WindSock V3.03 - Windows Performance Analyser

FreeWare by Chris Hewitt, CompuServe 100036,133   Copyright (c) 1992 Technical Pixies

WindSock measures your system's performance from the point of view of Windows. It uses Windows API calls where appropriate, measures the speed of the CPU, video, disk, and memory, and displays an overall Windows performance index for your machine.

WindSock 3.0 also allows you to determine the iCOMP (tm) index of your machine, and can use the iCOMP index as an alternative to the WindSock CPU index.

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

Major Topics:

Displays, Controls, and Options   FreeWare License

Known Bugs/Incompatibilities   WindSock Sim

Error and Warning Messages   Common Questions and Answers

Release Notes

Tests and Dialogs:

CPU performance   CPU Dialog

Video performance   Video Dialog

Disk performance   Disk Dialog

Memory performance   Memory Dialog

Windows performance   Windows Dialog

Tuning for Windows:

CPU   Video

Disk   Memory

✔ Optn   **WindSock Options**

The WindSock Options Dialog controls various option settings for WindSock.
These settings are saved in a WINDSOCK.INI file in your windows directory.

Check Boxes:

iCOMP Index
When this control is checked, the CPU index shown is an approximation
of Intel's iCOMP (tm) CPU speed index.

Test at Launch
When this control is checked, all the tests will be run as soon as WindSock
starts. Caution: The 'startup figures may be slower than usual due to the
interaction of the tests with the program startup.

Float on Top
When this control is checked, WindSock will 'float' above any other window on
the screen (both as an Icon and a Window).

Wave Logo
When this control is checked, the 'Sock' logo is animated when WindSock
is running as an Icon. The TPIX logo in the About dialog is also animated.
Turn this off if you find it distracting.

Use Win Clock
If this control is checked WindSock will use the Windows 'GetTickCount'
function rather than the PIT clock. If GetTickCount is in use, the tests
will run for 2-3 times as long, and the CPU test will no longer be performed
automatically (you will have to click on the CPU indicator each time) use
this option only if using the PIT clock causes problems on your system.

Total BIOS Scan
On some systems the BIOS scan which identifies system and Video BIOS
information may not pick up your system's ID. If this happens, switch this
option on, and a full scan of BIOS memory will be used (this is slower).

Other Options (in WINDSOCK.INI):

Dates DD/MM/YY
changing Date DD/MM/YY=0 to =1 will cause any dates in the program to
be displayed in European format (this switch is especially for John Howells).

. Disk Reset
This switch defaults to 1 (on), and causes a Disk Reset to be performed after
a disk test. This flushes the SmartDrive buffer, and allows another test to be
performed without the old test data remaining in the buffer, which would give
incorrect results. You can switch this off if Disk Reset causes problems on
your system, but only the results of the first test you perform will be valid.

SmartDrive Commit
This switch defaults to 0 (off). If your disk test results vary greatly, or look too
high, you can try changing this to 1 (on). This will cause a SmartDrive Commit

command to be issued before the disk test to flush the buffers. This option is only for systems with SmartDrive installed.

Start Iconic
If this switch is 1 (on) WindSock will launch as an icon rather than as a full window.

Test CPU Every n Seconds:
This control allows you to set the interval at which WindSock measures the CPU Index of your system. This figure can be set between 1 and 60 seconds. This is a 'Spin' control: click on the up arrow to increase, and the down arrow to decrease the value.

Test CPU for n Milliseconds:
This figure controls the length of the CPU Index test loop. Shorter tests use less resources, but may give unstable (changing) results. The test may be varied between 100 and 900 Milliseconds. This is a 'Spin' control: click on the up arrow to increase, and the down arrow to decrease the value.

 Save Test Data

This Dialog enables you to comment and save test information. The results of your latest test are saved in a file called WINDSTAT.TXT in the directory that WindSock was run from. This is especially useful if you are carrying the utility around on a floppy to evaluate systems.

Before you save the test data, perform the Video, Disk, and Memory tests several times until you are happy with them (they may vary in certain circumstances), then allow the CPU figure to stabilise. Set the CPU test interval to 4 or 5 seconds, wait for a test to complete, then push the save button. The test results are displayed, along with a comments field which allows you to annotate the test results. Push the OK button to append the new test data to the file.

Note: In version 3.03, when using the 'Win Clock' option, the CPU test will not be performed automatically - you will have to click on the CPU indicator bar each time. Also the test results will be much less stable with this option turned on - perform each test several times to get a feel for the 'correct' figure.

If you are using the iCOMP (tm) CPU index, this will be noted in the Save Dialog, and the composite parts of the iCOMP index (16 bit integer, 32 bit integer, and floating point) will also be written to WINDSTAT.TXT.

You may edit the WINDSTAT.TXT file yourself at any time.

