

Microsoft Windows Built-In Serial and USB UPS Support

Abstract

Availability, reliability, up-time...well-known terms to anyone who uses a computer, from the PC home user running Microsoft Windows XP, to the Datacenter Network Administrator, running Microsoft Windows Server 2003 Datacenter Edition. AC power quality is a critical element in achieving the reliability, availability and up-time that these users demand. APC and Microsoft have collaborated to include built-in support of Uninterruptible Power Supplies (UPS) in the Windows 2000, Windows XP and Windows 2003 operating systems in order to prevent crashes and data corruption due to poor power quality.

Summary

Every PC and server requires clean, consistent power to communicate, process and display information, and poor power can cause problems ranging from hard disk corruption, system downtime, and even equipment damage. An Uninterruptible Power Supply can protect your system from damaging power problems, and can improve server availability, or user productivity, by allowing the user to continue working during a short power outage. Communication between the operating system and the UPS is critical to ensure a graceful, unattended shutdown of the operating system in the event of an extended power outage. For more information on this topic, refer to APC White Paper #10, "Preventing Data Corruption on the Event of an Extended Power Outage".

This application note covers three APC/Microsoft integrations regarding graceful shutdown support.

Built-in Serial UPS Support for Windows 2003/XP/2000

Built-in USB UPS Support for Windows 2003/XP/2000

Windows Server 2003 Certification of APC InfraStruXure™



Windows 2003 Server, Windows XP & Windows 2000 Professional/Server Serial UPS Support

APC and Microsoft have partnered together to provide UPS support in the Windows operating system since 1994, with the initial built-in UPS support in Windows NT. Building on that foundation, Windows 2003 Server, Windows XP and Windows 2000 Professional/Server all include built-in serial UPS support developed by APC for Microsoft. The power management features are accessible from one location: the Power Options Control Panel, and the serial UPS support appears within the Power Options Control Panel applet under the "UPS" tab. (select "Start>Control Panel>Power Options" to view the Control Panel - note: this functionality does not appear on laptops since they do not require a UPS). See Appendix A for more information on the development of the serial UPS Support by APC, for Microsoft.

