Mark5 Disk Pack Temperature

The problem

A while ago we noticed that in some of our Mark5 units the disk packs get a lot warmer then in the other Mark5's that we have.
Especially inside the Mark5 which we recently outfitted with a new, dual processor, motherboard and a new power supply, the temperature of the disk packs sometimes exceed acceptable levels.

Since all our Mark5's sit inside a closed area, where the temperature is kept on a constant 18 ºC, we knew we had to investigate the internal airflow to reach a better understanding of the problem.

The Mark5 box can be divided into two compartments.
At the back there is the compartment with the motherboard and the power supply. This part is cooled by the fans of the power supply and a little fan in the back panel, which blows the warm air out.
The front part of the Mark5 box consists of the disk pack area, where the cooling air is sucked in through one or more air intakes at the front and blown through the disk packs by four large fans underneath the disk packs.

The Mark5 chassis we have here at Jive come in two different designs. The units with serial number Mk558 and lower only have one air intake at the front. The Mark5's with serial numbers above Mk558 have three air intakes, one at the front of the chassis and two at either side. There is no air outlet in the front of the cabinet, so all the cooling air of the disks has to go out the back, through the motherboard compartment.
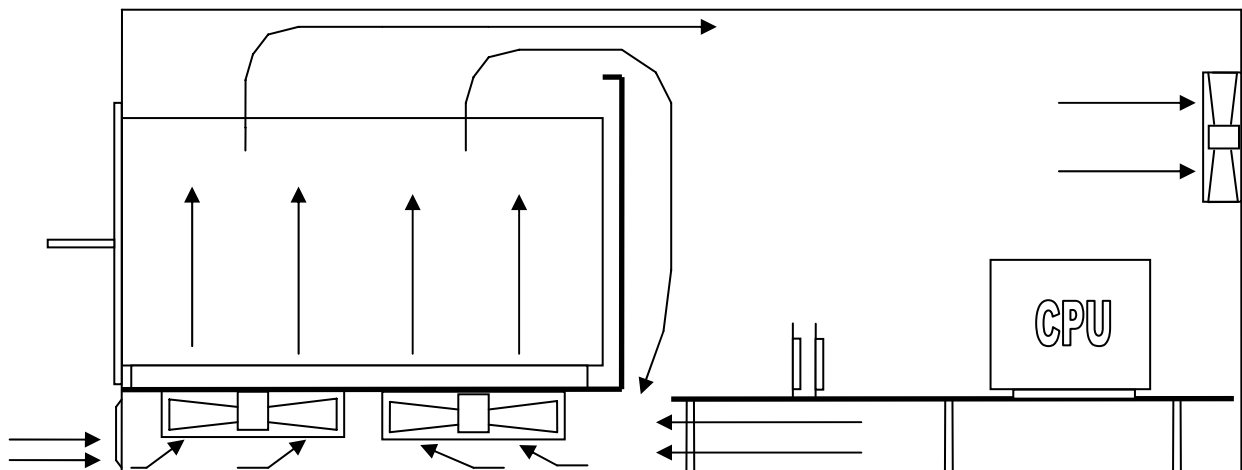

Figure 1: cross-section Mark5

The fans underneath the disk packs not only suck in cool air from outside the cabinet, but they also recycle some of the, already warm, air from inside the motherboard compartment. This air is warmed up again by the disks and forced back into the motherboard area.

In a situation where both bank A and B are in use, this can lead to a serious increase in disk temperature.

The solution

Close the gap underneath the disk pack bay between the motherboard section and the disk section. This will force the fans under the disk packs to suck in all their cooling air from the outside.

The easiest thing is to use flexible material that will block the airflow, but will still allow wires to run to the fans and the switches. Keep in mind though that the material you use has to be able to withstand the air temperature and the temperature of the components it comes into contact with.

We used neoprene cell rubber, which is very flexible and easy to put in place. It is insensitive to aging and it doesn't easily wear and tear. To prevent any fire hazard, we first tested the foam for heat resistance up to a temperature of 200 ºC. If the foam is cut is into a piece of 2 x 4 x 44 cm it will fit snugly underneath the metal bay that holds the disk packs.
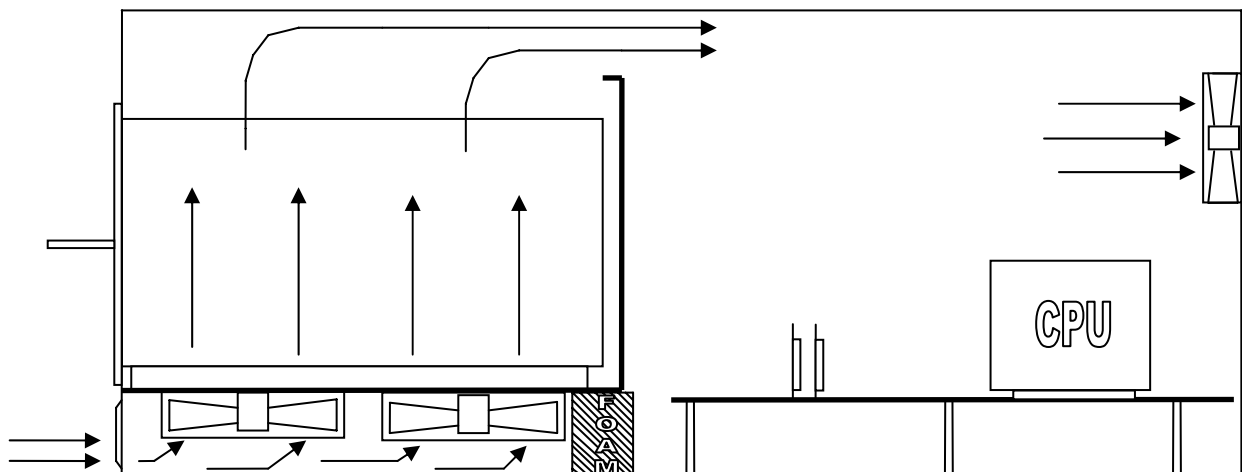
With this minor fix, we were able to reduce the temperature of the air coming out of the power supply from 42 ºC to 36 ºC.
More important, the temperature of the disk packs stays much lower now.

With the old Mark5 setup, this wasn't really a problem, but now that Jive is upgrading all their units with new motherboards and power supplies, we will put the foam strip in all our units.