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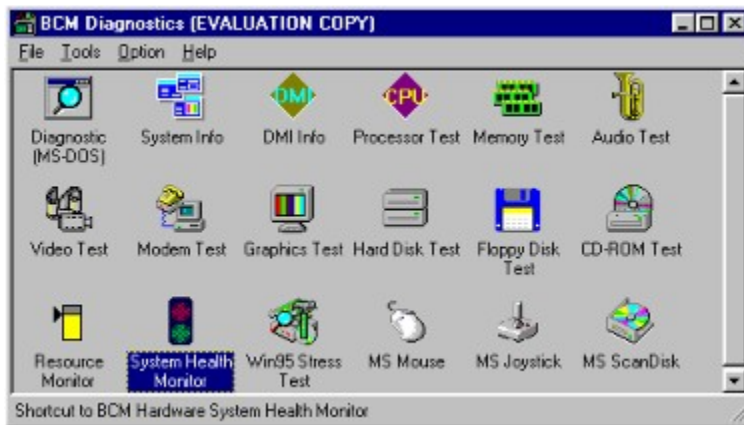
[BCM Diagnostics for DOS](#)



Introduction

BCM Diagnostics is a Win95 based program which helps you diagnose problems of your PC running Microsoft Windows 95 operation system. It includes System Info, Processor Test, Memory Test, Audio Test, Video Test, Modem Test, Graphics Test, Harddisk Test, Floppy Test, CD-ROM Test, and Stress Test. It also has a Resource Monitor and shortcuts to Microsoft Mouse, Joystick, and ScanDisk. DOSDIAG.EXE, the DOS based diagnostics utility, is also included. If your system motherboard contains a LM78 hardware health monitor chip and the BCM System Health Monitor utility is also installed, it will be linked with BCM Diagnostics and its icon will be displayed in the main window as well.

To start the program, click on the BCM Diagnostics icon from the BCM Diagnostics program group, from Win95 control panel or from Win95 desktop window which were automatically created during installation. The main window contains all the icon links for the test modules and system health and resource monitors and it appears:



Double click one of the icons in the main window to bring a property sheet or dialog box.

To uninstall BCM Diagnostics and System Health Monitor, simply bring up the Win95 control panel and click on Add/Remove Program icon, highlight BCM Diagnostics or System Health Monitor, the click on the Add/Remove button.



Test Modules

[Processor Test](#)

[Memory Test](#)

[Audio Test](#)

[Video Test](#)

[Modem Test](#)

[Graphics Test](#)

[Hard Disk Test](#)

[Floppy Disk Test](#)

[CD-ROM Test](#)

[Shortcuts](#)

Double click on the icon of the test module in the main window will bring up the test window. All test windows contain property style sheets with two pages - information page and test page.

The information page shows information for the test target. For example, the information page for Processor Test shows CPU type, family, model and etc..

The test page has at least a Start button (will change to Stop when testing), a progress bar and a list box for showing test results. It appears:





BCM Diagnostics for DOS

BCM Diagnostics for DOS is a DOS based program designed to help you evaluate BCM motherboards or identify problem causes in the event of motherboard malfunctions. BCM Diagnostics for DOS bypasses operating system layer and performs tests down to physical hardware level. The test results reflect the conditions of your system's compatibility, stability and reliability.

Some of PNP devices do not get initialized under DOS and will not be detected and tested by DOSDIAG.

Information

System

Disk/Floppy

I/O Port

VGA

Memory

Sound

Command Line

```
MS-DOS Prompt - BCMDIAG
BCM Diagnostics v1.01.02, Copyright (C) 1996-97, BCM Advanced Research, Inc.
Information System Disk/Floppy I/O Port VGA Memory Sound Exit
System Configurations
CPU: 486-CPU CPU 133MHz
Floppy A/B: 1.44 MB / None
Disk 1: None
Disk 2: None
Disk 3: None
Disk 4: None
Base Memory: 640KB
Extended Memory: 23552KB
Reserved Memory: 384KB
External Cache: Unable to detect
Video: Cirrus Logic GD-5400,1624KB
Serial Ports:
COM1: 2F8
COM2: None
COM3: None
COM4: None
Printer Ports:
LPT1: 378
LPT2: None
Joystick: None
PS/2 Mouse: Installed
Sound Cards: Blaster or Compatible
Esc=Cancel F1=Help F3=Exit F4=Run Tagged F5=Run All Space=Tag/Untag
```



Resource Monitor

Resource Monitor is a program that can be run in background to periodically check free system resource, free memory, free disk space, or CPU usage. Click on the Resource Monitor icon in the main window to bring up BCM Resource Monitor window. Then click on the combo box to select which resource to monitor, change the number in the edit control for desired update interval and move the slide bar to set warning threshold. Click the Close button to run Resource Monitor in background. A status icon will be displayed in the Win95 status bar. If system's free resource gets below the threshold, a warning message box will be displayed and ask you to restart Win95. You may need to close some applications to free up more system resource or clean up your hard disk to free up more disk space.

