Put Your PC to Sleep and Save Hundreds of Dollars!

Use your computer's S3 standby mode to dramatically minimize power consumption without sacrificing functionality

BY CAMERON BUTTERFIELD

The power requirements of the modern enthusiast's desktop PC have jumped to astronomical levels. Rigs sporting multiple processing cores and graphics cards and multiple hard drives in RAID configurations require more juice than previous generations of hardware did. Some high-end power supply units are now rated in excess of 1,200 watts. A modern computer enthusiast's gaming rig, including monitor, might pull as much as 400 watts just idling. Leaving a computer on all the time can translate into a pretty hefty power bill at the end of the month. In our scenario, an "always on" 400 watts at a $0.12-per-kilowatt-hour rate would cost you $34.56 a month! When talking these kinds of figures, it's easy to see how taking the time to configure a proper power-saving state for your PC could save you some serious cabbage.

Your computer is capable of several different power states, ranging from fully on (SO), to slightly powered down (S1), to virtually off (S3, or standby), to fully off (S4, or hibernate). In this article, we're going to focus on the S3 power state, as it provides incredible power savings with only a few seconds of recovery time. You might be thinking you can't use standby mode because you need your computer to be on all the time as a file server or you need remote access to your PC. Well, keep reading because we'll prove you wrong. In the following pages, we'll show you how to not only enter and troubleshoot the S3 standby power-saving state but also configure your computer to awaken when files are requested over the network or you need remote access to your PC.

PHOTOGRAPHY BY SAMANTHA BERG

Enable Your PC's S3 Sleep State

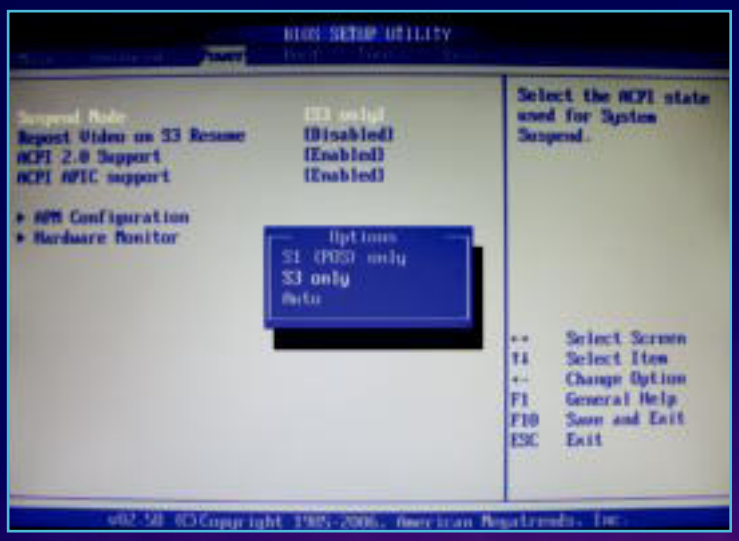
It's quite possible your computer is already configured to use the S3 standby state. Here's how to find out and how to troubleshoot issues that stand in your way

Signs of Sleep

To determine whether your PC is configured to use the S3 state, first put your computer in standby: In Vista, go to Start, then the Power icon, then Sleep; in XP, go to Start, then Shut Down, then Standby. Once the computer is in standby, you can tell if it's utilizing an S3 power state because no fans will be spinning and no noise will be emanating from your computer. This is because S3 standby mode turns off all the components inside your system except memory, so your rig will use as little as 1.8 watts! If your fans are still spinning, your computer is in S1 standby mode, which generates minimal power savings and does not have the advantages of an S3 power state. If your computer was unable to enter S3 standby in this test, all is not lost. Read on to learn how to enable S3 successfully.

