SiSoft Sandra Help Contents

Welcome to SiSoft Sandra(tm), a Windows information and diagnostic utility.

Sandra Topics

- Foreword
- Introduction
- The Sandra Program Interface
- Module List
- Command-Line Options
- Copyright
- Technical Support and Points of Contact
- List of Acronyms

Documents

- Read Me!
- Program Information
- What's New
- Who is Sandra?
- Program Requirements
- Compatibility Issues
- Questions and Answers
- License Details
- Update Sandra
- Sandra vs. SAW

Foreword

There are tens of million PC Compatibles world-wide, all due to the enormous popularity of the standard IBM PC. All these are supposed to be 100% compatible to the "real thing". However, nowadays, as IBM is no longer sets the standard, there is no such thing as a true IBM compatible; this term might mean, today, the most popular specification, i.e. a certain processor, graphics card, sound card, printer, etc. which is widely used - therefore supported by most software. A true PC compatible might mean the one (if available) that the software companies use (e.g. Microsoft) - if it works on theirs it should work on yours, too.

Worse, there were (and still are) many types and versions of DOS, DOS emulators, quite a few versions of Windows and Windows emulators. Also, there are 100's of thousand of software utilities - each doing its own thing. As you can deduce, it is very hard to make a program work on all systems. Just take a look at DOS games for example, and the problems of supporting different sound cards, joysticks, mice, video cards, memory managers, caches, etc.

Now Windows! Windows has brought us the key to all this - your program is supposed to work on every machine if you stick to the operating system calls (API). (Other operating systems like Windows NT, OS/2, UNIX, Linux, etc. all do much the same thing or have done long before Windows; I will stick to Windows as Sandra is targeted at this operating system) In a way this is true, most programs now work on systems under Windows that they would not have under DOS.

As far as SiSoft Sandra is concerned, or other diagnostic programs, the situations has not become that much better... Yes, it is easier to detect the characteristics of the system components (if the respective drivers are installed) but not always - the drivers have bugs themselves and sometimes tell lies for whatever reason. There are still holes in Windows, in the way that you still have to do much of the detection yourself. Worse, Windows is far cleverer than DOS and you can't get away with the things that some DOS programs do. As you still need DOS for many things, it gets a bit complicating to juggle virtual & protected mode, ring 0 & ring 3, VxDs & callgates and all other things...

While Windows 95 was supposed to replace DOS entirely, that was not possible. As long as we will need to run DOS stuff, DOS is here to stay. Most games are still written for DOS than Windows DirectX, and many hardware utilities are DOS based. Long live DOS!

Also, while we play with 32-bits now, and all new programs appear in 32-bit "clothing" there will be considerable time until Windows will no longer run them (like Windows 3.1 dropping the support for real-mode Windows apps). So, as you see Sandra has to show you information on 16-bit as well as 32-bit systems. In fact, as Windows95 is more than 50% 16-bit (still) you may actually be better off with a 16-bit system information utility (like SAW, "The System Analyser for Windows"!).

Anyway, we'll find out soon enough what the future holds in store...

Have fun with SiSoft Sandra and I hope it will be useful to you. I also hope that it will help you learn more about your computer and so make you more aware of what's going on as well as improving your productivity. In any case don't lose too much sleep over it...

Program Information

The latest information about SiSoft Sandra, and the index of the program documentation.

Click here ◪ to open the document locally.

Click here ◪ to open the document from the web. You need to go on-line in order to read it.

Who is Sandra?

Find out what Sandra is and what it (she) can do for you.

Click here to open the document locally.

Click here to open the document from the web. You need to go on-line in order to read it.

Program Requirements

Find out what you need to have in order to run SiSoft Sandra at peak performance and how to get the most our of it.

Click here 🔳 to open the document locally.

Click here 🔳 to open the document from the web. You need to go on-line in order to read it.

What's New

The latest information on Sandra and other utilities (Read Me! Document).

Click here to open the document locally.

Click here to open the document from the web. You need to go on-line in order to read it.

Questions & Answers

The answer to most questions, bugs listings & fixes, etc.

Click here ![icon] to open the document locally.

Click here ![icon] to open the document from the web. You need to go on-line in order to read it.

Introduction

SiSoft Sandra (The "**S**ystem **AN**alyser, **D**iagnostic and **R**eporting **A**ssistant") is a Windows 32 information/diagnostic utility. It provides more information (including undocumented) than some commercial diagnostic software, usually included with a tools/utilities package.

SiSoft Sandra was designed to run on Windows32. It is a 32-bit native application which takes advantage of all the improvements made to the operating system. It should run on Windows NT on Intel (x86) platforms with slightly less features. This is module dependant. Incompatible modules will not appear in the listing or will shut-down automatically depending on system characteristics.

Click <u>here</u>for more information.

The Sandra Program Interface

This picture is similar to what you should see when you execute Sandra:
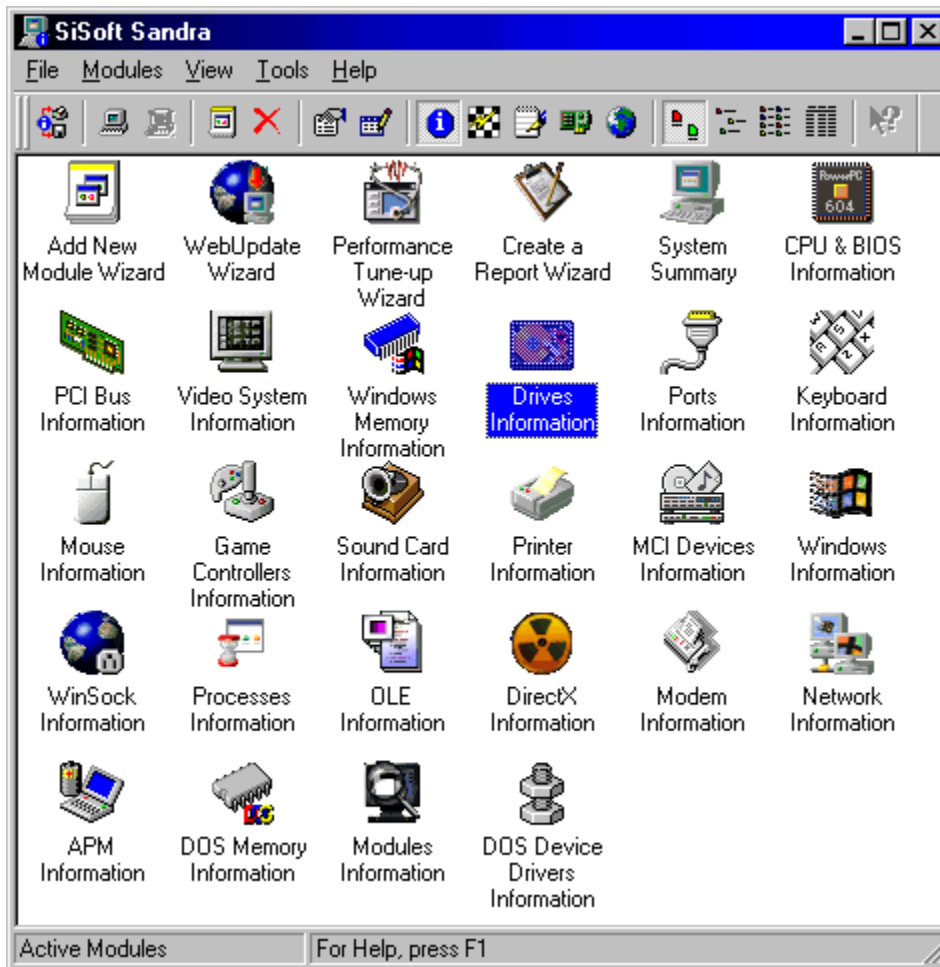
As you can see, SiSoft Sandra looks and behaves like any other Windows application - nothing different. If you don't recognise most of the elements featured you should read your Windows manual.

Module List

The modules in SiSoft Sandra are divided into **4** classes:

- Information Modules
- Benchmarking Modules
- Listing Modules
- Testing/Diagnostic Modules

A special class is the Wizard class which interfaces with all the above classes:

- Wizard Modules

Information Modules

- System Summary
- Computer (CPU/Bus/BIOS/Chipset) Information
- Motherboard Information
- Video System Information
- Printers Information
- WinSock (Internet) Information
- Joystick Information
- Sound Devices (Sound Card) Information
- Mouse Information
- Keyboard Information
- MCI (Multimedia) Devices Information
- APM (Advanced Power Management) Information
- PCI & AGP Buses & Devices Information
- Windows & DOS OS Information
- DOS Memory Information
- Windows Memory Information
- Ports (Serial/Parallel) Information
- OLE Servers Information
- Modules Information
- Processes/Threads Information
- DOS Device Drivers Information
- Drives Information
- DirectX Information
- Modem Information
- Network Information
- SCSI Information

Benchmarking Modules

- CPU Benchmark
- Drives Benchmark
- CD-ROM Benchmark
- Video (2D/3D) Benchmark
- Memory Benchmark

Listing Modules

- Config.sys Listing
- AutoExec.bat Listing
- MsDos.sys Listing
- System.ini Listing
- Win.ini Listing
- Control.ini Listing
- Protocol.ini Listing
- Config.dos Listing
- Autoexec.dos Listing
- BootLog.txt
- ScanDisk.log
- NetLog.txt
- NDisLog.txt
- Dump Hardware Settings

Testing/Diagnostic Modules

- [CMOS Dump & Check](#)
- [Hardware Irq Settings](#)
- [Software Protected-Mode Irq Handlers](#)
- [Software Real-Mode Irq Handlers](#)
- [DMA Channel Settings](#)
- [I/O Ports Settings](#)
- [Memory Range Settings](#)

Wizard Modules

- Add Module Wizard
- Create a Report Wizard
- Connect Wizard
- Performance Tune-up Wizard
- Web-Update Wizard

Command Line Options

SiSoft Sandra supports a variety of command line options:

• Create a Report in Batch Mode
   Syntax: **sandra.exe /r <report script>**
   Click here to load a sample script.
You can click **F1** for each module to find out the respective command-line option, or try
Module Properties.

• Load up and display a module
   Syntax: **sandra.exe /m <module command-line option>**
   You can use this for shortcuts and other things. The module will only load if it is
   compatible with the system's set-up.

Sandra does support other command line options. However they are for internal use only so
they are undocumented. Please don't use them even if you figure them out. You have been
warned...

Copyright & License Information

Technical Support & Points of Contact

You can contact the author at the addresses below:

Mail Address (letters only):	SiSoft Software PO Box 17273 London SW5 0HB
Home Address (last resort):	Prior arrangement only, please inquire by e-mail.
E-Mail:	Sandra@sisoftware.demon.co.uk C.A.Silasi@city.ac.uk
Telephone (6-10 GMT):	Registered users only.
Fax (various):	Registered users only.
Sandra WWW Pages:	http://www.demon.co.uk/sandra http://www.cs.city.ac.uk/~ax515/ sandra.html
SAW WWW Pages:	http://www.demon.co.uk/saw http://www.cs.city.ac.uk/~ax515/ saw.html
SiSoft Software Ltd. WWW Pages:	http://www.sisoftware.demon.co.uk/ http://www.cs.city.ac.uk/~ax515/

Very Important Notes:

• Please consult the Read Me! topic for up-to-date information.

• The subject of the e-mail message should begin with the word "**Sandra**" followed by the type (Standard, Professional, Enterprise or Client/Server) and version, e.g. "**SiSoft Sandra Standard Version 1.00 : Program Errors**". E-mail is sometimes re-routed via different accounts and it may get lost otherwise...

• **No** snail mail will be answered unless a **S.S.A.E** (**Stamped Self Addressed Envelope**) is enclosed. Be sure that the postage is correct, I will not check it or affix the correct stamp.

Click here 🔺 to open the document locally.

Click here 🔺 to open the document from the web. You need to go on-line in order to read it.

Hardware & Software Compatibility Document

The list of hardware and software SiSoft Sandra has been tested with and works with no problems.

Click here to open the document locally.

Click here to open the web document. You need to go on-line in order to read it.

Read Me! Document

This document contains the latest information about SiSoft Sandra, including bugs, features, options, compatibility and various other information which does not appear elsewhere. You are strongly advised to read it.

Click here to open the document locally.

Click here to open the web document. You need to go on-line in order to read it.

License Information Document

For **SiSoft Sandra Standard** Version:

• Click here ▣ to open the **End-User Licence** document locally.
• Click here ▣ to open the web **End-User Licence** document . You need to go on-line in order to read it.

• Click here ▣ to open the **Distribution Licence** document locally.
• Click here ▣ to open the web **Distribution Licence** document. You need to go on-line in order to read it.

For **SiSoft Sandra Professional** Version:

• Click here ▣ to open the **End-User Licence** document locally.
• Click here ▣ to open the web **End-User Licence** document . You need to go on-line in order to read it.

• **You cannot distribute this version in ANY way.**

Ordering Information Document

This document is the most important of them all**!**. It tells you how to order the **Professional** version of **SiSoft Sandra** and all the other things:

Click here ▣ to open the document locally.

Click here ▣ to open the web document. You need to go on-line in order to read it.

Sandra vs. SAW Comparison Document

This document was written to answer questions about the differences between **SiSoft SAW** (The **S**ystem **A**nalyst for **W**indows) and **SiSoft Sandra** (**S**ystem **AN**alyst, **D**iagnostic & **R**eporting **A**ssistant). If you never heard about SAW, then do not read it - you won't learn anything new.

Click here to open the document locally.

Click here to open the web document. You need to go on-line in order to read it.

Add Module Wizard

This wizard allows you to add modules to your display list if they are not already present (deleted) or were not compatible with your system.

• To see all the available modules make sure the 'Display Class' reads 'All Modules'. To change the display class list select the **View** menu and then click **All Modules**.
• Select the modules you want to add by holding down **Shift** while clicking on the module.
• You can select individual modules by holding down **Control** while clicking on the module.
• Click **Finish** to add the modules.
• Click **Cancel** to abort the operation.

System Summary

Shows a summary of all your system's characteristics and status. This is useful when you want to see at a glance the main features of the system. You can find detailed information elsewhere.

• Computer Type, Name
• CPU
• BIOS
• System Bus Types
• Memory Installed
• Monitor & Video Adapter(s) Installed
• Sound Card Installed
• Modem(s) Installed
• Floppy Disks, Hard Disks, CD-ROM & other drives
• Ports (serial/parallel/USB)
• Input Devices - Keyboard, Mouse
• Windows & DOS
• Network(s) Support

• **Command Line Switch**: SummaryInfo
• **Requirements:** See elsewhere
• **OS Support**: Windows 95, 98, NT (partially)

Explanations

See the following topics for explanations:

• Computer (CPU/Bus/BIOS/Chipset) Information
• Motherboard Information• Video System Information
• Printers Information
• Joystick Information
• Sound Devices (Sound Card) Information
• Mouse Information
• Keyboard Information
• PCI & AGP Buses & Devices Information
• Windows & DOS OS Information
• Windows Memory Information
• Ports (Serial/Parallel) Information
• Drives Information
• Modem Information
• Network Information

• List of Acronyms

Tips

This module does not generate any tips.

Motherboard Information

Shows detailed information about the following devices and general characteristics:

• System information
• Chassis information
• Motherboard information
• Chipset information
• Buses information

• **Command Line Switch**: MBInfo
• **Requirements:** Modern BIOS, CPU, Bus
• **OS Support**: Windows 95, 98, NT (partially)

Explanations

Computer Class - The type of PC that you have.
Motherboard Type - Most motherboards support a single processor, while others support 2 or 4. Special drivers must be used for the operating system (e.g. Windows NT) to use them.
System Buses - A bus is a set of wires (lines on boards, etc.) that allow devices to communicate. Generally this is done in parallel fashion to make the exchange of bytes faster. This field lists the buses present in your PC. There are many types of buses, see below.
Fast Windows PC - How does Windows itself rate your PC?

Computer Information - the manufacturer, model, and serial number (if available) of your computer system.

Motherboard Information - the manufacturer, model, type and serial number (if available) of the motherboard.

Chassis Information - the manufacturer, model, type, locking status, thermal status and serial number (if available) of the system chassis (case).

Memory Controller Information - the memory controller is the part of the chipset that manages the system memory. The Cache controller interfaces between it and the CPU in order to speed-up the process.
Error Detection Method - the method the controller uses to detect errors. Usually parity is used (an extra bit is used to hold a 1-bit checksum for a 8-bit byte). But parity can only detect 1-bit errors, other methods can do better.
Error Correction Capability - the method the controller uses to correct any detected errors automatically. Unfortunately most computer systems cannot do this - only servers have this capability which requires special (expensive) memory.
Number of Memory Slots - the number of memory slots on the board. You should try to have as many as possible so that you don't have to throw out your old memory modules when you upgrade.
Maximum Installable Memory - the maximum total size the system can use. This is very important for upgrading, while 100's MB may seem a lot today, tomorrow it may be too little.
Maximum Module Size - the maximum size of modules accepted by the board. This limits the maximum installable memory.
Supported Speeds - the list of supported memory speeds. Do **not** install memory with other speeds or you may get errors which are hard to diagnose.
Supported Memory Types - the list of supported memory types. Do **not** install memory which is not supported by the motherboard. It will not work.

Supported Voltages - the list of supported voltages. Using lower voltage (say 3.3V instead of 5V) will damage the memory modules. Using higher voltages (say 5V instead of 3.3V) will not work either. So check before buying.

System Chipset - The ancillary chips on the motherboard that complete the PC. The name, type and version of the system chipset is shown. Sandra cannot detect chipsets released **after** this release of Sandra! Update your copy of Sandra if this happens.

External Cache - also called L2 cache. Fast but small memory used by the chipset to hold recently accessed data and greatly speed the PC. Some advanced processors like the Pentium Pro even integrate it into the processor itself increasing the speed further. Size varies between 64KB to 2MB, the more you have the better. Very important especially if you've installed a lot of system memory. Don't buy a computer with no L2 cache! There are various types of cache, with 'pipeline-burst' being the fastest. If you have a choice also select 'write-back' instead of 'write-through'.

Memory Bus Speed - The speed in MHz that the memory bus (backbone) runs at. For 5th generation processors this varies between 50-66MHz with some advanced boards managing 75 or 83MHz. Faster is better, so if you have a 166MHz Pentium you should choose 2x83 rather than 3x66. You'll get faster than Pentium 200MHz performance. (some motherboards do not program the chipset correctly so results may not be accurate)

CPU Speed Multiplier - The multiplier used to reach the processor core speed. (since there is no proper way to detect the true multiplier results may not be accurate)

Memory Rows (Physical & Logical)- Lists the memory installed, size and read/write speed in each logical banks on the motherboard. There are various RAM technologies, with SDRAM (Synchronous Dynamic RAM) the fastest followed by BEDO (Burst EDO) and EDO (Extended Data Out) ram, FPM (Fast Page Mode) being the classic type. Your chipset must specifically support that type of ram so check before you buy.