Displays, Controls, and Options

The window which is displayed when you invoke WindSock shows five speed indicators, each consisting of a bar and a numeric LED, which show the relative speed of your CPU, Video, Disk, Memory, and Overall Windows performance. When the program is running minimised (as an icon) the CPU speed figure is displayed on the icon.

Context help is provided in a field at the bottom of the window. When you move your mouse over any control or data object a brief description of the object will be displayed

The buttons along the top of the window control various program functions, these are:
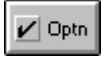
Displays information about Windsock.

Invokes Windows Help for WindSock.

Starts the save dialog, which allows you to save test information to disk.

Starts the options dialog, which allows you to change various program options.

Halts execution and exits from the program.

All main window commands are available when the program is minimised in the window's system menu. In order to use this menu, click once on the icon

The data area of the window is divided into five areas, each indicated by a button/icon. Each button, when clicked, invokes a dialog which will show you information about that aspect of your system. In order to perform a particular performance test immediately (or all tests in the case of the Overall Windows area), click on the indicator bar (sunken area) next to the appropriate button.

Note: In version 3.03, when using the 'Win Clock' option, the CPU test will not be performed automatically - you will have to click on the CPU indicator bar each time.

Click on the names below for details on the performance indicators, and the information presented in the related dialogs.

CPU performance   CPU Dialog

Video performance   Video Dialog

Disk performance   Disk Dialog

Memory performance   Memory Dialog

Windows performance   Windows Dialog

CPU Performance

The area to the right of the CPU button contains an indicator bar which shows the relative performance of your CPU, and an LED display which quantifies the speed as an index number. The CPU index tells you how many times WindSock managed to perform the CPU test in 100ms. The WindSock CPU test loop contains a balanced mixture of non floating point instructions, typical of those found in an 'average' program. If you move your mouse or run another program while the test is being performed, it may slow down significantly.

A scale under the performance indicator bar shows a '^' at the points on the indicator that I expect various Intel-based CPUs to register. If you point at these indicators, the machine types related to these indexes will be displayed in the MicroHelp field at the bottom of the main window.

In version 3.0 you may specify (in the Options dialog) that the iCOMP (tm) CPU index be used instead of the WindSock Index. If you are using the iCOMP test the characters '(i)' will appear on the right side of the CPU indicator bar. This index is scaled to be approximately the same as the WindSock index (on the display), although iCOMP includes floating point instructions, so there will be a difference between systems with x87 FPUs and those without.

The CPU index is tied fairly closely to the speed of the hardware (CPU/Cache), but it may be slightly higher when you are running Windows in Standard mode rather than in Enhanced mode (in a virtual 8086). If the figure varies, or seems too low, try changing the 'test for n Milliseconds' figure in the Options dialog.

Overlaying the CPU indicator bar are two extra pieces of information: the CPU type (as determined by Windows), and the maximum speed of the system clock in Mhz. This figure is the internal speed of the CPU, not the speed of the motherboard (which will be different in the case of DX2 and Overdrive CPUs).

As to what constitutes a 'good' CPU performance figure, well that depends on what you want to do with your system. A 386SX/20 has an index of 80, and is quite fast enough for most common Windows applications (word processing/spreadsheets etc.). More specialised applications may require a faster system, I use a 486DX/33 (index 250) for Windows development, and a 486DX2/66 (index 450) for NT development. A 386DX/33 (index 150) is now the standard 'entry-level' machine. The following are the results that you can expect from various Intel CPUs (If you have a non-Intel CPU, please send me your test results - I am very interested!).

CPU	WindSock	iCOMP	
386SX/16	65	22	
386SX/20	80	32	
386SX/25	100	39	
386SL/25	110	41	
386DX/25	115	49	
486SX/16	120	63	
386DX/33	150	68	
486SX/20	150	78	
AMD386/40	185	85	*
486SX/25	185	100	
486DX/25	190	122	
OverDrive/16	200	132	
486SX/33	245	136	