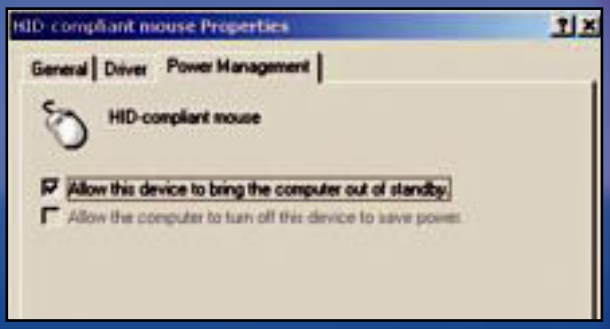
Configure BIOS Settings

The most common reason a computer fails to enter S3 is because the BIOS has not been configured to take advantage of this mode. To enter the BIOS, you must hit a specific button on your keyboard when your computer is first initializing, usually the Delete key. If pressing the Delete key doesn't work, refer to your motherboard manual for instruction. Next, go to the Power Management section of the BIOS. Once there, you should see options for changing the default suspend state. Here you must choose to enable S3 suspend mode. You'll also want to enable any ACPI (Advanced Configuration and Power Interface) support options. Setting these options correctly is essential for entering S3 standby. Ideally, these settings will be in place before Windows is installed, so the OS can configure its sleep states upon installation. However, if you installed Windows without having set these options, it won't prevent you from entering S3.



You may need to configure your BIOS to enable the S3 standby state.

WHAT IF MY USB MOUSE IS UNABLE TO AWAKEN THE SYSTEM FROM STANDBY?



If you are unable to wake your computer from standby after you wiggle your mouse several times, the mouse's power-management features may have been disabled. To resolve the issue, you must manually enable the mouse's power management features. Go to Control Panel, click System and then Device Manager, and then locate the entry for your mouse in this list; right-click it and choose Properties. Click the Power Management tab and select "Allow this device to bring the computer out of standby." Your mouse should now be capable of awakening your computer from standby when you move it.

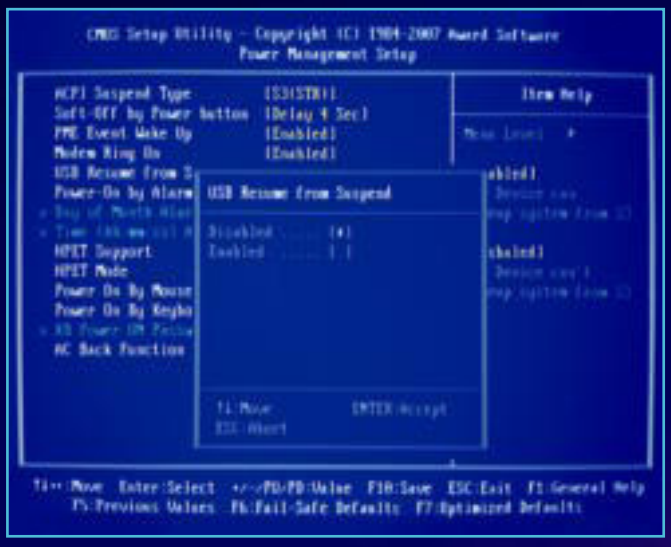
Correct USB Compatibility

Though it may sound strange, your USB devices could be keeping you from entering the S3 standby state. Because some older USB devices are incapable of resuming from sleep modes, when Microsoft released Windows XP, the OS wouldn't allow S3 standby if USB devices were present in order to prevent a computer from entering a sleep state it couldn't come out of. Fortunately, almost all USB devices are now fully compatible and won't cause any problems with standby states, and the ability to enter S3 sleep mode while using USB devices is easily allowed through the use of a registry entry. Just open regedit and create the following registry entry: `HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\usb "USBBIOSx"=DWORD:00000000`

If your computer enters S3 standby after setting this registry key but then immediately awakens all by itself, it's probably set to resume upon any USB activity and a USB device is sending signals to the computer nonstop. While it's better for most users to have USB wakeup capability enabled, if you're having these problems, you can try disabling the option to wake on USB activity in the BIOS. This should fix your compatibility problems, but it means USB remotes, mice, and keyboards won't be able to bring your system back from standby—you'll need to use the Power button to resume. Alternatively, if you find that your computer is unable to resume at all from standby after setting the above registry setting, it could be that one of your USB devices is incompatible with the S3 state. You can either delete the registry key and stick with S1 mode or try disconnecting certain USB devices until you're able to identify the conflicting device and replace it.

