ADVANCED COOLING TECHNOLOGIES

DESIGN | ANALYSIS | MANUFACTURING | TESTING

THE THERMAL MANAGEMENT EXPERTS

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ITAR Certified

SPACECRAFT THERMAL CONTROL

INDUSTRY-LEADING INNOVATION

With trusted expertise in engineering and manufacturing aerospace thermal control systems, ACT consistently delivers innovative solutions to meet the most demanding performance requirements.

BOARD AND CHIP LEVEL SOLUTIONS

- SATELLITES
- ROVER & EXPLORATORY MISSIONS
- LANDERS & PAYLOADS
- GROUND STATION COOLING

CONSTANT CONDUCTANCE HEAT PIPES (CCHP) use miniature grooves as the wick structure and ammonia (or other low-freezing-temperature fluids) as the working fluid to efficiently transfer heat in micro-gravity. ACT has in-house, qualified aerospace welding and x-ray capabilities to help you meet your tight launch schedule.

SPACE COPPER-WATER HEAT PIPES (SCWHP) AND HiK™ PLATES FOR SPACE are uniquely manufactured to survive the severities of spaceflight operation. ACT has developed precision processing and sealing techniques in order to pass numerous space-qualification programs.

Photo courtesy of BAE systems, showing ACT SCWHP embedded in a SpaceVPX Reconfigurable Computing Module (RCM)

SPACEVPX solutions from ACT solve the thermal challenges at the chip level. Utilizing ICE-Lok® and Space Copper-Water Heat Pipes (SCWHPs) for in-space flight applications allows customers to manage high heat flux of the electronics.

PHASE CHANGE MATERIAL HEAT SINKS are a valuable technology for spacecraft thermal control. They provide thermal storage for smoothing temperature swings during cyclic operation, allowing thermal solutions to be designed for the average heat load rather than the peak load.

VARIABLE CONDUCTANCE HEAT PIPES (VCHP) provide passive control, ensuring consistent payload temperature.

LOOP HEAT PIPES (LHP) can passively transport a large amount of heat (several kW) many meters in micro gravity. Some advanced LHPs have sophisticated control features to enhance thermal control. 3D printing has enabled application of LHPs at a fraction of the cost of traditional LHPs.

"ACT worked closely with the ITT team to successfully manufacture and deliver complex heat pipes for integration at ITT. At the end of the program, ACT received an outstanding supplier award from ITT (Harris)."

-CASE STUDY

EMBEDDED COMPUTING SOLUTIONS

SYSTEM-AND SUB-SYSTEM-LEVEL COOLING

Embedded Computing is an important aspect of defense electronics systems, routinely fielded in aerospace, ground, and naval applications. Many critical functions—such as data processing, Electronic Warfare (EW), imaging and communications—are made possible by specially designed embedded computing systems.

Defense systems require significant computing functionality and speed, leading to high levels of waste heat which must be managed without affecting the systems' durability or form factor. Complicating the thermal design, embedded computing systems are trending harshly towards higher power and smaller footprint electronics. ACT's team of engineers are well versed on the system- and component-level challenges and provide a variety of solutions for different types of systems.

ONLINE ORDERING

ICE-LOK® WEDGELOCK is a thermally enhanced wedgelock for conduction-cooled embedded computing systems. Compared to a conventional wedgelock, an ACT ICE-Lok® provides additional heat transfer paths between the card and the chassis, allowing heat to avoid traveling through numerous high-resistance, metal-to-metal interfaces. This allows for longer life and higher reliability for critical components without costly board or chassis redesigns.

2021 Military & Aerospace Electronics Innovators Awards
PLATINUM HONOREE

The form factors are compatible with standard VITA systems.

>30% LOWER THERMAL RESISTANCE

HIK™ CARD FRAMES increase thermal conductivity. In conduction systems it's para-mount to get heat efficiently to the edge and spread heat along the edge to lower heat flux into the chassis. Heat pipes can be strategically placed to accomplish both goals simultaneously. On air-cooled boards, the increased thermal conductivity will isothermalize the fin-stack base and reduce hot spots, optimizing fin efficiency.

HIK™ CHASSIS OR CARD GUIDES include heat pipes implemented into the side-walls to enhance thermal conductivity and reduce conduction gradients. These are particularly effective when the ultimate heat sink is located at the base of the chassis.

CUSTOM LIQUID COLD PLATES drive performance when implemented at the board, chassis sidewalls, or chassis base level. For a system-level design, there are often significant manufacturing and packaging considerations to work through in parallel.

RUGGEDIZED SYSTEMS FOR GROUND CONTROL OR LAUNCH VEHICLES

VIEW TEKGARD® PRODUCTS ONLINE

TEKGARD

ENVIRONMENTAL CONTROL UNITS (ECUS) are machines that are responsible for taking in the ambient air, cooling (or heating) it, and returning the conditioned air to the controlled space, which may include shelters, mobile command centers or ground systems and launch vehicles that need controlled air before launching or during ground testing.

ECU CONFIGURATIONS

HORIZONTAL

UNITARY

VERTICAL

LIQUID COOLERS AND CHILLERS keep mission-critical equipment at optimum operating temperatures, Tekgard® liquid chillers and heat exchangers are proven, with fielded heritage in dozens of deployed operations.

LIQUID-TO-AIR SYSTEMS reject heat to the ambient air and provide cooling fluid at a maximum specified increase over the ambient temperature.

CHILLER SYSTEMS are utilized when it is required to cool fluid below ambient temperature. These include a vapor-compression cycle to provide cold coolant even when ambient temperatures reach 60°C +(140°F).

RESEARCH AND DEVELOPMENT HAS BEEN A CORE COMPETENCY OF ACT SINCE ITS INCEPTION and continues to lead our product and market diversification efforts. ACT's research focus areas include a variety of topics.

ACT

LEARN MORE ABOUT OUR R&D DEPARTMENT