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486DX/33      250          166
OverDrive/20  250          166
OverDrive/25  315          231
486DX2/50     350          231
486DX/50      380          249
486DX2/66     450          297
```

Notes: These figures are for Windows **Standard** mode.
The iCOMP figures are the official Intel Index numbers.
* Non-Intel CPUs as reported by WindSock ('WiComp')

 CPU Dialog

The CPU Dialog presents the following information about your System:

Name
The name of the Manufacturer of this motherboard, or if that cannot be determined, the name of the BIOS manufacturer, or blank if unknown. If the system name is unknown, try turning on the 'Total BIOS Scan' option.

BIOS
The name of the manufacturer of the system BIOS, or blank if unknown. Use 'Total BIOS Scan' if the BIOS name is unknown. If you still do not get a result, and have access to CompuServe, I would appreciate it if you would send me a message and tell me what BIOS your system has.

Date
The date that the system BIOS was manufactured, or blank, or (possibly) garbage if the BIOS date is not at the usual location.

Math CPU
The generic name of the math CPU (80x87), or 'Not Installed' if no Math CPU is present.

 Video Performance

This area consists of an indicator bar and an LED which represent your system's video (screen) performance. Initially the video index is zero. To run this test, click on the video indicator bar. The test will last 3 seconds. A comment will overlay the indicator bar on the completion of a test, giving you some feel for how this systems stacks up. The index values for each level are:

Poor	0-29
OK	30-89
Good	90-209
Great	210-449
Superb	450 and up!

The test is conducted by painting a weighted set of lines, bitmaps, and text using the Windows API. The index is the number of test loops that were completed in 3 seconds. Your machine's video speed is determined by several factors: how fast your video card runs, your CPU speed, the driver that you are using, the version of Windows, and memory caching.

The video index figure may vary between tests due to other system activity that occurs while the test is running. Perform this test several times in order to get a feel for the comparative speed of the system.

Video Dialog

The Video Dialog presents the following information about your video subsystem:

BIOS
The name of the Video BIOS, or blank if unknown. If the BIOS name is unknown, try using the 'Total BIOS Scan' option to look for the Video BIOS name in less obvious locations.

Model
The model number of your video card, or blank if it cannot be determined.

Version
The version number of your video BIOS, or blank if this cannot be determined, or garbage for some cards (one algorithm doesn't fit all - sorry).

Driver
The name of the Windows video driver being used. This is the name of the .DRV file in your Windows/System directory that is being used.

Driver Version
The Windows version number of your video driver.

Driver Name
The full name of your video driver (on a line by itself).

Pixels
The number of pixels (X*Y) that the driver supports.

Colors
The number of simultaneous colors that the driver supports.

Disk Performance

This area consists of an indicator bar and an LED which represent your system's disk performance. Initially the disk index is zero. To run this test, click on the disk indicator bar. The test will last 3 seconds. A comment will overlay the indicator bar on the completion of a test, giving you some feel for how this systems stacks up. The index values for each level are:

Poor	0-29
OK	30-89
Good	90-209
Great	210-449
Superb	450 and up!

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.

The disk index figure may vary between tests due to other system activity that occurs while the test is running. Perform this test several times in order to get a feel for the comparative speed of the disk subsystem.

If you are using SmartDrive with write caching turned on, the whole problem of what is and what isn't in the cache gets much more complicated, and the Disk index figure varies much more. It is interesting to watch the internal workings of the cache. The write buffers tend to get in the way of the read buffers to   some extent and the cached read component of the test actually gets quite a bit slower (the write of course speeds up dramatically). Buffer flushes sometimes happen when you are re-running the test (or even the other tests), causing these figures to vary.

In a way write caching is just putting off till tomorrow (well for 5 seconds anyhow) what we used to do today. I would suggest that you test with read caching only, but it's up to you! The WindSock disk test issues a Disk Reset after it runs. This will cause a buffer flush for systems with SmartDrive, and possibly for other caching software/hardware.

 Disk Dialog

The Disk Dialog shows the name of the drive that is being used for your TempFile directory. The remaining part of the window shows size and usage of up to 6 disks (all that there was room for).

Windows Performance

This area consists of an indicator bar and an LED which represent your system's overall windows performance. This is a composite index made up from the results of all the other tests. This figure will be zero until all other tests have been conducted. If you click on the indicator bar, all the tests will be performed. The value is overlayed by a comment which aims to give you some feeling for how your system stacks up as a Windows platform. The comments and scores to which they relate are as follows:

Poor	0-29
OK	30-89
Good	90-209
Great	210-449
Superb	450 and up!

The composition of the index is:

CPU Speed	40%
Video Speed	20%
Disk Speed	20%
Memory Speed	10%
Memory Size	10%

The memory size figure is determined when WindSock starts, and displayed in the Memory Dialog.

