THE BOTTOM LINE

PERFORMANCE TESTING BY TOM MULHERN & ASSOCIATES, CAMPBELL, CA (408) 374-1353

TOA L-1102 Dual Leveler/Limiter

AT A GLANCE: Whether applied to onstage, studio, or broadcast applications, TOA's single-rack-space L-1102 Dual Leveler/Limiter lets you maximize gain in a system without risking distortion or damaged speakers. Each noise gate-equipped channel can operate as a limiter or leveler, and both channels can be linked for stereo operation.

By Tom Mulhern

Blown speakers, fried ears, and rattled nerves are no joke, but sometimes it's a tough balancing act between pushing enough volume and trashing the audio system and the audience. Too little volume, and the program material loses impact and intelligibility. Too much, and you may be working overtime to replace speakers—or at the least, you might be delivering far more distortion than you or the listener is comfortable with. TOA's L-1102 Dual Leveler/Limiter puts you under control of the maximum loudness and, with minimal knob twiddling, keeps you out of the danger zone. The circuitry is extremely effective and quiet, and it works without breathing or pumping effects. In addition, the L-1102 fits into a single rack space and can be used as two units operating independently in either leveler or limiter modes, or as a linked stereo unit in a single mode. Best of all, it operates cleanly and intuitively—adding neither noise nor confusion to the already complex task of running a sound system.

Both channels have identical controls and input/output busses, plus there's a link switch right in the middle of the front panel so that the channels can operate together. All controls are clearly labeled with crisp, white lettering that contrasts extremely well against the black face panel. Likewise, all knobs are black with a single white line, facilitating a quick visual check of settings from several feet away, or in low-light settings. To keep knobs from being twiddled or bumped in permanent installations, TOA includes a front-panel security cover with the unit. Two front-panel holes accept the screws that hold the cover in place.

TOA designed all aspects of the L-1102 not only to do its job extremely well, but to keep you informed of every function—all the way down to the LED that tells you that the unit is powered up. For example, both channels have their own signal-present LED to let you know for sure that program material is reaching the L-1102.

Each channel has a noise gate, which efficiently eliminates the operating noise of equipment preceding the L-1102. It's a simple set-and-forget gate that has an in/out pushbutton switch and a threshold control, labeled from -40dB to -80dB. A bright red LED tells you when the gate is closed. Adding to the simplicity, the gate is keyed from the audio signal coming into each channel, so there's no extra wiring involved. I found that the gate did an excellent job blocking out the hiss and noise resulting from multiple signal processors, weird equalization, etc., allowing me to crank the gain of the overall system without amplifying a load of noise. In addition, the noise gate is transparent. Switching it in and out of the circuit, there's no noticeable change in level or sound quality.

The leveler/limiter section is similarly easy to operate—only the bare essentials populate the front panel. Two bright LEDs tell you which mode is operational, and one knob serves as the threshold for both functions.

In the L-1102's leveler mode, both the threshold and the output-level controls let you set an appropriate amount of compression to thwart distortion while keeping a good, hearty level going to the power amps. The threshold can be set from -40dB to 0dB, yielding ample range, and the output level provides gains from 0dB to +20dB; it's labeled from "0" to "10." I found this mode to be a great help in dealing with music where the singer would duck out for a few choruses, or where a guitar would blare for a solo. The effect was smooth, and virtually unnoticeable.

The L-1102's leveler mode uses the same compression system, but it acts automatically to keep your system's output steady (the level knob is inactive). In this mode, the threshold control operates over a range of 1 volt to 100 volts RMS. Just run a pair of wires from your power amp's speaker output to the L-1102's sense input (any gauge of wire will work, even as small as 22 ga.). Tweak

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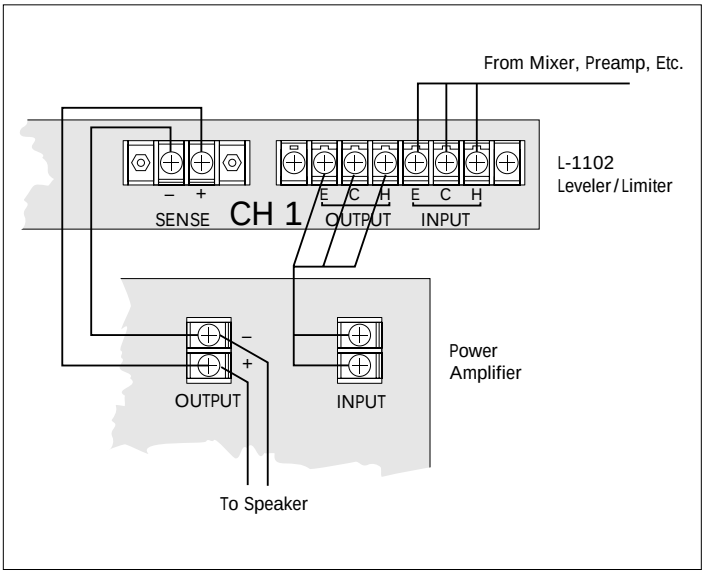
the threshold by watching the LED gain-reduction meter, and *voilà*, you have an automatic level control for the entire system. I found this especially useful for jazz, fusion, and classical music, or very dynamic music with percussion or slap bass that seems to come out of nowhere. By setting a reasonable threshold, I could keep the power amps and speakers running at an extremely high level and let the L-1102 keep the sudden transients and loud passages from either (1) sending me dashing for the mixer's output sliders, or (2) listening to the entire system go *blaaaaaaaap* from clipping distortion. Just like its leveler mode, the L-1102's limiter mode does the job silently, quickly, and reliably.

