossible.

I can tell you that the *PL-2* sounded great, or more specifically, it didn't really impart a sound at all. Mark found that he couldn't hear a tone to the *PL-2*. That was the last time I saw the *PL-2* as Mark asked to try it out for a bit and later bought it.

We did experiment with A/B'ing volume and with this setup were able to match the volume of the L2. Mark pointed out that he usually spends more time mastering a track and that he wasn't sure that he had hit the L2 as hard as he could have (although he was where he usually ends up). Also, Greg will be the first to point out that digital peak limiting will usually work better than the *PL-2* on a track that has already had some peak limiting. (I run into this a lot with hip hop.) So in the volume war between the *PL-2* and the L2, it's going to vary on a case-by-case basis.

We did one other test of something I've been experimenting with for a while, which is peak limiting in M/S instead of stereo. I brought my Dangerous Music S&M (*Tape Op* #54) to the shootout. In my experience, most of the peaks are in the center of stereo signal. So by putting the *PL-2* on the inserts of the S&M box, you can limit the peaks as much or more than you can in stereo, while actually doing less peak limiting overall. When we did a volume comparison this way, we got our loudest mix of the day.

In the end, what we really learned from our shootout was that separate from taste, there's no way to definitively say which sounds better or which can make a louder mix. However, I can definitively say that, in my opinion, the *PL-2* is an excellent peak limiter and does exactly what it was designed for and claims to do. I've had no problem making mixes as loud as I can with a digital peak limiter and whenever possible, I prefer using the *PL-2* to a digital peak limiter. (\$2500 MSRP; [www.pendulumaudio.com](http://www.pendulumaudio.com))

—Mike Caffrey, [www.monsterisland.com](http://www.monsterisland.com)