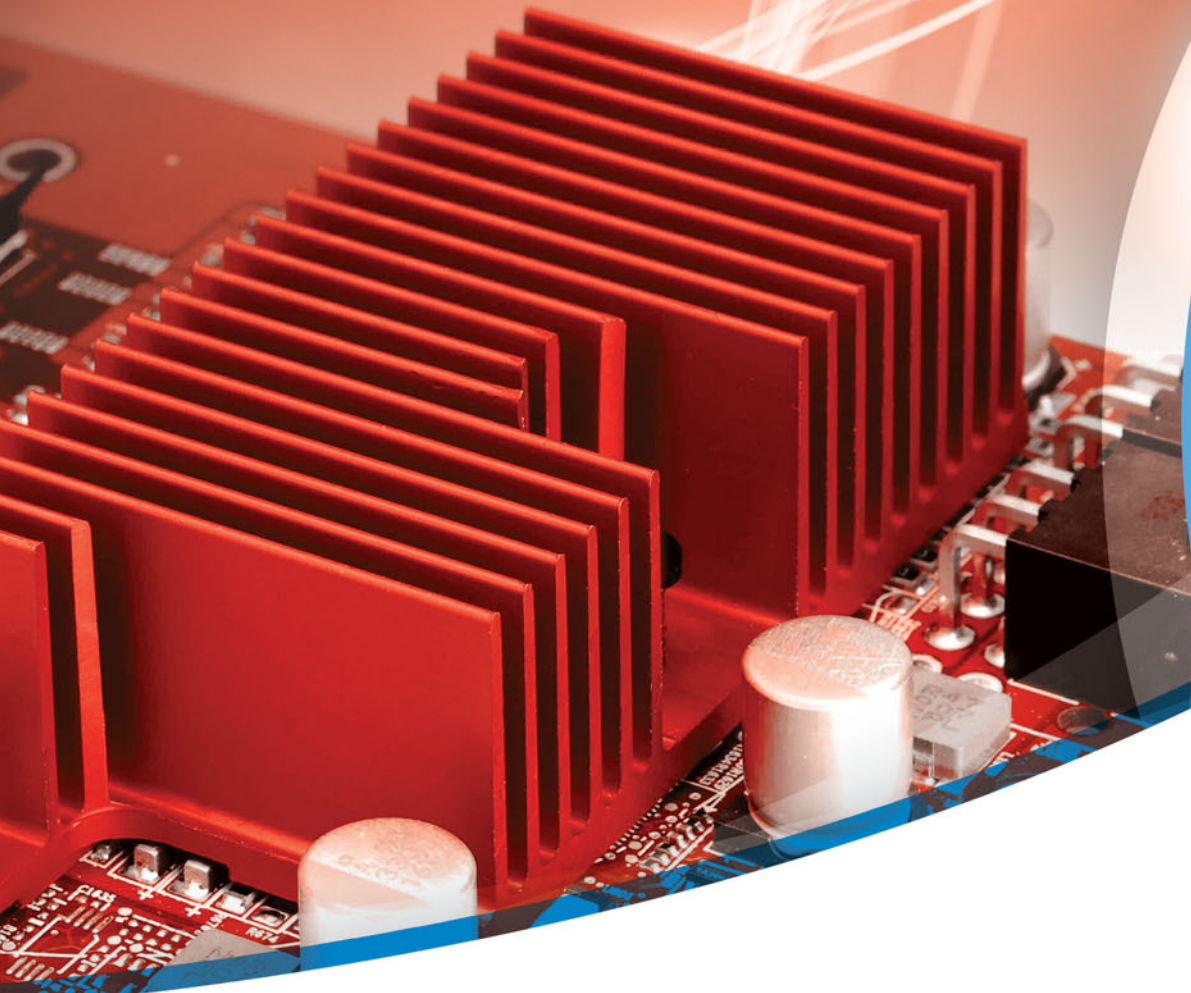
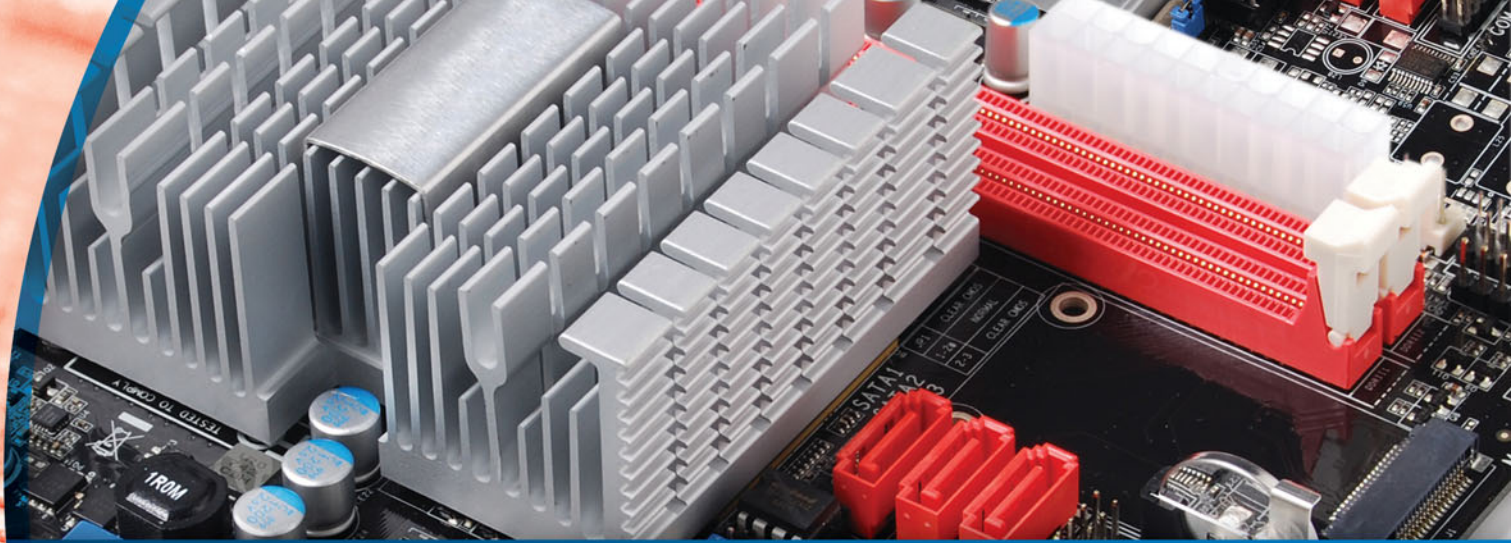