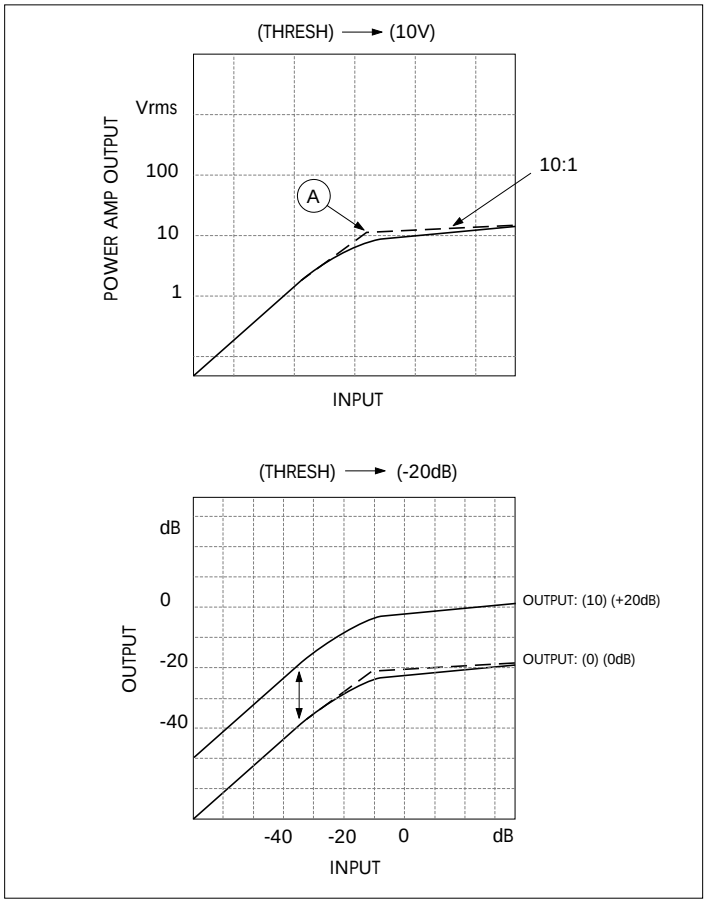


Connections for limiter operation (one channel). The wires between the power amp's output and the L-1102's sense input are unnecessary when the unit is used as a leveler.

I like having two independent processing units in one rack enclosure. Being able to apply one channel as a limiter and one as a leveler is great for mono PA systems; you can use the limiter to preserve your house speakers while setting the leveler to guard the monitors. It's also good for biamplification setups, where you might want to keep tighter reins on, say, your expensive high-frequency drivers.

Like the front panel, the L-1102's rear panel is clearly laid out, with both channels' busses completely identical. I like the ground-screw terminal, designed so that you can remove its metal shorting piece if ground loops are a problem. Similarly, I like the plastic covers that screw on over the sensing terminals. I'm not extraordinarily clumsy, but it's nice to know that if I were to slip with a screwdriver, I wouldn't be able to short out my power amp's speaker leads by bumping the sensing screws. It's a small point, but it shows good design on TOA's part.

Overall, how does the L-1102 stack up? Very well, not only in terms of how it functions, but in how easy it is to operate. In an age when signal processors are often buried in knobs and switches, it's refreshing to use a leveler/limiter that's so straightforward. It's clean, quiet, and well-made. I highly recommend TOA's L-1102 Dual Leveler/Limiter for onstage, studio, and broadcast applications.



The top diagram shows the compression curve of the L-1102 in limiter (speaker protection) mode. Output amplitude is linear with respect to input, up to the threshold (A), and gentle and constant thereafter for compression in the ratio of 10:1. The bottom diagram (leveler) shows compression of an output signal when the input level exceeds a predetermined threshold. The effects of 0dB and +20dB output-level settings are also shown.

INSIDE TOA'S L-1102 DUAL LEVELER/LIMITER

Type of unit: Leveler/limiter
Features: Two channels that can operate independently in leveler or limiter modes, stereo linkability, sensing inputs, extremely low noise, single-rack-space configuration
Power requirements: AC mains, 50 Hz/60 Hz
Power consumption: 14W (120VAC version), or 15W (220/240VAC version)
Frequency response: 20 Hz to 20kHz (±1dB)
Total harmonic distortion: Under 0.1%, 1kHz, rated output; under 0.2% 1kHz, 30dB compression
Input: +4dB for 10kΩ balanced load
Output: +4dB for 600Ω balanced load
Maximum input level: +20dB
Maximum output level: +20dB
Sense input: 100kΩ (electronically balanced)
Noise level: Under -92dB (IHF-A)
Threshold level range: Leveler, -40dB to 0dB (with respect to input); limiter, 1V to 100V RMS (with respect to sense input)
Noise gate threshold range: -80dB to -40dB
Attack and release times: Dependent on input (or sense input) signal
Finish: Black
Dimensions: 19" x 1.73" x 12.47" (482.6mm x 44.0mm x 316.8mm)
Weight: 8.8 lbs (4.4kg)
Manufacturer's address: TOA Electronics, Inc., 601 Gateway Blvd., Ste. 300, South San Francisco, CA 94080