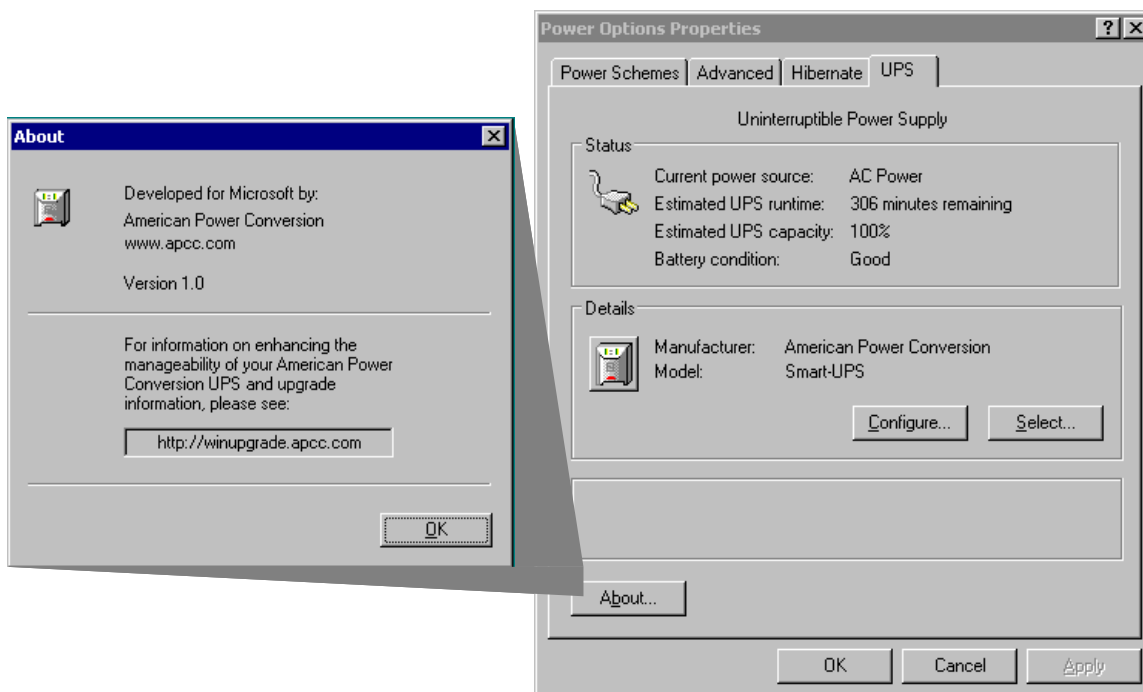


Figure 1 Power Options Control Panel with UPS Tab Selected

How to Configure Windows 2003, XP and 2000 to Work with a Serial UPS

The UPS Tab allows you to select a UPS model. Windows 2003/XP/2000 support both serial basic-signaling and advanced-signaling models. Generally, if you connect the communications cable that came with the UPS and select the manufacturer, family, and COM port, communications will be established. UPS signaling to the control panel applet will depend on the type of UPS used. Defaults in the UPS Selection screen assume you are using the cable that came in the box with the UPS (note: some UPSs actually support both advanced and basic signaling).

Certain UPSs support a more advanced method of serial communication that supports display of information such as runtime, capacity, and battery condition. A special APC driver has been included in Windows 2003, Windows XP and Windows 2000 to ensure APC customers the best possible out-of-the-box experience when using these types of UPSs.

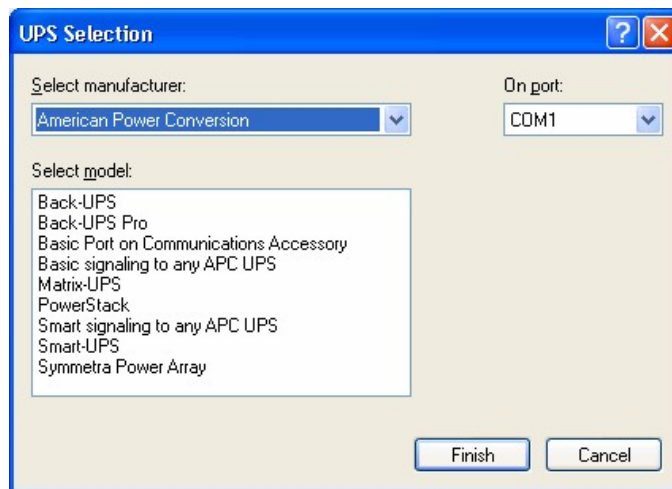


Figure 2 UPS Selection Dialog Box

As seen in Figure 3, this driver provides the following additional critical UPS information:

Estimated UPS runtime – Since UPS runtime varies both with load and the age of the battery, this information can be crucial if you are trying to target a specific amount of UPS battery runtime.

Estimated UPS capacity – Many UPS users prefer to oversize by a factor of two initially (i.e. protected load = 700VA, UPS chosen = 1400VA capacity). This provides extra runtime and facilitates adding additional loads when new hardware is acquired. Estimated UPS Capacity is essential for you to understand how much load is being placed on the UPS and how much is available for future use.

Battery Condition – This value is either "Good" or "Needs Replacing". Most UPS batteries generally have an estimated lifetime of 3 to 5 years. "Needs Replacing" indicates that the UPS battery is increasingly weak and is near the end of its useful life. The internal UPS battery monitoring firmware warns you in advance before the battery is too weak to adequately protect the load (this varies by manufacturer).