PCI Bus - PCI (Peripheral Component Interconnect) is a local bus capable of self-arbitration. Current versions (2.00 & 2.10) are 32-bit at 33MHz with 64-bit 66MHz and faster on the horizon. It is the principal bus used in today's PCs.

PC Bus Version - The version of the PCI standard this implementation complies with.

PCI Bus Speed - The actual speed of the PCI Bus. This can be between 20-66MHz, faster is better.

PCI Multiplier - The multiplier used to reach the speed with respect. the memory bus speed.

ISA Bus - ISA (Industry Standard Architecture) is the original bus used in the 1st PC. It started with 8-bits at 8MHz, moving to 16-bit at 8-9MHz with the 286 processor. Even today it is still present in PCs to cater for modems, sound cards, I/O boards, etc.

EISA Bus - EISA (Enhanced ISA) is the successor of ISA, using 32-bit at 8MHz but with burst mode support and arbitration. It is compatible with ISA. However it has been superseded by PCI.

MCA Bus - MCA (Micro Channel Architecture) was supposed to be the successor to ISA as designed by IBM and used in the PS/2 range of PCs. 32-bit, with arbitration and burst mode like EISA but not compatible with ISA at all. However it did not catch on with other PC manufacturers and was superseded by PCI.

VESA Bus - VESA (Video Electronics Standards Association) was an extension to ISA using 32-bits and variable speed - same as the processor speed. While it was very fast, only 2-3 cards could be plugged-in at lower speeds. Superseded by PCI.

AGP Bus - AGP (Advanced Graphics Port) is an extension to PCI (though not compatible)

allowing graphic adapters to use system memory, as well as being faster at 66MHz and above. Can typically transmit 2x or 4x more data than PCI in the same time. You can only use 1 slot now. Very new.

USB Bus - USB (Universal Serial Bus) is a peripheral bus designed to link slow & medium speed peripherals like keyboards, mice, scanners, modems, etc. thus eliminating the different types of sockets currently present. Quite New.

PCMCIA Bus - PCMCIA (Card Bus) is a peripheral bus used to connect peripherals to notebooks. You can add all the usual peripherals. The newest version uses 32-bits and is as fast as PCI. Quite new.

See <u>List of Acronyms</u> for more information.

<u>Tips</u>

W5000 - Windows considers you PC to be rather slow. This is usually due to insufficient memory (i.e. less than 16MB) but a faster CPU would also help.
T5001 - External or L2 cache greatly increases system performance. Without it you generally have a 15-30% slower PC and much slower in memory intensive applications. DO NOT buy a CPU without a L2 cache!
T5002 - While the 'asynchronous' cache was the original type of cache used on 386, 486 & 5x86 CPUs, new chipsets work best with 'pipeline-burst' cache. If your chipset supports it you can get 5-15% improvement just by changing the cache!
T5003 - If you have 32MB or more you should have 512KB cache installed for optimum performance. Also check whether your motherboard can cache more than 32/64MB of memory. With some motherboards you need to increase the cache when you increase memory.
T5004 - If you have a lot of memory (64-128+) you may need as much as 1MB cache. Remember that some 486 systems had 8M RAM and 256KB cache, so 1MB is little if you have 128MB RAM!
W5005 - If the system does not support memory error detection, any memory malfunction will not be detected resulting in corrupt data or crashes. All systems should support error detection.
W5006 - If the system does not support memory error correction (e.g. using ECC RAM) if an error is detected the system will stop. A system that supports correction will attempt to correct the error and continue. A server should use error correcting memory always.
W5007 - There are very few memory slots. If some are already filled, to upgrade the memory will mean that you will need to discard some of your existing modules which will prove expensive. Try not to buy a motherboard with at least 6 SIMM sockets or 4 DIMM sockets.
T5008 - All the memory slots are full. To upgrade the memory you will need to discard some or even all your existing modules which may prove existing.
T5009 - Memory bus speed seems low. Check that you are running it at the correct speed.
W5010 - The chipset may not have the capability to cache all the installed memory (e.g. Intel Triton chipsets cannot cache more than 64MB). While the overall performance may be higher if you're using all the installed memory, you may get higher performance if the additional memory is not used. Alternatively upgrade the motherboard with one using a more advanced chipset.
T5011 - You still have some free memory slots so you can upgrade the memory easily when the time comes.
W5012 - You seem to have an old, pre-release, version of the USB host controller. Some incompatibilities may arise when you connect new USB devices.
W5013 - The AGP bus seems to have been disabled. Check whether it is really so. It should be enabled always even if you don't use any AGP devices.

CPU, FPU, caches and BIOS Information

Shows detailed information about the following devices and general characteristics:

• System BIOS Information
• BIOS Properties
• CPU Information (including caches) & Performance Rating
• CPU Upgrading Information
• CPU Properties

• **Command Line Switch**: CPUInfo
• **Requirements:** Modern BIOS, CPU, Bus
• **OS Support**: Windows 95, 98, NT (partially)

Explanations

BIOS - the BIOS (Basic Input Output System) contains the start-up code that initialises and starts your PC. It also serves as an interface between hardware and software.
BIOS Manufacturer - company that wrote the BIOS code.
BIOS Date - the date the BIOS was released.
BIOS Version - the software version of the BIOS.
Plug & Play Version - Plug & Play is a resource management interface that allows automatic configuration of add-in cards to avoid resource conflicts. Some buses like PCI, PCMCIA, EISA take care of this themselves so Plug & Play must act as a liaison between them.
DMI Version - Desktop Management Interface (DMI) is an interface through which software can obtain very detailed system information either from local or remote workstations.
BIOS ID No - Codes that provide information about the BIOS.
ROM Size - The size in KB of the system BIOS.

System BIOS Properties - Information about the capabilities of your system.
Can be Flashed - you can update the system BIOS using a special program that load (flashes) a new version to the EEPROM (Electronically Erasable PROM) system BIOS. Otherwise you need to change the chip!
Can be Shadowed - a technique of copying the BIOS code & data to RAM. RAM is generally faster than EEPROM so this improves the speed of programs that use BIOS functions.
Is socketed - if the BIOS is soldered onto the motherboard or in a socket. If it is soldered you cannot easily change it if you destroy it by flashing it or you need to change it.
Supports Plug & Play - see Plug & Play.
Supports ESCD - see Plug & Play.
Supports EDD - Enhanced Disk Drive (EDD) Specification is specifies new features like EIDE, LBA addressing and many other enhancements.
Supports Selective Booting - whether you can select the boot media (floppy, EIDE, SCSI, ZIP, LS-120, CD-ROM) the computer uses. Older computers could only boot from floppy or hard disks.
PC-98 Specification - whether the computer is PC-98 compliant. All computers sold in 1998 and later should be. The specification defines the minimum recommended system configuration for 1998 and beyond.

Processor - The processor is the heart/brain of the system, executing the software running on your PC. This field shows the processor manufacturer, name and actual core speed in MHz. Sandra cannot detect processors and co-processors released **after** this release of Sandra! Update your copy of Sandra if this happens.

Processor Type - Generally processors come in the normal "OEM" form, i.e. with new PCs or motherboards. Some are designed to upgrade older PCs like 'OverDrive', 'MakeIt', etc.

Performance Rating - How fast a Pentium Classic processor must run to be as fast as your processor. This is useful when comparing different processors. Generally it is the score obtained by running WinStone (a system benchmark using real applications) on a test machine.

Co-Processor - Special arithmetic unit that does floating-point calculations directly, much faster than the processor would have done. While today this is integrated in the processor, in the past it was a separate chip that you had to buy if you used mathematical intensive programs/computations.

CPU Class - The class/generation your processor belongs to. A 286 is considered generation 2, while Pentium, K5, etc. are 5th class. Pentium Pro, Pentium II, etc. are 6th generation processors.

CPU Revision - The model & stepping of your processor, i.e. the processor version.

CPU Information - Extra information about your processor.

CPU Stepping/Mask - The version of the silicon mask that was used to fabricate your processor. This is important to know as early processors suffer from inherent bugs.

Internal Code/Data Cache - Very fast but rather small memory built-in the processor that holds recently accessed data. Also called L1 cache. Some processors have separate code & data caches, others have a unified cache. The size varies between 1 to 64KB. The bigger the better but depends on processor type so you can't add more.

CPU Feature Flags - Information about the capabilities of your processor

Co-Processor built-in - (FPU) Whether the co-processor (if present) is built-in or external.

Virtual Mode Extensions - (VME) CPU supports the extensions for V86 mode which typically enhances the speed of virtual machines under Windows.

Debugging Extensions - (DE) CPU supports breakpoint setting in the I/O address space.

Page Size Extensions - (PSE) The standard page size is 4KB. Some processors may support different sizes (4MB) which is advantageous when more memory is installed.

Time Stamp Counter - Internal counter incremented every clock cycle which allows high precision measurements.

Model Specific Registers - (MSR) CPU has special (model-specific) internal registers.

Physical Address Extension - (PAE) Physical addresses bigger than 32-bits are supported.

Machine Check Exception - (MCE) Exception 18 is supported.

CMPXCHG8B Instruction - (CX8) An instruction to compare & exchange 8 bytes.

APIC Built-in - (APIC) An Advanced Interrupt Controller is built-in which is faster and can be used for multi-processing.

Fast System Call - (FSC) Support for instructions SYSCALL & SYSRET.

Memory Type Range Registers - (MTRR) Supports special registers that improve cache throughput.

Page Global Enable - (PGE) CPU supports global pages enable/disable.

Machine Check Architecture - (MCA) Internal test of processor is available.

Conditional Move Instruction - (CMOV) Allows conditional execution of instructions without jumps.

MMX Technology - Multi-Media eXtensions is s set of instructions added by Intel to speed-up multimedia applications by using SIMD (single instruction multiple data) type operation like multi-processor arrays.

Extended MMX Technology - Extensions added to MMX by Cyrix.

AMD 3D Technology - this is a set of instructions added by AMD to speed-up 3D multimedia applications using the processor in conjunction with a graphics card. Support for them is included in DirectX 6 and later.

MMX is an extension to the x86 instruction set that allows multiple bytes of data to be packed together in a single register and operated on simultaneously. MMX consists of 57 new instructions for speeding multimedia tasks. The trick to these new instructions is that

they operate on many different data elements at once, which increases the overall amount of work the processor can do. Examples range from operating on multiple pixels in a bitmapped image to multiple sound channels in an audio stream. MMX is not intrinsically a graphics or multimedia acceleration technology, but those are the types of applications that stand to benefit most. MMX will provide a substantial performance boost for some new applications that are coded to use MMX (more so for home rather than for business applications).

See List of Acronyms for more information.

Tips

T200 - DMI (Desktop Management Interface) is not supported. The operating system may not be able to tune your system to maximum performance. Try to upgrade the BIOS if possible.
T201 - The system BIOS is more than 3 years old. Check whether a BIOS update is available from your motherboard/PC manufacturer.
T202 - Windows 95/NT need a 5x86 class CPU (e.g. Pentium) for optimum performance. An older CPU would not do. Time to upgrade.
T203 - A Plug & Play BIOS is required these days since it makes installing hardware devices much easier. Check whether a BIOS update is available from your motherboard/PC manufacturer.
W204 - Older CPUs (e.g. 486) do not support the CPU identify instruction which can be problematic with the new DOS programs and games which only run on 5x86 class CPUs.
T205 - Most new games, multi-media software and some applications can run faster and better on MMX CPUs. Since a MMX version also means a new, improved CPU even if MMX is not used you will still get 10-20% faster performance.
E206 - Your Pentium CPU has the infamous FPU (co-processor) bug. Contact Intel Corp. for a free replacement.
T207 - A DMI 2.1 compliant BIOS can allow the operating system and special programs to tune-up your system. Try to upgrade the BIOS if possible.
T208 - The BIOS does not supports the Enhanced Disk Drive Specification. You may not be able to use the latest disk drives and technologies. Try to upgrade the BIOS if possible.
T209 - The BIOS is not PC98 compliant. All new computers sold in 1998 and later should be. You cannot have a PC98 compliant system by upgrading the BIOS only - your peripherals must support certain advanced functions as described in the specification.
T210 - The motherboard supports faster CPUs so you don't need to upgrade the motherboard when you decide to install a new CPU. However, a new motherboard will yield faster performance with a new CPU simply because it will use a new chipset.
T211 - The BIOS can be updated (flashed) using a special program. This is a very important feature to keep your system up-to-date with new hardware.
T212 - The BIOS can be shadowed. Shadowing is a technique of copying the BIOS program from slow EPROM or EEPROM to RAM. This may yield some increase in performance so make sure you enable it in the BIOS. (**Note:** you should disable it before flashing the BIOS!)
T213 - The BIOS cannot be updated (flashed). The only way is to buy a replacement chip. All new computers should have a BIOS that can be flashed.
W214 - The BIOS can be updated (flashed) but is surface mounted. If the update goes wrong you won't be able to get a new chip to replace the old BIOS. This does not mean that you cannot recover from an unsuccessful flash but it removes an option.

Video System Information

Shows detailed information about the monitor, video adapter(s) and video drivers installed in the system:

• Monitor Information, Characteristics
• Video Adapter Characteristics
• Video Driver Information
• Video BIOS Information
• VESA Video BIOS & VESA Extensions Information
• Video Device Characteristics

• **Command Line Switch**: VideoInfo
• **OS Support**: Windows 95, 98, NT (partially)

<u>**Explanations**</u>

Monitor Name - the type and make of your monitor if known.
Maximum Resolution - the maximum resolution supported by your monitor. Usually you use a lower resolution since the very top one has low refresh rate.
Horizontal Scan Range - the horizontal scan range in kHz. It is dependent on horizontal scan range and resolution.
Vertical Refresh Range - or the refresh in Hz is the range of the number of times the screen can be repainted in one second - typically stated at a low resolution, not the top one. Higher numbers are better.
DPMS Energy Star Support - indicates whether your monitor can go to sleep mode, i.e. reduce its power. VESA DPMS (Display Power Management Signalling) is an interface through which the video adapter can power down the monitor.
Energy Star - is a programme administered by U. S. EPA (Environmental Protection Agency) to reduce the power consumed by computers and peripherals.

Video Adapter - the name and make of the video adapter if known.
Total Video Memory - the amount of video memory installed on the video adapter in MB.
Usable Video Memory - the amount of video memory that can be actually used by the video adapter. This depends on the video driver but is almost never equal to the total video memory since the latter can only be in multiples of MB.
Free Video Memory - the amount of video memory which is free in this mode. The rest is usually used for caches/fonts by intelligent drivers but mainly it stays unused. If too much memory is free then you're under-utilising your video adapter.
Hardware Revision - the silicon revision of the chipset on the video adapter.
VESA/DDC Support - indicates whether the video driver/adapter supports VESA DDC (Display Data Channel) which is an interface through which the video adapter can communicate with the monitor to optimise video parameters.

Current Video Mode - the current resolution and colour depth of the display.
Vertical Refresh Rate - the number of times the screen is painted every second. This number should be over 70Hz if you don't want to see flickering or over 80-85Hz if you're using a high resolution.
On some video adapters not using VRAM (Video RAM) or WRAM (Windowed RAM) increasing this number decreases performance especially at high resolutions and colour depths.
Supported Refresh Rates - the list of supported refresh rates at this resolution.

Video Driver ID - the file name of the video driver.
Video Driver Version - the version of the video driver.

Supported Windows Version - the version of Windows the driver was designed for. For Windows 95 this should be 4.00.
Plug & Play Video Driver - indicates whether the driver is plug & play compliant. Nowadays all drivers should support plug & play.
Video Acceleration - indicates the amount of acceleration you want out of the video adapter. Full acceleration is the fastest and recommended for most computers. If you're having trouble with the video and you suspect the video driver/adapter reduce the acceleration until the problems disappear.
Screen Saver Active - indicates whether the a screen saver is set-up.
Screen Saver Time-out - indicates the amount of idle time after which the screen saver will become active.

Supported Video Modes - list of all video modes, colour depths and refresh rates supported by your adapter. High performance display adapters support many video modes.

Video BIOS - the BIOS (Basic Input Output System) contains the start-up code that initialises and starts your video adapter. It also serves as an interface between hardware and software.
Video BIOS Manufacturer - company that wrote the BIOS code.
Video BIOS Date - the date the BIOS was released.
Video BIOS Version - the software version of the BIOS.

VESA BIOS - is a generic interface through which software can communicate with the video adapter. Most modern cards have this capability which was very important in DOS days of high-resolution games but it is not required in Windows. Sandra cannot detect VESA versions released **after** this release of Sandra! Update your copy of Sandra if this happens.

Version - the version of the standard the interface supports. Most cards should support version 2.00 although new ones come with the latest 3.00.
Manufacturer - company that wrote the VESA BIOS code.
Video Adapter - the name of the video adapter.
Adapter Version - the version of the video adapter.
VESA OEM BIOS - the company that wrote the original VESA BIOS code.
VESA OEM Version - the version of the BIOS code.
Total Video Memory - the video memory available for VESA use in MB.
Video Mode - the current hardware video mode in hexadecimal.
Linear Frame Buffer Address - the linear frame buffer is the address at which the video adapter's memory is mapped in the processor's 32-bit address space. Cards that support LFB (Linear Frame Buffer) are much faster since the memory is accessed in 32-bit and not 16-bit like older cards.

8-bit Mode DAC - the DAC (Digital to Analogue Converter) supports 8-bit modes.
VGA Compatible - indicates whether the card is hardware VGA compatible. Since the boot-up modes, DOS modes, etc. are VGA all cards should be compatible.

VESA Video Modes - list of all VESA video modes (in hexadecimal), resolutions, colour depths and memory needed supported by the video adapter through the VESA BIOS interface.

DirectX - DirectX is a video support library from Microsoft which caters especially for multi-media applications and games, including 3D, sound, computer input and multi-player capability. Latest version is DirectX 6.
DirectX- DirectDraw Support - indicates the version of DirectDraw display driver interface. DirectDraw is a Windows software interface which allows programs to take control of the display directly, bypassing the GUI. This is important for multi-media games and full-

motion video.

DirectX Direct3D Support - indicates the version of the Direct3D display drivers interface. Direct3D is a set of libraries that handle 3D rendering for games and other multi-media applications.