Free System Resources

Shows the percentage of free system resource. Free system resource indicates the free USER resource or free GDI resource, whichever is less.

Free Memory

Shows free physical memory size or free virtual memory size.

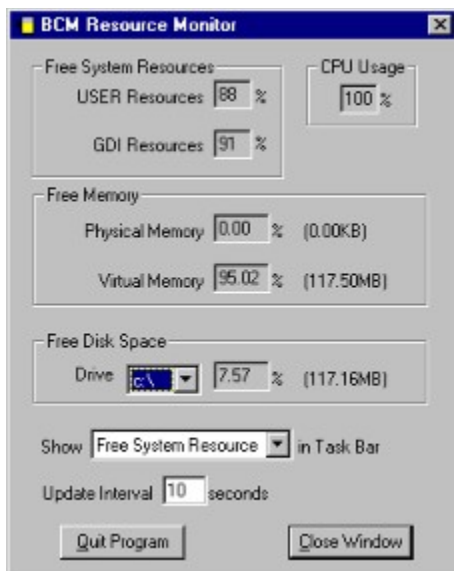
Free Disk Space

Shows free disk space of the selected drive.

CPU Usage

Shows CPU usage in percentage.

The Resource Monitor window appears:





Technical Support

For technical support, select Technical Support menu item from Help menu to bring up Technical Support Links window. There are three buttons in that window:

BCM BBS

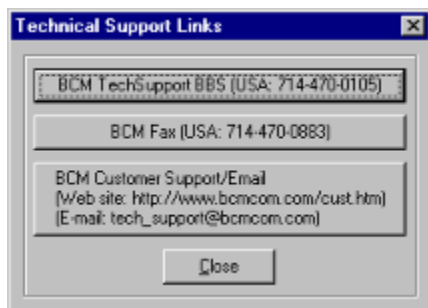
Dial in BCM BBS to download/upload files.

BCM Fax

Send a quick fax to BCM Technical Support.

BCM Web Site/E-Mail

Go to BCM Web site and/or e-mail to BCM Technical Support. A internet access account and proper window setup are required.





Stress Test

The Stress Test was designed to evaluate your system's stability under Win95 environment.

Click on the Stress Test icon in the main window to bring up the Stress Test window. Then double click on a module name to enable or disable it. Stress test will run all enabled module concurrently if Run Concurrently check box is checked and it will stop on errors if Stop on Errors check box is checked. Change the number in Number of Test edit control for desired test cycles. (Enter 0 for the maximum number allowed.) Each module, except for DOS Test and Win95 App., will output detailed test result at the end of each test cycle.

Click on the module name and then click on View Log to view the last test result. Since each test cycle will overwrite the previous test result, it is a good idea to check Stop on Errors when there are errors in some test modules. Make sure that all the other programs are closed and mouse/keyboard are not moved or touched while testing is in progress. The test time is also reported and can be used as performance index.

The Stress Test window appears:



When testing is in progressing, the current test cycle number will be displayed on the title bar. You can click the Stop button any time to stop test. It may takes a few seconds to stop all tests.



Processor Test

Performs general register test, mathematical calculation test, and CPU performance test. The CPU speed is calculated based on its performance and may be slightly different from the CPU speed rated by manufacturer.



Memory Test

Performs memory address test, data pattern test, walking one test, moving inversion test, walking zero test, and random memory block copy test. The Memory Test will optimize the physical memory size first to get the maximal continuous physical memory block. If your program requires a large block of continuous memory, you can also run this test to consolidate memory fragments and tune up free physical memory size.

If any error is found, you may want to check if the memory module are installed properly. If your system BIOS setup allows you to select memory access clock cycle, you can refer to your motherboard manual and select the proper setting for the installed memory type. If error continues, you may want to consult your system provider.



