Dr. Hardware 2004

Important note: Please read also the program usage help text! It informs about a lot of very interesting program features "behide the scene".

General introduction
Registered version and other programs by Gebhard Software

General introduction
Dr. Hardware ist made for everyone. It will help both the expert and the novice to answer all questions regarding hardware, configuration and power of his computer.

Dr. Hardware concentrates his efforts on detecting and inquiring the core hardware and the connected devices of your computer.   Also several relevant information about resources and operating system will be given.

It shows the really relevant information: important hardware data as well as somewhat sophisticated stuff, that can become of interest under certain circumstances, for example when dealing with the customer service.
For experts the program also provides the underlying data structures, e.g. dump of the PCI configuration space or of SDRAM modules eeprom.

Several charts and diagrams visualize data relations, e.g. free vs. used drive capacity or benchmark results.

Finally it´s worth to mention that all data are written to and maintained within a database consisting of numerous tables and you are able to edit these data in the programs text fields and grids, that show the results. Read more about the database concept in the help topic Database concept.

Registered versions and other products from Gebhard Software
Dr. Hardware is distributed as shareware. Thus you may evaluate the free trial edition before purchasing the registered version. The trial version stops working after 10 days of usage. With the purchased registration key you turn the shareware into the...

Dr. Hardware Professional Edition
The Professional version provides add-ons against the Shareware edition:
• Autoreport option for quick report creation of many systems without user interaction.
• Sensor monitor (Voltage, temperature and fan rotation sensors are part of nearly all modern
  mainboards. Dr. Hardware can detect and inquire most of the current mainstream sensors (provided
  access method is known) and shows their data in realtime).
• Burn-In Benchmark suite
• Includes free update option for all updates of the current **and** next main version (eg. Dr. Hardware 2004
  and 2005).

Other products:
Dr. Hardware Sysinfo:
Distributed since 1994 Dr. Hardware Sysinfo is a plane vanilla DOS utility that will be updated as long as there is need for a DOS analyzer. Very usefull when dealing with the "naked" computer; fits on one DOS boot floppy disk. Runs in the DOS box under OS/2 and under Linux dosemu shell. Try to run it on your first computer, XT or AT 286 or whatever.

Includes some sophisticated features especially of use for older machines that are not available in the Windows version: Eisa slot and PCMCIA analysis, VGA vertical refresh measurement, 1st Meg memory viewer, ISA PnP adapter analysis, Novell Netware analysis, SCSI analysis via CAM and lots of DOS stuff.

The Database concept

Dr. Hardware stores all it´s results in database tables and shows them in data sensitive grids and edit fields.
Practical advantages for the user:

· You can edit the results. You can add comments or insert/delete table entries.
· Data will not go lost after program termination. Although most data are overwritten the next time tests are executed, in statistical analysis, new records are appended and you can save benchmark results.
· Diagrams and charts are based on the database.

The underlying database engine is   totally encapsulated in the program, is very compact and requires no external file or runtime libraries.

Note:
All database tables reside in the program subdirectory \data. During the first program start a backup directory \save is created where all files are backupped. If ever some of the files in the \data directory are damaged the program uses those backup copies   automatically.

As long as data integrity is guaranteed for the files in the   \data directory you can manually backup them (copy files from \data to \data\save (copy them - don´t move them!!)).
This is advisable, if you have edited some of the tables (e.g. saved own benchmark results), because data are backupped only the first time the program is executed as mentioned above.

Database capacities

System capacities of the databse engine:

Maximum number of records per file	100 Millions
Maximum size of a table	2 Gigabyte
Maximum record size	64KB
Maximum character field length	250 Bytes

(According to the author of the database engine)

Miscelleanous

Export-/Import function: not available.
Data format: proprietary (DAT)

Program usage

The program provides a selfexplaining, easy-to-use interface. Therefore we will discuss only some of the most exciting features here.

Special features of the user interface
· By clicking the button "Show/Hide details" you can enlarge grids on pages that contain both a grid and a diagram (resp. details) section. You can restore the default state by clicking the button again.
· Furthermore many pages are divided into frames and you can move them with splitters between them.
  Tip: The button "Show/Hide details" (described above) allows resetting the frames to their defaults.
· Because it could happen one day that you have to deal with a computer without a working mouse, the program provides a keyboard interface too. Look at those hotkeys within titles of menus and register tabs that allow accessing all parts of the user interface.
· Grid line entries that don´t fit wholly into the visible part of the grid column can easily be made visible by moving the mouse over them. A tooltip window pops up containing the whole line.

Working with grids and text fields
Important note: All database tables (dat, idx und blb files) reside in the program subdirectory \data. During the first program start a backup directory \save is created where all files are backupped. If ever some of the files in the \data directory are damaged the program uses those backup copies automatically.
As long as data integrity is guaranteed for the files in the   \data directory you can manually backup them (copy files from \data to \data\save (copy them - don´t move them!!)).
This is advisable, if you have edited some of the tables (e.g. saved own benchmark results), because data are backupped only the first time the program is executed as mentioned above
(Do not edit tables outside of the programs datasensitive grids and edit fields!).

Use the navigator buttons   to move through grids. In order to edit tables (insert, delete records) activate the checkbox "Edit table". This brings up more navigator buttons suitable for editing tables. Note that the Insert/Delete buttons (<+> und <->) will not work for some tables resp. datasources. For example the datasource for the main processor information does not allow inserting or deleting a record because it consists of exactly one record.

After editing a grid cell or text field post   all changes made with the according navigator button.

On pages that contain more than one grid the navigator buttons will be automatically connected with the underlying database table thats corresponding grid has gained input focus.