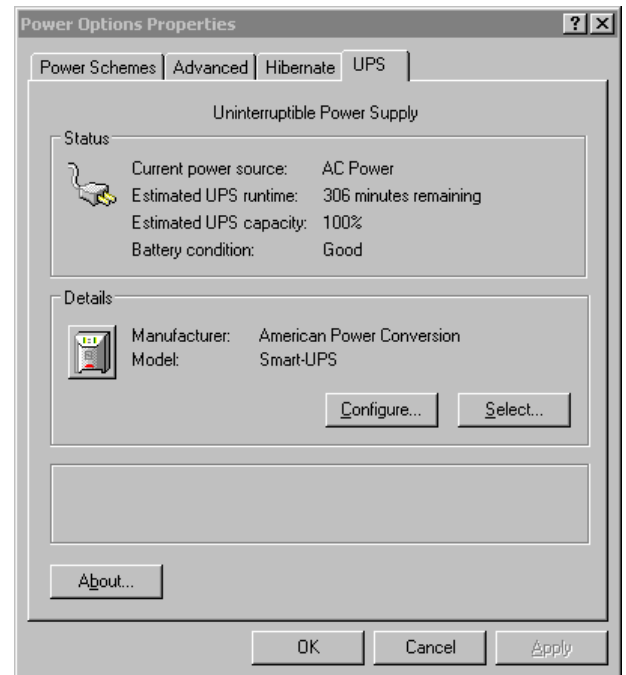


Figure 3 Critical UPS Information Polled from the UPS

UPS Configuration

Select "Configure" in the UPS tab (see figure 3) to display the UPS Configuration screen (Figure 4). You can specify the following:

Broadcast notifications and parameters (local machine only)

Shutdown based on how much time has elapsed (minutes on battery), or when the UPS reaches a low battery condition (the default).

A command file or executable program to run before shutdown (configured via the Windows XP Task Manager)

Shutdown OR Hibernation

Note: Hibernation must first be enabled in the "Hibernate" tab in the Power Options Control Panel. Hibernation is an alternative to shutdown that saves the entire state of system memory on the hard disk, so when you reboot the machine, all applications and files are opened and are in the same state – so your work in progress was automatically preserved and restored.

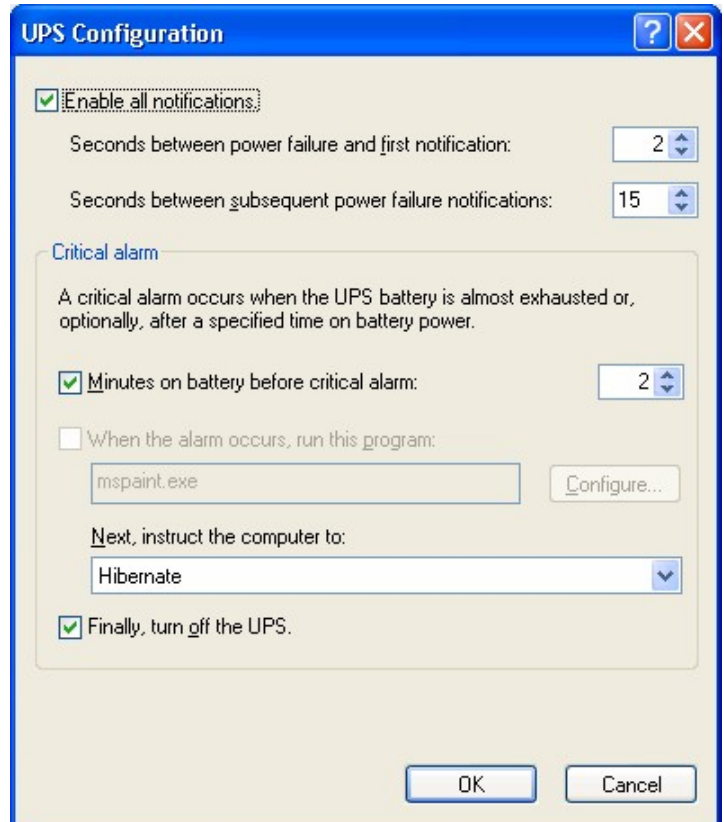


Figure 4 UPS Configuration Screen

Windows 2003/XP/2000 USB UPS Support

Windows 2003, Windows XP and Windows 2000 all include built-in USB UPS support, similar to the built-in serial UPS support. When the USB cable is connected, the system will automatically recognize the APC USB UPS. This can be verified in the Power Options applet, as shown in figure 5 below.