Command Line

DOSDIAG /?

Type DOSDIAG /? in DOS command line for input switch options.

Usage:

DOSDIAG [/B or /b] [/T or /t] [#] [/NC] [/REBOOT] [/L or /l]

[/B or /b] : Runs all tests at command line mode.
[/T or /t] : Runs only tagged tests at command line mode.
[#] : Runs test(s) # times at command line mode.
[/NC or /nc] : Runs tests without external loopback plug.
[/S or /s] : Skip system configuration autosensing.
[/L or /l] : Logs test results, non stop on errors.
[/REBOOT] : Reboots after tests.

Examples:

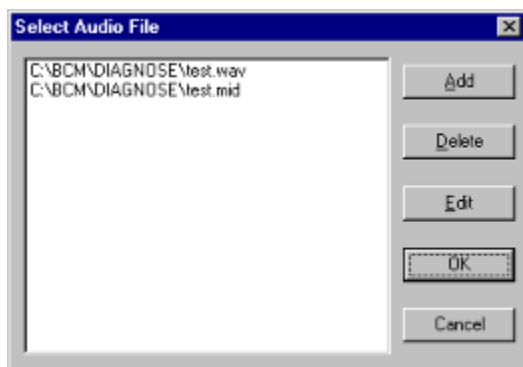
DOSDIAG /B 1 /NC /REBOOT ;Runs all tests once w/o ext. loopback plug
and reboots system afterwards.
DOSDIAG /NC ;Runs diagnostics w/o external loopback plug.

Read the README.TXT in DOSDIAG directory for more information.



Audio Test

Audio Test plays selected audio files (wave and/or midi). Click on Select Files button to bring up Select Audio Files window for adding or deleting files from the play list.



Click on Add button to add a new test file. You can add up to 10 test files. Click on Delete button to delete a test file. Click on Edit button to select another test file to replace the current one. Click on OK button to confirm changes or click on Cancel button to cancel changes.

If any error is found or no music is playing, you may want to check on the speaker wiring and go to the information page to see if the appropriate sound drivers were installed.

Audio CD Test:

Click on Audio CD Test button to test audio CD. It will bring up a CD player and play the first sound track. You need to verify if the sound is coming from your speakers. When done, close the Audio CD Test window.



Video Test

Video Test plays selected video files (avi and/or mpeg). Click on Select Files button to bring up Select Video Files window for adding or deleting files from the play list.

In the Select Video Files window, click on Add button to add a new test file. You can add up to 10 test files. Click on Delete button to delete a test file. Click on Edit button to select another test file to replace the current one. Click on OK button to confirm changes or click on Cancel button to cancel changes.

If any error is found or no video is playing, you may want to go to the Information page and see if the appropriate AVI and MPEG drivers were installed.



Modem Test

To begin the modem test, click on the Start button (to abort, click on the Stop button). The test module send modem several sets of AT commands including dial tone detection.

If modem was installed and is not detected, you may want to bring up Win95 Device Manger and see if modem driver is properly installed.

If test fails at certain AT commands, it may be a compatibility related issue, click on the Technical links in the Help menu and try if you can connect to BCM BBS or Web Site. If you can, it indicates your modem is working properly. In this case, please send us a fax or email and let us know about you modem model and error condition.



CD-ROM Test

To start CD-ROM test, first select the drive from the combo box (if there are more than one drive), then click on the Start button.

CD-ROM test consists of four test items:

1. Read File Test: Test reading a file larger than 5MB from the CD-ROM.
2. Transfer Rate Test: Test the transfer rate.
3. Full-Stroke Access Test: Test the access times of the worse case.
1. Random Access Test: Test the random access time.

The Transfer Rate Test requires a 5MB or larger size file in the CD-ROM. It can be any type of file. The test result is used to rate your CD-ROM speed.

The Full-Stroke Access Test requires a fully formatted CD or it will report not enough data in the CD-ROM for testing.



Shortcuts

BCM Hardware System Health Monitor

Bring up the BCM Hardware System Health Monitor as in Control panel.

Microsoft Mouse

Bring up the Mouse property page as in Control panel.

Microsoft Joystick

Bring up the Joystick property page as in Control Panel.

Microsoft ScanDisk

Run the ScanDisk program from System Tools.



Information (BCM Diagnostics for DOS)

Hardware

Displays hardware interrupt table.