Behaviour of analysis
Normally after clicking a register tab the corresponding analysis will be automatically performed at once. This is different for benchmark pages only where the user often wants to select the devices first that should be benchmarked (e.g. drives or ASPI devices). To run a benchmark please click the button "Run benchmark".
On all other pages the button "Refresh" allows repeating the tests. For automatic refreshing activate the checkbox "auto" and enter the desired intervall with the spinup control.

Benchmark pages
· To save your own results click the button "Save own results".

· Use the grids <u>checkbox column (with chart icon title) to insert/delete results into/from diagrams.</u> Always post your changes before clicking into the next checkbox column!

Diagram features

Diagrams provide options for zooming and rolling. With your mouse <u>draw frames from left to right</u> that cover the area that you want to be zoomed. After releasing the mouse button an animated zoom will be performed. By drawing frames that touches the right diagram border the diagram will be rolled to the right. Reset a diagram to it´s defaults by drawing a frame from right to left that touches the left diagram border. Diagram windows that contain <u>pies provide a ruler on the right side</u> for rotating the pie what may become usefull whenever a very small pie segment is nearly invisible as a result of forshortening.

Overview information

System overview

No action is performed after the program has started. The system overview grid remains empty. The program is loaded quickly and initialized error-free. To run the system overview tests click the arrow button.

Tip: You can force the system overview test to be performed automatically at program start in the program setting dialog box.

CPU usage chart*:*
The chart shows the current CPU usage. It stays inactive until the system overview tests has been executed.

The green line shows the percentage of the current usage while the red line indicates the average usage. The chart will be restarted after some time, when the underlying database table is emptied (CPU usage is affected by an increasing number of table records!).
Normally the cpu usage will be affected from 5 to 10 percent by the program overhead.
The cpu usage will increase for example when starting a new process.

Windows system tools

The tree list view provides a convenient way to run the most important Windows control panel applets and system services. Doubleclick an entry to run the service. Read the notes and tips before running an applet.

Bios Viewer

The Bios Viewer lets   you examine the contents of the Main Bios, Video adapter Bios and the Bios of any other Bios-equipped adapter card such as SCSI or EIDE host controller adapters.Simply click on one of the radio buttons associated with specific start addresses. You can dump the contents of addresses C0000h (where video adapter Bios is located by default) to FFFF0h. The mainboard Bios (Main Bios) is located at F0000h by default, however on some machines at E0000h. The Bios of additional adapters may be located anywhere from C8000h to E8000h. Also there is a radio button that allows to scan the BIOS for all copyright strings such as "Copyright (c) ...", a very useful feature to get the vendor copyrights flashed into the BIOS.
Another radio group control allows selecting between ASCII, String and hexadecimal output format. If you are interested in text strings only, such as copyright notices etc., you don´t need to switch to ASCII or hexadecimal format at all.
There is also a checkbox that allows to hide empty lines. "Empty" means: no alphanumeric characters if ASCII output format is selected resp. 0-entries only if Hex output format is selected.

You also may search and research for strings. Click the button at the bottom of the panel.

Hardware information

Processor
Description of the main processor. Processor detection probably fails for CPUs that were released later than this program version.   Try to get the latest update.
On the other side detection of clock rate, CPUID, serial number,   multi processor and features should work fine for those shortly released processors.
Clock rate can only be reported for processors that provide a Time Stamp Counter. The accuracy is about +/- 1 MHz.
The program never mentions those pre-production names inofficially introduced by the processor vendors. Mostly they are for internal use only.

Note that several processors provide a programmable CPUID. This is another possible trap in detecting the processor type.
The internal cache can be reported for specific types only, the frontside bus speed determination requires one of several mainboard chipsets that provide this specific information.
Reliability rating: high as long as the processor type is known, otherwise low.

Mainboard
Description of BIOS, bus type, chipset, memory etc.
Incomplete information is given for mainboards that are based on a chipset with unavailable or incomplete datasheet because several inquiries are based on chipset register inquiry.
Other results are being gathered by BIOS ROM analysis. Most accurate results can be given for mainboards with (Phoenix-)Award or AMI BIOS.
Reliability rating: varies - high, if chipset and BIOS are known, otherwise incomplete.

SDRAM
The SDRAM memory modules are analyzed according to the Serial Presence Detect Method   (Intel Specification 1.2b, Nov. 1999 and current Rambus and DDR/DDR-2 SDRAM specification).   A small eeprom chip on the module contains the SPD information data. Default SDRAM modules, DDR and DDR-2 SDRAM modules as well as Rambus (RIMM) modules are currently supported. For RIMM modules the module capacity cannot be detected so far.

The analysis requires a chipset with known SMBus access method. Therefore several systems are not supported. The program supports many but not all Intel, VIA, AMD, elder ALI, SiS and nForce/2/3 chipsets.
Current Asustek mainboards disable the SMBus access to the SDRAM specific addresses (resp. hide the SMBus controller) and on many ALI chipset based systems the SMBus controller is disabled (and cannot be enabled via BIOS setup). On other systems it may help to enable the Power Managements (APM or ACPI) via Bios setup.
On current SiS chipsets the SMBus controller is diabled (and hidden) as well and it can be enabled ("hot

plugged") at runtime. There is an option in the <u>Expert settings dialog</u> that allows to enable/disable the attempt to enable it.

Some of the fields may be empty because not all vendors fill them up.
Also the vendor name may or may not be derived from the JEDEC ID.

A note on PC133 SDRAM modules:
A MHz value of 133 followed by '?'   means that some but not all of the modules timing parameters follow the PC133 specification (as shown in the example listing of the mentioned Intel spec). Either the module really isn´t PC133 compliant or the SPD was badly programmed.