Windows Dialog

The Windows dialog shows you the following information about the Windows environment that you are running:

The **versions of Windows and DOS** that you are running. Different versions will give different results for the video and disk tests.

The **Windows Mode** that you are using. This will either be Standard or Enhanced (BC++ programs do not run in Real mode). Again, the mode that you are using will have an impact on the results of the tests. Standard mode is faster.

The **status of the swapfile**. In Standard mode the swapfile is inactive (not used).

Windows Directory
The name of the directory from which Windows is running.

Kernel
The name of the Windows kernel that is being used currently.

Shell
The name of the shell that is executed by Windows at startup.

Memory Performance

This area consists of an indicator bar and an LED which represent your system's Memory transfer performance. Click on the indicator bar to perform this test. The indicator bar will be overlayed by a comment which aims to give you some feeling for how good your system's memory transfer rate is. The comments and scores to which they relate are as follows:

Poor	0-29
OK	30-89
Good	90-209
Great	210-449
Superb	450 and up!

The actual rate achieved (in MB/Sec) is displayed in the Memory Dialog.

If you do not have enough real memory available to 'swamp' the system's SRAM cache, a warning will be displayed. In this case, the memory figure will be suspect, close some applications and try again.

Memory Dialog

The information displayed is:

Base Memory
The amount of memory below 640KB reported by the BIOS POST routine (usually 640KB).

Extended
The amount of extended memory available, as reported by POST.

Size Index
An index related to the size of your physical memory. This number contributes 10% towards the overall Windows performance index. The 'value' of your memory is scaled so that the first few megabytes are more important than the later ones: 16MB is **not** twice as good as 8MB. There is no 'feel' scale for this index, but 1MB works out as 'Poor' and 4MB is the start of 'Good'. You need something over 64MB to qualify your memory size as 'Superb'.

Transfer Speed
The number of Megabytes per second achieved by the memory transfer rate test. 'Not Tested' if this test has not been conducted.

Memory transfer rates expected for various CPU types (with no wait states) are:

386SX/20	4.7MB/Sec	
386DX/25	9.3MB/Sec	(if cached)
486SX/25	9.9MB/Sec	
386DX/33	11.5MB/Sec	
486DX/33	11.5MB/Sec	
486DX2/66	11.5MB/Sec	(33Mhz Motherboard)

The memory transfer speed is related closely to the MHz rating of the motherboard. If your system performs significantly worse than this, check that your motherboard is running at full speed, and that your memory is fast enough to function with 0 wait states (is the speed recommended for your motherboard). When running at 1 wait state, the memory speed will be halved.

Note: Many people have reported unexpectedly low memory transfer rates on their systems (with no known wait states). There appears to be a problem with some motherboards and **IDE controllers** - when certain motherboards have IDE controllers installed, their transfer rates drop alarmingly!

Swapfile Size
The size of the swapfile (permanent or temporary) if running in Windows Enhanced mode, or the size of the permanent swapfile if running in standard mode (when the swapfile will not be active).

Common Questions and Answers

If WindSock is so good, why is it free?

WindSock is free in order to achieve the widest distribution possible. WindSock is the basis for a shareware product called WindSock Sim (Windows Performance Simulator). Sim uses the data gathered by WindSock to allow it to predict the Windows performance of various hardware and software combinations. I will continue to upgrade WindSock in response to feedback from users. Upgrades will be available every 3 months, usually showing up on the CompuServe WINADV forum first (3.1 is due 1 Feb 93).

What other Software do you make, and where can it be found?

Actually, I write mainframe system software (including system monitoring software) for a living, and write Windows code as a hobby, but under the 'Pixie' label are currently:

> **WindSock**
> Performance Analyser, Current release 3.03, release 3.1 due 1 Feb 93.
>
> **WindSock SRM**
> Resource Monitor, Current release 1.4, release 3.0 (looks like this) due 1 Jan 93.
>
> **WindSock Sim**
> Performance Simulator, Currently alpha, release 3.0 due 1 Feb 93.
> (note: release 3.0 will be the first release publicly available - a beta test release of Sim will be available by 1 Jan on WINADV).

All of these programs are Freeware. If you are on CompuServe they can usually be found on WINADV or ZENITH forums, keyword 'WindSock'.

As well as the (demo) Freeware release of Sim, It will also be available as shareware, or possibly shrink wrapped, bundled with the other utilities, and including information on the performance characteristics of most popular hardware currently available. Anyone who is interested in publishing or distributing this package should contact me on [100036,133].

I have an amazingly fast/expensive disk drive/controller/video card, but my 386/20 still gets 'Poor' performance on the Disk, Memory, and Video tests - why?

Because the CPU is too slow for a better result. The video test uses the Windows API to write to the screen. The API calls use up CPU time, hence the faster the CPU, the better the video performance (although on the same machine, a good card will still give you better performance). Fast cache memory on the motherboard will also boost video performance, and faster machines generally also have SRAM cache.

The disk test is less sensitive to CPU speed, but it is weighted towards systems with lots of fast cache memory (which is a very good thing for a Windows application). A faster CPU usually has more and faster memory.