**PROVIDING
QUALITY THERMAL
DESIGN SOLUTIONS**



 **Cooling Source®**



MISSION STATEMENT

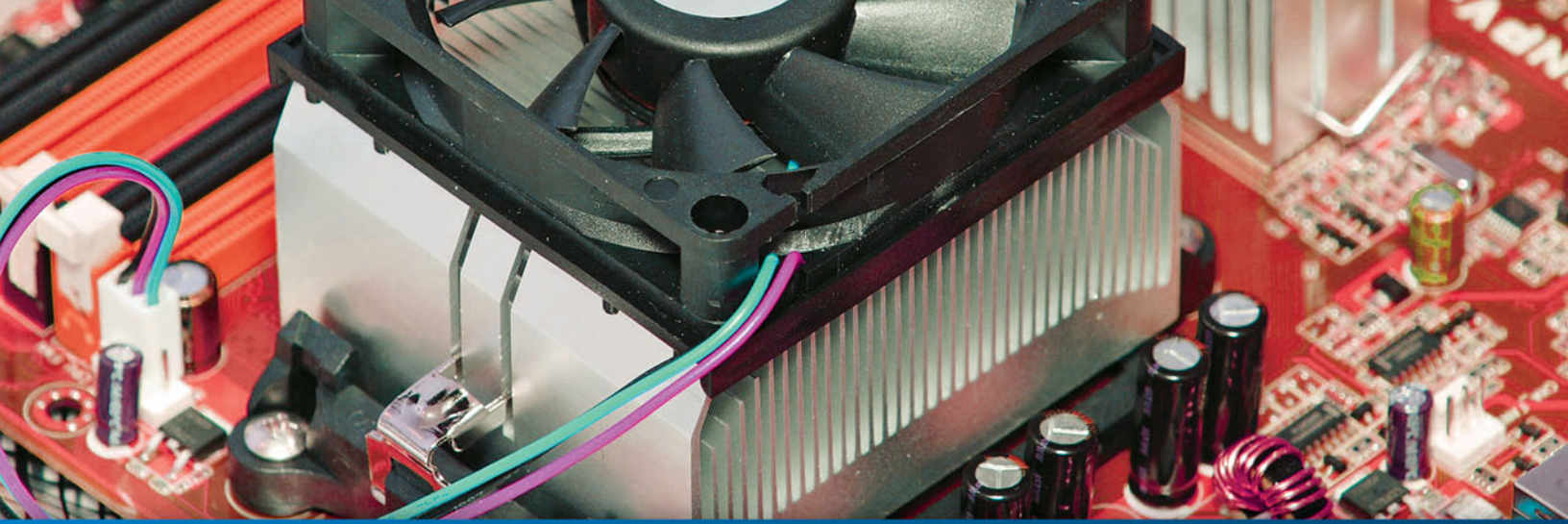
Cooling Source aims to deliver the highest value of services and products in a timely manner to our customers as the premier thermal solutions manufacturer, designer and service company.

