



WindSock V1.1 - Windows Performance Analyser

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WindSock measures machine performance from the point of view of Windows. Windows performance is not merely a function of the CPU/Memory/IO speed of the hardware (although the faster the better), it also depends on the way your system is configured. This utility allows you to determine how well Windows is performing on your system, and how this compares to other systems. This help file also contains some suggestions for improving speed in various areas.

Please report any bugs/suggestions to Chris Hewitt on CompuServe ID 100036,133.

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Main Window

The initial screen which is displayed when you invoke WindSock shows several items of information about your hardware and software, and two speed indicators, a bar and a numeric LED, which indicate the relative speed of your CPU (the 'WindMark').

The information presented is: the CPU type, if a math co-processor is present, the base physical memory of the machine, the amount of extended memory available, the version of Windows being run, the current Windows Mode, the amount of Windows Heap currently Free, and the size of your swapfile.

The WindMark is an indicator of the general performance of your CPU (excluding floating point), larger numbers are better. The ^ marks below the speedbar indicate current (early '92) average performance figures for various motherboards based on Intel 80x86 CPUs. The speed is calculated every second, and is the number of test loops completed in 100ms. If you use your mouse or run another program while WindSock is active, this number will drop.

There are 5 control buttons along the bottom of the window. About, Help, and Quit are self-explanatory. VCTest tests your system's video and disk performance, then displays the results (this will take 5 seconds). SRM invokes another utility, WindSkRM, a system resource monitor.

More Information Window

This window shows you two sets of bars and LEDs representing the system's Video (screen) and Disk performance. The legend below the bars (Poor, OK, Good, Great) gives you some feel for what the numbers mean.

Video performance is tested by painting a weighted set of lines, bitmaps, and text using the Windows API. Your machine's video speed is determined by several factors: how fast your video card runs, your CPU speed, and memory caching.

Disk performance is calculated from the weighted result of three tests: physical (reading an uncached file then writing another on the default hard disk), cached (reading the file we just wrote), and tempfile (writing to then reading from your Windows tempfile directory). Disk performance is dependant on disk speed, hardware caching, and software caching.

These numbers will probably be quite low on entry-level and uncached machines under Windows 3.0. This is intentional, and allows for the impact of Windows 3.1, which boosts video and disk performance quite markedly, and 486DX-based machines which would be right off the scale otherwise. Moral: Upgrade to Windows 3.1 and buy a 486/33.

Windows 3.1 delivers a 10-15% improvement in video speed over 3.0 (depending on the application), and a 10% improvement in I/O speed (without SmartDrive). SmartDrive 4.0, which is included in the Windows 3.1 package, will double your I/O throughput if used with write caching turned on (the default). When using SmartDrive 4.0 cached writes, the figures for both video and disk speed will sometimes vary dramatically, because SmartDrive often decides to flush it's cache in the middle of the test.

CPU Performance Considerations

Windows 3.0 is a lot slower than DOS for most applications. There is nothing much that you can do about this other than buying a faster machine. A 386SX/20 should be OK for a normal Windows user (Word processors and spreadsheets), if you have a 286, you should be seriously thinking of upgrading.

Another option is to upgrade to Windows 3.1 (if you are a Windows 3.0 user). Windows 3.1 includes a lot of tuning in the API, and you should see a dramatic improvement in video speed and general application performance. This performance improvement is not reflected in the WindMark CPU speed figure, because this measures the raw machine CPU performance. Since most Windows CPU usage is by video API functions (it is a GUI after all), the change in the video performance figure between 3.0 and 3.1 will be your most accurate gauge of CPU improvement. This will probably be a 10-15% improvement, although applications that were slow because they spent a lot of time doing video API stuff may seem to go **much** faster.

Due to the overheads of the Windows API, CPU speed also has a significant impact on your disk and video performance. This is especially true of machines which have SRAM cache which will deliver much better performance than an uncached machines with the same speed CPU.

Memory Size and Allocation

You should have at least 2MB of memory to run Windows. Adding more memory (at least 2MB) is a good idea, because you can use it as a disk cache with SmartDrive or some other disk caching software.

Memory usage is the most critical factor in windows performance which you can control (memory speed is probably more important, but you can't fix that short of getting a faster machine). Your major control is over the Size of the SmartDrive.

Typical SmartDrive assignments for various memory sizes (Windows 3.0 only) would be:

Memory	SmartDrive Size	Minimum
1MB	384KB	256KB
2MB	1MB	512KB
4MB	2MB	1MB
8MB	2MB	1MB

i.e. for an 8MB system use: "DEVICE=SMARTDRV.SYS 2048 1024" in CONFIG.SYS

Performance improvements from a larger SmartDrive cache size are usually minimal after 2MB. The actual optimum cache size for your machine is dependant on your application load. Experiment with various sizes to determine the best size for your machine.

Windows 3.1 users should probably accept the default SmartDrive configuration. At this release (4.0) SmartDrive has a tendency to lock your system if you let it have too much memory. The default configurations (for 4.0) are about half of the sizes I have suggested for Win 3.0. Experiment by all means, but not with important files open!