The Memory speed depends on the speed of your motherboard and on the number of memory wait states (i.e. the speed of your memory chips). A wait state can ruin your day, so make sure that you install memory that is recommended for your motherboard by the manufacturer. Care should also be taken to buy new memory from a reputable dealer, because there have been cases of memory being labelled misleadingly.

What is the best thing that I can do to make Windows run faster on my system?

There are three important facits to Windows performance: CPU, CPU, and CPU. Although it is generally accepted that an accelerated video card is a very good idea, from my observations the speed of the CPU has much more impact. You should buy the fastest CPU that you can afford, even if that means going for a cheaper video card.

The same goes for disk caching hardware. Investing the same amount of money in a faster motherboard and more memory (which can be used by SmartDrive) will give you better disk performance. I know several people with cached disk controllers (including myself), and they all say that when SmartDrive is on (given that they have sufficient memory), it makes very little difference to the speed of the system.

External cache on the motherboard also helps, as does large amounts of memory, try to get at least 256KB cache on your motherboard, and 8MB of RAM to start with. Ensure that you can upgrade your memory to at least 32MB - you will need it one day.

A fast video card should be next on your list, you can get very fast cards with Windows accelerators for little more than the cost of a normal VGA card - most PC magazines rate video cards regularly. You should probably go for the 'fastest cheap' accelerator card - unless you have a specific requirement for the absolute best.

There is little that you can do to tune Windows from the software side. Ensure that you have the latest (normally fastest) Windows drivers for your video card - these are often available on BBSs or direct from the manufacturer. Don't make your SmartDrive too large - 2MB is usually enough.

What does each test consist of?

The CPU test is a loop with a 'typical' mixture of instructions. The test uses the real time clock for greater sensitivity. It waits for the clock to hit zero, performs the test loop, then finds out how many ticks have passed since the test began. It runs this test as many times as it can in the test interval, then uses the average number of ticks to work out how many tests could have been carried out in 100ms. This figure is the CPU index (all the tests use our own RTC 'GetTickTime' function rather than GetTickCount). The CPU test loop does not contain any floating point instructions, so it does not test the math co-processor at all.

When you use the iCOMP option, a set of three tests is carried out: Integer, Long, and Floating point, and the CPU performance index is calculated using a modified form of the iCOMP algorithm. This will test your math co-processor if you have one.

The video test creates a new window, then loops for 3 seconds, writing a weighted set of lines, small bitmaps, and text to the window. The index is the number of sets that were written in that time. These are the most common video API instructions in Windows applications.

The disk performance index 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). Each test is run for 1 second, then the number of 1k blocks read/written by each section is then 'kludged' by a weighting algorithm to give the result.

The memory test allocates up to 1MB in 64KB chunks, then cycles for 2 seconds copying memory around. This should 'swamp' up to 512KB of SRAM cache, and give you a fairly accurate picture of the transfer speed of your system. A system with 1.2MB or more of SRAM cache deserves the extra points it will score (probably 999!).

In general the philosophy of this product is to be 'environmentally friendly'. None of the tests alter the normal running if the machine or disable interrupts or anything like that. Because of this tasks which happen in the background (TSRs, SmartDrive, drivers etc.) can have an impact on the test results, so don't use the mouse or do anything else while the tests are running.

Why do the test figures change from release to release?

I have attempted to change the tests as little as possible from release to release, but I am also trying to improve the quality of the testing. There have been problems with several tests at various times, as far as I know the 3.0 release solves all of them.

The policy is that any change in the test results will be indicated by a change in the major version number. You will be able to compare 3.0 to 3.1 results, but not to 2.x results. The main reason for the jump from version 2.0 to 3.0 was the introduction of the iCOMP test, which caused changes in the way that the CPU figures are calculated.

Note: In version 3.03, due to the introduction of the 'Win Clock' option, the segment alignments of the various tests have changed. Your test results may vary slightly from the 3.02 tests. If you are using the 'Win Clock' option, you will also notice that the results are slightly different from the PIT clock (normal) results - this is because the Windows GetTickCount function is less accurate than the PIT clock.

Why are most of the strings in this program actually bitmaps?

This is to enable the strings to be translated into Kanji/Kana. The bitmap/strings are 16 pixels high, which is just big enough for the smallest Kanji font. Translation of the strings into other languages can be performed using a resource editor. This scheme would also allow fairly simple translation of the constant strings into Arabic, Hieroglyphs, Cuneiform, or even Linear B!

