A method and device for connecting different types of fans to an information apparatus is proposed. Connecting pins required by the fans suitable for the information apparatus are summarized and integrated into a connecting device. Then, connection between the connecting pins of the fans and those of the connecting device is adjusted upon changing a different type of fans. Thus, only a single connecting device is required for connecting different types of fans to the information apparatus. In addition, the connection of pins can be adjusted based on actual requirement to control the position of an indicator for indicating fan status.
Start

S1: Summarize connecting pins required by the different types of fans

S2: Integrate the pins required by the fans into the connecting device

S3: Adjusting the connection between the pins of the fans and those of the connecting device upon changing a different type of fans

End

FIG. 1
METHOD AND DEVICE FOR CONNECTING SEVERAL TYPES OF FANS

FIELD OF THE INVENTION

[0001] The present invention relates to a fan connecting technique, and more particularly, to a method and device capable of connecting different types of fans to an information apparatus.

BACKGROUND OF THE INVENTION

[0002] Ever higher system efficiency in computing systems is demanded, especially for servers and large mainframes. At the same time, system designers continue to seek any opportunities in the system for reducing power consumption. In the field of the servers, growth of Internet has fueled the need for crowding a plurality of servers. These servers are usually crowded in critical nodes, and are connected to high-speed access of national communication main trunk network via a plurality of branches.

[0003] Since office buildings are usually situated in expansive locations, this directly causes the unit cost of a square inch of area of the room for storing the servers to increase. In order to cope with the high rent and demands for higher bandwidth, the server size has reduced from 5U to a single 1U cabinet. Each cabinet contains at most four processors with double the operating frequency three years ago. The efficiency of the central processing unit has always been proportional to the operating frequency. In only a few years, the efficiency has since increased by about a hundred fold (i.e. 2 (double operating frequency)x4 (number of processors)=5 (space reduction of the server cabinet)).

[0004] A single 1U server usually contains up to seven fans, each consuming current up to about 1 Amps (A). In more densely packed server system, more energy is required to produce the same amount of airflow. As a result, more fans are added into the system. If the total power consumption of a server system is 500 Watts (W), then each fan is responsible for dissipate the heat of a 70-W circuit. This task would require 12 W of power. It can be clearly seen that the efficiency is undesirably decreased as a result of increasing the airflow.

[0005] In terms of the influence of the fans have on the system, when electrical loading reaches 280 W (not the worse case), the power lost due to the fans becomes the most serious part in the overall system power lost. Thus, after the efficiency reaches 98%, it is difficult to reduce this part of the lost. Since eliminating fans usually reduces 12 W power lost, thus a new bus converter is used to improve the AC/DC converter in order to reduce the part of lost by 12 W. Additionally, 41 W power lost can be reduced by enhancing the efficiency of a buck converter. Under full load, these power lost takes up about 50% of the total power lost.

[0006] Under light load, the percentage of power lost by the fans is significant, which is why the fans are switched off whenever possible in many desktop and notebook computers. In the servers, the light-load efficiency can be greatly improved by compromising the cool ability with the power lost and using a variable-speed fan driver (motor) in conjunction with a power converter. By increasing the frequency to more than 20 kHz, the variable-speed fan driver can be used to reduce noise.

[0007] Despite of the efficiency and noise problems of the fans to be solved, integrating fans with different specifications in the server system is another problem to be addressed. Normally, a server system can incorporate three types of fans: 1U Fan Harness, 2U Non-Redundant Fan and 2U Redundant Fan. On an middle plate, circuits that adopt these three kinds of fans need to be designed and different connectors corresponding to the fans used need to be provided. This causes inconvenience in circuit design as well as the installing of fans. Thus, there is a need for a system that integrates the three kinds of fans, such that when a different fan is used, there is no need to change a connecting device.

SUMMARY OF THE INVENTION

[0008] In the light of foregoing drawbacks, an objective of the present invention is to provide a method and device for connecting different types of fans to an information apparatus which integrates connection pins required by the different types of fans, such that when a different type of fan is used for heat dissipation, there is no need to change a connecting device, thereby simplifying circuit design and inconvenience in installment.

[0009] In accordance with the above and other objectives, the present invention provides a method and device for connecting different types of fans to an information apparatus is proposed. First, connecting pins required by the fans suitable for the information apparatus are summarized and integrated into a connecting device. Then, the connection between the pins of the fans and the connecting device is adjusted upon changing a different type of fans. Thus, only a single connecting device is required for connecting different types of fans to the information apparatus. In addition, the connection of pins can be adjusted based on actual requirement to control the position of an indicator for indicating fan status.

[0010] In one embodiment, the connecting device is provided on a middle plate of a motherboard of the information apparatus.

[0011] In one embodiment, the connecting pins of the connecting device are for example, Power, PWM, LED, Fan Presence, Tach_1, Tach_2 and so on.

