Technology Merger

Evaluation of the EV P3000 amplifier

By Jeff Kuells

Electro-Voice (EV) has experienced many corporate changes throughout its 75-year history, especially in the late 1980s when it became common practice to acquire and/or merge companies. One change of note arrived in 1997 when Europe-based Dynacord merged with EV, which facilitated a combination of technology and expertise in product design and manufacturing.

My point here is not to do "History 101," but rather, to provide some context for my recent look at the EV Precision Series P3000 power amplifier. Simply, this unit has strong ties with Dynacord models and is manufactured at that company's facility.

Engineer Werner Pinternagel founded Dynacord in 1945 and owned the company for the next 25 years. In the early years, Pinternagel was engaged in "low-frequency transmission techniques". Working at an altered horse stable and with only one employee at his side, he constructed his first power amplifier, using common materials of the period.

At that time, amplifiers were not designed to meet the demands of specific applications, but instead were largely used by home hi-fi enthusiasts. Subsequently, the movie theater market boomed, with so-called "cinema amps" in high demand. Dynacord weighed in with the K1, capable of pumping out 25 watts of output power. (This lower output was pretty much the norm for that era.)

Two impressive power supplies are packed into the EV P3000.

Precision Series technology dates back about a decade, and the current models have been out for a while. They've proven to be a valid professional and commercial choice, with Dynacord noted for being a stickler about reliability.

The current Precision Series line consists of six models ranging from 375 watts per channel to 1750 watts per channel (at 8 ohms). The P3000 is the most powerful of the series, rated at 850 watts per channel at 8 ohms, 1400 watts at 4 ohms and 1800 watts at 2 ohms, with 1 percent thermal harmonic distortion (THD).

EV also publishes other power ratings under various conditions, with the idea that amplifiers should be tested and rated according to musical signal rather than potentially misleading theoretical lab measurements. There is a big difference between continuous signal and maximum bursts inherent to musical performance. This drives a Precision Series design tenant of offering headroom of about 30 percent in their amp power supplies.

WHAT'S INSIDE

Taking the cover off the P3000, the first thing noticed is two huge toroidal transformers. (I can see why they say they have 30 percent headroom in the power supply). Next, I note a good amount of forced air-cooling, handled by four fans. A variable speed circuit controls the amount of cooling required, and I found the fans to be very quiet.

The output stage is of a Class-H

topology. Each channel can dissipate 6,000 watts of energy through the 24 bi-polar output transistors. The output devices are mounted directly to the heat sink without mica insulators to ensure better dissipation of heat. Mica isolators can reduce heat transfer over 30 percent – the faster a transistor can get rid of the heat, the longer life it will have.

To achieve lower THD, the P3000 uses a proprietary design called Dual Differential Discrete Topology as part of the front end of the amplifier. Discrete electrical components are used instead of integrated circuits. All standard protection circuits that one expects from a professional unit are included – protection circuits guard against overload, temperature, shorted outputs, radio-frequency interference and DC faults.

Built-in limiters help protect loudspeakers from the harsh effects of clipping. The limiter's action is governed by input/output comparators, which have acoustically optimized time constants to help reserve the integrity of the source. Time constants are switchable, fast or slow, at the back of the unit.

The P3000 also includes switchable high and low-cut filters that attenuate infrasonic and ultrahigh frequency signals, preventing them from being amplified. This allows more effective use of the amplifier's power and adds a measure of load protection. (They are also switchable on/off via the rear panel.)

Input and output connectors are balanced XLR-type. An input routing switch allows selection of either normal dual-channel operation, or parallel mono operation, which routes an input to both channels but still allows for independent level control. There is also an input ground lift switch for nasty grounding situations we all face from time to time.

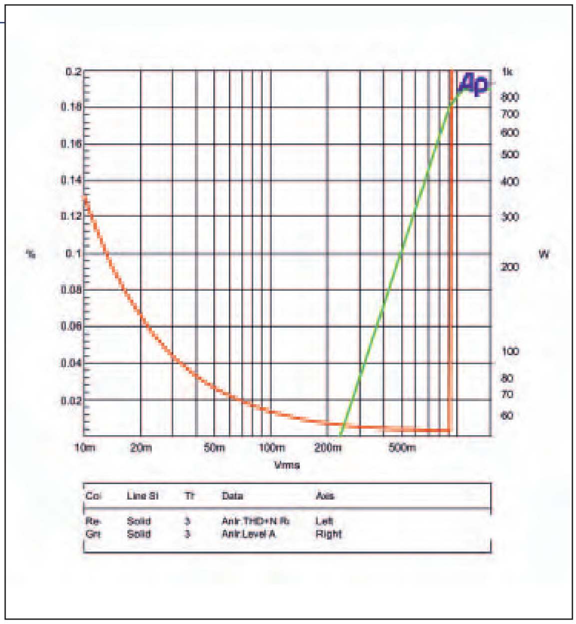

Figure 2: THD versus power. The red line shows THD when swept from 10 millivolts to 1.5 volts (at 1 kHz), while the green line indicates the output power at 8 ohms.

