



Idle Mode Power Requirements

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- The 50 to 60 watt requirement for Business Desktops is untenable from a hardware standpoint
 1. Today, a 95 watt 3.4 gigahertz Prescott based Hp business desktop system consumes approximately 85 watts in idle mode. A system in idle mode for our testing purposes is defined below:
 - A. Running Windows XP SP2
 - B. Screen blank
 - C. Hard drive spun down
 - D. No network connection
 - E. 512 megabytes of DDR 2 RAM
 - F. Internal graphics
 - G. Intel Enhanced Speed Step Technology enabled
 - H. Extended Hlt power savings (C1E) enabled
 - I. Both the physical and hyperthreaded processors are executing the Hlt instruction, interrupted only by the OS heart beep interrupt to check for task execution

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2. Future business desktops will include other processors, most likely embedded in the chip set, that may also pose a significant power draw of 10 to 15 watts.
3. Multi-core processors will dominate the business PC landscape, and the number of cores will grow as operating systems include features to exploit them.
4. Virtualization technology will drive not only an increase in processor cores but larger amounts of RAM and more and bigger hard drives.

Conclusion: Business PCs can't meet 50 to 60 watts at idle now and aren't likely to meet it in the near future.

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- The 50 to 60 watt requirement for Desktops may be untenable from a software standpoint
 1. Reduction in power in idle mode can and does vary from operating system to operating system. Power saving in idle mode is engaged by execution of the Hlt or a combination of the Hlt instruction and the operating system initiating a lower performance state. Other power reduction can come from:
 - A. Putting unused devices in D3.
 - B. Spinning down hard drives
 - C. Putting busses into lower power statesAll of these actions are up to the operating system.
 2. The concept of idle may change drastically in a world of multi-core processors and virtualization technology which allow multiple operating systems to run concurrently on the same desktop. Note that individual processor cores can run at different frequencies, however they are currently architected to lie on the same voltage plane. All processors cores would need to be executing the Hlt instruction and be at the same performance state to see full idle power savings.

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3. There is no ACPI definition for an Idle mode as there is for the Sx states. Thus, operating systems and hardware have no guidelines. It may be almost impossible to compare apples and apples between hardware and software combinations.

Conclusion: The definition of idle power will vary from operating system to operating system. Multi-core, virtual technology systems may seldom be truly “idle” when multiple operating systems are running concurrently on the same platform.

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□ Recommendations:

1. Drop the constraining, hard to define and nearly impossible to achieve idle power mode requirement.
2. Concentrate efforts on improving the abysmal 5% adoption rate of suspend to ram technology. The EPA's own studies show that PC's are idle 85 to 90% of the time. If this is true, then these idle machines should be in S3 using 3 to 5 watts rather than the 50 to 60 watts the idle mode requirement demands.