OpenGL Support - indicates the version of the OpenGL libraries. OpenGL is a set of standard multi-platform software libraries offering sophisticated 3D rendering. Can be used on a SGI, PC, MAC, etc. unlike DirectX.

RedLine Support - indicates the version of the Rendition RedLine libraries. RedLine is a proprietary 3D set of libraries for Rendition video adapters.

Animation Effects - indicates whether window animation is on.

Full Windows Drag - indicates whether while moving/resizing a window the contents of the window is updated in real-time.

Font Smoothing - indicates whether screen fonts will be anti-aliased. This method reduces font "jaggies" and makes the display look better but reduces performance.

Video Device Mode - various characteristics of the video mode which are self-explanatory.

Video Capabilities - lists the various functions the video adapter/driver support natively. Functions not supported will be emulated by Windows. Very fast video adapters implement most of the listed capabilities and, generally, this is why there can be a large difference between two adapters even if the same chipset is used. The video driver can be more important then the chipset itself!

Video Clipping Capabilities - lists the clipping capabilities of the video adapter.

Video Raster Capabilities - lists the drawing capabilities of the video adapter.

Video Curve Capabilities - lists the curve drawing capabilities of the video adapter.

Video Line Capabilities - lists the line drawing capabilities of the video adapter.

Video Polygonal Capabilities - lists the polygon/triangle capabilities of the video adapter.

Video Text Capabilities - lists the text drawing capabilities of the video adapter.

See List of Acronyms for more information.

Tips

W300 - using the "unknown monitor" setting may result in incompatibilities and flickering. Always select   your monitor from the list of a similar one.

T301 - 64-bit cards need 2MB video RAM to use 64-bit memory access, and can manage 32-bit only with only 1MB installed. Typically this reduces performance by as much as 60% with large resolution/colour depth modes.

W302 - 16 colour (4-bit) modes are obsolete and may cause you trouble. Switch to a 256 colour mode and you won't regret it.

W303 - 24-bit colour depth uses 3 bytes which is not a power of 2 number. 32-bit colour depth uses 4 bytes (64-bit) and can be accessed much faster resulting in a performance increase even though more video memory is used. If you have enough video memory (3/4 more than for 24-bit mode) always use 32-bit modes instead of 24.

W304 - VGA desktops (640x480) are the absolute minimum, 800x600 is the norm (15" monitors) while 1024x768 is becoming the new norm as 17" become cheaper. There's no point in using anything less.

T305 - Video drivers designed for Windows 95 and later are 32-bit and are faster than older 16-bit drivers on new hardware. You need to check for a new driver for your video adapter.

T306 - A Plug & Play / DDC compliant video driver is recommended today since it removes most configuration/resource allocation problems and optimises the video mode as well.

W307 - The video hardware acceleration is not set to full. You should not reduce it unless you have video problems with your video adapter/driver. The full mode offers the best performance.

T308 - Your video card does not support the VESA interface. Most do, but this interface is not used by Windows unless the video driver is the generic SVGA VESA driver. If you still run high-resolution DOS games you will need a TSR VESA BIOS or a video BIOS update.

T309 - Your video BIOS does not support the latest VESA BIOS interface. While this is not important unless you actually need it, find out whether a video BIOS update is available.

T310 - DirectDraw is not installed. All recent and future Windows games and multi-media applications use DirectDraw so you may need to install it sooner or later. Also, full-motion video players may run faster with it.

T311 - Direct3D is not installed. New Windows 3D games and multi-media applications are starting to use Direct3D for 3D rendering. Most applications will install DirectX for you if it is required but is recommended that you install and optimise DirectX yourself.

T312 - OpenGL is not installed. While only sophisticated 3D rendering programs and games need this - it may become useful in the years to come.

W313 - While the "font smoothing" feature makes the display look much better, it reduces the overall graphics performance by a significant amount. If the display seems sluggish - disable this feature.

W314 - The video BIOS is more than 2-3 years old. If the video adapter has a flash video BIOS, check whether an update is available and install it. You may gain extra performance or bug fixes.

T315 - 15-bit colour depth uses 15-bit which is not a multiple of 8-bit (a byte) like 16-bit modes (2 bytes). Most adapters use 16-bit anyway for 15-bit since it's faster but reduce the number of simultaneous colours available on the display to 32K instead of 64K. So use 16-bit modes instead of 15-bit always.

T316 - A DPMS saving monitor can turn itself off (when instructed by the video adapter) and thus reduce power consumption as well as increasing its life. Nowadays all monitors should support DPMS.

W317 - The video adapter is not hardware VGA compatible. Some DOS display modes, some games or DOS applications display correctly. Some video adapters need a TSR or a video BIOS update to handle this.

W318 - You are using the highest mode supported by the monitor. Since you're at the limit, the image may be less focused/sharp and the colours less bright. You may also see interference. Usually it is better to decrease the resolution to the next down or buy a new monitor if you want use this mode.

T319 - Usually, a refresh rate of 75Hz or more is necessary to completely remove flicker from monitor screens - depending on resolution, the brightness of the display and the person itself. Usually higher is better but use whatever you can.

W320 - The hardware cursor should be enabled unless you have problems with it. Disabling it will cause the cursor to flicker.

W321 - The LFB (Linear Frame Buffer) should be enabled - otherwise performance may suffer.

T322 - It's better (and greener) to use the power-down function of the monitor instead of silly screen saver. You are supposed to **save** the screen!

T323 - Unless you have a lot of RAM and computing power, using a desktop wallpaper consumes memory and decreases the display speed since it must be re-painted when needed. You should remove it if your computer seems slow.

T324 - The video driver you are using was included with Windows itself. While this means it is certified to be stable, almost certainly an updated driver is available from the video adapter manufacturer which should be superior overall.

T325 - Windows animation is cute at the beginning but reduces display speed and can become annoying. Turn it off.

T326 - Animated cursors are fun but they consume memory and quite a few processor time. Unless you have the very latest video adapter they also flicker. Unless you're really keen on them you could consider turning them off.

T329 - For full-movie movie playback (MPEG, DVD) you need to use 24/32-bit colour depth if you want to get a quality picture.

T330 - Using small icons will make them harder to see and click but you will gain a considerable increase in usable desktop space.

T331 - Using small fonts will make text harder to read and dialogues smaller but you will gain a considerable increase in usable desktop space.

Printer & Fax Information

Shows detailed information about the printer(s) and fax device(s) available to this system either local or remote:

• Printer Information
• Printer Settings
• Printer Driver Support
• Printer Driver Settings
• Printer Device Characteristics

• **Command Line Switch**: PrinterInfo
• **Requirements:** Printer or Fax & drivers installed
• **OS Support**: Windows 95, 98, NT

<u>**Explanations**</u>

Printer Name - the type and make of the printer.
Printer Status - the status of the printer. The printer can be **idle**, **printing** documents or in an **error** mode. The error type is specified if known.
Printer Type - the printer can be either local or remote (i.e. on a network).
Shared As - the name of the shared resource that represents this printer.
Port - the port the printer is connected to.
Comments - user defined comments for this printer.

Print Processor - the print engine that the printer driver uses. Generally it is Windows but there are other specialised print processors, especially on a network.
Data Type - the format in which printing information is stored on your disk. Generally **EMF** (Enhanced Metafile Format) is faster as it is smaller and is printer independent. **RAW** format is printer specific and takes more space but some printers (e.g. faxes) cannot use EMF.
Default Printer - indicates whether this is the default printer.
Shared Printer - indicates whether this printer can be shared with other users on a network.
Spooler Priority - the process priority of the print spooler. **Maximum** prints faster but the machine becomes very slow since most time is spent printing. The default is **minimum**.

Driver Version - the version of the printer driver.
Supported Windows Version - the version of Windows the driver was designed for. For Windows 95 this should be 4.00.
Print Driver ID - the filename of the print driver.
Printer Driver Version - the file version of the print driver.

Print Technology - the technology used by the printer. Most printers are **raster** printers (i.e. deal with dots) - only plotters use **vector** printing technology.
Printer Mode - the resolution in dpi (dots per inch) and monochrome/colour depth.
Print Quality - the print quality either as a term (e.g. Draft, Proof) or specified in dpi.
Paper Size - the paper type used and its dimensions.
Page Orientation - can either be portrait or landscape.
Paper Source - the bin used for printing.
ICM Colour Matching - the system used to optimised the printing of colours or grey scales.
True Type Font Support - specifies whether the printer can download the fonts (i.e. the printer does the rendering) or print them as graphics (i.e. rendered by the computer).

Printer Bins - the list of paper bins supported by the printer.

Paper Types - the list of paper types and dimensions supported by the printer.

Printer Modes - the list of supported printer resolutions and monochrome/colour depths.

Printer Device Mode - various characteristics of the video mode which are self-explanatory.

Printer Capabilities - lists the various functions the printer supports natively. Functions not supported will be emulated by Windows. Very fast printers implement most of the listed capabilities and, generally, this is why there can be a large difference between two printers even if the same hardware is used. The printer driver can be more important then the hardware itself!
Printer Clipping Capabilities - lists the clipping capabilities of the printer.
Printer Raster Capabilities - lists the drawing capabilities of the printer.
Printer Curve Capabilities - lists the curve drawing capabilities of the printer.
Printer Line Capabilities - lists the line drawing capabilities of the printer.
Printer Polygonal Capabilities - lists the polygon/triangle capabilities of the printer.
Printer Text Capabilities - lists the text drawing capabilities of the printer.

Printer Drive Escapes - lists the specialised functions the printer driver supports.

See <u>List of Acronyms</u> for more information.

<u>Tips</u>

W400 - the printer driver was written for a previous version of Windows. To take full advantage of Windows 95/98 find an updated printer driver.
W401 - the resolution of the printer is low for this type of printer. Make sure this is what you want, otherwise you will get less quality print-outs than possible with your printer.
W402 - the print quality of the printer is low for this type of printer. Make sure this is what you want, otherwise you will get less quality print-outs than possible with your printer.
T403 - generally you should use the EMF data format since it is faster and takes less space. Use RAW only if the printer (i.e. faxes) cannot use EMF, only RAW data format.
T404 - while printing directly is faster, your machine may become unresponsive during printing. Spooling the print data takes longer but your machine will become available sooner.
T405 - if you use the actual fonts built-in your printer you will get faster printing since the fonts do not need to be downloaded or rendered. See your printer manual for the list of built-in fonts. If you have a print cartridge installed make sure you installed the "soft" fonts that come with it so that Windows can use them.
T406 - you're using a very high resolution. While the quality increases, so do the printing speed and resources consumed. Unless you really need to use it, you should reduce it.
T407 - by optimising the PostScript driver settings you may obtain faster printing and/or better quality. See your printer manual for more information.

WinSock (Internet) Information

Shows detailed information about the Windows Sockets Interface which connects your computer to the Internet via various protocols:

• WinSock Library Information
• Local Host Information
• Network Services Information

• **Command Line Switch**: WinSockInfo
• **Requirements:** Internet connection, 32-bit WinSock stack
• **OS Support**: Windows 95, 98, NT

Explanations

32-bit WinSock Library - Windows 95/98/NT programs use a 32-bit version of the library which is faster and offers more functions.
16-bit WinSock Library - the 16-bit version is used by legacy programs, e.g. Windows 3.1 programs.

Version Required - the version required by most popular Internet programs. Your library should support at least version 1.01.
Highest Version - the highest version supported by the library. The latest version is 2.02 which adds various new functions and improvements.
Description - the name and version of the WinSock library.
System Status - the current status of the library.
Maximum Sockets - the maximum number of sockets a process can use. This is roughly the number of connections that can be made at any one time.
Maximum UDP datagram size - the maximum size (in KB) of a packet that can be sent by UDP. UDP is a connectionless protocol (resembling the postal service) through which applications can transmit messages.

Host Name - the fully-qualified name (including domain) of your computer.
IP Address(es) - list of IP addresses used by your computer.
IPX Address(es) - list of the hardware (MAC) addresses of your computer.

Services Information - list of services, including name, port and protocol used. Services include FTP, TELNET, HTTP (web) and many others. You can find a complete list and descriptions in any TCP/IP book.

See List of Acronyms for more information.

Tips

This module does not generate any tips

Game Controllers Information

Shows detailed information about the game controllers(s) connected to the system and the driver software:

• Game Controller Driver Characteristics
• Game Controller General Characteristics
• Game Controller Current Status Information
• Game Controller Calibration Settings

• **Command Line Switch**: JoystickInfo
• **Requirements:** Joystick, game-pad, game port, joystick driver
• **OS Support**: Windows 95, 98, NT

Explanations

Name - the name and make of the game controller.
Manufacturer - the manufacturer of the game controller driver.
Driver ID - the filename of the joystick driver.
Support - the maximum number of game controllers supported by the driver.

Buttons - the number of buttons on the game controller.
Z-Coordinate - the game controller supports depth.
Rudder - the game controller supports rudder style use.
U-Coordinate - the game controller supports U-axis.
V-Coordinate - the game controller supports V-axis.
Point-Of-View - the game controller supports point-of-view hat or mode.
Continuous Degree Bearings - the game controller supports rotation.
State - specifies whether the device is plugged-in or not.

Min/Max X-Position - the range of values possible for X-axis.
Min/Max Y-Position - the range of values possible for Y-axis.
Min/Max Polling Interval - the range of time intervals the device can be polled at. This determines the responsiveness of the controller.

Tips

This module does not generate any tips.

Sound Card Information

Shows detailed information about the sound card installed, and the various sound drivers installed:

• Wave Devices - Recording and Playback
• MIDI Devices - Control (input/output) and Playback
• Mixer Devices
• Auxiliary Devices

• **Command Line Switch**: SoundInfo
• **Requirements:** Sound card, multi-media drivers installed
• **OS Support**: Windows 95, 98, NT

<u>**Explanations**</u>

Wave Devices - are the digital audio devices present in your system. They are used for voice playback and special effects in games.
MIDI Devices - are the music devices present in your system. MIDI is an interface allowing the connection of various musical devices for playback or recording purposes.
Mixer/Auxiliary Devices - are mixer channels that handle the mixing of the audio, MIDI, Video, line-in, line-out, CD, microphone, etc. devices.

Name - the name of the device. Sandra cannot (sometimes) detect devices released **after** this release of Sandra! Update your copy of Sandra.
Manufacturer - the name of the company that wrote the driver for the device.
Version - the version of the device driver.
Product ID - the unique ID number assigned to this device.

Sampling Bits - the maximum number of sampling bits used for playback or recording. Current devices use 16-bits which convey higher quality music than older 8-bit devices.
Sampling Rate - the maximum sampling rate supported by the device in kHz. This is the number of times the sound is sampled in one second. Latest devices can sample at 44.1kHz.
Channels - the number of supported channels.
MIDI Device Type - the type of MIDI device the device implements, generally the type of synthesiser implemented.
Auxiliary Device Type - the type of input/output device this mixer channel deals with.
Voices - the maximum number of voices that can play at any one time.
Notes - the maximum number of notes that can play at any one time.

Device Capabilities - lists the various functions the device supports. This depends on the type of device. A device does not need to support all the functions, some are not required. The performance has nothing to do with the number of functions supported - only usability is affected.

See <u>List of Acronyms</u> for more information.

<u>**Tips**</u>

W700 - a sound card is required in today's PCs since most programs need one, not just games. You should purchase one.
W701 - wave/audio drivers are vital to the operation of the sound card. Unless your sound card supports only MIDI, this means that some drivers are not installed properly. Run the Add New Hardware Wizard.

W702 - wave/audio recording drivers are not installed. You will not be able to record using your sound card. Generally all sound cards support recording. Check with your sound card manual.

W703 - MIDI/music input drivers are not installed. You will not be able to plug-in and use external MIDI devices like keyboards and synthesisers. Most sound cards should support this, although few people actually use this.

W704 - MIDI/music playback drivers are not installed. You cannot play MIDI music. Most sound cards do have a synthesiser built-in and this means that some drivers have not been installed properly.

W705 - no mixer drivers are installed. All sound cards contain a mixer. If mixer drivers are not installed you won't be able to set the volume/balance for channels or you may not hear any sound at all. Re-install the sound drivers.

W706 - no auxiliary drivers are installed. This means that some channels may be muted or you won't be able to adjust their volume/balance. Check that your sound drivers have been properly installed.

T707 - Today's sound cards use 16-bit sampling which offers better sound quality. While 8-bit devices still work you should upgrade your sound card.

T708 - Today's sound cards support at least 2 channels (stereo). Mono sound cards have long been superseded by stereo devices. You should upgrade your sound card.

T709 - Your sound card does not support the high quality sample rates used for high quality (CD) music. The quality of sound from audio devices (wave, video, etc.) may be less than optimal. You should upgrade your sound card if possible.

W710 - the driver for the sound card seems to be obsolete. Make sure it was written specifically for Windows 95+ and it is not an old (legacy) driver.

Mouse Information

Shows detailed information about the mouse input device and drivers installed:

• Mouse Information
• Mouse Driver Information
• Configuration Settings
• Windows for Pens Support
• Accessibility Features

• **Command Line Switch**: MouseInfo
• **Requirements:** Mouse or pen present
• **OS Support**: Windows 95, 98, NT

Explanations

Name - the type and make of the mouse.
Buttons - the number of buttons the mouse has and are supported by the mouse driver.
Type - the way the mouse is connected to the PC. Most mice today are PS/2 type, but there are also USB, Serial and Bus mice.
Port - the port the mouse is connected to.
Interrupt - if the mouse requires a specific interrupt, the number of the hardware interrupt used by the mouse.
COM Port Address - if the mouse is connected through a serial (COM) port, the hardware address of the I/O ports used by the serial port.
Plug & Play Version - the version of plug & play the mouse supports.

Driver ID - the filename of the mouse driver.
Version - the version of the mouse driver.
DOS Version - if a DOS (real-mode) mouse driver is installed, the version of the DOS mouse driver.
Pen Windows - specifies whether the mouse driver supports pen input.

Button Configuration - specifies whether the user uses the mouse with the right or the left hand.
Pointer Trails - specifies whether the pointer trails are active. Pointer trails improve mouse pointer visibility on laptop displays.
Tracking Speed - the index of tracking speed.
X/Y Threshold - the X/Y-axis movement threshold, i.e. no of units of movement that   the mouse must be moved in order to register a movement.
Double Click Speed - the maximum time between 2 mouse clicks that are taken to represent a double-click instead of 2 separate clicks.

Accessibility Features - various settings used to make Windows more accessible for disabled users. Must be installed and configured specifically.

See List of Acronyms for more information.

Tips

T800 - If you are not a disabled user and/or you don't use them it is better to un-install them to reduce memory consumption and potential problems.
T801 - the DOS mouse driver version is very old. You should use the DOS mouse driver supplied with Windows or the latest version provided by the mouse manufacturer.

