



## Core Technology Guide

# Krell Current Mode™

In designing preamplifier and amplifier gain circuits, a designer of high fidelity audio equipment who wants to optimize one performance parameter is forced to sacrifice others. Achieving low noise, for example, means operating gain stages at low currents, but this means less output drive capability and reduced bandwidth. Achieving high output drive capability means operating at high currents. This results in poorer linearity because of the characteristics of large-signal transistors needed for this mode of operation.

C.E.O. Dan D'Agostino has directed the Krell® engineering effort to meet these problems of circuit design head-on by creating a breakthrough audio topology unique in high fidelity equipment: **Krell Current Mode™**. To achieve high output capability with uncompromising performance, a Krell Current Mode™ circuit employs many small-signal transistors operating in parallel. These transistors are chosen for low self-noise, wide bandwidth, and high linearity. Parallel operation boosts output drive without the need for using slower, less-linear power transistors. Operating at their ideal Class A bias points, the many small-signal transistors offer extremely low-distortion performance. In addition to minimizing distortion, a beneficial fact of parallel operation is that it further lowers noise below that emitted by a single transistor, substantially reducing circuit noise with each doubling of the number of parallel devices.

In Krell Current Mode™, each stage is operated in current mode, rather than voltage mode amplification. The low impedances intrinsic to current mode operation preserve low noise and wide overall bandwidth without the need for large amounts of overall negative feedback. A moderate amount of feedback is used in Krell Current Mode™ only to assure gain stability and to maintain thermal and operating point stability.

Combined with fully-balanced operation, which doubles the number of amplifier components, Krell Current Mode™ is an expensive amplifier topology to produce, but it yields sound quality that is unexcelled—the authentic sound of music from Krell®.