Device Driver

Shows all DOS device drivers installed in system memory.

System Information

Displays DOS version and BIOS information.



VGA (BCM Diagnostics for DOS)

Test All

Performs all VGA tests.

Auto Sense

Senses video memory size.

Video Memory Test

Tests video memory in standard VGA mode and VESA mode.

RAM DAC Test

Tests memory in DAC chip.

Graphics Test

Performs graphics drawing functions for drawing random pixels, lines, blocks and polygons.



System (BCM Diagnostics for DOS)

Test All

Performs all system board tests

Speaker Test

Turns on on-board speaker for a few seconds and lets user verify the sound quality and volume.

Keyboard & PS/2 Mouse Test

Tests keyboard and mouse interfaces. Stuck one and zero tests are performed. Reset commands are sent to keyboard and mouse and proper responses are verified.

Port B Test

Verifies port 61h and checks for refresh and parity bits.

Programmable Timer Test

Verifies 8254 timer and checks status/control registers and counters.

Interrupt Controller Test

Verifies 8259 interrupt controller and checks IRQ operations and noise conditions.

RTC/DOS Clock Test

Compares time deviation between RTC and DOS timers.

Real Time Clock Test

Verifies CMOS memory with various test data patterns, checks RTC flags and interrupt.

DMA Page Register Test

Verifies DMA page registers with various test data patterns.

DMA Controller Test

Verifies DMA status/control registers with various test data patterns and checks DMA operations.



Disk/Floppy (BCM Diagnostics for DOS)

Test All

Performs all tests.

Floppy Drive Test

Senses floppy drive types, perform read, seek, write and verify operations.

IDE Hard Disk Test

Senses IDE drive types, checks controller integrity and performs read, seek and verify functions.

Measures average disk access time and data transfer rate.

CD-ROM Interface Test

Senses IDE CD-ROM types.



I/O Port (BCM Diagnostics for DOS)

Test All

Performs all I/O tests.

Printer Port Test

Senses port address and test status/control registers and data port.

Printer Port Test (Ext Loopback)

Tests printer operations with external loopback connector. Checks for interrupt, control signals and data port integrity.

Serial Port Test

Senses port address and tests status/control registers and data port and checks baud rate accuracy and internal data loopback. Checks for modem connection.

Serial Port Test (Ext Loopback)

Tests serial port operations with external loopback connector. Checks for interrupt, control signals and serial data communication.



Memory (BCM Diagnostics for DOS)

Test All

Performs all memory tests.

Auto Memory Sizing

Senses base memory size and extended memory size.

Base Memory Test

Performs read/write tests on base memory blocks with various test data patterns.

Extended Memory Test

Performs read/write tests on extended memory blocks with various test data patterns.

Random Cache Test

Senses external cache size and verifies cache integrity with various test data patterns read and written to random addresses. The test is done in linear memory mode.

Random Memory Test

Tests extended memory with various test methods. Random data patterns are verified onto random selected addresses. All tests are done in linear memory mode.

Memory Stress Test

A dialog box is provided for user to specify continuous test loop counts for long period stress test.



Sound (BCM Diagnostics for DOS)

Test All

Performs all sound tests.

Speaker Test

Turns on on-board speaker(buzzer) with various frequencies.

FM Synth Test

Initializes FM synthesizer in sound adapter and play a few different tones. Check for sound output



System Information

When the System Info icon is clicked, the Win95 System Information property sheet will be displayed and it contains the following tab control buttons.

Summary

Shows a summary of your system devices, components, drivers and free system resource.

Memory

Shows memory usage, total physical memory, free physical memory, total page file, free page file, total virtual memory and free virtual memory.

Processor

Shows CPU type, family, model, stepping, math type, and CPU speed. The major CPU features are also shown.

BIOS

Shows BIOS date, manufacturer, PNP, DMI and APM BIOS versions.

PCI

Shows PCI BIOS info and PC device info.

PNP

Shows device resource(IRQ, I/O, DMA and Memory) allocations reported by Win95.

Video

Shows graphics information including BIOS version, VGA memory size, OEM string, mode table and driver information (including video drivers). The Hardware Support indicates the hardware capability of your graphics card and the Driver Support indicates the capability of the installed software driver.

Audio

Shows Sound Blaster compatible information and audio drivers information. This test will try to detect Sound Blaster compatible DSP chip within I/O port range of 240h-280h.