You may verify the PC133 compliance by comparing certain register values in the eeprom listing with the required values as shown below. The values for your module should be equal or less than the values below. If some of them are not your BIOS may not have recognized as PC133 module.

Register 09 : <= 75h/117d (SDRAM cycle time for highest CL (Tclk))
Register 10 : <= 54h/084d (SDRAM access time from clock for highest CL (Tac))
Register 32 : <= 15h/021d (Command and Address signal input setup time)
Register 33 : <= 08h/008d (Command and Address signal input hold time)
Register 34 : <= 15h/021d (Data signal input setup time)
Register 35 : <= 08h/008d (Data signal input hold time)

Old SDRAM module with missing eeprom chip will not be supported by this analysis.

Further information about the memory modules of your system may be found via the SMBios and chipset analysis.

Reliability rating: very high as long as the eeprom was properly programmed by the manufacturer.

Sensor chips (Registered version only!)
Current mainboards often provide sensors for control of voltages, temperatures and fan rotation.
The inquiry is sensor-specific. Detecting the sensor type is tricky sometimes especially if the same detection algorithm is supported by more than one sensor type. Furthermore a known SMBus host is often required. This program version supports various (not all) Intel, VIA, AMD, ALI, SiS and nVidia nForce/2/3 chipsets. In some cases the PCI device that provides the SMBus functionality (often power management controller) is disabled and you may enable it by enabling the Power Management (APM/ACPI) functions in your BIOS setup.
However we found out that on several mainboards with ALI chipsets this PCI device cannot be activated. Also the SMBus functionality will not be activated sometimes although it´s corresponding PCI device is enabled.
Below is a list of detectable sensors:

Asus: AS99127F, ASB100, Mozart
Winbond: W83781D, W83782D, W83783S, W83627HF, W83627THF, W83637HF, W83697HF, W83791D
National Semiconductor: LM75 (program support for up to 3 sensors), LM78, LM78J, LM79, LM80, LM81, LM87, LM90
Genesys: GL518, GL520, GL523, GL525
Analog Devices: ADM1021, ADM1022, ADM1024, ADM1025, ADM1026, ADM1028, ADM1029, ADM1030, ADM9240
Maxim: MAX1617, MAX1617A
Texas Instruments: THMC10, THMC50
Dallas Semiconductor: DS1780
Heceta 2
SMSC: MON35w42, MON35w82

VIA 686A/B internal sensor
SIS: 5595 and 950 internal sensor
ITE: IT87, ITE8705F, ITE8712F
Fujitsu-Siemens: Poseidon, Scylla

As a rule of thumb the temperature sensor #1 is mostly connected to the main processor, sensor #2 to the mainboard and the other sensors (if any) to various external components.

You may configure the sensor analysis through the expert settings dialog, where you may exclude specific sensor types or alter the address range to scan for.
Reliability rating: varies, medium to high.

SMBios

The SMBios interface enables the system to get information about system configuration and status whenever required.
However the   PnP functions to access the database were not properly implemented in some elder BIOS versions. Therefore the analysis may cause a program error for SMBios version less 2.1. Should this happen then try to update your Flash BIOS. Furthermore, accessing   the DMI data pool sometimes fails.

Beneath that the collected data should always be considered with critical eyes because incorrect data can often be found in the database.

Under Windows NT/2000/2003/XP an SMBios version equal or better than 2.1 is required.

Reliability rating: partially low.

Chipset

Describes the mainboard chipset configuration. Select the main category in the left handed grid because data are grouped. The analysis will fail for chipsets thats datasheets are currently unavailable. Current VIA, SiS and nForce chipsets cannot be analyzed due to lack of datasheets.
Shortly released chipsets will be analyzed in a later program update.
Reliability rating: very high.

Multi I/O Chip

One of the jobs of the plug and play BIOS is to detect and register all the on-board devices. The information is stored in nodes (structures). The user may configure those devices using the extended bios setup, for example he may wish to turn on the ECP/EPP-mode of a parallel port.
Under Windows 9x there are two inquiry methods for the Multi I/O nodes. The default method is based on registry inquiry while the other is based on 16bit PnP function calls (see program settings). The second method provides more precise device descriptions but may cause a program error on some newer machines.

Chipsets of the future will more and more integrate the purposes of the I/O chip.

Note: This test cannot be performed under Windows NT4, so the corresponding register tab will be invisible.
Reliability rating: very high.

PCI-Bus

List of installed PCI devices. Vendor and product name may not be detected for shortly released devices. Try to get an updated program version. We will update the internal list of detectable PCI devices with each new version!

Reliability rating: very high, except vendor and product name for shortly released devices.

Ports
List of installed serial and parallel ports. Ports that aren´t properly installed will not be detected.
All information except ECP detection for parallel ports are gathered through documented Windows API32 calls and registry inquiry.
Reliability rating: very high.

Device information

Drive list
List of all currently installed drives.
Additional information are shown in diagram form:

• Diagram free/used capacity: The green part symbolises the remaining free capacity for the drive (harddisk and net drives).
• Diagram Total capacity: gathers the capacity of all installed hard drives (including net drives) and shows the percentage of each.
• Diagram Total free capacity: gathers the free capacity of all hard drives (including net drives) and shows the percentage of each.

Click on the register tab Media info (CD ROM/DVD) to get copyright information for data cd/dvd roms. Note that the grid focus must be set onto the CD ROM drive.

A second tab summarizes partition information for all physical drives.