COMPANY INTRODUCTION

Cooling Source, Inc. offers the most comprehensive value-added standard and custom heatsink solutions, including the latest technology to a wide range of markets. We provide design assistance and thermal analysis to help you achieve your goals. We will deliver the highest value to our customers as the premier manufacturer, designer and Service Company. Our ISO 9001-2008 and ISO14001 certified manufacturing plant is based in main land China to ensure you the lowest cost, best quality and supply chain continuity for your volume production.

 **Cooling Source**[®]





COOLING SOURCE - THE DIFFERENCE

- Provide CFD modeling of heat sinks, boards and assemblies
- Mechanical design assistance on thermal solutions and attachments
- Broadest range of manufacturing processes
- Flexible fin shape designs
- Market leader in heat-pipe solutions
- Rapid prototyping for the validation of new projects
- Dedicated customer service and support
- Competitive global market cost
- Quality System: ISO 9001-2000 certified
- 100% inspection and testing of heat sink, heat-pipe and assembly
- Short lead times

DESIGN FLEXIBILITY

Cooling Source provides the broadest range of manufacturing processes to ensure you the most cost effective thermal solution.

- Die Casting
- Machining
- Extrusion – High aspect ratio
- Folded Fin
- Forging
- Skived Fin
- Swaged Fin
- Stamped Fin
- Heat-pipe Assembly

1

COST EFFECTIVE MANUFACTURING

- Manufacture your volume requirements at our facility located in Shenzhen, China.
- RFQs, order placements and coordination performed by US - based personnel.
- Engineering and local customer service support.
- ISO 9001- 2000 certified manufacturing facility.
- High quality components with competitive, global market cost.
- Utilize suitable manufacturing processes to ensure lowest production cost.

2

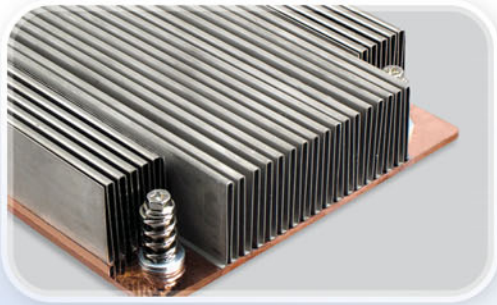
ENGINEERING SUPPORT

- Provide thermal analysis of heat sinks, assemblies and boards for new designs using CFD modeling.
- Quick turn-around of prototypes and pre-production quantities to support short design cycles.
- Provide design proposal of heat sinks and thermal solution assemblies.

3

MANUFACTURING CAPABILITIES

Cooling Source's flexible manufacturing capabilities ensure customers the most cost-effective, and maximum performance thermal solution of each design.



FOLDED FIN

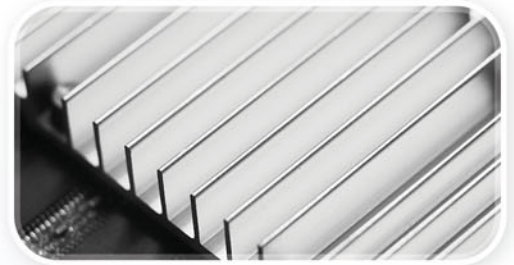
The process is achieved by bending a strip of aluminum or copper sheet in an array of fins. The fins are then bonded to the heat sink metal base.

