Patent Description

I. Computer server motherboard design elements for increasing overall power efficiency

    (a) Use of 5 volt fans instead of 12 volt fans

5-Volt fan headers, allowing the use of 5V fans which typically can use much less power than traditional 12 volts fans, in efficient servers that don't need high speed, and/or high pressure, cooling fans.

    (b) Onboard components and component connector placement

Memory, cable connectors and other components that are wider in one aspect than another, are mounted with the thinner aspect in line with the direction of cooling air flowing though the computer, thus increasing cooling efficiency. This is shown in low detail in Fig. 1A.

    (c) I/O device connector port placement

Conventional designs located these headers on the left side of the board, which is usually in the direct path of the air flow cooling the CPU. This new design locates the rear I/O ports, and any other virtical components, on the opposite side of the motherboard from the CPU or CPUs to prevent them from obstructing the cooling air flow. This substantially improves air flow over the motherboard (and therefore through the computer case) of cooling air propelled by cooling fans. With the rear I/O headers, ports and other large components moved out of the way, the cooling air can flow across the CPU and other hotter parts, and exit the case substantially easier, allowing the use of less powerful fans to cool the components of the computer server, which in turn reduces the amount of energy consumed overall by the computer server. This applies to the I/O ports, but also to other tall components that could hinder air flow. Also shown in Fig. 1A.

    (d) Use of components, especially I/O controllers, that are designed for the high efficiency requirements of mobile computing. Including, but not limited to: network controllers and the associated PHY; CPUs; fan controllers; disk controllers and associated integrated circuit devices; video controllers (if any); USB controllers; and keyboard/mouse controllers.