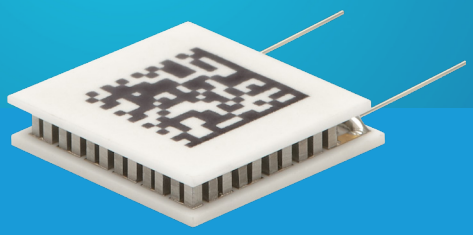

Thermal Management for

Optoelectronic Applications

Q-FLEX

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Laird™

THERMAL SYSTEMS

Optoelectronic Applications Cooling

Used to source, detect and control light, optoelectronics is a fast-emerging technology that has become increasingly important in a wide range of automotive, telecom and industrial applications.

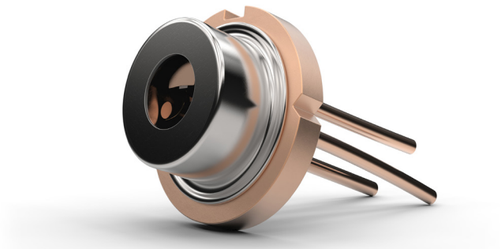
With high beam quality and low power consumption, optoelectronics provide superior performance at a low cost for applications such as modern fiber-optic telecommunications and imaging sensor devices.

Sensitive optoelectronic components can operate in high temperature environments and require active cooling to maintain peak performance. Thermoelectric coolers are designed for temperature stabilization of such applications to minimize effect from higher temperatures and assure long-life operation.

Laird Thermal Systems offers a broad range of thermoelectric coolers designed for high temperature applications including optoelectronics. We design and manufacture cooling components and systems for the top companies within industrial, telecom and transportation industries. With unmatched thermal management expertise, our global engineering team uses advanced thermal modeling and management techniques to solve complex heat and temperature control problems in optoelectronic applications including:

Laser Diodes
Optical Transceivers
Lidar Sensors
Digital Light Processors
CMOS Sensors
Machine Vision
Security Cameras
Infrared Range Sensors

Laird™
THERMAL SYSTEMS



Laser Diodes

With the ability to convert electrical current into high-intensity light, laser diodes enable fast data transmission in modern fiber optic communication systems. They are also bundled together in industrial laser processing to form a high-power laser that can cut through materials. Active cooling is required for temperature stabilization of laser wave length to assure peak performance.

A thermal solution will ensure
Peak performance
Long-life operation

Learn more about Laser Diodes

Optical Transceivers

Used to receive and transmit data, optical transceivers are key components of modern telecommunication networks. Increased data transmission speeds with 5G standard present significant thermal challenges. Optical transceivers contain a laser diode package that must be kept at temperatures below 70°C to prevent loss of data transmission.

Thermal management will ensure
High-performance data transmission
Minimum data loss

Learn more about Optical Transceviers

LAIRD THERMAL SYSTEMS PRODUCTS AND SOLUTIONS

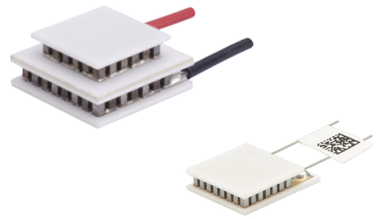
Thermoelectric Coolers
OptoTEC™ OTX/HTX Series
Multistage MS Series

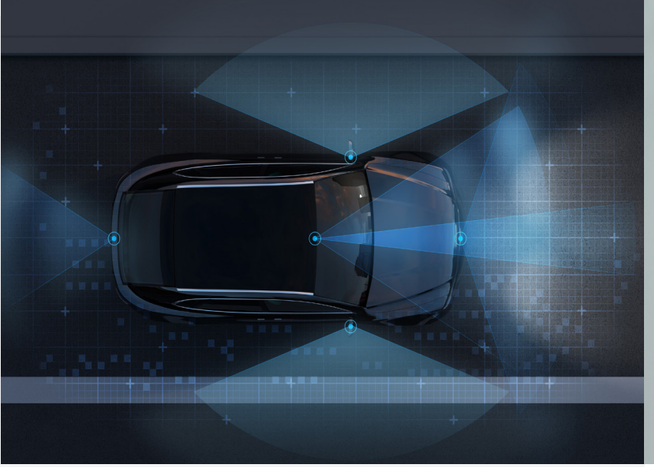
Thermoelectric Coolers
OptoTEC™ OTX/HTX Series
Multistage MS Series

Custom Thermoelectric Cooler Assemblies

Why Thermoelectrics?

- **Compact form factor and low weight**
- **High-temperature operation**
- **Can be used in vacuum without outgassing**
- **Solid-state construction providing long life and low maintenance**



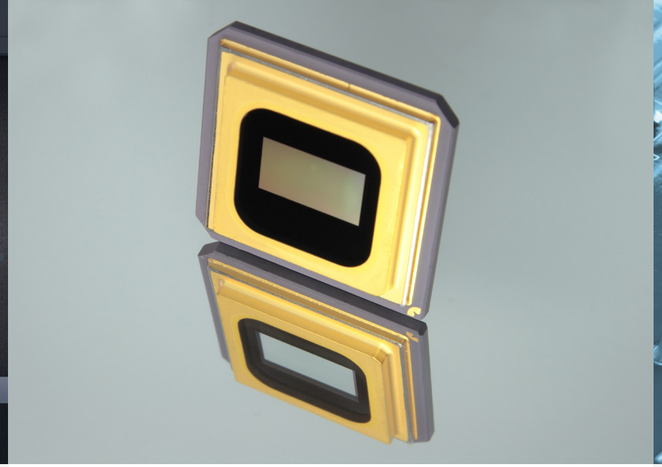


LiDAR Sensors

LiDAR sensors can read up to million data points per second, enabling them to build high quality 3D images of scanned objects or landscapes. Laser diodes used in LiDAR systems, particularly in outdoor autonomous applications, require active cooling to keep the temperature of wavelength stable to assure high-mapping resolution. Thermoelectric coolers will ensure