W802 - the double-click speed has been set very low - make sure you're able to double-click!

Keyboard Information

Shows detailed information about the keyboard input device and drivers installed:

• Keyboard Information
• Keyboard Driver Information
• Configuration Settings
• Accessibility Features

• **Command Line Switch**: KeyboardInfo
• **Requirements:** Keyboard present
• **OS Support**: Windows 95, 98, NT

Explanations

Type - the name and type of the keyboard.
Type/Sub Type - the hardware type and sub-type assigned to this type of keyboard.
Function Keys - the number of function keys available on the keyboard. Modern keyboards have 12 function keys, F1 to F12.
Intercept Support - whether the keyboard controller supports a special function used to change various settings.
Get/Set Typematic Rate - an enhanced functionality of some keyboards. This enables you to modify the Repeat Speed and Repeat Delay. These two variables can be changed usually from the BIOS.
Keyboard Controller - the controller built-in your keyboard. Usually this is an Intel 8042 or compatible. However, some keyboards may have different controllers which support different functions.
Layout ID - the ID number assigned to this keyboard layout.
Layout Type - the country this keyboard was designed for.

Driver ID - the filename of the keyboard driver.
Version - the version of the keyboard driver.
DOS Version - if a DOS (real-mode) keyboard driver is installed, the version of the DOS keyboard driver.
Code Page - the code page the keyboard uses. Code pages specify characters used by different countries.

Repeat Delay - shows how long the computers waits after you press and hold down a key. For example 2 is a medium repeat delay (nearly the default) while 0 is fast, i.e. the computer will not wait at all.
Repeat Speed - shows how fast a key repeats when you press and hold it down. Roughly it means characters/second. For example 16 is a medium repeat speed; 22 is fast where 9 is slow

Accessibility Features - various settings used to make Windows more accessible for disabled users. Must be installed and configured specifically.

See List of Acronyms for more information.

Tips

T900 - If you are not a disabled user and/or you don't use them it is better to un-install them to reduce memory consumption and potential problems.
W901 - the type of keyboard installed is not the standard type. Unless you're using a laptop

or a special keyboard you could be using the wrong driver.

T902 - If you don't live in the U. S. and use DOS shells/programs you may find that certain characters cannot be typed or other characters are typed in their place. Usually this means that the computer thinks that you're using a U. S. type keyboard while you may be using a British keyboard, for example. You need to install the **keyboard.sys** driver and/or **contry.sys** driver.

Media Control Devices (MCI) Information

Shows detailed information about the Media Control Devices installed in your system:

• AVI, MPEG, VideoCD, Motion Video
• Animation
• Video Cassette Recorder (VCR)
• Laser Disc
• Wave Audio
• MIDI Sequencers
• CD Audio

• **Command Line Switch**: MCInfo
• **Requirements:** Multimedia drivers installed
• **OS Support**: Windows 95, 98, NT

<u>Explanations</u>

MCI - Media Control Devices are device drivers which handle various aspects of the Windows system by providing a simple generic interface which lets you play multimedia files (audio, video, animation, MIDI, etc.). Sandra cannot (sometimes) detect devices released **after** this release of Sandra! Update your copy of Sandra if this happens.

Name - the name and make of the device.
Type - the type of device.
Alias - the shortened name which uniquely identifies this device.
Full Name - the complete name and interface type of this device.

Driver ID - the file name of the device driver.
Version - the version of the device driver.

Device Capabilities - lists the various generic functions the device supports. This depends on the type of device. A device does not need to support all the functions, some are not required. The performance has nothing to do with the number of functions supported - only usability is affected.

Specific Device Capabilities - lists the various specific functions the device supports. This depends on the type of device. A device does not need to support all the functions, some are not required. The performance has nothing to do with the number of functions supported - only usability is affected.

See <u>List of Acronyms</u> for more information.

<u>Tips</u>

This module does not generate any tips.

Advanced Power Management (APM) Information

Shows detailed information about the APM interface and drivers installed:

• APM Interface Information
• Power Status
• Battery Status
• System Status

• **Command Line Switch**: APMInfo
• **Requirements:** APM BIOS, APM support enabled
• **OS Support**: Windows 95, 98, NT (partially)

Explanations

APM - APM (Advanced Power Management) is a system which manages the power of your PC. Usually this means the power of batteries for notebooks although it is also used in desktop computers. By turning off some devices (e.g. power down monitor, stop hard disk rotation, reduce CPU frequency, etc.) the power consumption is reduced thus increasing the life of the batteries.   Also, in the case of monitors the life of the tube is also increased.

APM Version - the version of the APM BIOS interface. Latest version is 1.02.
Program Support - whether the APM interface supports 16-bit and/or 32-bit protected mode software or just real mode.
APM Status - whether the APM is currently operational or it has been disabled.
AC Line Status - the status of the power connection to your PC.   It can be On-line, i.e. powered by the mains or Off-line, i.e. powered by batteries.

Battery Status - whether a battery is currently plugged-in and if so whether it is charging.
Battery Life - the percentage of the full capacity that is still available.
Battery Remaining Time - an estimation of the time left before no more power is left based on the current rate of consumption or based on recent history.

Clock slow-down - whether APM can reduce the CPU frequency in order to conserve power.
Global stand-by - whether the computer can enter stand-by mode.
Time Wake-up - whether the computer can wake-up at a certain time automatically
Ring Wake-up - whether a telephone ring can wake up the computer using a modem.
PCMCIA Ring Wake-up - whether a telephone ring can wake up the computer using a PCMCIA modem.

See List of Acronyms for more information.

Tips

T1100 - Typically desktops don't need to use APM. Monitors don't need APM to shut-down, this is done using VESA/PM by the video adapter.
W1101 - Since APM tries to conserve energy at the expense of performance, if you don't need to conserve energy you should disable APM to get the maximum available performance out of your PC.
W1102 - If CPU clock-slowdown is enabled you will get reduced performance. See W1101.
W1103 - The battery level is low, so find a mains supply, change the battery or save your work before it's too late.
T1104 - The latest version of APM is 1.02 which adds various new improvements. Check whether a BIOS upgrade is available.

W1105 - The drive spin-down time may be too low. In general manufacturers recommend 30-60 minutes for a desktop or 10-30 minutes for a portable. A small value may reduce the drive's life since changes in temperature adversely affect hard drives.

T1006 - Drive spin-down is not very useful for desktops running from the mains since other devices consume much more power. Usually hard drives are left running since this keeps the temperature relatively constant which requires less thermal re-calibration.

PCI & AGP Buses and Devices Information

Shows detailed information about the PCI and AGP buses and the devices (cards) connected to them:

• PCI & AGP Bus Interface Information
• Device Information & Capabilities

• **Command Line Switch**: PCInfo
• **Requirements:** PCI or AGP system, version 2.00 or higher
• **OS Support**: Windows 95, 98

<u>**Explanations**</u>

PCI Bus - PCI (Peripheral Component Interconnect) is a local bus capable of self-arbitration. Current versions (2.00 & 2.10) are 32-bit at 33MHz with 64-bit 66MHz and faster on the horizon. It is the principal bus used in today's PCs. Bridges can be used to connect PCI buses together or to connect to ISA, EISA, MCA, PCMCIA or other bus types

AGP Bus - AGP (Advanced Graphics Port) is an extension to PCI (though not compatible) allowing graphic adapters to use system memory, as well as being faster at 66MHz and above. Can typically transmit 2x or 4x more data than PCI in the same time.

PC & AGP Bus Interface Version - the version of the PCI standard this implementation complies with. However, while the 2.10 specifications includes 66MHz support this does not mean that 2.10 compliant buses and adapters will actually run at 66MHz. Similar for other features. Also, note that ALL adapters must support a feature for it to be enabled, so don't use very old cards.
No Buses - the number of installed buses, up to 255. Usually there is only one or at most two.
Configuration Space Access Mechanisms - specifies the CMOS access type, either using an address & data register (type 1) or the an I/O mapped address (type 2) for the configuration data.
Cycle Generation Mechanisms - specifies the configuration mechanism type that generates the messages within the special cycle.

Device Type - the class & subclass the device belongs to, e.g. video adapter, disk controller, bridge, network adapter, etc.
Device ID - the number of the device in hexadecimal assigned on the bus, the bus it is attached to and the function in a multi-function device. Generally most adapters have one functional unit only, but chipsets can have as many as 4.
Windows Device Name - the name of the device Windows thinks this device is. This is the name of the product and not the name of the actual chipset/device. Same device sold by multiple vendors may use different names and different drivers.
OEM Device Name - the real name of the chipset/device. This includes the name of the real manufacturer (OEM) and not that of the re-seller. This determines the driver used for this device by Windows. Sandra cannot detect devices released **after** this release of Sandra! Update your copy of Sandra if this happens.
Hardware ID - the unique PCI identifier for this device. No two different devices have the same id. Every new PCI device/chipset must be registered with the PCI Standards Organisation and assigned an unique id.
Product Device Name - the name of the product and that of the product manufacturer. This should tally with the Windows Device Name unless you're using different drivers. This was introduced to differentiate between products using the same chipset. Sandra cannot

detect devices released **after** this release of Sandra! Update your copy of Sandra if this happens.

Product Hardware ID - the unique PCI identifier for this device. No two different devices have the same id. Every new PCI device/chipset must be registered with the PCI Standards Organisation and assigned an unique id.

Revision - the revision of the device (silicon mask version). 0 means the very first version. Usually, later versions contain bug fixes and maybe performance enhancements.

AGP Device - whether this device is a AGP device (i.e. enhanced) or just a normal PCI device.

Device Properties - lists the various generic characteristics of the device. This depends of the type of device. A device does not need to support all the functions but, sometimes the more it supports the better. Also the performance may vary to the actual setting of some of this variables.

Line Cache Size - the size of the buffer-cache in bytes. A small cache can speed-up some transactions, and some devices have a 8-byte (2 32-bit words) cache.

Latency Timer - specifies the maximum length of a bus transfer in cycles set-up for this device. Higher numbers means this device can use more of the bus bandwidth but this can slow-down other devices. You can set modify this value from the BIOS, higher numbers (up to a point) are better. The range is between 32-255.

I/O Access - specifies whether this device uses I/O ports.

Memory Access - specifies whether this device uses system memory.

Bus-Master Capable - specifies whether this device can take control of the bus and transfer data without outside support - which is generally faster.

Special Cycle Recognition - the device recognises and can transmit messages to all the other devices on the bus using special "broadcast" cycles.

Memory Write & Invalidate - whether this device supports a caching algorithm similar to write-back caching used by system caches.

VGA Palette Snoop - whether the device allows access to its palette registers by other cards. Typically PCI video cards must allow snooping by ISA overlay cards for the ISA card to use the correct palette.

Parity Error Response - whether the device supports parity generation and detection.

Wait Cycles - whether wait cycles are used by this device in order to operate correctly. If all signals can become active simultaneously, wait cycles are not used, resulting in higher performance.

System Error Line - whether the system error line is active. This line must be active if the system is to detect parity errors reported by the devices.

Fast back-to-back Transactions - specifies whether this device can coalesce transactions and execute them in less time, one after another, in less time than if done normally. This "compression" can result in higher performance if many transactions need to be done.

66MHz Bus Support - whether this device can run at 66MHz. A PCI bus runs at 66MHz only if all devices can run at this speed.

User Defined Features Support - whether this device supports user defined features.

Device Select Timing - specifies the timing used for this device. This does not specify the actual speed of the device, but rather what timing is used to identify this device on the bus.

Interrupt Line -the actual hardware IRQ used by this device, if any. If the device uses a PCI interrupt line, this must be mapped to a hardware interrupt (e.g. ISA). However, modern chipsets and the newest Windows 95 version uses PCI IRQ Steering to use only one hardware interrupt (shared) for all the PCI cards. Otherwise, there would not be enough hardware interrupts.

Interrupt Pin - the PCI interrupt line used by this device. There are 4 interrupt pins for PCI (A to D) assigned to each PCI adapter. If the device requires an interrupt, generally INT A is assigned, the other 3 are used for the other functions in a multi-function device.

See <u>List of Acronyms</u> for more information.

<u>Tips</u>

T1200 - As discussed above, the 2.10 revision offers more functions and greater compatibility since most of today's PCI devices are 2.10 compatible and may not run on older versions. Check whether a system BIOS upgrade is available.
T1201 - This device is the very first revision. While this does not mean it is buggy in any way, all new devices are potentially buggy. It's up to you if you want to live on the "bleeding edge".
T1202 - Bus mastering is a method of transmitting data by taking control of the bus. This is much faster than making many smaller transactions if a lot of data is to be transferred over the bus. Advanced devices transferring a lot of data support this feature.
W1203 - VGA palette snooping is only useful if you have an ISA bus capture or overlay card to synchronise with the palette of the video card. Otherwise you should disable it or video performance may be seriously impaired.
W1204 - This device seems slow. While this does not hamper the bus speed directly transactions with this device will take longer and thus reducing the overall efficiency.

Windows Operating System Information

Shows detailed information about Windows and its subsystems:

• Windows Operating System Information
• DOS Sub-System Information
• OS Properties
• OS Folders
• Regional Settings

• **Command Line Switch**: WinInfo
• **OS Support**: Windows 95, 98, NT

<u>**Explanations**</u>

Name - the name and version of the operating system as reported.
Full Name - the true name, version, revision and other information about the operating system.
Windows ID - the product ID of the operating system.
Owner - the name of the licensee.
Organisation - the name of the organisation the licensee's organisation.
Plus! Version - the name and version of the Plus! Pack if installed.
Plus! ID - the product ID of the Plus! Pack if installed.
DOS Operating System - the name, version and revision of the DOS operating system your current operating system runs on or emulates.

Computer Name - the name assigned to this computer.
User Name - the log-in name of the current user (i.e. you).
Display Scheme - the name of the display scheme used.
Time since start-up - the time this system has been running for.

Debug Version - whether this version is the special version used by developers.
Security Present - whether this version implements tough security precautions (e.g. NT).
Double-byte Compatible - whether this version supports double-byte characters as used in the middle-east or oriental languages.
Middle-East Compatible - whether this version supports the middle-east specific additions and modifications.

Boot Type - whether the boot was the normal type of booting or safe-mode, safe-mode with network, safe-mode with logging, etc. The other types are used only when a problem appears.
Boot Configuration - if boot configurations are used, the name of the configuration used at boot-up time.
Boot into Windows - whether Windows is loaded automatically or the booting stops when the command prompt is reached (i.e. like DOS). To start Windows, type **win**.
Muti-boot Enabled - whether this system can boot into different operating systems at start-up, e.g. DOS, Windows 95, Windows NT, etc.
Boot Windows by Default - whether Windows 95 is chosen as the default operating system at boot-up if the system is configured for multi-boot.
Start-up Delay - how long Windows will wait after starting the boot-up process to check whether any function keys are pressed.
Show Boot Menu - whether a boot menu is shown every time Windows is booted. Usually this menu is shown only when a problem has been detected or you have modified the boot process by pressing the function keys.

Boot Keys Enabled - whether the boot function modifier keys can be used.
Default Menu Item - the name of the menu item used as the default for boot-up.
Default Menu Select Delay - how long Windows waits if you have not chosen a boot-up menu item before it automatically selects the default one.

Show Windows Logo - whether the animated splash screen is shown during booting.
Auto-load Double Buffering - whether double-buffering is enabled. This is automatically enabled if DOS DMA drivers are used (e.g. SCSI drivers).
Auto-load DoubleSpace - whether DoubleSpace is enabled. If you're not using compression, this should be disabled to save more memory for other programs.
Auto-load DriveSpace - whether DriveSpace is enabled. If you're not using compression, this should be disabled to save more memory for other programs.
Load Command Interpreter High - whether the command interpreter can be loaded into HMA (High Memory Area) or HMB (High Memory Blocks) to free base memory for other programs. This should be set unless you're using old versions of the Novell NetWare Shell.
Network Drivers Enabled - whether the network drivers are enabled or not. These should be disabled when you suspect there may be a problem caused by the network.
Safe Mode Start-up Warning - whether the system will inform you of a previous system crash and whether it will boot into Safe Mode by default.
Logging Disabled - whether the boot-up logging is enabled or disabled. This is useful to check whether the problem occurs.

Windows Folder - the location of the main Windows folder.
System Folder - the location of the System folder.
Program Path - the path used by the system.
Temporary Folder - the location of the folder used for temporary files.

Country - the country the computer is in.
ANSI Code Page - the code page used for the ANSI character set.
OEM Code Page - the code page used for the OEM character set.

See List of Acronyms for more information.

Tips

T1300 - If you are the owner of this copy of Windows and this computer is at your home it is customary to enter the house name and address or just "**home**".
T1301 - You should enter you full name if you're the owner of this copy of Windows.
T1302 - If you're not using any real-mode DOS DMA drivers you can save memory and improve performance by disabling double-buffering. The system should do this for you.
T1303 - You should disable DriveSpace or DoubleSpace if you're not using compression to save memory.
T1304 - The Plus! Pack includes many new improvements and it is generally worth buying unless you are really short of money. While it uses more resources it will make you Windows experience more enjoyable.
T1305 - Windows has been running for a long time on this machine. Windows 95 is still not as reliable as Windows NT and performance may deteriorate over time due to rogue programs or memory fragmentation. You should reboot it regularly.
T1306 - The **win.ini** configuration file is much larger than usual. If you have installed and un-installed many programs or have used Windows for years it may be time to clean-it op or even delete it and re-install it from scratch.
T1307 - The registry is much larger than usual. If you have installed and un-installed many programs or have used Windows for years it may be time to clean-it op or even delete it and re-install it from scratch.
T1308 - While the Windows logo is cute, if you want to see the boot-up messages and boot

faster you should consider turning it off.

T1309 - The task-bar should be set to auto-hide to maximise available desktop space, especially on a small monitor. This way you get the best of both worlds unless you need to switch between applications regularly.

T1310 - A patch for the original version of Windows 95 (OSR1 to 950a) can be downloaded and installed from Microsoft's site. You are advised to do it.

T1311 - A patch to Windows 95 OSR2 which includes various new updates can be bought or obtained when buying a new computer. If you have the money it is worth it.

T1312 - The **system.ini** configuration file is much larger than usual. If you have installed and un-installed many programs or have used Windows for years it may be time to clean-it op or even delete it and re-install it from scratch.