Separate output connectors are provided for channels A and B, and one more for bridge mode. The bridge connector has a plastic cover to prevent connection errors.

Calibrated, detented potentiometers on the front panel are supplied to regulate gain. A constant-gain option offers a 26 dB voltage gain that is identical to all Precision Series amplifiers, regardless of power rating, making it possible to interchange amplifiers of different power ratings. Front-panel LED displays are provided for each channel: power on, input signal, output signal, limiter on and protection active.

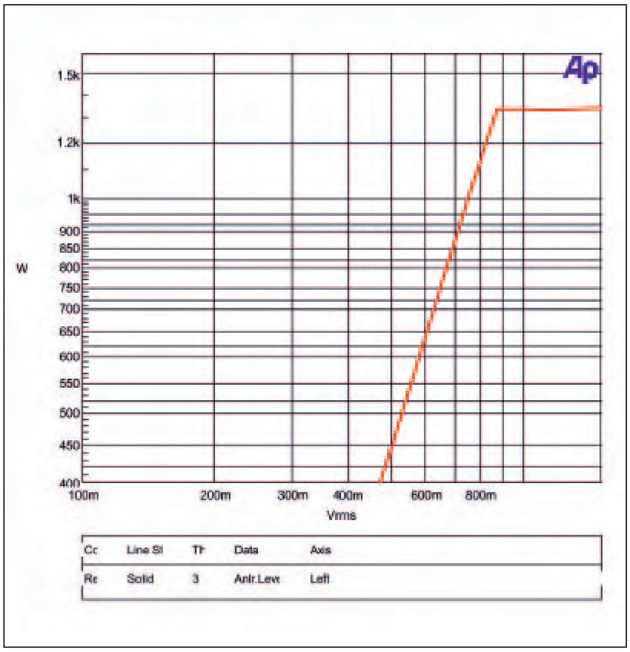

Figure 1: The 4-ohm, two-channel sweep meets the company's specification.

Whenever I do an evaluation, I try to be fair to both the audience and manufacturer. All measurements and tests are subject to scrutiny; I feel my job is to look for obvious misleading information that is published, and also, to try to present useful information in the practical sense.

RUNNING SWEEPS

For power testing of the P3000, I ran the input level sweep with a 1 kHz signal from 100 millivolts to 1.5 volts, maintaining a 120-volt line voltage by varying a 30-amp variac. I tested each channel separately, and then both channels simultaneously, at 8-, 4- and 2-ohm loads, not looking at burst power, but rather industry-standard RMS levels.

Figure 1 shows the 4-ohm, two-channel sweep, and the amp peaked out at 1350 watts. I was pleased to see it meets the company's specification, but wasn't really surprised due to the power supply design. Further, both 8-ohm and 4-ohm power specs were easily met. Only one channel could be measured at 2 ohms because I ran out of wall juice (bench slang for AC current), but feel comfortable from the other tests that this would also meet spec.

My THD sweeps differ from those of most lab engineers – I look at THD versus power. **Figure 2** shows two graphs in one format. The red line indicates the amount of THD when swept from 10 millivolts to 1.5 volts.

This is done at 1 kHz, and you can see extremely low distortion throughout the power band.

The green line indicates the output power at 8 ohms. You can tell when the amp has reached full power by the sudden increase in THD. This test is very helpful to see what the THD levels are at all power levels.

I also test THD versus frequency at a fixed level to see if there were any anomalies in the audio spectrum. This is depicted in **Figure 3**. So the company is not exaggerating its low THD specifications.

The green line in **Figure 4** indicates frequency response of the unit, with I feel is decent, measuring only .25 dB, down 20 Hz to 20 kHz. After testing for maximum bandwidth, I engaged the selectable low-pass and high-pass filters. When engaged the low-pass filter is 3 dB down at 25 Hz, while the high-pass filter is -3 dB at 35 kHz. This is indicated by the red line in the graph. The limiters performed well, remaining stable even when a 6-volt signal was applied.

Noise: not all large amps do well at this test. Specifically, I've noticed that some of the swich-mode amplifier designs use a gating system when the amp is idle, which can lead to incorrect assumptions about the noise floor.

I measured the P3000 referenced to the maximum output voltage at 8 ohms, and the noise floor measured quite well. However, the real test comes by listening as an amplifier drives a loudspeaker. I used a Community SLS 960 for this purpose, because of its high sensitivity. Also, it's horn-loaded (on the mids and highs), so it will reveal just about any noise that is present. I found the noise to be more than acceptable.