In recognition of the fact that most of the world does not speak English, the main window display (icons, indicators, LEDs etc.) is designed to be mostly 'language free'. The program is also (almost) Keyboard free, partly for the same reason, but mostly because you have to be crazy or desperate to try running Windows without a mouse.

Note: **Hieroglyphs** ('priestly writing')- Early form of WingDings,
        the only language ever to consist entirely of puns.
        Cuneiform - First language that 'Even a manager could write'.
        Linear B - Job creation scheme for Philologists,
        something like well-aged S/360 Assembly Code.

WindSock Sim (Windows Performance Simulator)

WindSock Sim is a Windows utility that uses data gathered by WindSock to predict the performance characteristics of various machine configurations **before** you buy or upgrade.

Sim allows you to visually create a system configuration, including motherboard, memory, video card and monitor, disk controller, drives etc. and estimates the Windows performance of this system in terms of WindSock test results. You can even add prices to the database to allow you to determine the most effective system for your money.

The WindSock Sim program and demo database are free. The full database will be available for a moderate fee, and will be updated quarterly to allow for new hardware and software releases.

The initial release of the program, WindSock Sim 3.0 (the release numbers will track the WindSock releases used to gather the data, appearing approximately 3 months later) will be available in early February 93. Ordering information for the database will be included with the program documentation. Companies that are interested in distributing the database can contact us on CompuServe or at the address below.

What appeals to me most about Sim is that the software is free, but the information is expensive! This is the way the business is moving. Anyone can write a good Windows program with the tools now available, but gathering, analysing, and factoring the data is much harder. You will be able to use WindSock to check the results (i.e model your current system!), so the simulation has to be accurate.

In order for this product to work, statistically meaningful amounts of data are required for thousands of different machine configurations. Anyone who provides complete and accurate (i.e. useful) data on 5 or more different system configurations will receive a **free copy** of the database. By different configurations I mean various combinations of motherboard, video card, disk drives etc. (the software part is easy to factor). Results which fall outside standard deviations will be rejected, so throw in a few extra sets for luck.

Data on Proprietary Japanese systems (NEC, Fujitsu etc.) would be very useful, and I would like to hear from people using **non-Intel** Math Co-Processors and CPUs.

The data required is the WINDSTAT.TXT (iCOMP CPU please) results of your tests, annotated to include:

> - The system manufacturer.
> - The name, type and BIOS of the motherboard.
> - The amount of SRAM (external) cache.
> - The amount and speed (in nanoseconds) of the memory.
> - The manufacturer, model, and BIOS date of the Video card.
> - The manufacturer and model of the screen
> - The manufacturer and model of the disk drive tested, and the controller

The following is an example of the sort of data needed. If you don't have all this information, just try your best.

WindSock 3.03 Performance Test Results

Comments: Handmade by Pixies, for Pixies

Manufacturer: Technical Pixies
MotherBoard: NS-486/3, ABC Computer, AMI BIOS
SRAM cache: 256KB (30ns)
Memory: 8*1MB SIMMs, 70/80 ns mixed (with a wait state!)
Video: Video7 1024i 512KB, Headland BIOS
Screen: Compaq VGA
Disk: Maxtor 120IDE, 12ms, Miniscribe AT Controller

Test Conducted at 00:44:45 on 11/4/92
Processor: 486DX/33+FPU (CPU index is iCOMP)
System Inf: ABC Computer, American Megatrends
Video Inf: Video Seven, 1024i, 2.17,
             Size: 640x480 Colors: 256
iCOMP: Int 16 (67%) 135 32, Float (8%) 498 26,
             Int 32 (25%) 153 28
Memory: Base 640KB, Extended 7168KB,
             Size Index 172

Environment:	Windows 3.0	Standard Mode		CPU	Video	Disk	Memory	Overall
	DOS 5.0	Swapfile Inactive	168	130	214	119		197

You can send your data to the following addresses:

CompuServe: [100036,133]

Snail Mail:

        Technical Pixies
        25 Coleman St,
        North Fitzroy,
        Victoria 3068,
        AUSTRALIA

Progress report:

As of 07 Dec the Sim product is on track for a 1 Feb release. A Beta should be available on WINADV by 1 Jan. The program is looking **very** slick, and I think that you will be pleasantly suprised!

Some individuals are sending in data, but a lot more is needed - I expect that the Beta will result in a lot more interest. Luckily several corporations have sent in test results for all/many/most of their machines, so it looks like a reasonable database will be available for the initial release.

The iCOMP (tm) index

(iCOMP is a trademark of the Intel Corporation)

iCOMP stands for Intel COmparative Microprocessor Performance. The iCOMP index has been developed by Intel as a standard way of measuring the relative speed of various processors.

The iCOMP index is based on an analysis of the execution profiles of the most popular current and future applications. Intel then ran suites of test programs which approximate these workloads, and summed up the results as an index number, based on the performance of a 486SX/25 being 100.

The 'iCOMP' index implemented by WindSock is not the same as the official iCOMP index, because it does not use exactly the same tests. The WindSock iCOMP index (WiCOMP) is an approximation of the official iCOMP test.

The official iCOMP index numbers (and their WindSock equivalents) are:

CPU	WindSock	iCOMP	