DOS Memory Information

Shows information about the DOS memory available to a process in a DOS virtual machine:

• Base Memory (Low) Information
• UMB Memory Information
• EMS Memory Information
• XMS Memory Information
• HMA Memory Information
• DPMI, VCPI Memory Information

• **Command Line Switch**: DosMemInfo
• **OS Support**: Windows 95, 98

Explanations

Base Memory - (DOS or real mode memory) this is the memory used by DOS and its programs to run in (below 1MB). No matter how much memory you actually have, you still cannot use more/bigger DOS programs unless they use EMS or XMS memory.
Total - the total amount of base memory. This should always be **640KB** unless you use some special hardware or your computer is very old.
Free - the total amount of currently available base memory.

UMB - (Upper Memory Blocks) are blocks of memory found between memory locations B000-EFFF (or C800-EFFF), the area normally reserved for various BIOS ROMs. But, these do not occupy all the space, so we can use this holes to load programs and free base memory. UMBs are provided by an EMS driver like EMM386, QEMM386 or Windows. Depending on configuration you may have around 160KB of UMB space. If you use EMS memory with a page frame then you lose 64KB. The more cards you have the less UMB space remains free. You can load TSR programs in the UMBs left using DOS commands manually or using MemMaker.
Total Memory - the sum of all UMBs provided by the memory manager.
Free Memory - the sum of all available UMB blocks. Note that due to fragmentation some of those blocks may be too small to be used.

EMS Memory - As Base Memory is restricted to about 640KB, a Lotus / Intel / Microsoft (LIM) collaboration developed a technique for making more memory available to programs. The EMS (Expanded Memory Specification) bypasses these limits by supporting memory cards (386+ computers usually emulate it with emm386 or compatible memory manager) that contain 16KB memory pages (banks) that are mapped into the address space by the processor. Applications must be specially written to uses EMS, so most old DOS heavyweight programs use it. You will need to specify a generous amount of it in the program properties if you work with large data.
LIM Version - the EMS specification supported by the EMS memory manager. The latest is **4.0** - and is compatible with older versions.
EMS Page Frame - the real mode address of the memory buffer used to transfer data between programs and the EMS memory pool.
Total Memory - the default amount of memory Windows provides to DOS programs.
Free Memory - the amount of currently available EMS memory. This is always **100%** as Windows does not use any.

XMS Memory -   Windows uses XMS (eXtended Memory Specification) memory itself provided by HIMEM (or compatible memory manager) accessing it directly. Windows also caches XMS through the memory manager, taking advantage of the attributes of Windows

applications memory segments. Also, Protected Mode DOS applications can use DPMI and VCPI to access XMS.

Interface Version - the XMS specification supported by the XMS memory manager. The latest is **3.0** - and is compatible with older versions.

Driver Version - the version of the XMS driver itself which is in addition to the version of XMS memory it provides.

Total XMS - the total amount of XMS memory available to Windows. This should be equal to the physical memory installed in your computer.

Free XMS - the default amount of XMS memory currently available to DOS applications.

HMA Memory - HMA (High Memory Area) is a 64K block of memory above 1MB which can be accessed by real mode programs due to a quirk in the x86 processor architecture. This can be used to increase the available DOS memory. A XMS driver is required.

HMA in use - whether the HMA is used or it is free.

Total HMA - the total size of the HMA block. This should be **64K** except in special circumstances.

Free HMA - the amount of free memory in the HMA left unused.

DPMI - DPMI (DOS Protected-Mode Interface) is a memory interface which enables DOS programs to run in protected mode using a DOS extender. These DOS programs can be 32-bit (like Windows 95, NT) and use all the installed memory directly, without the need of cumbersome memory managers like EMS or XMS. The Base Memory limitation does not matter any more. Most modern games requiring megabytes of memory uses this interface.

Interface Version - the specification of the DPMI standard supported by the driver. The latest is **1.0**.

Provider Type - whether 32-bit programs are supported or not.

Total Physical Memory - the size of the memory installed in your computer.

Swap File Size - the size of the virtual memory that is available for use.

Free Memory - the amount of system memory (physical & virtual) that is currently available for use.

Page Size - the size of the memory block the memory is partitioned in. Memory is managed in blocks of this size, not in bytes which would make allocation and management much more difficult. Currently this is **4KB**.

See List of Acronyms for more information.

Tips

T1900 - the free base memory is very low. You may be unable to run larger DOS programs. As Windows provides 32-bit device drivers you can remove DOS TSR (Terminate and Stay Resident) programs and any device drivers that Windows does not need.

W1901 - the EMS memory manager is disabled. This is fine if you don't use any DOS programs that require EMS (only quite old programs do), but should you need to run such a program you will need to enable the EMS memory driver.

W1902 - the DPMI memory manager is disabled. This should not happen generally as most modern DOS programs and games use DPMI memory.

T1903 - the DPMI memory that Windows provides to DOS programs is too small to be useful. Most programs require at least 2MB. Increase this using the shortcut properties.

W1904 - DOS programs using EMS version 3.2 need a page frame to work unlike EMS version 4.0 programs. You need to set-up a EMS page frame in order to use them. You will lose 64K worth of UMB.

T1905 - DOS is usually loaded into HMA by default since it generally makes the best use of it. Only in special circumstances should you load another program into HMA instead of DOS. Remember that only one program can use the HMA. Any memory left cannot be used.

Windows Memory Information

Shows information about the system's memory, resources, heaps and drivers:

• Physical and Virtual (Swap File) Information
• Heaps Information
• Resources Information (16-bit as well)
• Windows Base Memory Information

• **Command Line Switch**: WinMemInfo
• **OS Support**: Windows 95, 98, NT (partially)

<u>**Explanations**</u>

Total System Memory - the total amount of memory (physical & virtual) that is available to Windows.
Free System Memory - the total amount of memory (physical & virtual) which is currently unused.
Total Physical Memory - the amount of physical memory installed in your computer.
Free Physical Memory - the amount of unused physical memory. This can be zero most of the time as Windows tries to use all available physical memory to improve performance.
Maximum Swap File - the maximum size that the swap file (virtual memory) can grow to. Generally this is somewhat less than the free space on the drive that contains the swap file.
Current Swap File - the current size of the swap file. This should be as low as possible, since virtual memory is very slow compared to physical memory.
Free Page File - the current size of unused space in the swap file. Too high a number may mean that the swap file is too large; too low a number may mean that you need to add more physical memory or increase the size of the swap file.
Page File Drive - the drive that contains the swap file.

NB - Unless you know what you are doing you should let Windows manage the swap file.

True Allocated Memory Load - the percentage of allocated memory with respect to the installed physical memory. This is almost always over 100% since Windows utilities all physical memory as well as a bit of the swap file even when it does not need any.
Total Windows Base Memory - the total size of DOS memory available to Windows programs. This should always be 640K unless special memory managers are used or special cards.
Free Windows Base Memory - the total size of DOS memory that is available to use by Windows programs. While Windows programs don't use base memory, some need it to communicate with DOS programs, device drivers or legacy hardware.
Largest Free Base Memory Block - the size of the largest contiguous block of free base memory available. Due to fragmentation this is less than the free base memory.

16-bit System Resources - the percentage of free system resources in the 16-bit Windows sub-system. While Windows 95 provides much better resource management than Windows 3.1, 16-bit code is still present. This is the percentage of free 16-bit heaps and you should keep it above 20%.
16-bit GDI Heap Free - the GDI Heap is memory used to store the graphical elements in Windows, e.g. icons, pens, bitmaps. If you run programs which use a lot of bitmaps, icons, etc., you could run out of GDI Heap. In Windows 3.1 this was only 64KB no matter   how much memory you had. You should keep it above 20%, otherwise crashes can occur.
16-bit User Heap Free - the User Heap is memory used to hold information on active windows and other related information. In Windows 3.0 the Menu and String Heaps are

included in the User heap. In Windows 3.1 this heap was only 64KB. Running many large applications may result in a crash if the free percentage becomes lower than 20%.

See <u>List of Acronyms</u> for more information.

<u>Tips</u>

T2000 - For Windows 95, at least 16MB of physical memory is recommended, though 32MB is better. Windows NT runs optimally in 64MB of physical memory. You should add more memory.
W2001 - The free system resources are low. You may have insufficient memory to use all the currently loaded applications simultaneously. Alternatively if some programs have crashed or Windows is running for a long time, there may be too much memory/heap fragmentation - so re-boot Windows and try again.
W2002 - The memory load is 200% or more. Windows is using more than twice the memory you have installed which not recommended. Your system may become too slow to be usable. You need to close down some applications or install more memory if you need to run the all simultaneously.
W2003 - The swap file is almost full. You should increase the size of the swap file if you decided not to let Windows manage the swap file itself. However, if the swap file is currently as big or bigger than the installed physical memory you may need to add more memory rather than increase the size of the swap file.
W2004 - The swap file is too large compared to the amount of physical memory installed. There is no point in making the swap file bigger than 2.5 the size of physical memory as the system will become unusable long before this limit is reached. You may be wasting disk space unnecessarily.
T2005 - While letting Windows manage the swap file is generally better, performance may suffer as the swap file needs to grow/shrink depending on memory requirements. Also, it may become fragmented or allocated in a different part of the disk which further reduces performance. If you know what your memory requirements are you should set the size yourself, preferably making a constant size (i.e. min size = max size).
W2006 - The free base memory available to Windows is low. This typically means that there are legacy TSR and DOS device drivers which may not be needed in the present configuration since Windows uses 32-bit plug & play device drivers. You should remove all DOS TSR and legacy device drivers that are no longer needed.
W2007 - The swap file driver is currently 16-bit (i.e. using compatibility mode). Open Control Panel - System and fix the problems. Typically a DOS legacy device driver is loaded and interferes with Windows' own disk drivers.
W2008 - The drive that holds the swap file is almost full. The swap file will be unable to grow and you may run out of memory. You should free some disk space or move the swap file to a roomier drive.
T2009 - Memory doublers/compressors rarely do what it is stated on the box and are more trouble than they are worth. Since physical memory prices are rather low it is better to buy more physical memory than use software memory compressors. You should remove them.
W2010 - Your memory manager is not the one provided with Windows and appears to be obsolete. This may cause many problems. You should un-install it and let Windows use its own memory manager.

Ports Information

Shows detailed information about the parallel (LPT) and serial (COM) ports available to your system:

• Port Device Information
• Port Driver Information & Settings
• Device(s) Connected to Port
• Port Configuration
• Provider Capabilities

• **Command Line Switch**: PortsInfo
• **OS Support**: Windows 95, 98, NT

Explanations

Port ID - the port name.
Port Type - the port type, e.g. serial or parallel.
Port UART - serial ports use an UART (Universal AsynchRonous Transmitter) chip which is a converter that transforms data from parallel 8-bit to the required standard and vice-versa. It also manages the COM port and the connections. This is very important for communications thruput and all modern computers use at least an **16550A** or better.

Driver ID - the port driver file name.
Driver Version - the port driver file version.

Devices Connected to Port - the list of devices connected to this port.

Packet Version - the version of the send/receive packets.
Packet Size - the maximum size of a data packet.
Provider Type - the type of port hardware.
Receive Buffer - the size of the receive buffer in bytes.
Transmit Buffer - the size of the transmit buffer in bytes.

Provider Capabilities - the list of supported functions provided by the port driver. Not all functions need to be supported although most usually are. The performance of the port does depend on the supported functions although this depends on port type, usage, etc.

Default Port Configuration - the settings used as default for the port. Do note that modems and other hardware using the port re-configure these settings when they become active, so this list if just a guideline.

See List of Acronyms for more information.

Tips

T1400 - To get reliable and fast communications in Windows the UART driving the COM port must have large (e.g. 10-16+) internal data buffers. Only 16550 or later UARTs do and you should have at least an 16550A UART especially if you have a high-speed modem. You may need to use an internal modem or buy a fast serial card for your computer.

OLE Servers Information

Shows detailed information about the OLE object types installed in your system and the servers which provide them:

• Object Information
• Server Information

• **Command Line Switch**: OLEInfo
• **Requirements:** OLE servers installed
• **OS Support**: Windows 95, 98, NT

Explanations

OLE - or Object Linking & Embedding is a method of exchanging information between running applications. You can create a document that includes information such as charts, graphics, and spreadsheet data created by other applications. You can embed objects created by applications that support Windows and object embedding. You must have enough memory to run all of the applications you are using at once. All the information used to create the object is kept with the document which contains it. To edit the object, you simply select it. The server is started so you make the editing or formatting changes you want. When you switch back, the object is updated with the changes you made.

Class ID - the ID number that identifies this OLE server.
Object ID - the ID name (or nickname) that identifies this OLE server.
DDE Suport - DDE or Dynamic Data Exchange is a set of procedures which are used by applications to communicate with one another using defined protocols which may not be application specific. Information contained in a document created by another application, for example, can be updated automatically when it changes - ensuring information synchronisation. Here, it means that the server has defined the DDE commands that can be used to communicate with it. The available commands vary from application to application, but there are a set of main functions.
Insertable - specifies whether the object can be inserted (as a container) in an OLE client. OLE 2 Object - specifies whether the server supports the OLE 2.0 standard which   enables in-situ editing of objects, i.e. the server application takes over the client application - which makes easier editing. All new Software Suites support this for better integration

Server Application Information - the server file name, properties and information.

See List of Acronyms for more information.

Tips

This module does not generate any tips.

Processes Information

Shows detailed information about the processes, i.e. jobs running in your system. A process can create many threads and tasks:

• Process Information
• Module Information
• Threads Owned Information
• Modules Used Information
• Memory Footprint Information

• **Command Line Switch**: ProcessInfo
• **OS Support**: Windows 95, 98

Explanations

Window Class - the name of the class the window of this process belongs to. Each window belongs to a class which holds the windows attributes, settings, etc.

Module Name - the name of the module in the system.
File Name - the file name of the module in the file system.
Process Type - the type of process, e.g. 32-bit or 16-bit.
Process Priority - the priority of the process. All processes, except special system processes should run at the normal priority. VIP processes run at higher priorities and idle processes run at lower priorities.
Expected Windows Version - the version of Windows this process was designed for. For Windows 95 this number should be **4.0**.
Total Threads - the number of threads that belong to this process.
Usage Count - the number of processes that use this process.
Process / Glocal Count - the number of instances of this process.
Started By - the name of the process that started this process.
Memory Used - the amount of memory used by this process (excluding libraries).

Modules Used - the list of libraries used by this process, including their name, type (32-bit or 16-bit), number of processes that use that library and amount of memory used by the library.

Threads - the list of threads created by this process and their priorities.

Heaps - the list of heaps used by this process (dynamic data allocation), their size and the total amount of memory used by all the heaps.

Total Process Memory Used - the total amount of memory used by this process, including libraries, threads, heaps, stacks and other memory.

File Information - the process file name, properties and information.

See List of Acronyms for more information.

Tips

W1600 - This process is either a 16-bit process written for Windows 3.1 or a 32-bit process written for a previous version of Windows NT. You should check whether a new version is available.

Modules Information

Shows detailed information about the modules loaded in your system. Tasks, processes, drivers, libraries, etc. are modules themselves:

• Libraries (DLL, etc.)
• Processes (EXE)
• Device Drivers (DRV)
• Fonts (FON)

• **Command Line Switch**: ModuleInfo
• **OS Support**: Windows 95 (only)

Explanations

File Name - the module file name.
Module Usage - the number of processes and modules that use this module.
Expected Windows Version - the version of Windows this process was designed for. For Windows 95 this number should be **4.0**.
Memory Alignment - the number of bytes the module data is aligned on. If 2 bytes alignment is used, for example, a 1 byte variable will be allocated 2 bytes for faster access on 16-bit+ processors.

Module is a Library - whether the module is a library or not.
Module Type - whether this module is 32-bit or 16-bit.
Self-Loading Module - whether this module is loaded by Windows by default.
Implicit-Loading Module - whether this module is implicitly loaded by Windows.
Module Has Shared Data - whether this module uses shared data.
Module Has Auto Data - whether this module uses automatic data.

File Information - the module file name, properties and information.

See List of Acronyms for more information.

Tips

W1700 - This module is either a 16-bit process written for Windows 3.1 or a 32-bit module written for a previous version of Windows NT. You should check whether a new version is available.

Drives Information

Shows detailed information about the drivers connected to your system either removable, fixed or remote.

• Drive & Controller Information
• Volume Information & Properties
• Logical Drive Information
• Disk Cache Information
• Physical Drive Information
• Extended Information
• Partition Information
• Drive Statistics & Slack Information

• **Command Line Switch**: DrivesInfo
• **OS Support**: Windows 95, 98, NT

Explanations

Drive Class - the type of drive: floppy, fixed, CD-ROM, memory, etc.
Drive Device - the full name of the drive type.
Drive Type - extra type information about the drive, e.g. fixed drives can be EIDE/SCSI/RLE, etc.
Disk Controller - the name of the disk controller the drive is attached to.
IDE Device Configuration - if the drive is IDE/EIDE, whether this drive is a master or slave.
DMA Transfers Enabled - whether this drive uses DMA transfers or PIO. DMA is faster, especially if Ultra-DMA is supported.
Total Space - the total space on the drive in MB.
Free Space - the total amount of free space on the drive in MB.

Volume Name - the name of the drive label.
File System - the type of file system used by the drive, e.g. FAT, FAT32, NTFS, etc.
Serial Number - the drive's serial number.

Maximum Filename Length - the maximum size a filename can have. Older drives allow only 11 (8.3) characters, while new ones support 255.
Preserves Filename Case - whether the filename case is preserved.
Supports Case Sensitive Search - whether filename case is important..
Supports Unicode Filenames - whether UNICODE is supported.
Supports Access Control Lists - whether access control security is supported.
Volume is Compressed - whether this drive is compressed.
Supports Individual File Compression - whether individual files or folders can be compressed.

Sectors Per Cluster - the number of sectors in one cluster.
Bytes Per Sector - the number of bytes in one sector. Usually this number is **512** bytes.
Cluster Size - the size of the cluster. This should be as low as possible to minimise wasted space.
Total Clusters - the total number of clusters on this drive.
Total Free Clusters - the total number of available clusters on this drive.

Current Disk Cache - the current size of the disk cache in MB. This should be as high as possible but not at the expense of system memory.
Maximum Disk Cache - the maximum size the disk cache can grow to.

Minimum Disk Cache - the minimum size the disk cache can shrink to.
Typical Role - the typical role of your computer. The disk cache is optimised according to this role.

Physical Drive ID - the physical disk ID number if IDE/EIDE/RLE.
CMOS Disk No - the CMOS physical disk type. Drive no. 1-45 are pre-defined, while types 46 & 47 can be defined by user or auto-detected by the BIOS.
Cylinders - the number of cylinders of the physical disk.
Heads - the number of heads of the physical disk.
Sectors Per Track - the number of sectors in one track/cylinder.
Bytes Per Sector - the number of bytes in one sector. Usually   this number is **512** bytes.

