

High Power Notebook PC

Design Goals and Constraints

- High end laptop computers generate as much as 35Watts of heat
- Limited space for a thermal solution.
- Solution must be light weight
- Solution must be economical

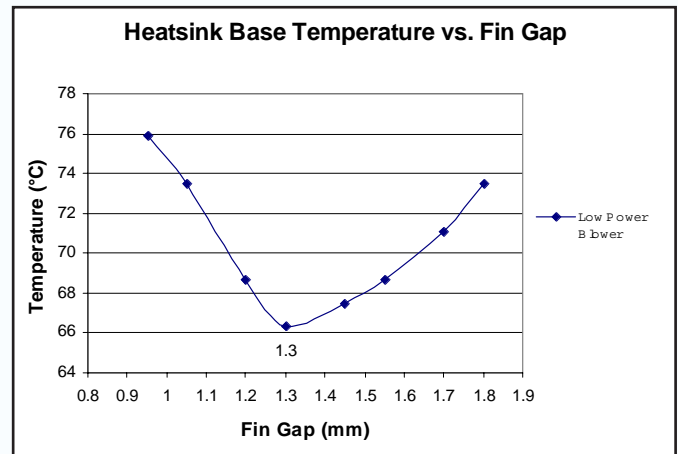


Figure 2: Experimental Results of the Optimized Fin Gap (Pitch)



Figure 1: Slim Modular Fan Cooler

Solution: *Slim Modular Fan Cooler seen in Figure 1.*

A compact, high capacity thermal solution was designed by Enertron engineers to solve this problem. The height of the solution is only 14 mm, and has a theta of 1.5°C/W, CPU case to ambient. The product consists of an aluminum base, two heat pipes, a fin array, and a blower. Due to the complexity of the problem, every aspect of the design had to be optimized. A phase change interface pad, due to its low thermal impedance, was used to mate with the CPU. The use of two heat pipes provided a larger conductive path for the heat to flow both into and out of the heat pipes. The two heat pipes also spread the heat more efficiently over the fins. The optimized pitch of the fin array was determined by experimentation with the blower.

The solution was kept lightweight by avoiding copper components (except for the heat pipes). The use of a die cast aluminum base allowed for a more complex shape, while reducing the overall cost of the unit.