Video adapter and monitor
Gathers information about video adapter and monitor:
The subpage Installed devices lists all currently installed adapters and monitors. Underneath the grid some more details are shown:
1. PCI device information as far as the adapter is PCI/AGP compliant
2. Registry information that describes the device from an OS point of view.
3. Detailed monitor description if available

The subpage DirectDraw Devices lists both primary and all other installed video adapters (insofar there are any installed). This analysis requires DirectX to be installed on your system. While DirectX 2 is the minimum requirement, DirectX 6 or better is recommended because it allows to get more accurate results.

The subpage Hardware details inquires both primary adapter and primary monitor through direct hardware access.
The DDC test does not run automatically because it might damage a DDC incompliant monitor. Please click the button to run the DDC test. It is recommended to read about DDC compliance in the monitor manual before running the test.

On the remaining subpages supported VESA modes as well as driver capabilities are listed.

ASPI devices
List of ASPI devices. These are native SCSI devices as well as ATAPI devices. The analysis supports

more than one bus and scans the bus for more than seven ID´s when supported by the host adapter.

Drive capacity may be reported incorrectly for drives larger than 8GB. This is not a program error. Only some newer systems seem to   allow more reliable inquiry.

Always try to install the latest ASPI for Win32. You can download it from http://www.adaptec.com/worldwide/support/driverdetail.html?cat=/Product/ASPI-4.70&filekey=aspi_v470.exe (last known URL).
Also note that only native SCSI devices allow complete device analysis.

Important:
This analysis requires ASPI for Win32 to be installed on your system. On Windows NT/200x and XP however the analysis is supported even if ASPI is missing. If so results are somewhat reduced.
While Windows 9x is shipped out with an ASPI layer that is automatically installed for ATAPI and SCSI devices under Windows NT/2000/2003/XP ASPI for Win 32 has to be installed by the user. Adaptec controllers are shipped with a tool called EZ-SCSI that allows to install ASPI.

EIDE/S-ATA/ATAPI devices
There are two ways to access EIDE drives under Windows: either through direct port access or by using a documented interface that is based on the kernel driver Smartvsd.vxd.
Although the direct port access is an undocumented way under Windows we´ll use it as the default one because it works more reliable than the driver based method.
You can select either direct port access or the driver based method in the expert settings dialog.

In order to use the driver based method the file Smartvsd.vxd must be found in the Windows system subdirectory \IOSUBSYS. If it resides in another directory copy it to the IOSUBSYS directory and restart Windows.
Note: Windows 98 was partially delivered without smartvsd.vxd!

A huge number of external host adapters and third/fourth IDE channels are supported as well (based on CMD, Promise, Highpoint chips).

Drive capacity may be reported incorrectly for drives larger than 8GB. This is not a program error. Only some newer systems seem to   allow more reliable inquiry.

The field AAM/APM-Setup describes the settings for the Automatic Acoustic Management and Advanced Power Management supported by harddisks since about 2000. Information given here include (for AAM): command status (not supported/supported, enabled/supported and disabled), current value (0-255) as well as the vendor recommended setting. Note that the current setting only takes effect if the command is enabled.

The description of the supported resp. enabled Ultra-DMA resp. ATA modes follows this syntax: Mode number(1,2,3,4, 5 or 6)/short mode name (33, 66, 100, 133 according to Ultra-DMA 33, 66 and ATA-100/133), addition "enabled" if the mode has been enabled.

Modem
The modem analysis supports both analog and ISDN modems. It not only informs about your modem but also let´s you send AT commands to it so that you can explore your modem by your own.

Subpage "Send modem commands"
The grid contains a bunch of Standard AT commands. Among them the ATI commands are those that extract the most interesting data about your modem. Check all the commands that you like to send to the modem.

Important: Consult your modem manual to find out whether it supports the enabled commands. Never send commands that might change the configuration settings of your modem.

After sending the commands the modem answers are written into the memo field on the right side. Note that this may take a rather long time (several minutes).

You may also define new commands by adding new records to the table.

Tip:
Although the program lists only those modems that are properly installed and that can be found in the device manager you may force the program to analyze modems that are physically connected to your system but not installed under Windows. In the table that lists your modems simply append a new record with a desired description and the port in the COMx standard notation ("COM1", "COM2") to which it is attached.

Printer
The printer analysis supports both local and network printers as well as virtual printer device drivers. Especially the inquiry of network printers may take a somewhat long time.

Multimedia Devices
The multimedia analysis supports several types of devices according to the Windows Multimedia Specification like Wave-In/Out, Midi-In/Out, mixer and auxiliary devices. They all may belong to one physically installed soundboard. Besides sound devices this analysis also includes game controller information.

Windows tests

Version, user, internal updates
This page contains core information about the installed Windows version including serial number and key.

Configuration
Brings up informations about all aspects of the operating systems configuration:
• Directories
• Boot options: stored in the file MSDOS.SYS (that resides in the root directory of the boot disk);
  determine the boot behaviour of Windows.
• System parameters: determine the look & feel of the user interface, for example whether smooth
  scrolling or several animation effects should be enabled.
• Autorun entries: Registry entries for executables that are going to be run automatically when Windows
  starts.
• File extensions
• Power Management
• Input devices

Current configuration
List of all currently installed devices. Shows Hardware ID (registry root path of the device) and device
status as well as additional driver information if available. Use the lefthanded grid to select a main
category of devices.

Internet Explorer
This information section lists all cookies stored on your hard disk as well as the browser cache files and
the recent documents.

The cookie list shows important information about each cookie and the entire file content as well.

The cache list shows extra information about HTML documents like title, author, description etc. as far as
provided by the publisher. Cached pictures are shown as well unless they are GIF format files. Due to
license terms of the GIF patent holder we are not allowed to show GIF files. However you may
doubleclick these files and they are loaded with the associated application.