Cylinders - the number of cylinders belonging to this drive out of all the cylinders on the physical disk.
Heads - the number of heads belonging to this drive out of all the heads of the physical disk.
Sectors Per Track - the number of sectors in one track/cylinder.
Bytes Per Sector - the number of bytes in one sector. Usually   this number is **512** bytes.
Copies of FAT - the number of FATs (File Allocation Table) the drive keeps. This number should be 2 (1 for backup) unless the drive is guaranteed not to fail (e.g. memory, CD-ROM).
Sectors Per FAT - the number of sectors that make up a FAT.
Media Descriptor - the media ID number for this drive.
Max. Root Entries - the maximum numbers of files & folders on the root of the drive.
Sectors Per Cluster - the number of sectors in one cluster.
Reserved Sectors - the number of sectors that are reserved (e.g. boot sector).
Hidden Sectors - the number of sectors that are hidden (e.g. partition info).

No. Files - the total number of files on this drive.
No. Folders - the total number of folders on this drive.
Space Used - the exact total space taken by the files and folders, not rounded.
Space Allocated - the actual total space taken by the files and folders, rounded to the cluster size.
Slack - the percentage of disk space wasted due to large cluster size. This number should be as small as possible, preferably under 10-20%.

Last Backup - the date you last backed up the drive. You should do it at least every week.
Last Scan - the date you last checked the drive for errors. You should do it at least every week.
Last Optimised - the date you last optimised the drive. You should do it at least monthly.
Last Image - the date you last imaged the drive. You should do it at least weekly.

See List of Acronyms for more information.

Tips

W1800 - the free space on this drive is very low. Programs using temporary files may crash. Delete some files, relocate them to another drive or consider compressing the drive.
W1801 - compression programs may be incompatible with certain programs and typically reduce performance as well as using system resources (processor power, memory). You should consider buying a new drive.
W1802 - large cluster sizes (e.g. 16KB or larger) greatly increase the amount of slack (disk space wasted). You should re-partition the drive into smaller parts or use a 32-bit FAT like FAT32 or NTFS.
T1803 - the maximum disk cache size is low for the amount of system memory you have installed. Generally this should not be lower than ¼ of physical memory installed.

T1804 - the minimum disk cache size is high for the amount of system memory you have installed. The system may need to use the swap file more, thus decreasing performance. Generally, this should not be higher than ¼ of physical memory installed.

T1805 - if you have a lot of memory, changing the typical role to "network server" will improve disk performance at the expense of memory - but this should not be a problem for you.

T1806 - if you have little memory installed, changing the typical role to "mobile computer" will decrease memory usage, and thus improving overall performance.

T1807 - the size of the read-ahead buffer is too small for the size of the memory installed. You should set it to maximum to improve disk performance.

W1808 - large cluster sizes (e.g. 16KB or larger) greatly increase the amount of slack (disk space wasted). You should re-partition the drive into smaller parts or use a 32-bit FAT like FAT32 or NTFS.

T1809 - the CD-ROM cache size is too large compared to the amount of physical memory installed. You should reduce it to improve overall system performance at the expense of a slight drop in CD-ROM performance.

T1810 - using a 32-bit disk driver is recommend. If you are using a legacy 16-bit driver there must be a conflict between Windows and such a driver. You should remove old device drivers and let Windows use a native driver. If Windows does not have such a driver, contact the computer manufacturer for an updated driver.

T1811 - turning on the troubleshooting options may result in incompatibilities. Generally you should not change them.

T1812 - the Recycle Bin size is rather large compared to the free disk space on this drive. Consider emptying it - but check whether you are likely to need any of the deleted files: you won't be able to get the back!

T1813 - you should scan you drive for errors at least weekly to prevent data loss or other problems. Set-up an automatic scan at pre-defined times.

T1814 - you should optimise the drive at least monthly to keep it in shape.

T1815 - if you have moderate memory installed, changing the typical role to "desktop computer" may yield the best performance.

T1816 - the CD-ROM optimise pattern may be set up incorrectly. Generally it should match the speed of the CD-ROM drive.

T1817 - you should back-up the drive at least weekly to prevent data loss. You should schedule backups at regular intervals to tape, CD-ROM, DAT, etc.

T1818 - you should scan the drive for viruses at least weekly, even if you have a virus monitor program. You never know how viruses manage to sneak in downloaded files and other similar ways.

T1819 - you should image the drive at least weekly to improve the chances of error detection and correction should any problems arise.

T1820 - your virus definition files seem old. You should update them at least quarterly, preferably monthly.

T1821 - generally, all drives should have names. You should label/name the drive.

T1822 - DMA transfers are not enabled for this drive. Check whether your drive supports DMA transfers and enable it in Control Panel - System. DMA is faster as the processor is not involved in the data transfer and can do other processing in the meantime.

T1823 - while EIDE drives are cheap and fast, SCSI drives and controllers are recommended for their performance as well as upgradability. You should use SCSI devices if you can.

T1824 - free disk space is low on this drive. Free more space by emptying the Recycle Bin.

T1825 - free disk space is low on this drive. Make more space available by compressing the drive.

T1826 - free disk space is low on this drive. Free more space by deleting some of the unused files and folders.

T1827 - the BIOS drive settings do not seem to be correct. Check them to see if they are set up properly.

T1828 - the CD-ROM cache size is too small for the physical amount of memory installed.

You should increase this to increase the CD-ROM performance

DOS Device Drivers Information

Shows detailed   information about the DOS device drivers installed in your system. While most have been replaced with 32-bit drivers in Windows 95 (VxDs) they still include memory managers, disk, CD-ROM drivers and other various drivers.

• Device Driver Type
• Device Driver Attributes

• **Command Line Switch**: DosDrvInfo
• **OS Support**: Windows 95, 98

<u>**Explanations**</u>

Driver Name - the name of the device driver.
File Name - the file name that corresponds to this device driver. Some are built-in DOS or Windows and are not stand-alone devices.
Attributes - the properties of the device driver. The list of attributes is shown below:

Character - device performs input/output one character at a time (e.g. keyboard, screen).
Block - device transfers blocks of data (e.g. disk, tape).
Input - this character device is the standard input device (STI).
Output - this character device is the standard output device (STO).
32-bit Sec - this block device uses 32-bit sector addressing instead of 16-bit.
Nul - this device is the NULL device.
Clock - this device is the CLOCK device.
Fchar -this character device supports fast character output.
Gen-IO - this block device supports logical drive mapping, generic IOCTL (Input Output Control) queries of both.
Query - this device supports IOCTL queries.
O/C/RM - this device supports the open/close/remove media functions.
FAT-Req - this block device needs a FAT to build the DCB.
OTB - this character device supports output 'till busy command.
R/W - this device supports read/write IOCTL functions.

See <u>List of Acronyms</u> for more information.

<u>**Tips**</u>

T2100 - you do not need to load EMM386 even if your DOS programs need EMM memory. Windows provides an EMM virtual device driver itself. You should remove it to save memory.
W2101 - while Quarterdeck's QEMM is a great memory manager, some of its advanced functions may cause incompatibilities and other problems. In the days of DOS and Windows 3.1 QEMM was great but in Windows 95/98/NT it is not needed. You should remove it to save memory.
T2102 - you only need SETVER if you use old DOS programs which do not want to run with DOS 7 included in Windows 95. Otherwise it is not useful. You should remove it to save memory.
W2103 - using compression (e.g. DriveSpace) may increase your disk space but performance may decrease and some incompatibilities may appear. Also, you computer becomes harder to repair when disaster strikes. You should consider buying a larger disk and remove compression.
W2104 - you do not need to use double-buffering unless you use DOS DMA SCSI disk drivers. However this may cause conflicts with Windows's own drivers. Check whether

double-buffering is really needed.

T2105 - you only need the DOS SoundBlaster drivers if you play games in straight DOS. Windows games or DOS games in a Windows shell do not need them. You should remove them.

T2120 - you do not need DISPLAY device driver for anything unless you want to change the properties of the DOS shell. You should remove it.

T2121 - ANSI was a great device driver in DOS days but it is not used unless you use DOS and want some fancy stuff. You should remove it.

T2122 - DOS CD-ROM drivers are not needed by Windows. Unless you are using straight DOS (not shells) you should remove them to save memory and reduce incompatibilities.

DirectX Information

Shows detailed information about the DirectX interface, devices and drivers installed in the system.

- DirectDraw Video Devices Information
- Direct3D Hardware 3D Accelerators Information
- DirectSound Sound Card Information
- DirectSound Capture (Emulation) Information
- DirectPlay Connections Information
- DirectInput Interface Information

- **Command Line Switch**: DirectXInfo
- **Requirements:** DirectX drivers installed
- **OS Support**: Windows 95, 98, NT

Explanations

DirectX - Microsoft developed DirectX so that the performance of applications running in the Windows operating system can rival or exceed the performance of applications running in the MS-DOS operating system or on game consoles. Developers of these games had to conform to a number of hardware implementations for a variety of cards. With DirectX, games developers get the benefits of device independence without losing the benefits of direct access to the hardware. The primary goals of DirectX are to provide portable access to the features used with MS-DOS today, to meet or improve on the performance of MS-DOS console-based applications, and to remove the obstacles to hardware innovation on the personal computer. Additionally, Microsoft developed DirectX to provide Windows-based applications with high-performance, real-time access to available hardware on current and future computer systems. DirectX provides a consistent interface between hardware and applications, reducing the complexity of installation and configuration and using the hardware to its best advantage. By using the interfaces provided by DirectX, software developers can take advantage of hardware features without being concerned about the implementation details of that hardware.

DirectDraw - is a software interface that provides direct access to display devices while maintaining compatibility with the Windows graphics device interface (GDI). It is not a high-level application programming interface (API) for graphics. DirectDraw provides a device-independent way for games and Windows subsystem software, such as 3-D graphics packages and digital video codecs, to gain access to the features of specific display devices. DirectDraw works with a wide variety of display hardware, ranging from simple SVGA monitors to advanced hardware implementations that provide clipping, stretching, and non-RGB color format support. The interface is designed so that an applications can enumerate the capabilities of the underlying hardware and then use any supported hardware-accelerated features. Features that are not implemented in hardware are emulated by DirectX.

Direct3D - Direct3D is designed to enable world-class game and interactive three-dimensional (3-D) graphics on a computer running Windows. Its mission is to provide device-dependent access to 3-D video-display hardware in a device-independent manner. Simply put, Direct3D is a drawing interface for 3-D hardware.

DirectSound - The Microsoft DirectSound application programming interface (API) is the audio component of the DirectX. DirectSound provides low-latency mixing, hardware acceleration, and direct access to the sound device. It provides this functionality while

maintaining compatibility with existing device drivers.

DirectPlay - The Microsoft DirectPlay application programming interface (API) for Windows is a software interface that simplifies application access to communication services. DirectPlay has become a technology family that not only provides a way for applications to communicate with each other, independent of the underlying transport, protocol, or online service, but also provides this independence for matchmaking servers and game servers. Applications (especially games) can be more compelling if they can be played against real players, and the personal computer has richer connectivity options than any game platform in history.

DirectInput - Microsoft DirectInput provides support for input devices including the mouse, keyboard, and joystick, as well as for force-feedback (input/output) devices.

See <u>List of Acronyms</u> for more information.

<u>Tips</u>

T2200 - DirectX is not installed on your computer. Most new games and multimedia applications use it so you'll have to install it eventually. Also, most new drivers include DirectX components anyway.
T2201 - DirectDraw is not installed. This probably means that your video drivers are not installed properly or there is some conflict. Check.
T2202 - Direct3D is not installed. Most new video cards should come with drivers that include Direct3D even if they do not support accelerated 3D functions. You should check for a driver upgrade.
T2203 - DirectSound is not installed. This probably means that your sound card drivers are very old. are not installed properly or there is some conflict. Check.
T2204 - DirectPlay is not installed. You may be using an older version of DirectX. Make sure you have installed the latest version of DirectX.
T2205 - The DirectX version installed is old. You should upgrade to the newest version of DirectX.
T2206 - The video driver does not support Direct3D. You should check for an updated video driver.
T2207 - Your video card does not support any hardware 3D functions or they are not implemented in this version of the video driver. If you do have the latest video driver consider upgrading the video card if you play 3D games.
T2208 - Your video card uses bank-switching which is much slower than LFB (Linear Frame Buffer). You should consider upgrading your video card.
T2209 - The free video memory available for Direct3D is very small. Consider upgrading the video memory on your video adapter or reducing the resolution/colour depth of the display.

Modem Information

Shows detailed information about the modem(s) connected to your computer.

• General Modem Information
• Modem Driver Settings
• Built-in Modem Information
• Connection Test

• **Command Line Switch**: ModemInfo
• **Requirements:** Modem driver installed
• **OS Support**: Windows 95, 98, NT

<u>Explanations</u>

Manufacturer - the modem manufacturer.
Modem - the type and name of the modem.
Serial Number - the modem driver serial number.
Plug & Play Version - the version of the PnP standard the modem adheres to.

Port - the port ID the modem is connected to.

Port Configuration - the settings used as default for the port. Do note that modems and other hardware using the port re-configure these settings when they become active, so this list if just a guideline.

Modem Information - the actual modem information and configuration.
Name & Type - the name of the modem manufacturer and type.
Plug & Play ID - the unique ID number for this modem.
Configuration Settings - the list of current modem settings.
Product Code - the modem product code. This is a unique number for this model which may be required by technical support staff.
Memory Checksum - the result of the memory checksum.
Self-Diagnostic Result - the result of self-diagnostic tests. This should be OK.
Modem Settings - the current configuration including internal registers.
NVRAM Settings - the settings stored in modem's NVRAM (Non-Volatile RAM).
Diagnostics Results - the result of self-diagnostic tests.
Dialling Information - information about the dialled numbers, errors, time connected, etc.
Link Diagnostic Results - information about the modem to modem connection.
FAX Classes - the classes supported by this modem. Most modems should support classes 1.0 and 2.0.

Connection Test - the result of the loop-back connection test.

See <u>List of Acronyms</u> for more information.

<u>**Tips**</u>

This module does not generate any tips.

Network Information

This module lists all the networks your system can connect to, their resources, workgroups and any other information. A list of supported protocols is also included.

• List of Networks
• List of Domains/Workgroups
• Network Information
• Network Protocols
• Workstation Information
• Resources Information

• **Command Line Switch**: NetInfo
• **Requirements:** Networking drivers installed
• **OS Support**: Windows 95, 98, NT

<u>**Explanations**</u>

Network Version - the version of the network driver for this type of network.
Network Status - the current status of the connection to this network. Usually this should be **running**.
Network Driver - whether the network driver is 16-bit of 32-bit.

Network Protocols - the list of all networking protocols supported by your computer and the capabilities of each protocol.

Workstations - the list of all workstations in this network workgroup/domain, including its name, type and list of resources available.

See <u>List of Acronyms</u> for more information.

<u>**Tips**</u>

This module does not generate any tips.

CPU Benchmark

Shows how your CPU/Motherboard stacks up to other typical combinations:

• Test takes about 30 seconds on 586-class PCs.
• Test is repeated 3 to 5 times to get a realistic result.
• Results outside the confidence limits (5%) are discarded.

• **Command Line Switch**: CPUBench
• **OS Support**: Windows 95, 98, NT

Explanations

Dhrystone (MIPS) CPU Benchmark 32-bit
Whetstone (MFLOPS) Co-Processor Benchmark 32-bit

See <u>Computer (CPU/Bus/BIOS/Chipset) Information</u> topic for more information.
See also <u>Questions and Answers</u> document for full information.
See <u>List of Acronyms</u> for more information.

Tips

T5000 - the processor utilisation is too high. This means that there are background applications that are using the processor while the benchmark is executing. You should close this processes down as they interfere with the benchmark.
T5001 - the Dhrystone score seems low for this type of processor/class. Check whether the settings are correct.
T5002 - the Whetstone score seems low for this type of processor/class. Check whether the settings are correct.

Video Benchmark

Shows how your Video Adapter compares to other popular video adapters in a typical system:

• Test takes about 2 minutes on 586-class machines with 64-bit video adapters.

• **Command Line Switch**: VideoBench
• **Requirements:** DirectX video drivers installed
• **OS Support**: Windows 95, 98, NT

Explanations

Windows GDI API 2D Video Benchmark 32-bit
DirectX (Direct3D) API 3D Video Benchmark 32-bit

See <u>Video Information</u> topic for more information.
See also <u>Questions and Answers</u> document for full information.
See <u>List of Acronyms</u> for more information.

Tips

This module does not generate any tips.

Drives Benchmark

Shows how your drive(s) and controller(s) compare to other devices in a typical system:

• Read Test: Buffered, Random, Sequential
• Write Test: Buffered, Random, Sequential
• Seek Test

• Test needs up to 512KB or more free space on the floppy disk tested.
• Test needs up to 1.5*System Memory Size or more free space on the hard-drive tested.
• Test needs up to 10MB or more free space on the remote/network drive tested.
• Test needs up to 4MB or more free space on the memory-drive tested.

• Test takes about 2 minutes on 586-class machines with 1GB hard disks.

• **Command Line Switch**: DriveBench
• **OS Support**: Windows 95, 98, NT

Explanations

See Drives Information topic for more information.
See also Questions and Answers document for full information.
See List of Acronyms for more information.

Tips

W5200 - the available free space on this drive is low. Increase it before running the benchmark.
T5201 - the disk index seems low for this type of drive. Check controller settings and driver settings.

CD-ROM Benchmark

Shows how your CD-ROM drive and controller compares to other CD-ROM drives in a typical system:

• Read Test: Buffered, Random, Sequential
• Seek Test

This benchmark consists of 2 different tests:

• **Data CD performance**
• **VideoCD performance**

For the Data CD test, a 600MB+ data disk is required which contains large (64MB+) data files. Data disks which contain MPEG, MOV, AVI or large databases are suitable.

For the VideoCD test, a 300MB+ VideoCD is required. A 600MB+ VideoCD is recommended. Do note that many drives/software drivers may not read CDI disks.

• Test takes about 2 minutes on 586-class machines with 4x (quad speed) CD-ROM.

• **Command Line Switch**: CDROMBench
• **Requirements:** CD-ROM installed
• **OS Support**: Windows 95, 98, NT

Explanations

See Drives Information topic for more information.
See also Questions and Answers document for full information.
See List of Acronyms for more information.

