

A Primer on Selecting and Installing Active Thermal Management Products

(Everything you always wanted to know about home theater cooling, but didn't know who to ask.....)

The 3 steps to successful cooling ---

1. Identify the ATM product you need
2. Decide how & where to install it
3. Install it.

You'd probably like a little more detail, especially in steps 1 and 2, so here we go.....and we promise NO math, and absolutely NO thermodynamics! (But if we've left any questions unanswered, call us at 661-294-7999...)

A few opening comments ----

There are formulas that determine how many CFMs you need to remove a given amount of heat. These are difficult to apply in A/V work; we've found it's easier to think about minutes between air changes. Change the air every few minutes and problems go away.... Most home theater systems fall into one of a few groups; entry-level, whole-house, high end (meaning "lots of stuff"), etc., and ones in similar groups usually generate similar amounts of heat.

Cooling requirements are at least as affected by enclosure size as by equipment details.....

Quiet, effective cooling is achieved by allowing enclosures to breathe freely (to let air pass through slowly, and therefore quietly), and by being certain that the airflow flows where it should - over the hot equipment!

General types of installations:

- ? Partially open enclosures/cabinets that restrict ventilation
- ? Small enclosures
- ? Mid-sized enclosures
- ? Large enclosures/closets
- ? Enclosed racks
- ? Freestanding racks
- ? Video projectors in enclosures ("hush boxes", "beauty boxes")
- ? Flat panel displays set into walls or cabinets

NON-ENCLOSED INSTALLATIONS

IF the equipment is NOT completely enclosed, but is on a bookshelf, in a corner, or otherwise has some (but not ENOUGH) ventilation (cabinet with no back, no doors), use a **Cool-it II** (on top),



OR

a **Cool-base** underneath (if the equipment has bottom slots and weighs less than 20 lbs., or a **Cool-plate** if it has bottom slots and weighs between 20 and 80 lbs. (For very small components, the **Cool-sat** is a junior version of the Cool-base.)



OR

If you want to put something heat-sensitive (DVD player, etc.) on top of something hot, use a **Cool-shelf**, and cool the "something hot" while shielding the device placed on top - this lets you put more gear in a cabinet than you ordinarily could.



Enclosed installations



IF the equipment generates a moderate amount of heat, and IF the enclosure is small, the **System 3** is the product to use. A computer in a kitchen cabinet, or a small music system in a small section of a large cabinet are examples.

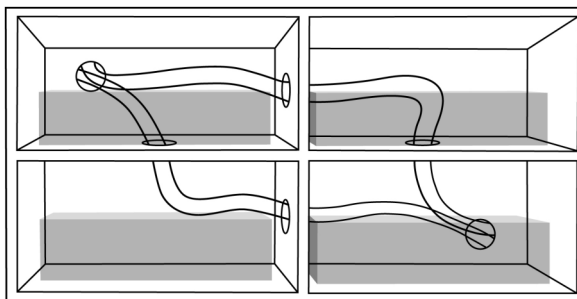
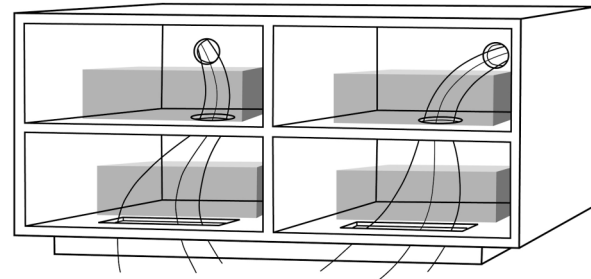
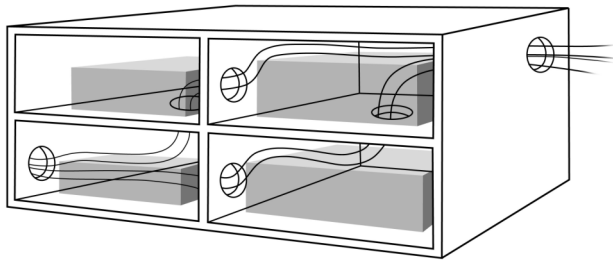
IF the enclosure is mid-size (24"-30" high, 1 or 2 components wide, 1 component deep), and the equipment is the typical home theater assortment of a receiver or amp, DVD player, a cable or satellite box, etc., a **System 2** or **System 2 Kit** is appropriate; completely automatic, with fan speed proportional to temperature rise. If the system is more ambitious, with a whole-house amp, TiVo, power conditioner, etc., use the 4 fan version of the System 2 Kit - the **System 2+2 Kit**.



Even if the gear is rack-mounted, if it's enclosed, *cool the enclosure, not just the rack.* (More later.)