Hard Drive

Shows number of track, sector, and head of each physical hard drive. And shows file system type, label, total and free space of each logical hard drive. If an Enhanced IDE drive is found, it will show both BIOS reported drive parameters and actual drive parameters reported by IDE firmware.

Floppy

Shows number of track, sector, and head of each physical floppy drive. And shows file system type, label, total and free space of each logical removable drive.

Modem

Detects installed modem, COM address and fax support. Also shows the results ATIO to AT111 commands.

CD-ROM

Shows installed CD-ROM drives and CD, if available, information including file system type, serial number, title, maximum file name length, total cluster, number of sector per cluster, sector size in bytes, used space, free space, and total space.



Graphics Test

Click on Start button to start Graphics test or click on Video Memory button to start Video Memory test.

Graphic test consists of 10 test items:

1. Direct 3D Test: Test if your system has the direct 3D capability.
2. Direct Draw Test: Test if your system has the direct draw capability.
3. Stretch Test: Test the bitmap stretching.
4. Drawing Test: Test the bitmap drawing.
5. Flood-Fill Test: Test the flood-filling function.
6. Pixel Drawing Test: Change the colors of pixels on the screen.
7. Line Drawing Test: Draw lines on the screen.
8. Ellipse & Rectangle: Draw ellipses, rectangles and polygons.
9. Scrolling Test: Test the bitmap scrolling.
1. Change Fonts Test: Change fonts.

These test verify the graphics functions of the drivers installed in your system.

The Video Memory test verifies the integrity of the physical video memory installed in the graphics adapter.

If any error is found, it may be caused by incorrect graphics driver or setup. You may want to get the appropriate driver and reinstall it. If error continues, your graphics adapter may have hardware related problem.



Hard Disk Test

Hard Disk Test contain two functions:

Click on Start button to start Win32 disk I/O tests on the selected hard drive(s). (Most Win32 disk I/O functions will be called including functions to read, write, and seek.)

Click on Verify button to perform low level verifications (verify sector, head seek, funnel seek, random seek, and data transfer rate) on the selected hard drive(s).



Floppy Disk Test

Floppy Disk Test contains two functions:

Click on Start button to start Win32 disk I/O tests on the selected floppy drive(s). (Most Win32 disk I/O functions will be called including functions to read, write, and seek.)

Click on Verify button to perform low level verifications (verify sector, head seek, funnel seek, random seek, and data transfer rate) on the selected floppy drive(s).

The free space left in the diskette will determine the largest file size to be tested.

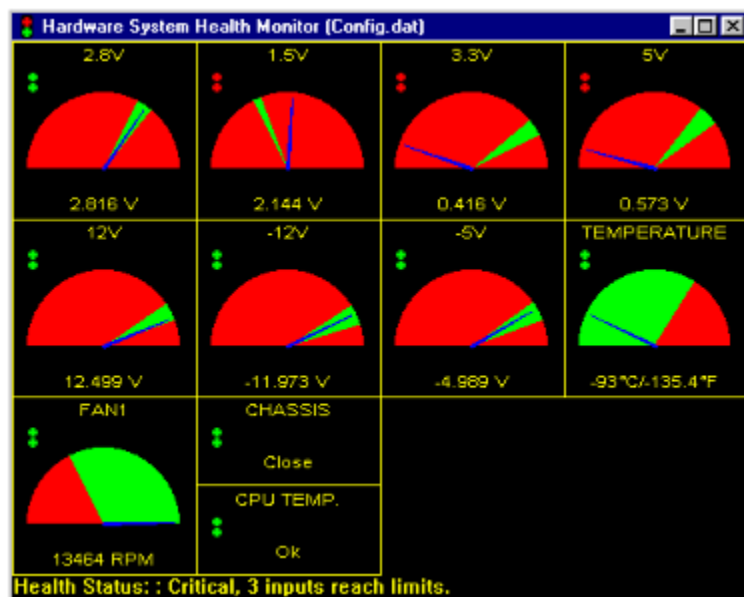


System Health Monitor

The System Health Monitor is a program that runs in background to periodically check CPU temperature, voltage inputs, and fan speed. A LM78 chip and its associated drivers are required to run this program and monitor the system's health condition.

The System Health Monitor window contains several cells to display the status of CPU temperature, voltage inputs and fan speed according to the configuration file. Each cell has a red-green light, a pie chart, a hand, a title and a current reading. The red-green light indicates if the current reading reaches limit. The red zone represents the area either over the high limit or under the low limit, while the green zone opposite. The blue hand indicates the current reading. The light will turn to red when the hand is in the red zones, otherwise, always green.