386SX/16	65	22	
386SX/20	80	32	
386SX/25	100	39	
386SL/25	110	41	
386DX/25	115	49	
486SX/16	120	63	
386DX/33	150	68	
486SX/20	150	78	
AMD386/40	185	85	*
486SX/25	185	100	
486DX/25	190	122	
OverDrive/16	200	132	
486SX/33	245	136	
486DX/33	250	166	
OverDrive/20	250	166	
OverDrive/25	350	231	
486DX2/50	350	231	
486DX/50	380	249	
486DX2/66	450	297	

Notes:

* Non-Intel CPU as reported by WindSock ('WiComp');

As WindSock 3.0 has not been tested against all possible combinations of CPU/FPU, the results you get may vary from those expected. If your results vary significantly from the standard results presented here, and you have access to CompuServe, please mail me your test results from 'WINDSTAT.TXT'.

The WiCOMP test was tuned to the iCOMP index using a range of Compaq machines (M series) as the test beds (i.e. for this index a Compaq 486s/25M = 100). The older 'E' series machines returned generally worse results.

The 'WindSock' figures in the previous table refer to the standard WindSock CPU test (iCOMP option off), which is integer only. These should be broadly comparable with WindSock 2.0 CPU results.

Error and Warning Messages

Error and Warning messages are displayed in red in the MicroHelp field at the bottom of the Main Window. These messages disappear after a few seconds. The following is a description of the possible error and warning messages and their meanings:

E001 - Unable to Allocate Buffer for Mem Test

WindSock was unable to allocate sufficient free memory on your system to run any sort of meaningful memory speed test. Close down some applications and try again.

E002 - Very Low Memory, Mem Test Aborted

WindSock was unable to find sufficient free memory on your system to run any sort of meaningful memory speed test. Close down some applications and try again.

E003 - WINHELP.EXE not found

WINHELP.EXE (Windows Help) was not in your system path. Check that this EXE file is available (it is usually in the Windows root directory).

W001 - Low Disk Space, Disk Test Unreliable

Less than 1.5MB of disk space is available on your Tempfile Disk (see Disk Dialog to find out which one that is). The test is still run, but the results may be higher than expected, because WindSock was unable to 'swamp' your disk cache. Delete or move some files from this disk and try again.

W002 - Low Memory, Memory Test Unreliable

Less than 1MB of free system memory was available to run the memory speed test. The test is still run, but the results may be high because WindSock was unable to 'swamp' the SRAM cache on your motherboard.

CPU Performance Considerations

Windows 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.

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 video and disk performance than an uncached machines with the same speed CPU.

The Speed of the CPU is the most important factor that impacts Windows performance - it is much more important than the speed of the video and disk subsystems. If you are looking for a hardware upgrade to improve your Windows performance, look at a faster motherboard (with lots of SRAM cache and RAM) first.

Windows is also slightly faster in Standard mode than in Enhanced. Run in Standard mode unless you have a reason (DOS programs, lack of memory) not to.

Memory Size, Speed, 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 <u>cache</u> with <u>SmartDrive</u> 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 would be:

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

i.e. for an 8MB system use: "DEVICE=SMARTDRV.SYS 2048 2048" in CONFIG.SYS for Windows 3.0, or "SMARTDRV.EXE" in your AUTOEXEC.BAT for Windows 3.1 (SmartDrive 4.0 will default to the appropriate size).

Note: I have noticed that on many systems people have installed Windows 3.1 and neglected to alter their AUTOEXEC.BAT and CONFIG.SYS file for SmartDrive 4.0. You should check that you have removed the 'DEVICE=SMARTDRV.SYS" line form your CONFIG.SYS and added a "SMARTDRV.EXE" line to your AUTOEXEC.BAT which specifies the SmartDrive that comes with 3.1 (in you Windows Directory).

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.

If your memory speed seems low compared to other similar systems, check the speed of your memory. Ensure that you have the recommended memory chips for your motherboard.

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 <u>Expanded memory</u>, you can convert it to <u>Extended memory</u> (which windows uses) with the appropriate software.or hardware switches.

You should create a permanent <u>swapfile</u> 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 reasonably safe, but if your system is halted before the write buffer is flushed to disk, you can lose data. The buffer is flushed at least every 5 seconds, so if you wait that long before turning your machine off, you should be OK. The following DOS command forces SmartDrive to flush it's buffers:

        SMARTDRV /C

Actually the performance boost from write caching is not as high as you might at first expect, because the writes are using the same cache as the reads, and may cause pages to be flushed that would normally be in memory for a future read (the reads and writes get in each other's way).

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).

Video Tuning

Video speed is dependant on the speed of your CPU, video card and video device driver. 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/firmware. These cards improve video speed dramatically.

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 and video driver).

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. The standard super VGA (800x600x16) driver seems to be just as fast as the old VGA driver.

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.

Test Interval:
The interval between CPU index tests. This can be varied between 1 and 60 seconds in the options dialog.