[0012] Therefore, the method and device for connecting different types of fans to an information apparatus allows integration of connecting pins required by different types of fans into a single connecting device, thus when a user wishes to change to a different type of fan, there is no need to change the connecting device, effectively solving the problems mentioned in the prior art.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The present invention can be more fully understood by reading the following detailed description of the preferred embodiments, with reference made to the accompanying drawings, wherein:

[0014] FIG. 1 is an operational flowchart illustrating the method for connecting several types of fans of the present invention; and

[0015] FIGS. 2 to 4 show physical configurations of the connecting device of the present invention when connecting to three different types of fans, respectively.
DETAILED DESCRIPTION OF THE EMBODIMENTS

[0016] The present invention is described by the following specific embodiments. Those with ordinary skills in the arts can readily understand the other advantages and functions of the present invention after reading the disclosure of this specification. The present invention can also be implemented with different embodiments. Various details described in this specification can be modified based on different viewpoints and applications without departing from the scope of the present invention.

[0017] FIG. 1 is an operational flowchart illustrating the method for connecting several types of fans of the present invention by integrating connecting pins required for operating the fans into a connecting device. The method of the present invention is suitable for a middle plate disposed on a motherboard of an information apparatus (e.g. a server). As shown, the method for connecting several types of fans includes the steps as follow:

[0018] In step S1, summarizing connecting pins required for operating the plurality of fans (e.g. 1U Harness, 2U Non-Redundant or 2U Redundant Fan etc.). Then, proceed to step S2.

[0019] In step S2, integrating the pins required by the fans into a connecting device. Next, go to step S3.

[0020] In step S3, when a user wishes to use a different fan, adjusting the pin connection between the fan to be connected and the connecting device based on the specification of the fan, such that different types of fans can be connected to the same connecting device. Moreover, an indicator (e.g. a light) can be controlled according to the changes in connections of the pins of the connecting device to indicate current operating status of the fan. Examples of pin connections are shown in FIGS. 2, 3, and 4.

[0021] FIG. 2 shows an example of the actual connection between the device for connecting several types of fans of the present invention (connecting device) 1 and a fan 2. As shown, the connecting device of the present invention comprises pins 1 to 10, respectively are: Tach_1, Tach_2, Power, Pwr_1, Tach_1, Rtn, Rtn, Fan Presence, LED_Anode and LED_Anode_Rtn. The pins 1 to 10 are connected to the fan 2 in a manner shown in FIG. 2. FIG. 2 shows the connection between the connecting device 1 and a 1U Harness fan; FIG. 3 shows the connection between the connecting device 1 and a 2U Non-Redundant fan; and FIG. 4 shows the connection between the connecting device 1 and a 2U Redundant fan. As can be seen from FIGS. 2 to 4, regardless of which type of fans is used, the fans can be connected to the connecting device by adjusting the pin connections with the connecting device of the present invention.

[0022] Additionally, by changing the connections of a LED 3 represented by pins 1 and 2, the position of an indicator for indicating fan status can be controlled.

[0023] The above embodiments are only used to illustrate the principles of the present invention, and they should not be construed as to limit the present invention in any way. The above embodiments can be modified by those with ordinary skills in the arts without departing from the scope of the present invention as defined in the following appended claims.

What is claimed is:

1. A method for connecting a plurality of types of fans to an information apparatus, comprising the steps of:
   summarizing connecting pins required by the plurality of types of fans;
   integrating the connecting pins required by the plurality of types of fans into a connecting device; and
   adjusting connection between the connecting pins of the fans and those of the connecting device upon changing a different type of fans.

2. The method for connecting a plurality of types of fans to an information apparatus of claim 1, wherein the information apparatus is a server.

3. The method for connecting a plurality of types of fans to an information apparatus of claim 1, wherein the method is applied to a middle plate disposed in a motherboard of the information apparatus.

4. The method for connecting a plurality of types of fans to an information apparatus of claim 1, wherein the plurality of fans comprise at least one of 1U Harness fans, 2U Non-Redundant fans and 2U Redundant fans.

5. The method for connecting a plurality of types of fans to an information apparatus of claim 1, wherein the connecting pins of the connecting device comprise at least one of Tach_1, Tach_2, Power, PWM, Rtn, Fan Presence, LED_Anode and LED_Anode_Rtn.

6. A device for connecting a plurality of types of fans to an information apparatus, the device being disposed in a motherboard of the information apparatus, the device comprising a plurality of connecting pins for connecting the plurality of types of fans to the information apparatus.

7. The device for connecting a plurality of types of fans to an information apparatus of claim 6, wherein the information apparatus is a server.

8. The device for connecting a plurality of types of fans to an information apparatus of claim 6, wherein the plurality of fans comprise at least one of 1U Harness fans, 2U Non-Redundant fans and 2U Redundant fans.

9. The device for connecting a plurality of types of fans to an information apparatus of claim 6, wherein the connecting pins of the device comprise at least one of Tach_1, Tach_2, Power, PWM, Rtn, Fan Presence, LED_Anode and LED_Anode_Rtn.

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