Kicker’s boost converter power supply is a high efficiency step-up DC/DC switching converter. Its main inductor is used as an energy storage component. The converter uses a transistor switch (MOSFET) that is switched ON and OFF with a given ratio of ON and OFF times (duty cycle). The switching frequency (in the controller) is chosen to minimize inductor and output capacitor sizes and at the same time keeping the MOSFET switching losses low. When the MOSFET is ON, the input voltage is applied across the inductor and current starts flowing through it. When it is OFF the boost diode starts conducting and the energy is transferred from the inductor to the output and the load. The output voltage depends on the duty cycle DC as shown in the formula:

$$V_o = \frac{V_i}{1-DC}$$

The control circuitry senses the output voltage and varies the DC in order to keep it stable.

Advantages compared to conventional push-pull topology:

1. The input current is continuous (non pulsating) which makes input filtering easier. This leads to better EMC.
2. It is a regulated DC-DC converter.
3. Higher efficiency:
   a) There is no power transformer and its associated power losses
b) A Schottky diode is used which has low conduction and almost nonexistent switching losses.

c) The latest generation MOSFET’s have very low conduction and switching losses. They can be switched on/off faster, because there are no limitations from power transformer parasitic losses as in push-pull designs

4. Simpler, therefore more reliable.

5. Takes less space on the PC board.

An important “real world” application that uses boost converters is Hybrid Electric Vehicles (HEV).

Battery powered systems often stack cells in series to achieve higher voltage. However, sufficient stacking of cells is not possible in many high voltage applications due to lack of space. Boost converter technology can increase the voltage and reduce the number of cells.

The NHW20 model Toyota Prius HEV uses a 500 Volt motor. Without a boost converter, the Prius would need nearly 417 battery cells to power the motor. However, a Prius actually uses only 168 cells and boosts the battery voltage from 202 V to 500 V.

As previously stated, this power supply is regulated. *It will provide the necessary voltage and current to the amplifier section to make maximum rated output power from 10.5 to 16 Volts of input.* This can be compared to the cruise control in your car. Once set, the speed controller adjusts the throttle position as the speed of the engine changes with different loads (going up or down hills, etc).

A conventionally designed regulated DC/DC converter in a 1000 Watt class A/B amplifier is capable of drawing over 100 Amps of current (assuming 50% efficiency) to make that power.

By comparison, Kickers Boost Converter power supply is greater than 90% efficient!

In conclusion, Kickers Boost Converter technology gives our amplifiers the ability to make full bass power at any vehicle voltage between 10.5 and 16Volts along with super high efficiency and audiophile quality sound. It really doesn't get any better than that…