The recent document list´s lines may be doubleclicked as well. The file will be loaded with the associated
program.

Network
This information section lists information about net adapters, Windows network, ressources and remote
access connections including connection statistics for the active connection. Scanning the network for
shared ressources may last several minutes.

Hint: You can get detailed connection statistics for UDF, TCP and ICMP protocols under

Resources/System monitor, especially under Windows NT/200x and XP.

Resources information

Memory
Reports the current memory usage. Enable autorefreshing at an intervall of 5 seconds or below by activating the checkbox below the refresh button.   The diagrams then show the current physical memory usage in real-time.
The history chart shows the free physical memory percentage in time.

Note: The results are slightly reduced under Windows NT/2000/2003/XP where some of the inquiry functions provided by Windows 9x/Me are not supported.

Tip: You may define the main program window as stay-on-top in the program settings dialog so that it will not be overlapped by   any window of other programs even if they were started later.

Process list
Shows the currently running processes in the lefthanded grid and for each process all the modules it consists of in the righthanded grid. Furthermore file version informations are included on a second page.

Hardware resources
List of resources currently in use -IRQ- and DMA channels, I/O and memory ranges.

System monitor
The system monitor allows to look insight of Windows machine room.
With the help of these statistics you can analyze the current state of   file system, memory and cache management and network transfers. If   other processes are running, if data are going to be copied or files are going to be compiled the data change continousely.
Under Windows NT4/2000/2003/XP the amount of information is far more extended and includes statistics for processor and drive usage.

Tip: Enable autorefreshing at an intervall from 5 to 10 seconds by activating the checkbox below the refresh button.

File statistics
The file statistic analysis reports the usage of harddisk and network drives classified according to file types. Diagrams demonstrate what the file types are that require most space on the drives.
These statistics are usefull especially after a longer time period because new data are appended to the existing ones so that you are able to see how the drive usage has changed in time.

In the pie diagram the data for the activated record are shown. In the history chart you have to enable the checkboxes first in order to see the corresponding file types lines.

Benchmarks

Introduction

Normally after clicking a register tab the corresponding analysis will be automatically performed at once. This is different for the benchmark pages where the user often wants to select the devices first that should be benchmarked (e.g. drives or ASPI devices). To run a benchmark please click the button "Run benchmark".

Benchmark results will be inserted both in the table grid and in the diagrams - colored differently compared to the values that existed before.

Use the grids checkbox column (with chart icon title) to insert/delete results into/from diagrams. Always post your changes before clicking into the next checkbox column!

To save your own results click the button "Save own results".

Processor, Memory

Measures the performance of processor, memory and chipset. Hard- and Softstones are overall performance index values, indicating the integer/memory resp. the floating point performance.

Multi Thread

Measures the performance of a multi processor system. (However it works also for single processor systems). It consists of 4 different threads that are executed "simultaneously". That means that up to four processors are currently supported by this benchmark.
Only multi processor systems running under Windows NT, 2000, 2003 or XP Professional Edition are providing real multitasking with real time execution of more than one thread at a time. The resulting increase of performance is indicated in the field "SMP Factor" that shows the relationship between execution on all and execution on only one processor. In order to get this relationship the system will be forced to run the benchmark first on all available and afterwards only on the main processor.

Note that the results are partially and intentionally influenced by graphical output performance. For authentic results it is necessary to consider GDI performance because even on multiprocessor systems there is only one GDI available!

The field "CPUs used by OS" indicates the number of processors the operating system relies on.

This benchmark is an application by it´s own and may (and should) be executed outside of Dr. Hardware too. To get most reliable results any overhead should be avoided.

Hint: You may study the Processor counters of the system monitor to find out more about the usage of the installed processors of your system.

Video
Measures the 2-D video performance via GDI API calls.

Harddisk drives
Measures the performance of harddisk drives via API32 calls.
There is a checklistbox where you may select the drives you want to be benchmarked before running the tests.
The tests include both read and write operations. If possible any buffering is disabled during these operations so that the results should report the native drive performance rather than virtual cache efficiency of the operating system. However the disabling of buffering seems to fail sometimes and irrational results come out of the tests.

CD ROM/DVD drives
Measures the performance of CD ROM and DVD drives.
There is a checklistbox where you may select the drives you want to be benchmarked before running the tests.
The benchmark include both low level and API level performance testing.
Access times as 1/3 or full stroke are measured through direct sector reading operations. API calls provide measurement of the filebased data transfer rate, provided a file of sufficient size (about 2 Meg) can be found on the CD ROM.

Important: A data CD/DVD ROM is required. If the benchmark fails use another disk instead. Note that the disks minimum capacity is 100 Meg while 600 Meg is recommended.
If a native CD writer without reading capabilities is installed in your system please uncheck it before executing the test because it cannot be distinguished from   a normal CD ROM drive and test may fail.
Also uncheck any virtual CD ROM drive installed by software. They too cannot be distinguished from a normal CD ROM drive and "accessing" them may cause the system to hang.

ASPI drives
Measures the performance of ASPI/SCSI/Atapi drives.
There is a checklistbox where you may select the drives you want to be benchmarked before running the tests.
The tests are based on read accesses of different block size. On a lot of systems the maximum block size is 64 KB.
The ASPI benchmark is based on true SCSI commands so the results may be more reliable for native SCSI devices than the results from the harddrives benchmark tests.
If a CD writer is installed in your system please uncheck it before executing the test because it cannot be distinguished from a normal CD ROM drive and test may fail.

Net drives
Measures the performance of remote drives via API calls.
There is a checklistbox where you may select the drives you want to be benchmarked before running the tests.
The tests include both read and write operations. If possible any buffering is disabled during these operations so that the results should report the native drive performance rather than virtual cache efficiency of the operating system.