Thermoelectric coolers will ensure
Maximum Mapping Resolution

Learn more about LiDAR Sensors

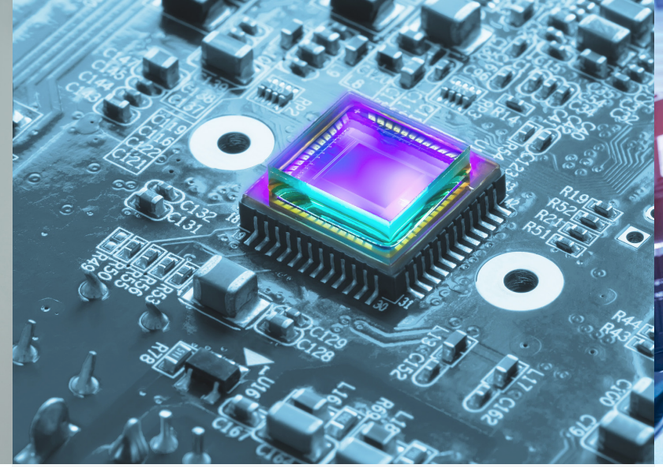


Digital Light Processors

Digital Light Processors (DLPs) utilize micro-mirrors to create high-resolution images for industrial and autonomous display and projection applications. The combination of small form factors, lack of airflow and high temperature environments present thermal challenges such as thermal noise and outgassing.

Precise temperature control reassures
Long-life operation

Learn more about Digital Light Processors



CMOS Sensors

Enhanced CMOS Sensor technology enables the capturing of high-resolution images at fast readout speeds in consumer, industrial and autonomous (ADAS) applications. Because high temperatures increase the thermal noise, which negatively affect image resolution, thermal protection is critical for CMOS Sensors.

Proper cooling will ensure
Maximum image resolution

Learn more about CMOS Sensors

Machine Vision

Inspection systems, object detection and facial recognition utilize machine vision technology to capture and analyze images of a specific process or activity. To keep the imaging sensor below its maximum operating temperature and ensure highest image resolution, active cooling is critical.

Thermoelectric cooling results in
Maximum image resolution

Learn more about Machine Vision

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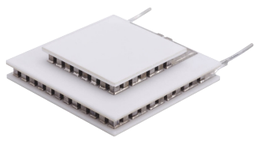
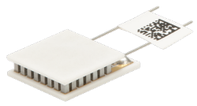
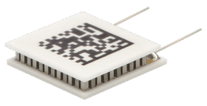
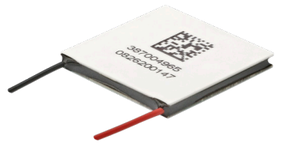


Why Thermoelectrics?







Ability to cool well below ambient, minimizing thermal noise

Withstand high temperature environments

Can be placed in vacuum

Compact form factor and low weight

Solid-state construction providing long life and low maintenance

Security Cameras

Outdoor security cameras require active cooling to keep sensitive electronic components below their maximum operating temperature, minimizing thermal noise. Thermoelectric coolers can provide temperature stabilization in temperatures up to 150°C, exceeding most outdoor applications.

Thermoelectric coolers will ensure
Maximum image quality
Long life operation

Learn more about Security Cameras

Infrared Range Sensors

An infrared range (IR) sensor sends out infrared light to measure radiation (heat) in the target object and converts it into a visual image. IR sensors must maintain an operating temperature usually well below freezing to minimize thermal noise, which is the difference between the target object and its surrounding environment.

Thermoelectric coolers will ensure
High-resolution images
The capturing of maximum light spectrum in the infrared range

Learn more about Infrared Range Sensors

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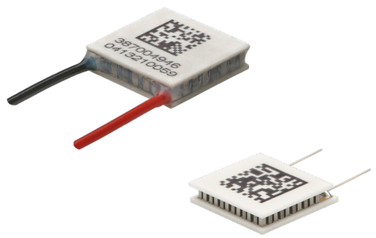

Laird™
THERMAL SYSTEM

About Laird Thermal Systems

Laird Thermal Systems designs, develops and manufactures thermal management solutions for demanding applications across global medical, industrial, transportation and telecommunications markets.

We manufacture one of the most diverse product portfolios in the industry ranging from active thermoelectric coolers and assemblies to temperature controllers and liquid cooling systems.

With unmatched thermal management expertise, our engineers use advanced thermal modeling and management techniques to solve complex heat and temperature control problems. We have more than 50 years of experience in the design, manufacture and servicing of thermal management solutions with millions of installations in operation today.

Contact us for a solution to your next thermal management challenge.

Learn more by visiting www.lairdthermal.com

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