My take on the P3000 is that it's a viable choice for professional applications. It sounds and performs quite well, and the rated specifications are indeed (and refreshingly) accurate. I also believe it sounds bigger than it looks, thanks to that large power supply.

Downsides are weight (61 pounds) and the amount of current it takes to operate it under heavy loads. A nice thing about an amplifier that has been around a while is that all of the bugs have been worked out assuring you long term reliably. All of this leads me to suggest the P3000 and other Precision Series models are worthy of consideration. ■

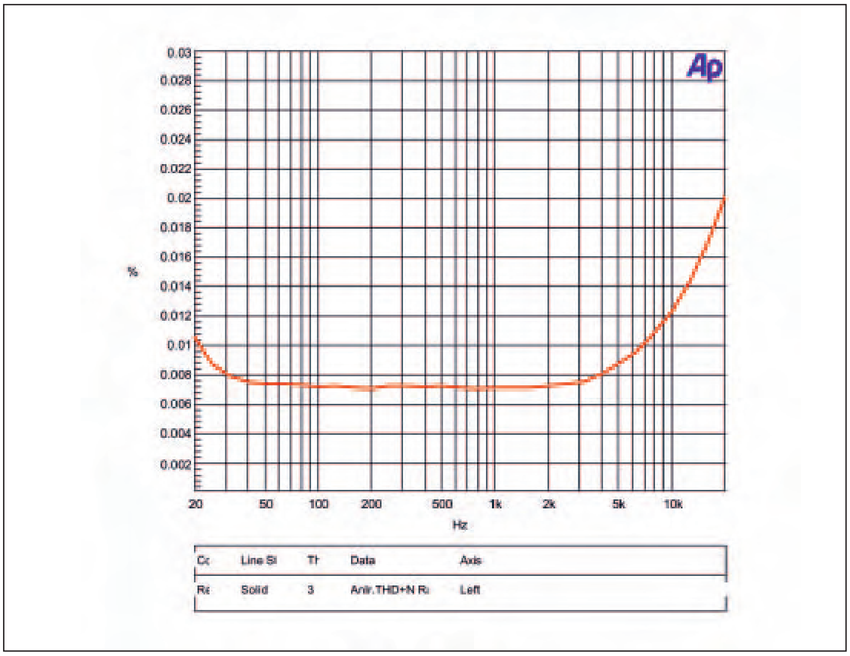

Figure 3: THD versus frequency at a fixed level tells if there are any anomalies. None here to be seen.

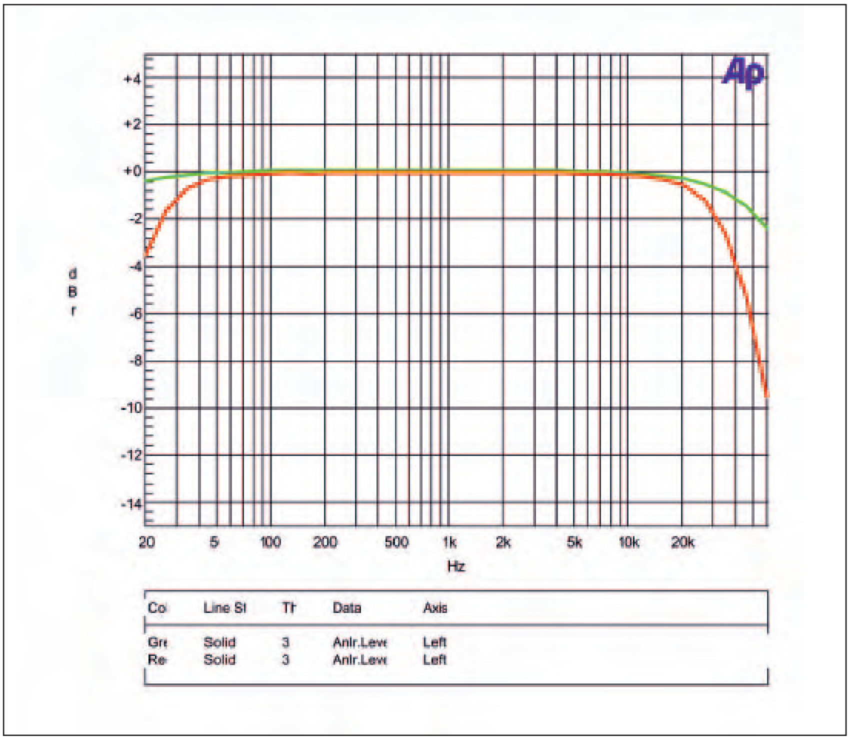

Figure 4: Frequency response measures .25 dB, down 20 Hz to 20 kHz.

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