

Fan Requirements

Based on a worst-case estimate of approximately 1.25W of heat produced by each channel assembly board and given that there were 8 assembly boards, a fan that would provide an air flow that could dissipate 10W of heat was required.

In addition to the amount of internal heat dissipated by the system, the allowable temperature rise of the system must also be known. From the spec sheet of the D68L8D250HZ (please refer to the D68.pdf in the components section for this module), the operating range of the filters is 0 to +70 °C. Taking into account that the Anti-Aliasing Filter Bank will be operating at least at room temperature (25 °C), the maximum allowable temperature rise of the system was found to be 70 °C – 25 °C = 45 °C.

The air flow needed to dissipate the heat produced inside the Anti-Aliasing Filter Bank can now be computed using the following equation:

$$Q = \frac{1.76 \times P}{\Delta T}$$

Q = Air flow required to dissipate heat produced by system in cubic feet per minute (CFM)

P = Amount of internal heat produced by the system in Watts (W)

ΔT = Allowable temperature rise of the system (°C)

Substituting $P = 10W$ and $\Delta T = 45 \text{ }^\circ\text{C}$ into the above equation, the minimum air flow required to cool down the Anti-Aliasing Filter Bank was found to be $Q = 0.391 \text{ CFM}$.