Important: you must have writing operation rights for the tested remote drives otherwise the test will fail.

Program settings

Miscellaneous settings
- **Force system overview test:** Usually no action is performed after the program has started. The system overview grid remains empty. The program is loaded quickly and initialized error-free. You can however force the system overview test to be run automatically at program start by enabling this option.
- **Just open pages, no automatic analysis:** Normally after clicking a register tab the corresponding analysis will be automatically executed at once. Prevent the program from autoexecuting the tests connected with their tabs by enabling this option.
- **Program window stays on top:** You may define the main program window as stay-on-top so that it will not be overlapped by   any window of other programs even if they were started later.
- **Benchmark diagrams: Sort diagram data points by value:** The data points of a diagram will be positioned in fixed order by default. Enabling this option positions them according to their value, that means a higher value is positioned right beside a lower value. Thus the x-axis position indicates the value of the data point. Disadvantage: data points will often overlap each other.
- **Adjust color settings for low resolution:** By default the background colors for several control elements of the program interface are optimized for 256 colors or above. For 16 color resolutions enable this option.
- **Classic GUI design:** by checking this option you switch back to the Dr. Hardware 2000-2003 user interface with it´s 16 color icons etc.
- **3D charts:** This option is enabled by default thus providing nice 3-dimensional Benchmark charts. If you prefer flat appearance disable it.

Program window scaling
The program window has a dialog frame that is not sizeable. Also the maximize button in the title bar is disabled. To resize the window anyhow you need to scale the window.

- **Percent of default size:** The default size is 100%.   Enlarge the window by entering a value > 100. Note that a small addition is sufficient. Also avoid successive scalings. Scaling a window always comes along with loss of quality. So scaling a window that was already scaled before decreases the scaling quality.
- **Rescale to default size at next program start:** Scale to the default size next time the program is started.

Data integrity
Determines the level of data integrity checking and maintaining. Higher level comes along with slower program execution.

Editor:
- **Use internal editor by default** - Advantage: supports syntax highlighting and allows to edit very large files.
- **Use Windows editor by default**
In any case the program will load the alternative editor if the selected editor cannot be loaded.

Expert settings
- **Force direct IDE port access:** There are two ways to access EIDE drives under Windows: either through direct port access or by using a documented interface that is based on the kernel driver

Smartvsd.vxd. Although the direct port access is an undocumented way under Windows we´ll use it as the default one because it works more reliable than the driver based method. You can select either direct port access or the driver based method with this option.

- **Force DDC test:** The DDC test will not be executed automatically by default because it might damage a DDC incompliant monitor. You can force automatic test here.
- **Forbid 16bit tests:** Several tests require 16bit BIOS calls under Windows 9x/Me. You may forbid any 16bit calls here.
- **"Hard" I/O access method:** Hard port accesses enables the program to access devices under Windows NT/2000/2003/XP that are under the control of another driver. However this may result in conflicts. On the other side tests may fail when using the soft method.
- **Multi I/O test via PnP calls:** Under Windows 9x there are two inquiry methods for the Multi I/O nodes. The default method is based on registry inquiry while the other is based on 16bit PnP function calls. The second method provides more precise device descriptions but may cause a program error on some newer machines.
- **PCI access via 16bit method:** If the system hangs or reboots while performing PCI related tests (including subtests of the CPU and mainboard section) under Windows 9x/Me you should activate this option that enables a slow but secure PCI access method via 16Bit BIOS calls.
- **Data validity check after program start:** A data validity check at program start is advisable because previously damaged data files can be repaired and even replaced by backupped copies automatically. The only advantage of disabling this option is to speed up the program start. At least when encountering analysis errors you should reenable it!
- **Enable SMBus controller:** This feature allows to attempt to enable an SMBus controller that is suspected to be installed in the system but disabled (and hidden) by the vendor. Currently SiS chipsets are supported only. Do it at your own risk! On all tested systems enabling the device didn´t affect the system stability in any way. After rebooting the system the device will be disabled again. An enabled SMBus controller is required for the Serial Presence Detect (SDRAM) analysis and sometimes for the sensor test as well.

Serial Presence Detect - preset number of modules

If a program error occurs while performing the SDRAM test you may enter the number of SDRAM modules that are actually

present in your system here to avoid access on banks that are not populated.

CPU usage chart

- **Show fix range:** Either all gathered data points are shown in the diagram or a fix range of points. Showing all data points means that the chart will be compressed steadily.
- **Empty table after ... received data:** It´s advisable to rebuild the chart after some time and to empty the underlying database table because the CPU usage is affected by an increasing number of table records!.

VESA Test (Windows NT/2000/2003/XP only):

While performing the VESA analysis the system has to be switched to fullscreen DOS mode temporarily. Therefore the test has to be confirmed by the user by default. You can preset and skip the inquiry by setting this parameter to one of the following values.

- **Inquiry** - A message box enables the user to skip the test each time before it is going to be performed .
- **Always** - No message box: test will be performed without previous inquiry.
- **Never -** No message box: test will be skipped without previous inquiry.

SDRAM/Sensor analysis - configuration

All the sensor types the program checks for are listed in a table with fields for the SMBus address range and access method (SMBus/ISA bus), preset with the default values. For each sensor type (resp. group of sensor types) the experienced user may alter the settings in order to exclude certain sensors from being searched for or to exclude certain port addresses from being scanned.

If you want to change the address range settings please note that **you have to**...