Tips

T5300 - a full VideoCD movie disk is recommended for thorough testing. Otherwise the results may have a higher degree of inaccuracy.
T5301 - a data CD-ROM which a huge file is recommended for thorough testing. Otherwise the results may have a higher degree of inaccuracy.
T5302 - if you want to test the video performance of your CD-ROM use a VideoCD.
T5303 - if you want to test the data performance of your CD-ROM use a data CD with very large files.
T5304 - the CD-ROM index seems low for this type of CD-ROM. Check controller settings and cache settings.

Memory Benchmark

Shows how your memory sub-system compares to other systems with the same or similar processors in other systems. Tests caches as well. The benchmark is based on the well-known STREAM memory bandwidth benchmark.

• Arithmetic Operations Benchmark (assignment, scaling, addition, triad)

• Test needs at least **50%** of free physical memory free.
• Close all programs before running it especially if you have less than 16MB.

• Test takes about 2 minutes on 586-class machines with 16MB.

• **Command Line Switch**: MemBench
• **OS Support**: Windows 95, 98, NT

Explanations

See <u>DOS Memory Information</u> or <u>Windows Memory Information</u> topics for more information.
See also <u>Questions and Answers</u> document for full information.
See <u>List of Acronyms</u> for more information.

Tips

This module does not generate any tips.

SCSI Information

- SCSI Host Information
- SCSI Device Information
- SCSI Block Devices Extra Information

- **Command Line Switch**: SCSInfo
- **Requirements:** SCSI Host Adapter, SCSI devices and 32-bit ASPI drivers.
- **OS Support**: Windows 95, 98, NT

Explanations

See List of Acronyms for more information.

Note: Windows 95 and NT use drivers that make ATAPI devices look like SCSI devices for consistent management. This is done since ATAPI is in many ways quite similar to SCSI. Therefore, some of your IDE/EIDE devices may appear as SCSI devices as well. This is not a bug - but a feature of the operating system.

Host - The host is the controller that manages the SCSI bus. Most SCSI controllers support up to 7 devices (8 including the controller itself). Each device on the SCSI bus has a unique address.
Device - The devices that can be connected to the SCSI bus are varied and include the usual hard disks, CD-ROMs, backup devices, tape drives, scanners, optical disks and many others.

Device Type - the type of the device.
Manufacturer - the company that manufactured the device.
Product - the full name of the product.
Version - the product version or revision.
Extra Information - extra information about the device, generally either a serial number or the release date.
Removable Device - whether the media of the device is fixed or removable.

Target ID - SCSI devices occupy (i.e. respond to) one address on the SCSI bus. Generally, the SCSI device provides a means (e.g. switches, jumpers) to select one of the eight available addresses (0 through 7). This address is used during bus arbitration and selection or re-selection of SCSI devices. Each device on the SCSI bus is assigned a unique address.
Logical Unit Number - Each target has one or more logical units, beginning with logical unit zero. There is a maximum of eight logical units. These logical units are usually mapped directly to peripheral devices, but they may be a portion of a peripheral device or may comprise multiple peripheral devices.
Device Currently Connected - Whether this device is currently on-line or not. Some devices can disconnect from the bus.
Bus Width - The SCSI bus width. Usually it is 8-bit but Wide SCSI supports 16-bit for faster data transfer. Some SCSI implementations even support 32-bit.
SCSI ANSI Version - The device complies to this version of SCSI. This code designates this standard upon approval by ANSI.

Supports Relative Addressing Mode - device supports the relative addressing mode for this logical unit.
Supports Synchronous Transfers - device can transfer data synchronously.
Supports Command Queues - device supports queued commands.
Supports Linked Commands - device supports command linking.
Supports Soft Reset - device can be soft reset in addition to the hard reset.

Supports Terminate I/O - device can terminate a I/O transaction.

Int 13h Drive No. - if the device is a hard disk, this is the BIOS ID for the drive. With an ID the BIOS and DOS can use the drive without specific drivers.
Heads - the number of heads (tracks) for the device.
Sectors - the number of sectors per track for this device.

Tips

This module does not generate any tips.

Config.sys Listing

Shows information about the Windows/MS-DOS initialisation file **Config.sys** and its contents.

- **Command Line Switch**: Config.sys
- **OS Support**: Windows 95, 98

Config.dos Listing

Shows information about the MS-DOS initialisation file **Config.dos** and its contents. This file is used when you boot into the previous version of MS-DOS instead of Config.sys.

- **Command Line Switch**: Config.dos
- **OS Support**: Windows 95, 98

AutoExec.bat Listing

Shows information about the Windows/MS-DOS initialisation file **AutoExec.bat** and its contents.

- **Command Line Switch**: AutoExec.bat
- **OS Support**: Windows 95, 98

AutoExec.dos Listing

Shows information about the MS-DOS initialisation file **AutoExec.dos** and its contents. This file is used when you boot with the previous version of MS-DOS instead of the usual AutoExec.bat.

- **Command Line Switch**: AutoExec.dos
- **OS Support**: Windows 95, 98

MsDos.sys Listing

Shows information about the Windows/MS-DOS initialisation file **MsDos.sys** and its contents.

- **Command Line Switch**: MsDos.sys
- **OS Support**: Windows 95, 98

System.ini Listing

Shows information about the Windows initialisation file **System.ini** and its contents.

- **Command Line Switch**: System.ini
- **OS Support**: Windows 95, 98,NT

Win.ini Listing

Shows information about the Windows initialisation file **Win.ini** and its contents.

- **Command Line Switch**: Win.ini
- **OS Support**: Windows 95, 98, NT

Control.ini

Shows information about the Windows initialisation file **Control.ini** and its contents:

- **Command Line Switch**: Control.ini
- **OS Support**: Windows 95, 98, NT

Protocol.ini Listing

Shows information about the Windows network initialisation file **Protocol.ini** and its contents.

- **Command Line Switch**: Protocol.ini
- **OS Support**: Windows 95, 98, NT

BootLog.txt Listing

Shows information about the Windows boot log file **BootLog.txt** and its contents.

- **Command Line Switch**: BootLog.txt
- **OS Support**: Windows 95, 98, NT

ScanDisk.log Listing

Shows information about the ScanDisk boot log file **ScanDisk.log** and its contents. This file holds the log of tests done on the drives and any errors (if any) encountered and corrections (if any) attempted.

- **Command Line Switch**: ScanDisk.log
- **OS Support**: Windows 95, 98

NetLog.txt Listing

Shows information about the Windows network boot log file **NetLog.txt** and its contents:

- **Command Line Switch**: NetLog.txt
- **OS Support**: Windows 95, 98, NT

NDisLog.txt Listing

Shows information about the Windows network initialisation file **NDisLog.txt** and its contents:

- **Command Line Switch**: NDisLog.txt
- **OS Support**: Windows 95, 98, NT

Dump Hardware Settings

Dumps the hardware settings from the system registry. Very useful to technical support people to check that a hardware was correctly installed in Windows and the correct settings are used.

- **Command Line Switch**: DumpHardware
- **OS Support**: Windows 95, 98, NT

CMOS Dump & Information

Dumps the CMOS hardware settings and shows various information encoded in CMOS.

• Time, Date
• Floppy Disks and Hard Disks
• Memory Size & Type
• Various Devices Information & Status
• Chesksums

• **Command Line Switch**: CMOSDump
• **OS Support**: Windows 95, 98

Explanations

This information is only useful to programmers and therefore is beyond the scope of this document. You can get information about this settings from your BIOS manual or an advanced computer book that deals with this topic.

See List of Acronyms for more information.

Tips

This module does not generate any tips.

Hardware Irq Settings

Shows the list of interrupt requests lines (IRQ), their settings and the hardware (device) that uses each setting.

• **Command Line Switch**: HardIrq
• **OS Support**: Windows 95, 98, NT

Explanations

Hardware Interrupts (Irq) - are the interrupts generated by hardware. There are 16 in total in today's PC. However most of them are used before you add any devices. Most hardware devices (keyboard, mouse, modem, disk controller) need an interrupt to interface to the CPU.
Channels - There are 2 interrupt controllers in today's PC, each providing 8 channels. One channel is used to connect the master interrupt controller to the slave interrupt controller, leaving 15 free interrupts. However, the chipset itself uses many interrupts (about 11) leaving only about 3-6 free. Until recently no two devices could share and interrupt (in most cases) since the software could not tell them apart, but new BIOSes & OSes have implemented a resource sharing protocol since there are just not enough free interrupts for all the hardware to use.

Irq. No. - The number of the hardware interrupt that is used by a device or more.
Device - The name and type of hardware device or devices that owns/own the hardware interrupt.

See List of Acronyms for more information.

Tips

This module does not generate any tips.

Software Protected-Mode Irq Handlers

Shows the list of software interrupt requests lines (Int), their settings and module that handles this interrupt in protected mode (16/32-bit).

• **Command Line Switch**: ProIrq
• **OS Support**: Windows 95, 98

Explanations

Software Interrupts - are interrupts generated by software, Typically they are used to call services provided by a BIOS (system, video, hardware). There are 256 in total which include the 16 hardware interrupts. When an interrupt occurs the CPU   jumps to the interrupt handler which is listed in a table called the 'interrupt vector table'. The handler saves the current   CPU state, deals with the interrupt, restores the initial state and exits.

Irq. No. - The number of the software interrupt in hexadecimal.
32-bit Address - The address (32-bit flat mode) of the protected mode interrupt handler. Protected mode is the mode in which Windows runs on.
Handler - The name of the Windows module/device driver which handles the interrupt.
Description - The purpose of the interrupt and typical usage or device that uses it.

See List of Acronyms for more information.

Tips

This module does not generate any tips.

Software Real-Mode Irq Handlers

Shows the list of software interrupt requests lines (Int), their settings and module that handles this interrupt in real mode (16-bit).

• **Command Line Switch**: RealIrq
• **OS Support**: Windows 95, 98

<u>**Explanations**</u>

Software Interrupts - are interrupts generated by software, Typically they are used to call services provided by a BIOS (system, video, hardware). There are 256 in total which include the 16 hardware interrupts. When an interrupt occurs the CPU   jumps to the interrupt handler which is listed in a table called the 'interrupt vector table'. The handler saves the current   CPU state, deals with the interrupt, restores the initial state and exits.

Irq. No. - The number of the software interrupt in hexadecimal.
16:16-bit Address - The address (16bit segment + 16bit offset) of the real mode interrupt handler. The real mode is the mode MS-DOS runs on.
Handler - The name of the Windows module/device driver which handles the interrupt.
Description - The purpose of the interrupt and typical usage or device that uses it.

See <u>List of Acronyms</u> for more information.

<u>**Tips**</u>

This module does not generate any tips.

DMA Channel Settings

Shows the list of direct memory access channels (DMA), their settings and the hardware (device) that uses each setting.

• **Command Line Switch**: DMARes
• **OS Support**: Windows 95, 98, NT

Explanations

DMA - DMA or Direct Memory Access is a method of transferring data between a device and memory without CPU involvement. This way is faster. Also, the CPU can do other computation in the mean-time.
Channels - There are 2 DMA controllers in a PC, each providing 4 channels. Since one channel is used to connect the master DMA controller to the slave DMA controller there are 4 8-bit and 3 16-bit available channels. One channel can be used by one hardware device only.

DMA Ch. No. - The channel number used by a hardware device.
Device - The name and type of hardware device that uses the DMA channel.

See List of Acronyms for more information.

Tips

This module does not generate any tips.

I/O Port Settings

Shows the list of input/output ports (I/O), their settings and the hardware (device) that uses each setting.

• **Command Line Switch**: IORes
• **OS Support**: Windows 95, 98, NT

Explanations

I/O Ports - are ports that can be used by software to talk to hardware directly without using interrupts and the BIOS. There are 65 thousand ports, but each hardware device may use as many as 20-40, i.e. a range. Some are input only, some are output only and some are input/output depending on hardware. No two devices may share one port, so ranges must not overlap.

I/O Port - the port range used by the hardware device.
Device - the name and type of hardware device that uses this I/O port range.

See List of Acronyms for more information.

Tips

This module does not generate any tips.

Memory Settings

Shows the list of memory blocks, their settings and the hardware (device) that uses each setting.

• **Command Line Switch**: MemRes
• **OS Support**: Windows 95, 98, NT

Explanations

Memory - a 32-bit processor (386, 486, Pentium, etc.) has an address range of 4G (00000000 -FFFFFFFF in hexadecimal). The installed physical memory, the video adapter memory, BIOSes can be mapped somewhere in this address space. While the address range is huge, there may still be conflicts since most devices try to use the same lower addresses.

Memory Range - the memory address range used by the hardware device.
Device - the name and type of hardware device that uses this memory address range.

See List of Acronyms for more information.

Tips

This module does not generate any tips.

Create a Report Wizard

Runs the Create a Report Wizard which helps you create a system report quickly. You can:

• Print, Fax, Save or E-Mail the report
• Create a script with the choices made for batch-mode runs
• Select only the modules that you require
• Adjust the information type/amount each module provides
• Schedule reports (System Agent)
• Run batch-mode reports (**/r** command)

Open Module

Loads (runs/executes/activates/updates) the selected module.

Run Control Panel

Loads the Windows **Control Panel** utility. This utility allows you to change your system's settings.

Click here to run **Control Panel**.

Run Scan Disk

Runs the disk testing and fixing Windows utility **ScanDisk**. ScanDisk can detect and repair most disk problems.

Click here to run **ScanDisk**.

Run Disk Defragmenter

Runs the disk defragmenter Windows utility **Defrag**. By defragmenting your hard disk you speed it up thus improving the system's performance.

Click here to run **Defrag**.

Run System Files Configuration Editor

Runs a program which allows you to view and edit the system files (Config.sys, Autoexec.bat, Win.ini and System.ini) as well as back them up. Should be used with case as it is not a supported program.

Click here to run **System Editor**.

Run Registry Editor

Runs the registry editor utility which allows you to view, add, delete and modify registry keys and values. Unless you know what you're doing you should not try it as you may destroy the system set-up.

Click here to run **Registry Editor**.

Run Policy Editor

Runs the policy editor which allows you to grant or revoke user privileges including using system programs, changing system configuration and many other things. Useful only to system administrators and multiple users of the same system.

You must install this program yourself manually from the Windows CD. See the **Admin** directory. If you have the Plus! Pack you can install it using the install program.

Click here to run **Policy Editor**.

Run the IP Configuration Editor

The TCP/IP configuration editor allows you to view and set various settings which mainly relate to the Internet and/or Network connection. These should be done once at the beginning and left well alone unless you change your set-up.

You must have the TCP/IP network protocol installed.

Click here to run **IP Configuration Utility**.

Run WordPad

Runs **WordPad**, the basic word-processor application included with Windows.

Click here to run **WordPad**.

Run NotePad

Runs **NotePad**, the basic text editor application included with Windows.

Click here to run **NotePad**.

Run BackUp

Runs **Windows BackUp**, the disk back-up application. You should use this regularly (or another back-up application) to back your hard disk(s) to tape(s) or other removable media. Just in case…

If you haven't install it run **Control Panel\Add-Remove Programs\Windows Setup\Disk Tools** and select **Backup** to install it.

Click here to run **Windows Backup**.

Run Registration Clean-up

Runs the **Registration Clean-up Wizard** which is an application which checks and removes garbage from the system's registry as well as checking the validity of keys and data to a certain extent.

You need to get this yourself from Microsoft's Web Site. Search for it.

Click here to run **Registration Clean-up Wizard**.

Run System Monitor

Runs the **System Monitor**, an application which monitors system resources and shows you various graphs so you can check your system's load. This may tell you that you need more memory or a faster processor, etc.

If you haven't install it run **Control Panel\Add-Remove Programs\Windows Setup\ Accessories** and select **System Monitor** to install it.

Click here to run **System Monitor**.

Run the System Analyst for Windows

Runs the **System Analyst for Windows**, a 16-bit Windows utility developed by SiSoft Software in the "recent" past. This may prove useful for information on the 16-bit Windows sub-system and 16-bit application and libraries.

See the Read Me! document for more information about it.

Run the Microsoft System Information

Runs the **Microsoft System Information**, a 32-bit Windows utility which provides most of the information Sandra provides. You may want it to compare results and make sure.

The program comes with **Microsoft Office**.

Loads SiSoft Sandra's WWW Page

Starts up your default World-Wide-Web browser and loads up the **SiSoft Sandra WWW page**.

If this does not work, try entering the address manually in your WWW browser. See Technical Support and Points of Contact topic for more information.

Connect

Runs the **Connect Wizard** which helps you select the computer you wish to connect to using SiSoft Sandra Client/Server version. Then all the information Sandra Client displays refers to the remote computer.

To connect to more than one computer simultaneously or run the statistics wizards from the same copy of the program, you need the special add-ons. However, you can run more than one copy of SiSoft Sandra Client simultaneously.

Disconnect

Disconnects from the current SiSoft Sandra's connection(s). This does not disconnect you from the Internet or your other network(s).

Set Sandra's Options

Allows you to set SiSoft Sandra's options. At the moment there are no options to set, all are automatic.

View Module Properties

Shows the Sandra module's properties and various other information:

• Module Information
• Display Capabilities
• Command Line Option
• OS Support
• Module Settings

This information is useful if you wish to create scripts or customise Sandra in special ways.

View Information Modules

Shows only Information Modules.

View Benchmarking Modules

Shows only Benchmarking Modules.

View Listing Modules

Shows only Listing Modules.

View Testing/Diagnostic Modules

Shows only Testing/Diagnostic Modules.

View All Modules

Shows all modules, including Wizards.

Large Icons

Use Large Icons for the module list.

Small Icons

Use Small Icons for the module list.

List

Shows modules in a list.

Details/Report

Shows modules in a report and shows module information.

Refresh

Refreshes the module list.

Arrange modules by name

Arranges modules by name.

Arrange modules by description

Arranges modules by their description.

Auto Arrange

Auto arranges the module list

Exit Application

Closes Down SiSoft Sandra. It also disconnects all Sandra connections if any.

View Toolbar

Shows or hides the Sandra's standard toolbar.

View Status Bar

Shows or hides Sandra's status bar.

Help Contents

Displays the SiSoft Sandra's help topics.

Help Search

Searches the on-line documentation for keywords.

Tip of the Day

Shows a tip of the day from Sandra's tip database. This is a standard feature on modern Windows applications.

About SiSoft Sandra

Displays program information, version and copyright details. See the <u>License Details</u> topic for more information.

Change Module Options

This Wizard allows you to:

• Select the tests the module runs. This is useful if some tests lock the computer or you don't require them.
• Adjust the amount of information to your requirements. Some information may not be needed or may be too large for some reports.

• Check or un-check the checkboxes next to the option you want to select/de-select.
• Options are saved for later use.
• While the options come into effect immediately, you may need to click the **Update** button to refresh the module's information.

