The Peltier Effect is a fascinating bit of thermoelectric magic. A Peltier Junction has a hot surface, a cold surface, and two wires. Applying DC electricity to the wires heats the hot surface and cools the cold surface. It's used in compact, silent refrigerators, for example, which don't have to have a bulky, noisy compressor. And now it's being applied in lighting. DLP headlight systems operate in temperature environments that can reach 110 °C—well above the 70° maximum operating temperature of a DLP. Laird Thermal Systems' HiTemp ET Series thermoelectric cooler module, they say, protects the sensitive DLP electronics and ensures optimum performance.

The HiTemp ET Series is a Peltier cooler that delivers active spot cooling, it can lower the control temperature by as much as 40°C below ambient dependent on active heat load. The Peltier cooler offers reliable solid-state construction, long life operation, and compactness that fits into tight space constraints commonly found in headlamps. Compared to passive cooling solutions, the active HiTemp ET Series can be integrated similarly into a DLP automotive headlight system. A cold block and interface material are typically used on the cold side and comes in direct contact with the DLP. The cold block then comes in contact with the Peltier Cooler. When power is applied to the HiTemp ET Series, heat is absorbed by the Peltier Module and pumped to the hot side. A heat dissipation mechanism—typically a heat sink and fan—then sheds the heat into the surrounding environment. The HiTemp ET Series is designed to operate in temperatures between 80 and 150°C.