- Thin fin
- Low tooling cost
- The base and the fin can be made of different material
- Light weight

BONDED FIN

The fins are manufactured from aluminum or copper sheet metal or through extrusion and bonded to the extruded base, using epoxy or through a solder/braze process.

- Designed for high power applications
- Low thermal resistance
- Forced air cooling required



DIE CAST

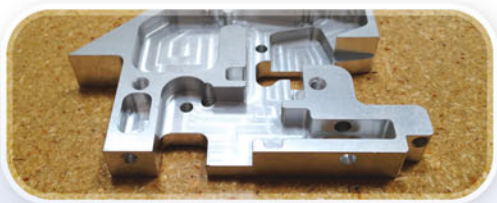
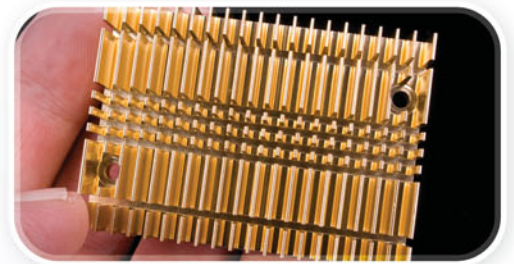
A versatile process for producing custom designed aluminum heat sinks by forcing liquid metal under high pressure into reusable steel molds.

- Optimal for high volume production
- Can produce complex design
- Lower thermal conductivity

EXTRUSION

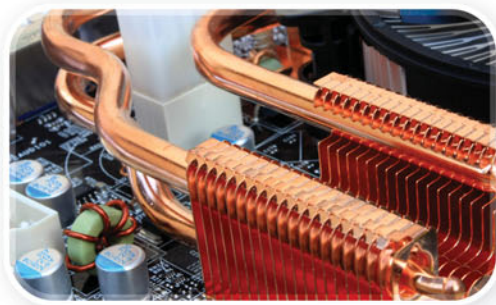
The aluminum block is pushed or drawn through a die to manufacture straight fins or cross cut heat sinks.

- Little or no secondary machining required
- Low tooling cost
- Low piece part cost



CUSTOM MACHINING

Cooling Source utilizes the latest multi-axis CNC center, milling, EDM and grinding machine to provide you complex and high precision heatsinks. We deliver affordable quality machined parts.



HEAT PIPE

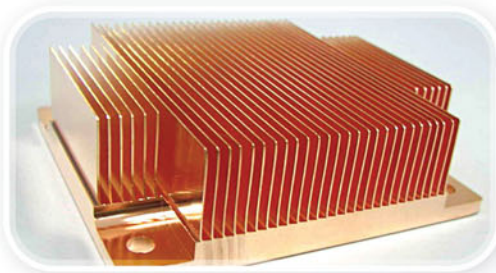
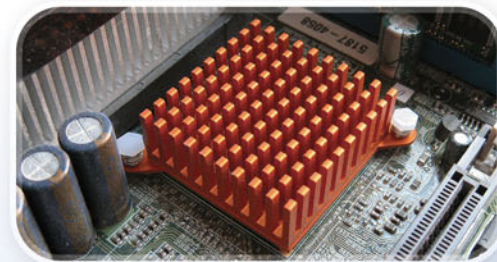
Cooling Source mainly uses sintered or powdered copper heat pipes.

- Under any kind of orientation: horizontal, gravity-aided or against gravity
- Can handle high heat flux density (the heat load divided by the heated area)
- Great potential to increase thermal performance with wick structure to accommodate the increasing CPU thermal dissipation demand
- Consistent thermal performance
- Optimal for high volume production
- Can produce complex design

PRECISION FORGING

The metal is pressed, pounded or squeezed under great pressure into high strength parts known as forging die. The process is normally (but not always) performed hot by preheating the metal to a desired temperature before it is worked.

