

Thermal Management

A PAINLESS PRIMER ON COOLING ELECTRONIC COMPONENT RACKS

Most home theater components are designed to run in well-ventilated areas. Unfortunately, when installing several components in an enclosed area without adequate airflow, the combined heat from the various components will shorten the life and hamper the performance of many expensive components. This is where cooling products and systems can help.

There are formulas that determine how many cubic feet per minute (CFM) you need to remove a given amount of heat. As these are difficult to apply in AV work, I have found it is easier to think about minutes between air changes. Change the

Moving air successfully in order to cool your jets...adds **STABILITY, PERFORMANCE,** and **SAFETY** to any home or office electronics installation

air in a home theater system every few minutes and problems go away. Quiet, effective cooling is achieved by allowing all 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.

The three steps to successful cooling are: (1) identify the cooling problem and the product you need; (2) decide how and where to install it; and (3) install it.

UNENCLOSED INSTALLATION

There are many types and styles of cooling devices, and the particular installation and size dictate which of these would be most effective for the situation. Generally, these are good rules to follow:

- If the equipment is not completely enclosed, but is on a bookshelf, in a corner, or otherwise has some, but not enough, ventilation (i.e. a cabinet with no back, no doors), use a cooling device that sits below or on top.



ATM's Cool-stack III, a 1-unit high hot air exhaust system pulls up to 70 CFM of hot air out of tightly packed racks while generating very low noise levels.

- Use a cooling-base type device that sits underneath the equipment if the component has bottom slots, or a top-mounted fan unit if the vent openings are on top. If you want to put a heat-sensitive device, like a DVD player, on top of something hot, use a cooling-shelf (“heat-shield”) product, and cool the “something hot” while shielding the device placed on top. This lets you put more gear in a given area than you safely could ordinarily.

ENCLOSED INSTALLATION

If the equipment generates a moderate amount of heat, and if the enclosure is compact, a small system-type cooling package is the solution. A computer in a kitchen cabinet, or small music systems in a section of a larger cabinet are examples. In these cases, look for a cooling product with a couple of fans and grilles. These devices can be used to either pull in cool air, or push out the hot.

If the enclosure is mid-size (24- to 30-inch high and one- or two-components wide) and the equipment is the typical home theater assortment of a receiver or amp, DVD player, a cable or satellite box,

etc., there are larger system kits available to address the size and complexity of the configuration. Quality system sets will include multiple slow-turning fans, grilles, power supplies, and a control device. They should be heat sensitive and able to automatically adjust to environment and usage temperature changes with fan speed controlled by, or (better yet) proportional to, temperature rise.

If the system is more ambitious, with a whole-house amp, TiVo, power conditioner, etc., look for a still larger version of the system kits with full four-fan versions of the same automatic temperature sensitive cooling systems.

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 a system that states it is specially designed for and 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.

Finally, for the largest jobs (and the most power-hungry video projectors), there are serious commercial air handlers capable of moving air tens of feet to utility areas where it can dissipate.

> TECH REVIEW

STRUCTURED WIRING

Are you new to custom installation or simply in need of a refresher course on backbone technologies? If so, visit www.resmagonline.com/techreview to download free, monthly technical PDFs from industry veteran, Todd Adams of DI Partner. This month, Adams reviews the basics of structured wiring.

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