METHODS FOR HEAD-MOUNTED EYE TRACKERS IN NATURAL THREE-DIMENSIONAL ENVIRONMENTS

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BRIEF DESCRIPTION

Researchers at UC Berkeley have developed a flexible and scalable Thermal Test Vehicle (TTV) designed to address the critical challenges of thermal management in modern high-performance computing. As GPUs and CPUs push the limits of power density, cooling solutions require rigorous validation under realistic conditions. This TTV utilizes an integrated array of power transistors that function as programmable heat sources, allowing it to mimic the complex thermal profiles and localized hotspots of next-generation integrated circuits. With onboard measurement and control circuitry coupled with an integrated computer, the vehicle can dynamically adjust power loads and capture high-resolution temperature data. This enables the precise characterization of cooling performance across a wide range of operating environments, providing a standardized platform for validating liquid cooling, phase-change materials, and advanced heat sinks.

SUGGESTED USES

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Datacenter Infrastructure: Validating immersion cooling and cold-plate solutions for high-density server racks to optimize energy efficiency.

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Semiconductor R&D: Testing the thermal limits of new chip packaging designs and thermal interface materials (TIMs) prior to mass production.

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Automotive Power Electronics: Simulating the heat generation of power modules in electric vehicles to refine active cooling cycles and improve battery longevity.

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Aerospace Systems: Characterizing the reliability of cooling systems for flight computers operating in pressurized or vacuum environments.

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Consumer Electronics: Benchmarking the efficiency of vapor chambers and heat pipes for compact gaming laptops and mobile devices.

ADVANTAGES

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High-Fidelity Simulation: Replicates non-uniform heat distributions and transient power spikes typical of real-world GPU and CPU workloads.

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Integrated Scalability: The modular transistor array can be reconfigured to match various chip dimensions and power envelopes, reducing the need for multiple fixed test setups.

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INVENTORS

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OTHER INFORMATION

CATEGORIZED AS

» **Computer**
» Hardware
» **Engineering**
» Engineering
» **Research Tools**
» Other
» **Semiconductors**
» Design and Fabrication
» Testing
» **Sensors & Instrumentation**
» Physical Measurement
» Scientific/Research

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Precision Control: Onboard measurement circuitry provides real-time feedback and high-speed data logging without the latency of external monitoring equipment.

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Cost-Effective Validation: Accelerates the development cycle by providing a reusable, standardized platform for testing prototypes under diverse stress conditions.

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Standalone Operation: The inclusion of an onboard computer allows for autonomous testing, making it ideal for integration into environmental test chambers.

RELATED MATERIALS

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