Many Windows applications use temporary files. These are usually placed in the directory identified by the TEMP environment variable. This directory should be on your fastest hard disk, or if you have enough memory (4MB or more), in a RAM disk. 256KB is usually enough for a RAM disk, assigning more may result in unnecessary swapping when your applications run out of real memory. Microsoft suggests not using a RAM disk at all unless you can think of a good reason why you should, because SmartDrive (especially SmartDrive 4.0) may actually be faster than RAMDrive especially when using 'look-ahead' buffering techniques (the default).

To set TEMP directory:

In AUTOEXEC.BAT use: "SET TEMP = C:\TMPFILES"

To setup a 256KB RAM disk:

In CONFIG.SYS use: "device = c:\windows\ramdrive.sys 256"

If you have Expanded memory, you can convert it to Extended memory (which windows uses) with the appropriate software.or hardware switches.

You should create a permanent swapfile if you require extra virtual memory to run applications in Enhanced 386 mode. If you are using a swapfile you should still use a reasonable amount of memory for the disk cache. If you do have enough real memory for your applications to run, you should use Standard Mode which is faster than Enhanced 386 mode.

Disk Considerations

Windows uses your hard disk intensively. Windows programs tend to be large, and application programs often use tempfiles. In 386 Enhanced mode the disk may be heavily used for application swapping. Use Standard mode if you have enough real memory. You should use disk caching software to minimise actual disk accesses. See under Memory Tuning in this help file for recommended SmartDrive sizes.

A caching disk controller card will improve your system's performance, but it is usually better to spend your money on extra extended memory which can be configured as either Heap or disk cache.

If you are experiencing very poor application performance due to disk I/O, you should consider using caching software or hardware which allows disk **writes** to be cached (most only cache reads). SmartDrive 4.0 (which comes with Windows 3.1) has this capability (in fact it is the default). This option is dangerous because updates to the disk may not be completed if your system crashes.

If you have any difficulties with SmartDrive 4.0 write caching use:

```
SMARTDRV.EXE C D
```

in your AUTOEXEC.BAT file to turn off write caching while maintaining read caching (in this example for the C and D drives).

Warning

When you have Windows 3.1/SmartDrive 4.0 write caching enabled, always use the following command to flush the write buffers before turning off your machine:

```
SMARTDRV /C
```

Video Tuning

Video speed is dependant on the speed of your CPU and video card. Some systems allow video BIOS to be placed in high conventional memory (640KB-1MB), or to be cached with fast RAM. Use these options if you can.

Some video cards implement common Windows video functions (BitBlt, TextOut etc.) in hardware. These cards improve video speed dramatically, but care should be taken to ensure that your hardware will support future versions of Windows.

If you are using higher display resolutions (800x600 etc) or more than 16 colours, you may notice that your video slows down quite a bit (depending on the card).

Windows 3.1 is 10-15% faster than Windows 3.0 on video I/O (depending on the driver). The standard drivers for Windows 3.1 are also improved, especially the Video7 drivers which now run 256 colours without noticeable performance degradation. If you are thinking of buying a new system or upgrading your video card, you might like to specify a Video7 card, because the new drivers always seem to come with the new Windows releases.

Base Physical Memory('Real' memory):
Usable memory below 1MB as determined by the BIOS POST routine.
Usually limited to 640KB.

Extended Memory:

Extra (above 1MB) conventional memory installed on your system, usually on the motherboard. Windows comes with HIMEM.SYS which manages extended memory. Some machines can utilise memory between 640KB and 1MB as extended memory..

Expanded Memory:

Extra memory available via an expanded memory manager. Often installed on a special card.

Windows comes with a driver, EMM386.SYS, which manages expanded memory. Expanded memory can be converted to extended memory for windows use. Check the manual for your expanded memory board or software.

Windows Mode:

Windows can run in 3 modes: Real, Standard, and Enhanced.

Real mode uses the base physical memory ('real' memory) of the machine, it can also utilise Expanded memory.

Standard mode uses base and extended memory. Windows runs faster in Standard mode than in Enhanced mode.

Enhanced mode requires a 386 or 386SX machine with 2MB of memory. Enhanced mode allows you to use a swapfile (virtual memory).

Heap:

The memory available to Windows to run applications, includes base, extended and virtual memory

Swapfile:

A disk file used as virtual memory in Enhanced 386 mode

tempfile directory:

The directory identified in your environment as TEMP. Usually defined in AUTOEXEC.BAT as TEMP=C:\WINDOWS\TEMP or some other directory

cache:

Memory used as a temporary store for information from slower memory or disk.

Motherboards may have fast cache memory to improve access time to main memory. Software like SmartDrive allows memory to be used to improve disk performance. Some disk drives have integral cache to improve their performance, and disk controller cards are available which include CPUs and memory to boost the speed of attached disk drives. Caching is a generally good idea, see under Disk tuning in this help file

SMARTDRV.SYS:

SmartDrive is a disk caching program supplied with Windows. It is added to your CONFIG.SYS file (or AUTOEXEC.BAT for Win 3.1) automatically by the Windows install program.

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