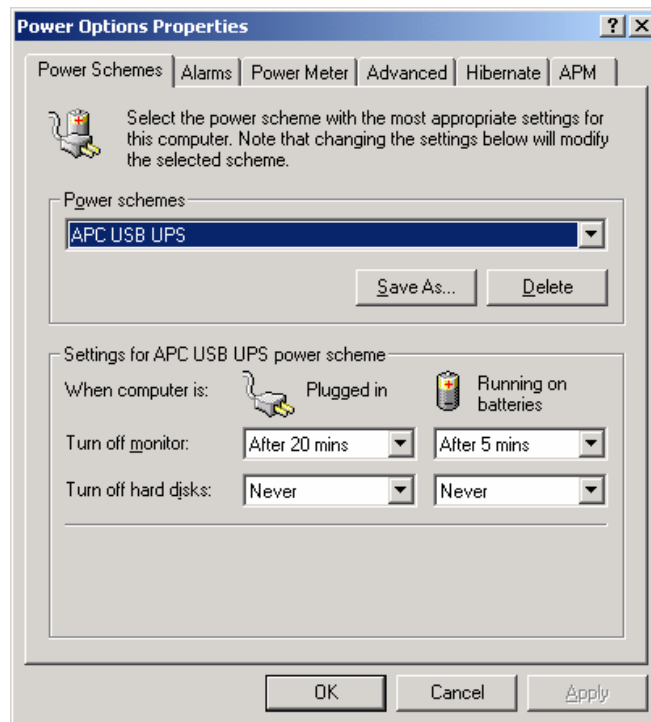


Figure 5 Power Options applet

The various tabs within the Power Options applet can be used to configure how the system will react to a power failure, i.e. what kinds of alarms will be sent, and when. One important configuration setting to note is within the Hibernate tab; the “Enable Hibernate Support” checkbox must be checked for file and data saving to occur.

The Alarms tab is where you will configure notifications and shutdown sequences in the event of an extended power outage.

The recommended configuration settings for Low Battery are notification via audible alarm and popup message when the battery reaches a 60% power level.

The recommended configuration setting for Critical Battery are notification via an audible alarm and popup message, and "Hibernate" for the power mode when the battery reaches a 50% power level.

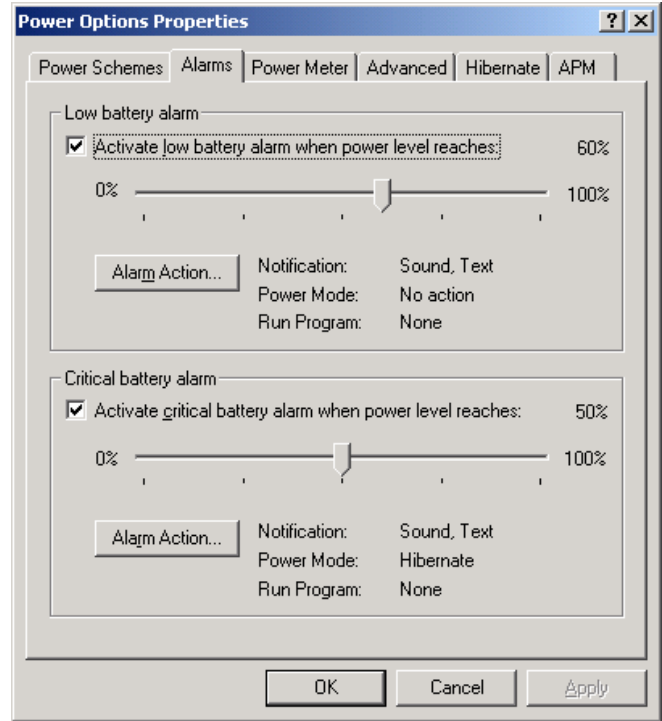


Figure 6 Alarm & shutdown configuration settings

The notification and power level settings for critical and low battery can be set by clicking on the appropriate Alarm Action button.