- use the hexadecimal format for the addresses (e.g. do not write "44" but 2Ch, where 'h' stands for hex and is an option)
- separate single addresses or ranges by semicolon (;)
- avoid any spaces

Here is an example for a correct entry: "0h-23h;2Ch;2Eh;7Ah-7Fh"

Beneath the sensor chips you may also change the settings for the SDRAM test.
Normally you will never need to change anything here!

Note: Please do not change any of these settings unless you are quite sure what you do and never delete a line from the grid!

PCI bus count (Windows NT/2000/2003/XP only)
On certain machines the PCI bus number inquiry causes the system to hang or reboot.
Should this happen then preset the number of PCI buses that are installed in your system. In most cases todays machines are equipped with two PCI buses (One for the PCI slots and one for the AGP bus). Mainboards with more than 6 PCI slots or with adapters that contain PCI-to-PCI bridges may have additional buses. In most cases the program will be able to autodetect the number of PCI buses.

Status messages
- **Confirm messages:** Each status message is shown in a popup window. This is for debugging tests only.
- **Write status messages to logfile (MSGLOG.DAT):** Each status message will be written into the data file MSGLOG.DAT. This is for debugging tests only.

Report generator and Report viewer

Create a report to save the test results to printer or file.

Creating reports
Open the report dialog via main menu File/Creating reports... or by clicking the corresponding toolbar button.

On the register page Selection you may determine the tests you plan to include into the report.

On the register page Target, Layout you may determine the output target: printer resp. QRP file or file with one the following formats: txt/htm/rtf/csv. If you want to write the report to file (except QRP file format) you have to enter a valid file name. Text, HTML, RTF and   CSV are supported.

By selecting printer as output target you will be able to save your report to the proprietary QRP file format once the report has been loaded into the print preview. Reports saved as QRP files may be loaded into the Report viewer   later. Note that the QRP file format is a proprietary non-text file format that cannot be viewed with a text editor. The size of a QRP file varies from 600KB to 2 Meg and above!

There are also edit fields for the page border settings.

You may add header and footer to your report that will be printed on each page. Furthermore you have the opportunity to write a short comment that will be inserted at the top of the report.

On the register page Special report settings you´ll get final information and you may also enable several more options:
Option to run previously executed tests again If you have made changes to some of the output results you should disable this option. Otherwise the tests would be executed again and previously made changes would be overwritten. Example: Before creating the report you have executed the processor analysis and you have added the address of your vendor to the processor field.
Option to create a silent report Enabling this option will suppress any warning, error or inquiry messages. Note that most of the common messages are suppressed by default anyway.
Option to hide user specific data. If you want to send your report to someone else it may be advisable to exclude information like user and company name, serial numbers and keys. The corresponding fields will be filled with 'x' instead.

Click <Okay> to start report creation. You may abort the report creation at any time by clicking <Cancel>.

Print preview
After the report has been created it will be loaded into the print preview. Loading the preview form takes a certain time, please be patient. The preview provides toolbar buttons for printer setup, printing, zooming, navigating and saving the report to file.

Creating auto reports
In order to run Dr. Hardware in such a way that it automatically opens the report dialog or even creates a report at once without any program interaction you have to start the program with the commandline parameter -r: (drhard -r).

Additionally you can specify a file name as output target. Command line parameters: **-r filename.ext** (space character between -r and filename!)

Examples:
drhard -r textreport.txt
drhard -r c:\myreports\htmlreport.htm
drhard -r commadelimitedreport.csv
drhard -r rtfreport.rtf
drhard -r proprietaryreport.qrp
Important: Tests that you want to include into the report have to be selected during a previous program session.

The autoreport option enables you to collect data of numerous computers quickly and with minimum effort.

Report viewer
Call the report viewer via the main menu   File/Report viewer... or by clicking the corresponding toolbar button. The report viewer provides the same functionality as the preview. The File-Open button let´s you load the desired report. The viewer only supports QRP files.
In order to view previously created reports stored in different file formats choose "Open report or other file..." from the main menu "File"

Site license program

Note: The latest update of the following information can be found on the web at http://www.dr-hardware.com/pghpsite.htm.

Introduction

We offer very attractive site licenses to companies, schools and institutions.
Beginning with 5 licenses the price for the site license is lower than the price for the according amount of single user licenses.

Your way to get your site license is **easy** and consists of two steps:
- Order the desired site license at **RegSoft.com**. You may order online on the web (direct URLs on our homepage), via fax, phone or postal mail. Primarily you need the **main product ID** (31670) to select the desired main product Dr. Hardware Professional and secondly the **price code name** (e.g. "58pP1" for "50 User"). Details below. **Purchase orders** will be accepted for approved customers. Please contact sales@RegSoft.com.
- After your order has been processed by RegSoft.com we will send you a **registration key** to unlock the shareware version, a **license key** (start the Registration Wizard to enter both keys) and a **permission** that grants the right to copy the registered (unlocked) version x times (according to license type). You will receive both keys and permission via **e-Mail** unless you insist on receiving it via fax or postal mail.

You may **upgrade to a higher license level** at any time. The upgrade price is the **difference** between the price for this higher license and the license you purchased formerly.

Site License offers

License Name	License amount	USD
"5 User"	max. 5 user / computers	109$
"10 User"	6 - 10 user / computers	149$
"25 User"	11 - 25 user / computers	298$
"50 User"	26 - 50 user / computers	449$
"100 User"	51 - 100 user / computers	598$
"1000 User"	101 - 1000 user / computers	998$
"Open World"	unlimited user / computers	1498
"School"	Classroom	109$

RegSoft.com product ID and price codes

Product ID=31670 Dr. Hardware Professional
"5 User" , Price Code=D4510
"10 User",Price Code=62WF1
"25 User", Price Code=58pP1
"50 User", Price Code=D4510
"100 User", Price Code=1v17H
"1000 User", Price Code=87Q3Y
"Open World", Price Code=88CW4
"School", Price Code=7057K

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If you have further questions contact us at mail23@dr-hardware.com

Monitor test screen

The test screen enables the user to check and adjust the settings of his monitor. Once opened you may close the screen by a left button mouse click.
Clicking the right mouse button opens a popup menu that provides additional tests and patterns. Please note however that this menu   is disabled in the shareware version.