In the 3 situations illustrated below, note how fans can be mounted in various positions, depending on availability of space behind (or beside) the cabinet, the presence of feet or a kick-panel, etc., while moving air in patterns that will produce reasonable ventilation. If the equipment is on shelves, put holes in the shelves under the gear; if it's a rack installation, leave some open space in the rack, using vent panels such as Middle Atlantic's VT-1 and VT-2; this lets cool air get in & around the equipment, so heated air can leave the rack & be removed from the enclosure.

Try to get complex air motion; side to side, down to up, front to back.



NOTE: Don't assume you have to move the air through tubing outdoors or into another area. It's ALMOST NEVER necessary to do that - just move it into the room.

If fans will be visible when installed (on a wood cabinet) & "looks count", consider the **Cool-vent I, II, or III**. 26 woods available; use the I only if necessary (kick panel mounting).



Cool-vent I

For the larger jobs, such as closets and enclosed video projectors, where you have to move the hot air up into an attic or dead space, use either the Cool-cube or the System 1. The **Cool-cube** is suitable for converted coat closets, enclosed single-chip (up to about 500 watt) projectors, and large cabinets (that are about the same size as coat closets). Use the 4" tubing version, and the **backdraft damper** to keep drafts & other undesirables from coming back down the tube when the fans are off.....

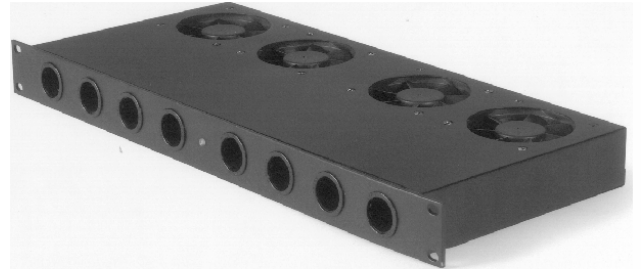


For double-wide cabinets that go to the ceiling, the enclosed 3 chip projector (500++ watts) or the walk-in closet, the **System 1** is the answer. This powerhouse



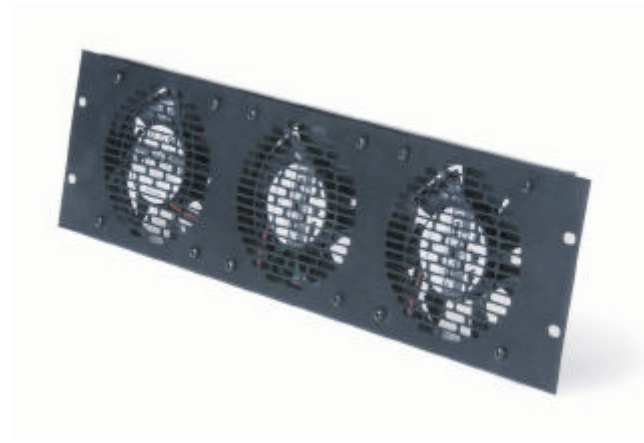
will move large volumes of hot air up to 25', and has a wide variety of **thermal switches** and other accessories to make the installer's job easier.

For small racks in the open, with no doors in front, a **Cool-stack I** (exhaust version) at the top will move heat up & out. For the larger rack, use an exhaust version on top, & an intake version at the bottom (shown in picture).



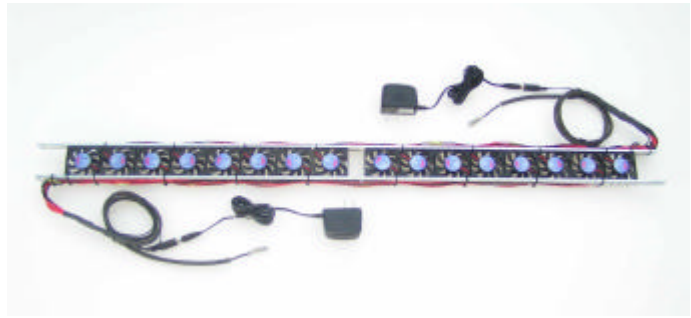
Cool-stack I

For mid-size racks with doors in front but open in the rear, or where there's no open space in the front of the rack, etc, or where there are local hot spots in the rack that need some "stirring", try the System 2 Rack Mount mounted to the rear rack rails. Three units high and very shallow (2 3/4" deep), it has the same proportional speed control as the other System 2 products.



For the REALLY LARGE rack, in or out of an enclosure, use the **Cool-stack II**. This new ATM product will not only cool the rack, it will **move the air forward, backward, or straight up & out of the cabinet or closet**; tubing and all fittings are included.

For cooling flat-panel displays that are being recessed into walls or cabinets, the Cool-stick will provide a wide curtain of cool air. 36" wide, narrow and thin, it lends itself to mounting behind that plasma or liquid crystal panel. Cool-stick has 2 power supplies and 2 thermal switches powering 16 fans; your client's expensive video panel will be well-protected against overheating.



There are other ATM products that can also be used in these frequently-difficult flat-panel installations; download our paper on "Cooling Flat-Panel Displays" from the Technical Info page at www.activethermal.com.