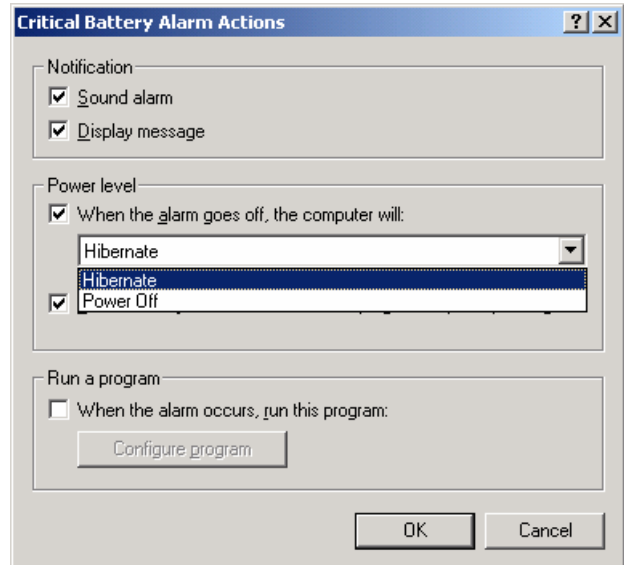


Figure 7 Alarm Action settings

APC's InfraStruXure™ is Windows Server 2003 Certified

The Microsoft "Certified for Windows" program is designed to improve customers' application experience on Windows Server 2003 and Windows 2000 Server. Its goal is to provide customers with the best possible application experience on those operating systems, and is focused on enterprise issues: availability, reliability, security and supportability.

APC's InfraStruXure (ISX) is on-demand architecture for network-critical physical infrastructure (NCPI). Fully integrating power, cooling and environmental management within a rack-optimized design, InfraStruXure's agile architecture dramatically reduces NCPI installation time while decreasing total cost of ownership.

Microsoft certified software and hardware components of APC's InfraStruXure's architecture for the Standard, Enterprise and Datacenter editions of Windows Server 2003. APC's PowerChute® Network Shutdown software for Windows and APC Network Management Card provide graceful shutdown of Microsoft Windows in the event of an extended power outage, completed rigorous testing resulting in the qualification of the entire architecture.

"We are pleased that APC has successfully completed this Windows Server certification program. With its focus on power back up, server rack enclosures, and software management, APC's InfraStruXure architecture has proven to be a critical component for ensuring a high availability Windows Server 2003 platform environment".

Jigish Avalani, Managing Director, US ISV Team, Microsoft Corp



Conclusion

Since power protection is critical to overall system availability, Microsoft and APC have fostered a long-term relationship to improve availability of all Microsoft operating systems, starting with initial UPS support in LAN Manager, following with NT4.0, Windows 2000, and with the co-development of the improved serial UPS support in Windows XP and Windows 2003. Going forward, APC will continue to be committed to maintaining our strong relationship with Microsoft and will continue to provide world-class products and support for our mutual customers.

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Dear Neil,

Thank you and everyone at APC for the excellent work you did in developing the built-in serial UPS Support for Windows XP. Given APC's record for producing excellent code during the development of the UPS control panel for LAN Manager 2.0 and for Windows 2000, it was a natural choice to offer an APC developed applet for Windows XP users.

Microsoft is delighted to include APC's industry-leading power protection expertise once again, this time as part of the Windows XP experience. APC's integrated support for reliable power protection and management in Windows XP provides users with a safe, simple and reliable power protection solution when they are using an uninterruptible power supply or battery backup system.

We are very pleased to have collaborated with APC over the years to co-develop optimal power management solutions for Microsoft customers.

Warmest thanks,

A handwritten signature in black ink, appearing to read "B. Valentine".

Brian Valentine,
Senior Vice President, Windows Division
Microsoft Corporation