Create a Report Wizard - Steps 1 to 4

This wizard allows you to select which modules you want to include in the report:

• Hold down the Shift key and click on each module you want to include in the report.
• All modules are selected by default.
• Your selection is saved for later use.
• If you want to set a module's options, click the module and then the **Options** button.

Create a Report Wizard - Step 5

Enter your comments in the edit box, where it says "Enter your comments here". If you don't type anything, that phrase will not appear in the report.

Create a Report Wizard - Step 6

Here you can choose the way you want the report to be delivered:

• **Print or Fax** - you will be able to choose the Printer or Fax you want to send the report to and also set the device settings, number of copies, etc. A print or fax needs to be installed.
• **Save to Disk** - you will be able to select the drive, path and filename for the report.
• **E-Mail** - you will be able to enter the message subject and the recipient's name(s). The report will be send as a Text file attachment. A 32-bit MAPI compatible client needs to be installed.
• **Save choices as script** - a script will be created using the current options defined in the wizard. You can run the script later using the command: **Sandra /r <script file name>**

Create a Report Wizard - Step 7

Here you can choose the way the report file is created:

• **Text Document (.txt)** - This is the normal view, readable by humans (i.e. with formatting, alignments and other things). But cannot be easily imported into a database or spreadsheet. Sandra herself cannot read it.

• **BugX Compatible (.rpt)** - If you want to upload it to the BugX system or want Sandra to be able to read it back you should choose this option. While not readily accepted as input to a database or spreadsheet - a converter is available.

• **Database Compatible (.csv)** - If you want to add the report to a database or spreadsheet then you should choose this option. The file is saved in comma-delimited-version file format which all programs understand. Not easily readable by humans though.

• **Append to existing Report -** check it if you want the new report to be appended to the selected file instead of overwriting the file.

• **Encrypt Report** - available only if you save the report to disk. Only useful if you want to send the report encrypted to the author (of SiSoft Sandra). The engine is proprietary and you will be unable to read it or convert it back to text. The size of the report may increase slightly. The encoding uses a key larger than 128-bits.

• **Compress Report** - available only if you save the report to disk. The report will be compressed in the Windows cabinet (CAB) format. As the file is text the saving may be appreciable (90% saving). If you also select encrypt, the report will not be cabinet encrypted, but using Sandra's own algorithm.

Create a Report Wizard - Last Step

Here you can choose:

• **E-Mail Message's Subject** - type your own subject or accept the default.
• **E-Mail Recipient(s)** - type the address(es) of the recipients for the message. They are usually separated by ',' or ';'. You don't need to type the person's name, only the address.

• If you want to send the message to SiSoft Sandra's author, click the E-Mail Program Author button. The fields will be set-up for you.

• The field's contents will be saved for later use.

Benchmarking Status

This window notifies you that SiSoft Sandra is benchmarking your system and you should not disturb the system while this is going on. If you do the results will be lower than expected. Therefore, **don't**:

• Press any keys
• Move the mouse or click the buttons
• You should not have any background processes running (MIDI/Wave/Video playback, Internet transfers, Network transfers, etc.)

• Please wait until the test is done. Most take less than 1 minute and no test lasts more than 5 minutes

Creating Report Status

This window shows the status of report creation:

• The type of report created and on what device
• Report creation status
• Current running module
• Any warnings encountered
• Completion percentage

• At any time you can click the **Cancel** button to abort the report.

• The animation tells you if Sandra is running properly or it has locked.
• If the animation is running, don't worry if the creation takes a long time: if you include all modules (especially the disk benchmarks) the total time may be well over 10 minutes.

Tip of the Day

This window shows a tip of the day.

• Click the **Next Tip** button to see the next tip.
• Click the **Close** button to close the window.
• Un-check the **Show Tips at Startup** checkbox if you don't want the Tip of the Day window to appear each time you start SiSoft Sandra.

Registered SiSoft Sandra Required

Sorry, this module only runs on the **Registered** versions of Sandra, either **Professional** or **Enterprise**. You will need to register your version to activate this module.

To find out how to do that, see the Ordering Information topic.

Performance Tune-up Wizard

This wizard runs all enabled information & testing/diagnostic modules and collects the performance enhancing tips as well as other errors or warnings and displays them in a list.

It is a convenient way of obtaining a complete view of your system in one go without going through every module and choosing every options.

Do note that this operation may take some time, although less than creating a report.

Web-Update Wizard

This wizard makes it easy to keep Sandra up-to-date. The wizard uses your computer's modem or Internet connection to automatically download updates directly from the web. These updates are free.

You should run this wizard monthly to see if there are any new updates. New updates add more modules, new features and/or fix bugs or other incompatibilities. So don't forget.

Click here to open the document locally.

Click here to open the document from the web. You need to go on-line in order to read it.

Delete Module(s)

Delete/remove the selected module(s). This operation will remove them from the display list and will unload them from memory. Note that you cannot delete Wizard modules.

To add the module(s) back, use the **Add New Module Wizard**.

No Help Available

No help is available for this area of the window.

No Help Available

No help is available for this message box.

Reset All Sandra Options

If you have played with the Sandra's options and messed them up, here's how you can reset them to the built-in defaults (no need to reinstall):

• Click here to run the **Registry Editor** utility
• Double-click **HKEY_USERS**
• Double-click **.Default**
• Double-click **Software**
• Double-click **SiSoft**
• Right-click **Sandra** and select **Delete**
• Answer **Yes** to the confirmation dialogue box
• Close Registry Editor

Reset the Module List

If you have played with the module list (swapping icons back and forth) or other module options you can reset them to the default this way:

- Click here to run the **Registry Editor** utility
- Double-click **HKEY_USERS**
- Double-click **.Default**
- Double-click **Software**
- Double-click **SiSoft**
- Double-click **Sandra**
- Right-click **Modules** and select **Delete**
- Answer **Yes** to the confirmation dialogue box
- Close Registry Editor

The VideoCD Benchmark

This benchmark is different from the normal data-disk benchmark. This is because the data is encoded differently on this disks and the CD-ROM driver treats them differently. The disk access is optimised for sequential scan and pre-fetch while buffering is kept to a minimum.

If you want to test your CD-ROM's VideoCD performance, then run this test. Data disk performance may can be irrelevant for VideoCD performance. A drive & software driver which perform brilliantly with data disks may cause jerky VideoCD playback.

A 600MB+ VideoCD will yield true values for the random read performance and access time. When different size CDs are used the results are extrapolated statistically for a 600MB disk. This makes the benchmark test disk size independent.

The Data CD Benchmark

This benchmark is different from the VideoCD benchmark. Disk access is optimised in the same way as for hard drives, i.e. mainly buffering and random access. While there are data CDs which contain MPEG, MOV or AVI files, the performance could be much worse than for a VideoCD.

A 600MB+ data disk with 600MB+ data files is recommended for true benchmark results. When different size CDs are used the results are extrapolated statistically for a 600MB disk. This makes the benchmark test disk size independent.

Suitable CDs for testing:

• Ziff-Davis PC Benchmarks CD-ROM - recommended
• Microsoft VC++ 4.0 or later
• Microsoft Visual Basic 4.0 or later
• Astra Medical CD-ROM

List of many acronyms

AC	Alternating Current
AE	Applications Engineer
AFS	Andrew File System
AI	Artificial Intelligence
ALU	Arithmetic-Logic Unit
AM	Amplitude Modulated
AMD	Advanced Micro Devices, Inc.
AMI	American Megatrends Inc.
ANSI	American National Standards Institute
ASCII	American Standard Code for Information Interchange
ASIC	Application Specific Integrated Circuit
ASPI	Advanced SCSI Programming Interface
AT	Advanced Technology
ATA	AT bus Attachment
ATAPI	ATA Packet Interface
ATDM	Asynchronous Time Division Multiplexing
ATM	Asynchronous Transfer Mode
AUI	Attached Unit Interface
BBS	Bulletin Board System
BCC	Block Check Character
BCD	Binary Coded Decimal
BE	Back End
BiCMOS	Bipolar Complementary Metal-Oxide Semiconductor
BIOS	Basic Input / Output System
BNC	Bayonet Nut Connector
BPS/bps	Bytes/bits Per Second
BSC	Binary Synchronous Communications
BSD	Berkeley Standard Distribution
BTU	British Thermal Units
CAD	Computer Aided Design
CAM	Computer Aided Manufacturing
CAM	Content Addressable Memory
CAM	Common Access Method
CAS	Column Address Strobe
CBX	Common Branch eXtender
CCD	Charge Coupled Device
CCITT	Consultative Committee of International Telephony and Telegraphy
CD	Carrier Detect
CDDI	Copper Distributed Data Interface
CDROM	Compact Disk Read Only Memory
CGA	Color Graphics Adaptor
CHS	Cylinder Head Sector
CISC	Complex Instruction-Set Computer
CLA	Carry Lookahead Adder
CMOS	Complementary Metal-Oxide Semiconductor
CP/M	Control Program / Monitor
CPI	Clocks Per Instruction
CQFP	Ceramic Quad-FlatPack
CPU	Central Processing Unit
CR	Carriage Return

CRC	Cyclical Redundancy Check
CRQ	Command Response Queue
CRT	Cathode Ray Tube
CS	Chip Select
CSMA/CD	Carrier Sense Multiple-Access /with Collision Detect
CSR	Command Status Register
CTS	Clear To Send
DAT	Digital Audio Tape
DC	Direct Current
DCD	Data Carrier Detect
DCE	Data Circuit-terminating Equipment
DD	Double Density
DEC	Digital Equipment Corporation
DES	Data Encryption Standard
DID	Direct Inward Dial
DIN	Deutsche Industrie Norm (German)
DIP	Dual-In-line Package
DIS	Draft International Standard
DMA	Direct Memory Access
DOS	Disk Operating System
DPE	Data Parity Error
DPSK	Differential Phase Shift Keying
DRAM	Dynamic Random Access Memory
DRDOS	Digital Research Disk Operating System
DS	Double Sided
DSP	Digital Signal Processor
DSR	Data Set Ready
DTC	Data Terminal Controller
DTE	Data Terminating Equipment
DTMF	Dual-Tone Multi-Frequency
DTR	Data Terminal Ready
EBCDIC	Extended Binary Coded Decimal Interchange Code
ECC	Error Correction Code
ECL	Emitter-Coupled Logic
ECO	Engineering Change Order
ECP	Enhanced Communication Port
ECU	EISA Configuration Utility
EDO	Extended Data Out RAM
EEPROM	Electrically Erasable Programmable Read-Only Memory
EGA	Enhanced Graphics Adapter
EIA	Electronic Industries Association
EIDE	Enhanced Integrated Device Electronics
EISA	Enhanced Industry Standard Architecture
EMI	Electro-Magnetic Interference
EMF	Electro-Magnetic Force
EMS	Expanded Memory Specification
EOF	End Of File
EOL	End Of Line
EOS	Electrical OverStress
EPP	Enhanced Parallel Port
EPROM	Erasable Programmable Read-Only Memory
ESD	Electro-Static Discharge

ESDI	Enhanced Small Devices Interface
FAT	File Allocation Table
FCC	Federal Communications Commission
FDD	Fixed / Floppy Disk Drive
FDDI	Fiber Distributed Data Interface
FDM	Frequency Division Multiplexing
FDX	Full-Duplex Transmission
FE	Front End
FEP	Front End Processor
FF	Form Feed
FIFO	First-In First-Out
FILO	First-In Last-Out
FM	Frequency Modulation
FPGA	Field Programmable Gate Array
FPM	Fast Page Mode RAM
FPU	Floating Point Unit
FRU	Field-Replaceable Unit
FSF	Free Software Foundation
FSK	Frequency Shifty Keying
FTP	File Transfer Program
GAS	Gallium Arsenide
GFLOPS	Billions of FLOating Point Operations Per Second ("GigaFlops")
GNU	Gnu's Not Unix
GUI	Graphical User Interface
HD	High Density / Hard Disk
HDD	Hard Disk Drive
HDX	Half-Duplex Transmission
HFS	Hierarchical File System
HPFS	High Performance File System
HS	Helical Scan
I/O	Input / Output
IBM	International Business Machines Corporation
IC	Integrated Circuit
IDC	Insulation Displacement Connector
IDE	Integrated Device Electronics
IEEE	Institute of Electrical and Electronic Engineers
IMP	Interface Message Processor
IPC	InterProcess Communication
IPX	Internetwork Packet eXchange
IRQ	Interrupt ReQuest
ISA	Industry Standard Architecture
ISDN	Integrated Services Digital Network
ISO	International Standards Organization
JFS	Journaled File System
kVA	KiloVolt-Amps
LAN	Local Area Network
LBA	Linear Block Array
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LF	Line Feed
LIM	Lotus/Intel/Microsoft's Expanded Memory Manager (EMS)
LRU	Least-Recently Used

LSB/lsb	Least Significant Byte/bit
LSI	Large Scale Integration
LUN	Logical Unit Number
MAN	Metropolitan Area Network
MB/Mb	Mega Bytes/bits
MBR	Master Boot Record
MCA	Micro Channel Architecture
MCGA	Multi-Color Graphics Array
MCM	Multi-Chip Module
MFLOPS	Millions of FLOating Point Operations per Second ("MegaFlops")
MFM	Modified Frequency Modulated
MHz	MegaHertz
MICR	Magnetic Ink Character Recognition
MIDI	Musical Instrument Data Interface
MIMD	Multiple-Instruction Multiple-Data
MIPS	Millions of Instructions per Second
MISD	Multiple-Instruction Single Data
MMU	Memory Management Unit
MMX	Multi-Media Extensions
MNP	Microcom Network Protocol
MODEM	MOdulator / DEModulator
MOPS	Millions of Operations Per Second
MOS	Metal-Oxide Semiconductor
MP	Multi-Processor
MPP	Massively Parallel Processor
MSB/msb	Most Significant Byte/bit
MSDOS	Microsoft's Disk Operating System
MSI	Medium Scale Integration
MTBF	Mean Time Between Failure
N/C	No-Connect
NBS	National Bureau of Standards
NEMA	National Electrical Manufacturers Association
NFS	Network File System
NFU	Not-Frequently Used
NMI	Non-Maskable Interrupt
NMOS	Negatively doped Metal-Oxide Semiconductor
NOP	No OPeration
NRU	Not-Recently Used
NSF	National Science Foundation
NVRAM	NonVolatile Random Access Memory
OCR	Optical Character Recognition
ODI	Open Datalink Interface
OEM	Original Equipment Manufacturer
OS	Operating System
OSF	Open Software Foundation
OSI	Open Systems Interconnect
PAL/PLA	Programmable Array Logic / Logic Array
PB	Push Button
PBX	Private Branch eXtender
PC	Personal Computer, Program Counter
PCB	Printed Circuit Board
PCI	Peripheral Component Interconnect
PCM	Pulse Code Modulation

PCMCIA	Personal Computer Memory Card International Association
PE	Processor Element
PFF	Page Fault Frequency
PGA	Professional Graphics Array
PGA	Pin Grid Array
PIC	Programmable Interrupt Controller
PIO	Programmed Input/Output
PLCC	Plastic Leaded Chip Carrier
PLL	Phase Locked Loop
PM	Preventive Maintenance
PMOS	Positively doped Metal-Oxide Semiconductor
POST	Power On Self Test
PPP	Point-to-Point Protocol
PQFP	Plastic Quad-FlatPack
PROM	Programmable Read-Only Memory
PSTN	Public Switched Telephone Network
PTE	Page Table Entry
QAM	Quadrature Amplitude Modulation
QFP	Quad-FlatPack
QIC	Quarter Inch Cartridge
RAID	Redundant Arrays of Inexpensive Disks
RAM	Random Access Memory
RAMDAC	Random Access Memory Digital to Analog Converter
RAS	Row Address Strobe
RCA	Radio Corporation of America
RCC	Routing Control Center
RFC	Request For Comments
RFI	Radio Frequency Interference
RI	Ring Indicator
RISC	Reduced Instruction-Set Computer
RLL	Run Length Limited
RMS	Root Mean Squared
RMW	Read Modify Write
ROM	Read-Only Memory
RPC	Remote Procedure Call
RPM	Rotations Per Minute
RTC	Real Time Clock
RTS	Request To Send
SAM	Sequential Access Memory
SASI	Shugart Associates Standard Interface
SCSI	Small Computer Systems Interface
SD	Single Density
SDLC	Synchronous Data Link Control
SDRAM	Synchronous Dynamic RAM
SE	Systems Engineer
SIMD	Single-Instruction Multiple-Data
SIMM	Single Inline Memory Module
SIPP	Single Inline Pinned Package
SISD	Single-Instruction Single-Data
SLIP	Serial Line Internet Protocol
SMD	Surface Mount Device
SMT	Surface Mount Technology
SNA	System Network Architecture

SNR	Signal to Noise Ratio
SO/SOL	Small OutLine
SOIC	Small Outline Integrated Circuit
SPOOL	Simultaneous Peripheral Operation On Line
SPT	Sectors Per Track
SPU	Single Processor Unit
SRAM	Static Random Access Memory
SS	Single Sided
STDM	Synchronous Time Division Multiplexing
STN	Super Twisted Nematic
STU	Streaming Tape Unit
SVGA	Super Video Graphics Array
TCM	Trellis Code Modulation
TCP/IP	Transmission Control Protocol / Internet Protocol
TDM	Time Division Multiplexing
TI	Texas Instruments
TIA	Telecomm. Industry Association
TLB	Translation-Lookaside Buffer
TPI	Tracks Per Inch
TRANSISTOR	TRANSformer resISTOR
TSR	Terminate and Stay Resident
TTL	Transistor-Transistor Logic
TUV	Technischer Ueberwachuags Verein (German)
UAE	Unrecoverable Application Error
UART	Universal Asynchronous Receiver/Transmitter
UDP	User Datagram Protocol
UMB	Upper Memory Block
UPS	Un-interruptible Power Supply
USL	UNIX System Labs
UUCP	UNIX to UNIX Copy Program
VCR	Video Cassette Recorder
VESA	Video Enhanced Standards Association
VGA	Video Graphics Array
VLB	VESA Local Bus
VLIW	Very Long Instruction Word
VLSI	Very Large Scale Integration
VM	Virtual Memory
VME	Versa Module Eurocard
VRAM	Video Random Access Memory
VTR	Video Tape Recorder
WAN	Wide Area Network
WATS	Wide Area Telephone Service
WD	Western Digital
WORM	Write Once - Read-Many
WS	Wait State
XGA	eXtended Graphics Array
XMS	Extended Memory Specification
XOR	Exclusive-OR
XT	eXtended Technology
ZIF	Zero Insertion Force

Note: Some of these acronyms are explained elsewhere...