Windows Mode:
Windows 3.0 can run in 3 modes: Real, Standard, and Enhanced (3.1 does not support Real).
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).

System 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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The program and associated documentation may not otherwise be modified, sold, or used as part of a commercial package without the express permission of the author.

This Program was developed using Borland C++ 3.1 and the Borland ObjectWindows Library.

I would like to thank all the people who reported bugs with the previous versions of this product, or made suggestions for improvements and new features - especially Jonathan Gift, Akira Ohkado, Paul Kingsley and John Howells.

I would also like to thank Robert McCulloch of Intel UK for going out of his way to supply me with the details of the iCOMP index and it's compilation the same day that I requested it.

Chris Hewitt, 07 December 1992

Release Notes

Release 3.0 4 Nov 92

Release 3.0 was a major enhancement to release 2.0. The new features were:

- Introduced the iCOMP CPU index
- added Memory Speed and Overall Windows indexes
- added Memory Size index (in memory dialog)
- tests now performed by clicking on the results areas, not buttons
- 5 new dialogs, to display extra system and performance information
- facelift of all dialogs, buttons, and displays
- review of all tests for greater accuracy

Release 3.01   8 Nov 92

Release 3.01 fixed a bug in 3.0 which caused TMP files to be created (by GetTempFileName) and not deleted.

Release 3.02   15 Nov 92

Release 3.02 fixed a number of early bugs reported with 3.0, and adds a few requested features:

- Adds support for Mono screens (requested by Kenichi Nakano)
- Uses Disk Reset to ensure stable disk results with > 512KB SmartDrive
- Places the Video test window in the center of the screen
- moves the cursor out of the video window during tests
- changes the CPU test to improve results on 50 and 66MHz machines
- changed the Disk test to give slightly lower results

Release 3.03   07 Dec 92

Release 3.03 is a minor upgrade to 3.02 which:

- Adds the 'Use Win Clock' option which uses 'GetTickCount' rather than the PIT clock
  (many Japanese PCs do not support the PIT clock).
- Fixes a problem with CD ROM drives.
- Changes the segment/page alignment of some tests which will cause some figures
  to vary slightly from 3.02 (because of the addition of code to support
'GetTickCount').

See Options for an explanation of the 'Use Win Clock' option.

Known Bugs and Incompatibilities

Norton Desktop for Windows 1.0

There is a problem with message handling between BC++ programs and NDW 1.0. This is not a problem with NDW 2.0. The symptom is a UAE when using the Hist button.

Very low/changing CPU performance figure/Divide by Zero in CPU test

The CPU performance test uses the PIT clock to give a more accurate measure of CPU time. It appears that some systems have a problem with this. If you experience this problem, use the 'Use Win Clock' option to revert to the Windows 'GetTickCount' function for timing.

Many Japanese PCs do not support the PIT clock. GetTickCount is less accurate, but the figures should still be OK for comparison. The CPU figure may vary a bit between tests when using GetTickCount, there is not much I can do about this as the Windows clock is not very accurate. If you experience very unlikely results with this option, please report it and I can try increasing the test intervals.

Disk performance figure varies by +-10%

When SmartDrive 4.0 (or other) write cache is enabled, the figure for disk performance will vary depending on when the disk buffer was last flushed. Perform several tests and use the average figure (shown on the right of the display), or just test with write cache turned off.

WindSock will perform a Disk Reset by default after the Disk test to prepare for another test. If you are still having problems, change the SmartDrive Commit option to 1 - this may help (this option for users of SmartDrive only).

The iComp index reported by WindSock is not accurate

OK, this is not a 'known' problem, more like an 'expected' problem. The iCOMP index is accurate (within +-3%) for the 10 or so (mostly Compaq) systems that version 3.03 has been tested on. I fully expect to have to release a 3.04 and maybe even 3.05 version before I am happy with the iCOMP test results. If your results are way out of line, check the following, then send me your results.

Is your system running at the correct speed? I have heard of cases where people have been sold 486/25s as 33s (an honest mistake?) - this even happens with some big-name brands! Check that you are running at full speed (turbo on). Use the WindSock index as a reality check.

Are you running some software that might slow the system down? TSRs and VxDs that 'steal' CPU cycles constantly will have an impact.

Are you running in Standard Mode? Enhanced mode is slower. The tests are tuned for Standard Mode.

If you can, check the speed of the crystal. Different Crystals operate at different frequencies. I have seen 33Mhz crystals that range from 31.5 to 34!

Note: As of 07 Dec I have not received any complaints about the iComp index (hence no fixes yet) - is it perfect or is everyone asleep out there?

The disk/video figure is 'maxed' (999)

I have heard some reports that the newer VL/local bus accelerated video cards can 'blow' the video index. If you have exceeded any of the indicies, please send me some e-mail - there is plenty of room to add another LED digit! Please include your WINDSTAT.TXT results.

I am also considering alterations to the video test (more API calls, longer test, more complex). If you experience any problems with any of the tests, please contact me - via CompuServe or by mail.