



KSA-i400 Power Amplifier

The KSA-i400 is a state-of-the-art 400 watt/channel stereo amplifier. It incorporates Krell's most advanced circuit topologies and Krell's proprietary technologies iBias, XD, and Sym-Max. This gives the KSA-i400 an organic, spacious, and detailed presentation along with the rock-solid bottom end and effortlessness that Krell is known for.

iBias

iBias enables the KSA-i400 to operate in Class A up to its full rated power of 400 watts with absolute accuracy but without the heat produced by a traditional Class A design. It does this by using a novel circuit to unobtrusively monitor the current flowing through the output stage which is part of a closed-loop controller that makes sure this current never drops below a preset level (Class A means that it never drops to zero). This is what makes the amp both efficient and accurate.

The efficiency comes from the controller adjusting the bias to maintain that low preset current level as the signal and speaker load changes. Traditional Class A amplifiers set it for the maximum level all the time so they're always dissipating the maximum amount of heat. iBias is like having a variable size Class A amplifier. If, for example, the signal and speaker are only requiring 10 watts, it's like having a 10 watt Class A amplifier, all the way up to 400 watts in the case of the KSA-i400.

The accuracy also comes from maintaining that low preset current level. It doesn't matter what the signal is doing or how the speaker impedance changes with frequency, by maintaining that preset current level the amplifier is always operating in Class A. Other variable bias schemes monitor the input or output signal to adjust the bias but that doesn't take into account varying speaker impedance. This means they will sometimes apply more bias current than necessary or drop out of Class A operation.

XD

XD is a technique for lowering the amplifier's output impedance. This results in better control over the speaker drivers which improves musical dynamics, depth, and dimensionality. It is very dependent on maintaining thermal equilibrium in the output stage so that all the output transistors are contributing equally to the signal output. The KSA-i400 uses a massive aluminum device bar to mount the output transistors and also employs special temperature compensation across the device bar to limit temperature variations. With its low output impedance, the KSA-i400 achieves a damping factor of better than 800.

Sym-Max

Sym-Max is short for "Symmetry Maximization." The circuitry in the KSA-i400 is differential, meaning that there is a positive half and a negative half. The transistors in this circuitry are complimentary, meaning opposite polarity but with equal characteristics. In practice they are not so equal which means the circuit is operating asymmetrically. Sym-Max makes small adjustments in the circuit parameters to remove this asymmetry. The result is that 2nd order harmonic distortion is almost completely eliminated.

This dramatically opens up the sound stage with more detail and a better sense of pacing, making for a more realistic experience.

Power

The heart of any power amplifier is the power supply. The KSA-i400 has a massive power supply consisting of 5400VA of transformers and 188,000uF of filter capacitance. Delivering this power to the output circuit is a combination of gold-plated circuit boards and silver-plated solid copper buss bars with a very short physical path for extremely low impedance. This, along with the audio circuitry enables the KSA-i400 to double its power from 400 watts into 8 ohms to 800 watts into 4 ohms and even 1600 watts into 2 ohms. It can drive 1 ohm speakers and will deliver a peak current of up to 62 amps.

Circuitry

The KSA-i400 uses Krell Current-Mode circuitry with advanced current mirroring that is balanced, differential, and direct-coupled. Each stage is independently tuned and matched to the previous stage for optimal operation. The output stage consists of 16 pairs of high-power audio transistors and 8 pairs of audio driver transistors. This results in a frequency response greater than 100kHz that is flat at 20Hz for effortless reproduction of the audio band.

Control and Protection

The KSA-i400 is microprocessor controlled and has Ethernet connectivity and a 12VDC trigger input for easy connection to a home controller. The Ethernet connection allows access to the KSA-i400 web page for status information and control. The KSA-i400 is protected against high DC on the outputs, output short circuit conditions, and power brown outs. The protection operation is conveniently indicated on the front panel status lights and the web page.