- High aspect ratio
- Aluminum or copper
- Any fin type



SKIVED FIN

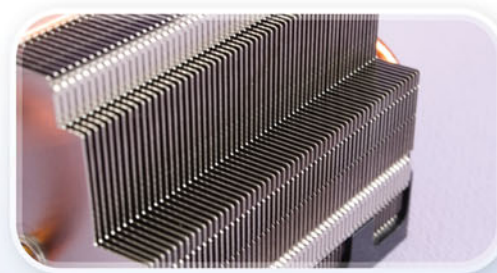
This machining process uses cutting tools and a controlled slicing technique to manufacture heat sinks from a solid block of aluminum or copper.

- High aspect ratio
- Low tooling cost
- Thin fin
- Unidirectional flow

STAMPED FIN

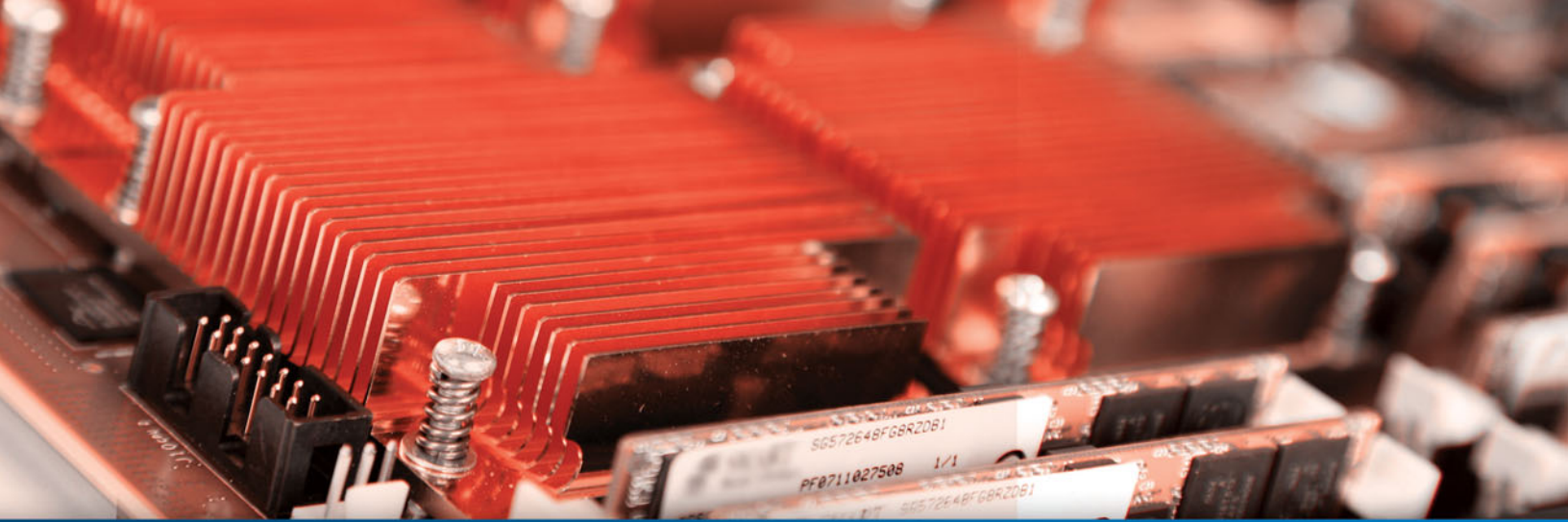
This process manufactures fins by applying extreme pressure to a blank piece of aluminum or copper and forming into the desired height, thickness and shape. The fins are then bonded to the heat sink metal base.

