

Solar Load Challenges – Cooling HUD



PROJECT DETAILS

Customer: **Navdy**

Application: **Head-up Display (HUD)**

Technology: **Heat Pipe, Heat Sink**

Industry: **Consumer Electronic**

Location: **San Francisco, CA, USA**

navdy[®]

THE DESIGN CHALLENGE

Automobiles continue to be at the vanguard of technology convergence. One example of this is after market head-up display (HUD) devices that project information for the driver directly above the steering wheel of a car. A prime example of these innovative devices is Navdy's upcoming head up display that links with an Android or iOS phone to display various notifications from the phone onto a transparent screen. The display allows the driver to control the HUD using hand gestures and voice recognition so the driver can keep their eyes focused on the road.

The largest threat to the success of this groundbreaking driving device is thermal management. The sophisticated electronics and projection system contained within the device is subject to varying and often high temperatures as it is mounted to the dashboard of the vehicle.

Because of the mounting location, both storing and operation conditions pose a threat. The worst storing condition is also one of the most common, when a vehicle is parked out in the open on a hot, sunny day. The ambient temperature rises drastically as solar loading pours heat energy into the car and the unit's top surface. During operation there are several crucial components inside the unit that need to be maintained below a specific temperature for the unit to function properly.

To understand these problems and develop an effective thermal solution forth HUD, Navdy hired Aavid, Thermal division of Boyd Corporation.

Solar Load Challenges – Cooling HUD

THE AAVID SOLUTION

To solve the given challenges, the design focus was broken up into two parts. The first was to investigate the effectiveness of a solar shield for the unit during storage. The second to design options for active cooling inside the unit during operation.

To develop the solar shield solution, Aavid did extensive research and solar testing to design a suitable top housing that reduced the overall thermal load during storage and operating. The solar test setup has the unit inside a car and placed inside an environment chamber with a controlled solar load.

To evaluate active cooling options for operating mode, Aavid modeled the unit in CFD to improve the air flow path within the unit, thermal solutions on various components, and components placement inside the unit.

The result from the collaboration between Navy and Aavid was a head up display unit that has an innovative thermal management solution for two significant technical problems.

Aavid's solutions enhanced Navdy's product and enabled a device higher in reliability and with a longer lifetime. The development and use of devices such as Navdy's HUDs increase road safety for all and the more reliable they are, the safer our roads become.



In house testing done by Aavid

“ The result...was a head up display unit that has an innovative thermal management solutions for two significant technical problems. ”

For more case studies and information on Aavid Design & Engineering Services, please visit www.aavid.com.

Or call us at 1.855.32.AAVID