After having set these options, your computer should now be configured to enter S3 standby mode.

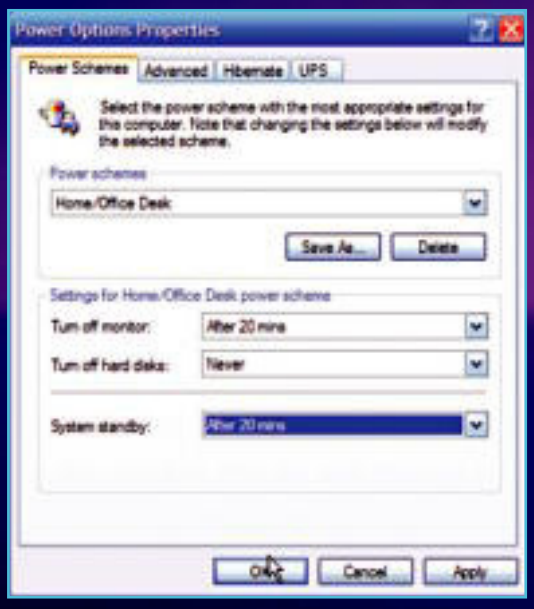
You can bypass USB restrictions with a registry key.



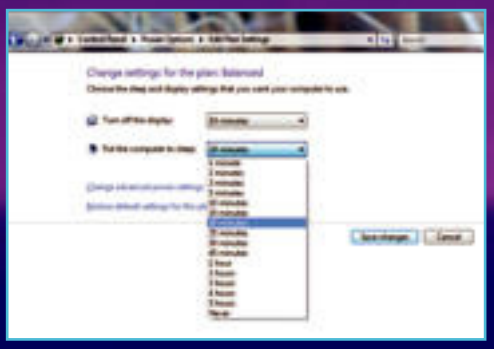
If a connected USB device sends signals to your PC nonstop, you will need to disable the USB Resume from Suspend option in your BIOS.

Select a Power Profile

Now that your computer is capable of entering S3 standby, why not allow your rig to do just that whenever you step away from it? You'll want to configure a power profile in Windows that allows your PC to go into standby mode after a specified number of minutes. To do this in Vista, go to the Hardware and Sound section of your Control Panel, select Power options and then Edit Plan Settings. In Windows XP, go to the Power Options section of your Control Panel. The number of minutes you choose depends on your personal preference. Keep in mind that if you're playing a movie or someone is remotely accessing files on your computer, the PC will not go to sleep until all activity has stopped.



In Windows XP, set your power profile in the Control Panel's Power Management section.



In Vista, you can create a power profile within the Hardware and Sound section of the Control Panel.

Make S3 Standby Act Like 'Always On'

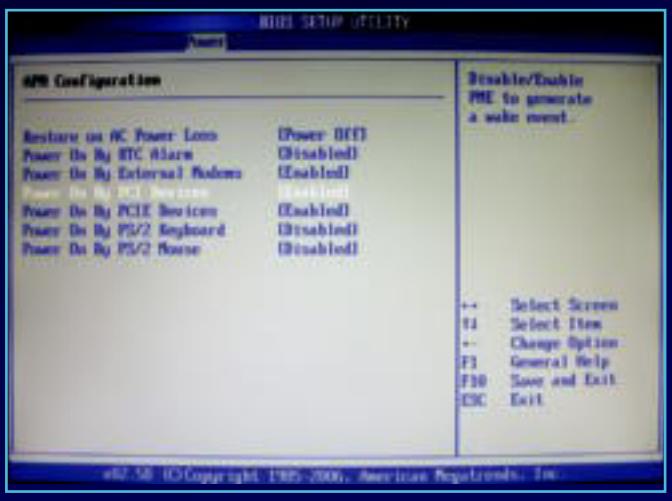
Whether your PC acts as a file server, a remote access point, a VNC server, or something else entirely, you'll want to configure it to resume from standby when it detects network activity