- Low piece price
- Limited thermal performance
- Thin fin
- High tooling cost



BGA/PC BOARD HEATSINKS

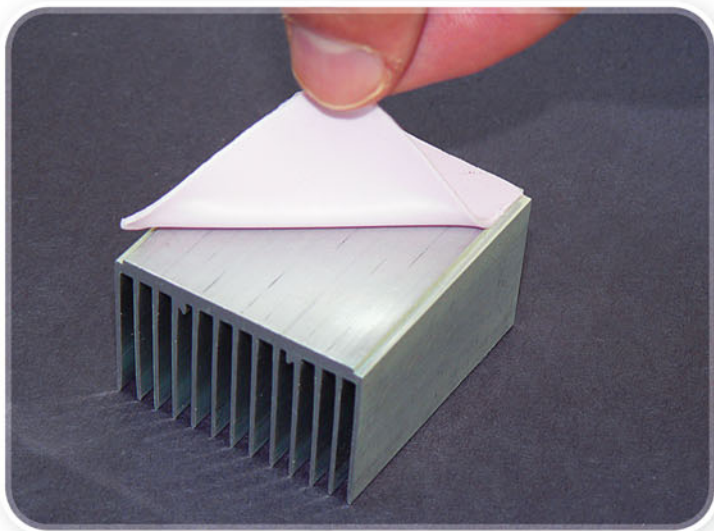
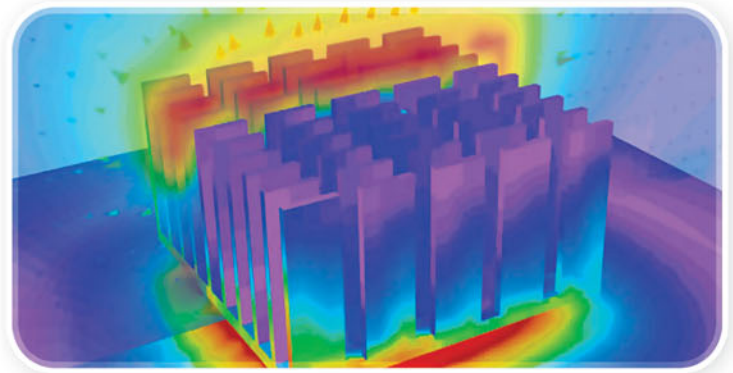
Cooling Source offers a wide range of BGAs and board level heatsinks. Non-standard parts can be delivered quickly and at a competitive price.



We offer rapid optimized custom design solutions using CFD parametric software programs and pro/E. In addition we'll help you determine the most cost effective manufacturing process for your application.

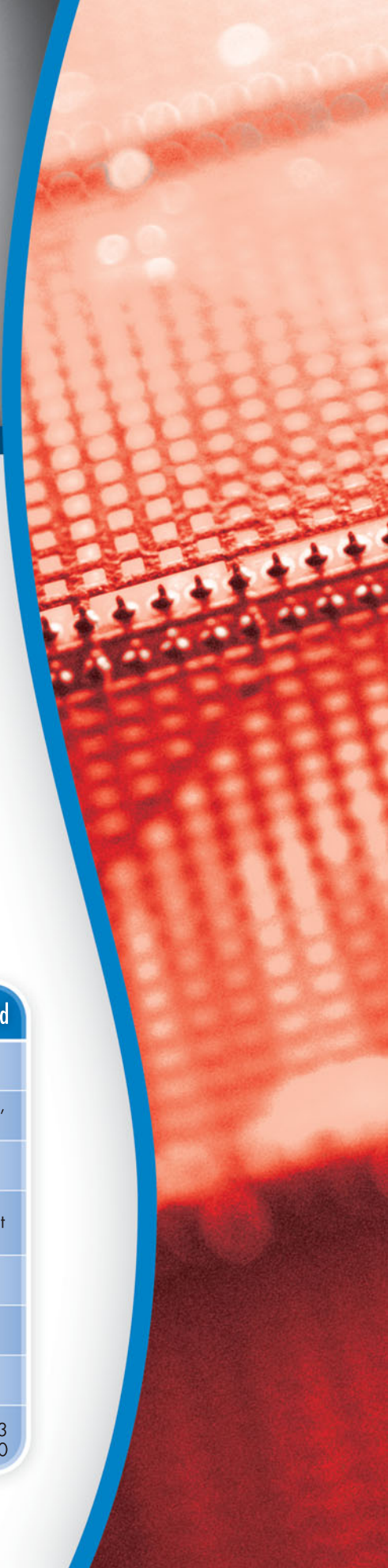
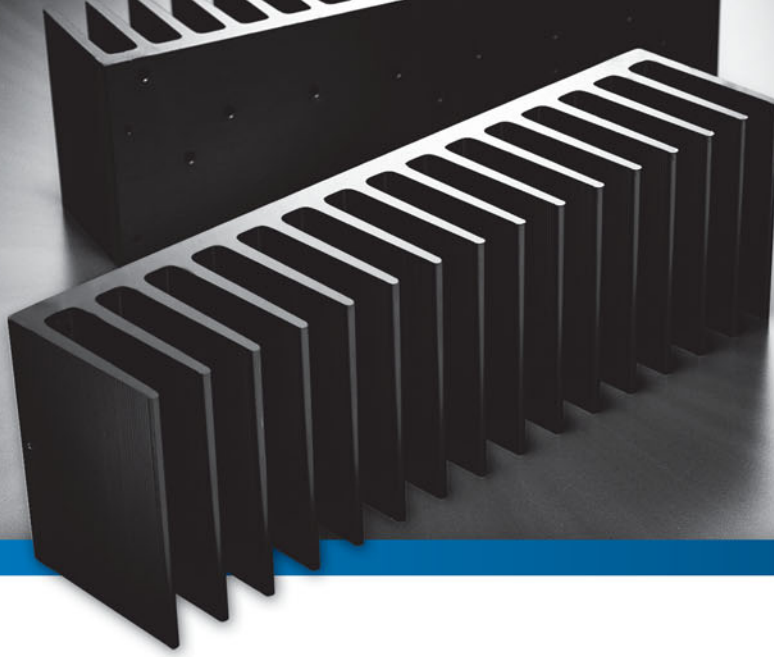
THERMAL SOLUTION ASSEMBLIES

