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## FAN-LESS MANAGEMENT TO SAVE IDLE POWER FURTHER

HP INC

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# Fan-less management to save idle power further

## Abstract

Consider sustainability, how to reduce idle power is a key topic to address in the personal computer (PC). In typically, more focus almost points to higher light-load efficiency. The disclosure is to try to turn off fan spin at the specific conditions to save idle power.

## Problems Solved

1. To save more idle power consumption if turn off the fan (Fig 1).
2. To provide better score in the Energy star.

## Concept

1. Most of PC is operating under ACPI power management, where the key status is classified as idle (S0), sleep (S3), hibernate (S4) and off (S5).
2. System might not be hot if the status is idle (S0).
3. Turn off fans (system fan, CPU fan and others) to save more power.

## Operation

Use the HP VPM system to real-time monitor system power consumption, if system power is lower than a specific level, it could imply the system has already entered the idle mode (S0) and is good to turn off the fan spin. Meanwhile, if the internal temperature is increasing and reach the trigger point, re-spin the fan to cool the system further until touch the turns off condition. Of course, the fan-less mode will be forced interrupted if the system back to normal operation (Fig. 2) or enters sleep mode (Fig. 3).

## Conclusion

The idea has been proof in our lab and met the concept.

## Reference

1. [https://uefi.org/sites/default/files/resources/ACPI\\_6\\_3\\_final\\_Jan30.pdf](https://uefi.org/sites/default/files/resources/ACPI_6_3_final_Jan30.pdf)
2. <https://www.energystar.gov/sites/default/files/ENERGY%20STAR%20Computers%20Final%20Version%208.0%20Specification.pdf>

Figure list

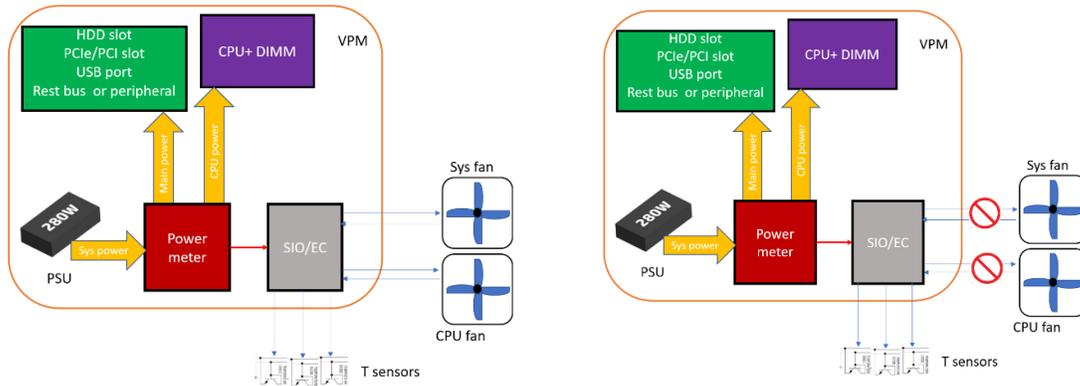


Fig. 1 Fan-less management (Left normal; Right fan-less)

System back to Normal operation

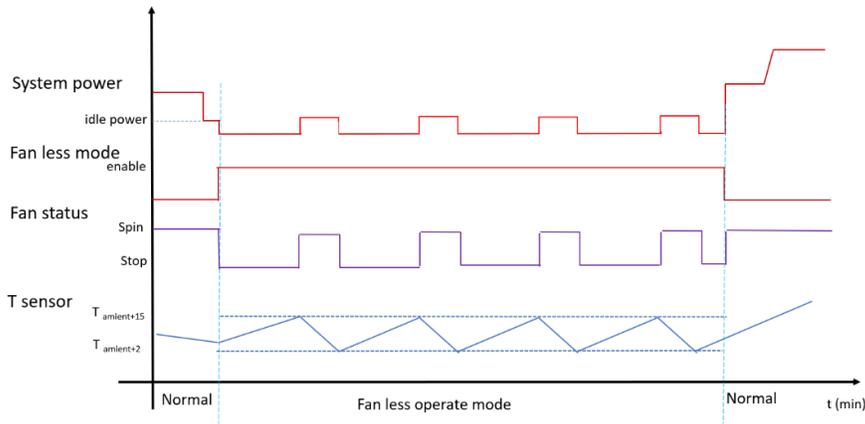


Fig. 2 fan-less mode return normal operation

Standard ACPI

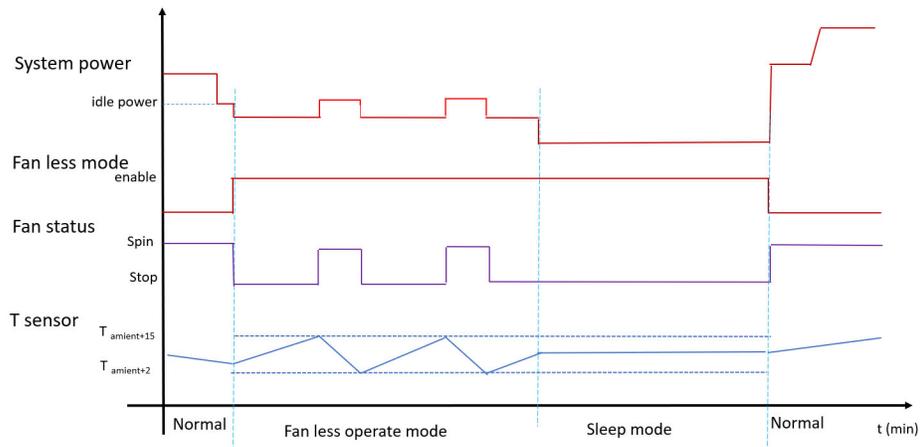


Fig. 3 fan-less mode enter sleep mode

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