Configure Your PC to Wake on Demand

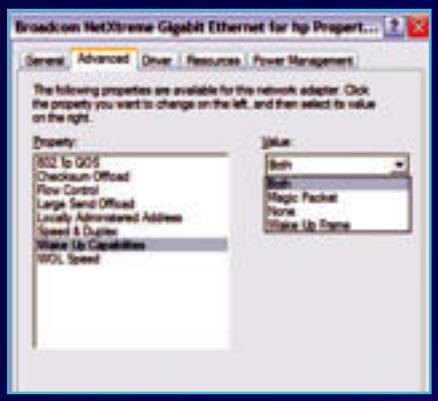
Enter your BIOS and make sure WOL (Wake On LAN) and the Power On options for modems, PCI devices, and PCI Express devices are enabled. You may need to check your motherboard manual for specifics since not all BIOSes are the same.

In Windows, you'll need to configure the wake-up capabilities of your network device. To do this, navigate to the Control Panel, double-click Network Connections, right-click Local Area Network, and then choose Properties. Your network adapter will be visible in the Properties box. Click Configure and then navigate to the Advanced tab. Select Wake Up Capabilities. Here you want to enable any wake-up options available. Choose "both" or "Magic Packet & Pattern Match."

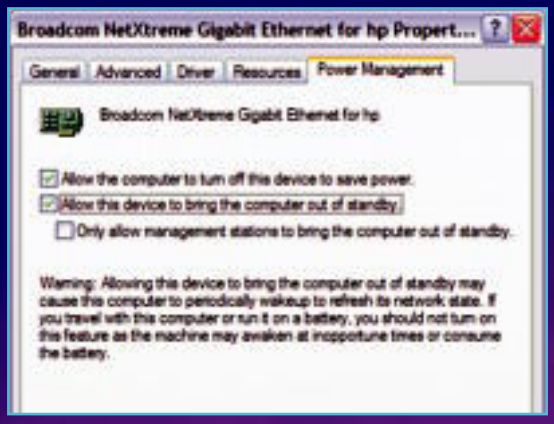
Next, choose the Power Management tab and check "Allow this device to wake the computer." Reboot your computer, and you'll be able to enter standby mode, but your rig will still awaken when it detects incoming network activity.



In the BIOS, enable Power On options for WOL, modem, and PCI-E devices.



You'll need to set your network adapter's wake-up capabilities in Windows.



Once you set the power management options for your network adapter, you're all set.

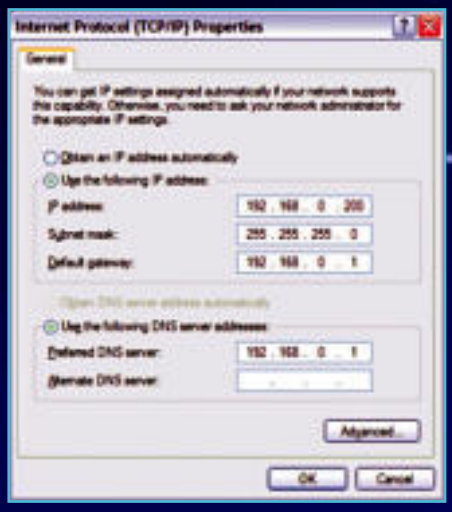
HOW WILL S3 RESPOND TO SCHEDULED ANTIVIRUS SCANS AND DEFRAGS?