- **Fan Sink Solutions**
Fan sink modules for video chips and other low profile applications.
- **Heat-pipe Solutions**
Heat-pipe modules for high-end electronics applications such as servers, notebooks, graphic cards.
- **Vapor Chamber Solutions**
Vapor chamber solutions with soldered fins.



ACCESSORIES

- **Standard Mounting Clips**
Various Clips for GPU's, CPU's and BGA's.
- **Custom Mounting Clips**
Cooling Source has the capability to provide metal custom mounting clips.
- **Interface Materials**
Cooling Source works with a variety of suppliers, including Chomerics, Fujipoly, Laird, Bergquist, Dow Corning, Shin Etsu. Each thermal interface material supplier we work with offer global support and a wide variety of Thermal Interface Materials. We will be glad to assist you on designing-in the most suitable interface material for your specific application.



QUALITY MANAGEMENT SYSTEM

Our ISO 9001-2000 certified manufacturing plant is based in main land China. Cooling Source continued strive for excellence ensures you the lowest cost and best quality.

- Quality Policy
- Quality Organization
- ISO 9001:2000 Certificate
- Inspection Standard & Testing Equipments
- Quality Control System
 - IQC, IPQC, OQC(QA), QE,CQE Procedure
 - Product Management Plan
 - SPC Control

HEAT SINK MANUFACTURING PROCESSES COMPARISON CHART

Fin	Bonded	Cast	Extrusion	Folded	Forged	Skived	Stamped
Max. Fin Height	6.0"	3.0"	3.0"	2.0"	5"	1.5"	2.0"
Min. Fin Thickness	0.032"	0.07"	0.040"	0.010"	0.020"	0.016"	0.007"
Max. Aspect Ratio	60:1	10:1	10:1	40:1	35:1	16:1	4:1
Type	Straight	Any	Straight Cross-cut	Straight	Any	Not Perfectly Straight	Straight
Cooling Factor	0.8x	1.4x	x	0.7x	1.5x	1.2x	1.4x
Base Cost Factor	1.3x	0.8x	x	1.2x	1.3x	1.2x	0.7x
Tooling Cost Factor	1.5x	4.0x	x	1.8x	3x	1.2x	2.8x
Material Type	Au6063 Cu1100	Au356	Au6063	Au6063 Cu1100	Au6063 Cu1100	Au6063 Cu1100	Au6063 Cu1100



- *Bonded Fin Heat sink*
- *Stamped Fin*
- *Heat-pipe Assembly*
- *Precision Forging*
- *Die Casting*
- *Skived Fin*
- *Extrusion*
- *Fansink*
- *Cold Plate*



3111 Independence Drive
Livermore, CA 94551

Tel: 888.509.2665
Tel: 925.292.1293
Fax: 925.292.5061

www.coolingsource.com