Below are some hints on how to get the utmost out of your monitor.

· Shape, rotation, picture size: Check whether the grid´s corners are rightangled and top and bottom lines are in real horizontal position. Circles should be circles, no ellipses. The border lines of the grid also give control when zooming the picture to the maximum size.
· Definition: All text ought to be well defined in both the middle and the corners of the screen. On a large number of monitors definition is reduced toward the sides. It may be vice versa for other ones. Especially some early and/or cheap 19" models come along with uneven definition. Definition cannot be adjusted on most of the models via control menu!
· Convergence (alignment of red, blue and green color signals): lines and letters should be free from any colored shadows surrounding them.
· Colors: The color palette should represent the 16 base colors.
· Contrast, brightness: you should be able to distinguish the 5 light and the 5 dark grey tones. Otherwise brightness and/or contrast have to be adjusted.

Adjustment of grid, circles and colors may be improved by switching to the appropriate **single test mode** through the popup menu.

The popup menu provides these additional tests and features:

· Single test mode for grid, circles and colors.
· Blank screen: This is a good test for achromasia as well as appropriate refresh rate setting. With brightness and contrast set to their defaults the screen must not flicker.
· Picture ghosting check: Shadows on the right side of the bar indicate insufficient shielding of the video cable. Avoid using video cable extensions, fix the plugs properly in their sockets, don´t use video switch boxes. Mostly this is not a monitor defect but a signal disturbance.
· Toggle background color (black/white): You may toggle the background color that by default is black.

Tips:

· The on-screen menu of todays monitors allows to adjust almost all monitor parameters described above.
· On some models you can reset the factory default settings through a reset button. General color problems may be corrected via color temperature settings.
· Two thin grey horizontal lines (damper wires) on a white or light grey background in conjunction with a slightly convex screen are typical characteristics of high quality black trinitron cathode ray tubes and no defects.

FAQ - Frequently asked questions

You will find an updated list of FAQs at http://www.dr-hardware.com/pghpsupp.htm.
Further problems are discussed within the help topics.
Note: Please use the latest program version. You can get it from http://www.dr-hardware.com.

Problem: For registered user: How to update and unlock new versions
Solution: How to find your previous key: Run the registration/Unlock wizard of the previous version, select "Unlock...". The key can be found in the leftsided field. Enter this key in the same field of the new version. Unlocking may fail if you migrate to a Windows platform that is not supported by your key or if the update support has been expired. In these cases you may purchase an update key at reduced price. Run the registration wizard of your previous (registered) version.

Problem: I get the message "Unable to activate kernel mode driver" after starting the program.
Solution: This may happen after uninstalling any previous version. Therefore it is recommended to uninstall the previous version before installing the newer one. To fix the problem just reinstall the program to reinstall the kernel driver.   This may also happen when upgrading from Windows 9x/Me to 2000, 2003 or XP. The program requires different kernel drivers for the Windows technologies. Again, simply reinstall the program.

Problem: The video benchmark hangs during report creation under Windows XP.
Solution: In order to get the video benchmark into the report do the following: start the program, run the video benchmark, open the report dialog, uncheck "Run previously executed tests again" on the **Special report setting page**, and finally start creating the report. The video benchmark will be skipped but the result from the previous execution will be added to the report.

Problem: The PCI analysis causes the system to hang or reboot. All program pages with PCI access are affected (e.g. CPU, PCI, Video).
Solution: Under Win 9x/Me: Go to the program settings dialog/Expert settings and enable "PCI access via 16 Bit Bios".
Under Windows NT/2000/XP: Go to the program settings dialog/Expert settings and enter the number of PCI buses installed in your system (most often 2 buses).

Problem: The ASPI analysis (and ASPI Benchmark) causes the system to hang or reboot.
Solution: none (possibly a device or driver causes this problem). Before running the ASPI benchmark you may preselect the devices that are to be benchmarked. umgehen.

Problem: Vesa test shows incorrect video RAM result

Solution: none (error in adapters VESA function support), but the DirectDraw Devices page always shows the **correct** amount of RAM.

Problem: ASPI and EIDE drive capacity is not correct for drives   > 8GB.
Solution: none (newer systems seem to   allow more reliable inquiry)

Problem: SDRAM test fails.
Solution: If a program error occurs you can enter the number of SDRAM modules that are actually present in the program settings/Expert settings dialog, to avoid access on banks that are not populated. The analysis fails on systems with unknown SMBus specification. Furthermore all current Asus mainboards prevent SMBus scanners from accessing the SPD data.

Problem: The sensor analysis fails.
Solution: The analysis fails on systems with unknown SMBus specification resp. unknown sensor specifications.

Problem: Error (system crash etc.) during CD ROM benchmark
Solution: Virtual CD ROM devices (created by special software tools to emulate physically non-existing drives) can cause errors because the program cannot distinguish between physical and virtual drives.

Problem: Reduced results under Windows NT
Solution: Upgrade to Windows 2000, 2003 or XP.

Problem: Unable to print report or order form.
Solution: Always install the latest printer drivers. If this happens with Epson printers please visit the report generators vendors support page at http://www.qrsoft.com/epson.htm for Epson printer issues.

Burn In Benchmark Test