Some tasks need to be run regularly, such as virus scans, backups, and defragmenting jobs. If your computer is in standby all the time, how is it supposed to run these programs? Not to worry, most utilities are programmed to bring the computer out of standby automatically to run these tasks. Alternatively, you can use Windows's built-in task scheduler. To do this, go to Start > All Programs > Accessories > System Tools > Scheduled Tasks. Then select Add Scheduled Task to launch the wizard and create your task. You can schedule any program you want. Just be sure to click the box that says "Wake the computer to run this task" on the Settings tab. This option works for programs that are unable to bring the computer out of standby—use it to wake the computer a few minutes before the application is scheduled to run.

Set a Static IP Address

When your computer is in standby mode and your Ethernet adapter is set to wake the computer on network activity, we've found that it's more reliable to access the computer by its IP address rather than the Windows network name of the computer. Since a dynamically assigned IP address changes frequently, setting a static IP on your PC (if you haven't already) will allow the computer to wake reliably every time—the network activity on a static IP will be delivered directly to the PC. To set up a static IP address for your PC, navigate to the Control Panel and then Network Connections. Right-click Local Area Network and choose Properties. Select Internet Protocol (TCP/IP) and then click Properties. Here you can set your IP address manually.

A good rule of thumb is to look at your current dynamic IP address; you can find it by typing `ipconfig /all` at a command prompt (you should also take note of the DNS, subnet mask, and default gateway). Change the last three digits of your IP address to a lower number to avoid conflicts. Most routers reserve some IPs in the x.x.x.5 to x.x.x.99 range for statically assigned devices. You'll also need to manually set your subnet mask, default gateway, and DNS. Once you have made your changes, click OK. Your network adapter will then reconfigure itself based on the new IP address. Now you can access your machine over the network using the static IP, even when it's in standby mode!

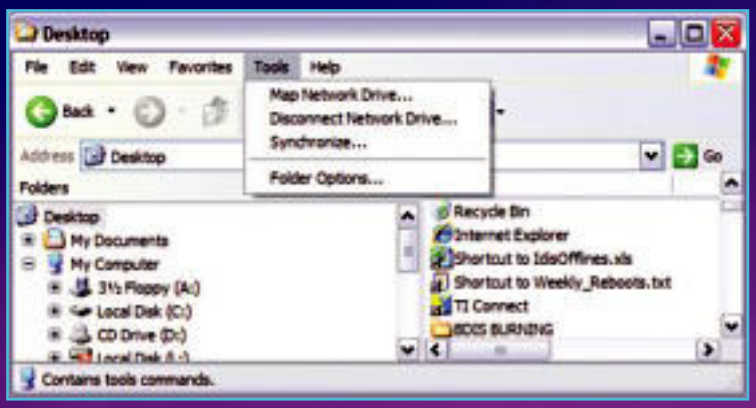


When you want to awaken your PC from standby mode, a static IP address is more reliable than a dynamically assigned one.

Map Network Drives for an S3 State

We've found that the most reliable way to access networked files on your S3-enabled file server is to set up your shares based on the IP address of the machine rather than the Windows network name (i.e., "192.168.0.200" instead of "office"). The easiest way to access your files using the local IP is to create a mapped drive. To do this, enter Windows Explorer, hit Tools, and then select Map Network Drive. Map the drive to the path you desire using the static IP. This way, you don't have to type in the IP address, \\192.168.0.200\, for example, every time you want to access the machine; you can simply navigate to a drive letter, which will wake the computer when accessed.

Mapping a static IP as a network drive makes accessing shared folders much easier.



Use the static IP address you created in the previous section as the folder for a shared drive.

WILL S3 STANDBY WORK WITH A MEDIA CENTER PC?

A home Media Center PC probably benefits the most from an S3 standby state, as it typically doesn't get as much use as a business computer and can spend more of its time in standby. Windows Media Center has built-in standby capability, which means that Windows will automatically bring your computer out of a standby state to record your scheduled programs and then go back to sleep. Follow the same directions in this article to ensure that your Media Center PC is consuming minimal energy when not in use. MPC