There are two menus: system menu and pop up menu. Click the icon in the left-top corner to bring up the system menu. Press and release right button of the mouse to bring up the pop up menu. In addition, double-click on any cell will bring up the configuration dialog box for that input.





System Health Monitor Menu

System Menu:

1. Configuration:

1. **Edit:** bring up a configuration dialog box to change settings.
2. **Open:** open a specific configuration file.
3. **Save As:** save current settings in another configuration file.

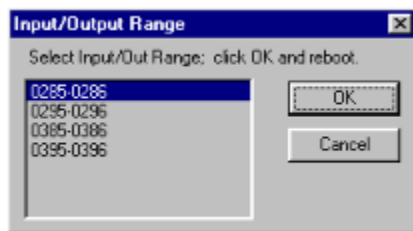
2. Colors:

1. **Text:** change the color of the text.
2. **Hand:** change the color of the indicator.
3. **Red Area:** change the color of the red zones.
4. **Green Area:** change the color of the green zones.
5. **Default:** use the default colors.

3. **H**elp Topic: bring up the help context.

4. **A**bout: product information.

5. **I**O Range: bring up a dialog box to set I/O range.(only appear in Windows NT)



Pop Up Menu:

1. **M**ore Info: show help context about the input where you right click the mouse button to bring up this pop up menu.

2. Configuration:

1. **Edit:** bring up a configuration dialog box to change settings.
2. **Open:** open a specific configuration file.
3. **Save As:** save current settings in another configuration file.

3. Colors:

1. **Text:** change the color of the text.
2. **Hand:** change the color of the indicator.
3. **Red Area:** change the color of the red zones.
4. **Green Area:** change the color of the green zones.
5. **Default:** use the default colors.



System Health Monitor Configuration Dialog Box

To configure the settings, select the desired input from the drop-down list in the right-top corner.

Enabled

Enabled monitoring this input.

Warning Message Box

Pop up a "restart Windows 95" dialog box, when the reading of this input reaches limit and the display window is minimized.

Label

Title for the input shown in the display window.

The LM78 is capable of monitoring the IN0-IN6, FAN1-FAN3, TEMPERATURE, FAN1-FAN3 and BTI signal inputs. In a typical motherboard design, its usages are listed below:

IN0: V-CPU, used to monitor the voltage of CPU and core chipset. Its value depends installed CPU type. Consult your system manual for the proper value.

IN1: V-T, used to monitor the voltage of the signal termination. Its value varies.

IN2: 3.3V, used to monitor 3.3-volt input.

IN3: 5V, used to monitor 5-volt input.

IN4: 12V, used to monitor 12-volt input.

IN5: -5V, used to monitor -5-volt input.

IN6: -12V, used to monitor -12-volt input.

TEMP: used to monitor CPU or motherboard temperature.

FAN1: CPU-FAN, used to monitor CPU fan. A speed signal output is required.

FAN2: other fan input.

FAN3: other fan input.

CHASSIS: used to monitor the "Open" or "Close" status of the system chassis.

BTI: CPU-Temp, used to monitor the status of additional CPU or other temperature sensor.

Voltage Ratio

Only IN0 to IN6 has this attribute. It is a factor in determining the current reading and is determined by the motherboard hardware. If you believe that your system is in good health and the default values are not suitable for your system, you can adjust the ratio to get the appropriate values. To change this value, the program must be started by issuing command "hsysmon -config" under DOS prompt.

Fan Speed

Only FAN1, FAN2, FAN3 has this attribute. It is a factor in determining the current reading. To change this value, the program must be started by issuing command "hsysmon -config" under DOS prompt.

Low Limit

Low limit of the allowable area. This value can be changed.

High Limit

High limit of the allowable area. This value can be changed.

Update Interval

Refresh time interval in seconds. This setting applies to all inputs.

No Warning Message

Disabled "Warning Message Box" settings for all inputs.

No Warning Beep

No warning beep when any input reaches limit.

Hardware System Health Monitor (Config.dat)

Enabled INO

Warning Message Box

Label: Voltage Ratio:

Low Limit: 2.672 V

High Limit: 2.928 V

Update Interval: seconds (1-60)

No Warning Message Box

No Warning Beep

No Help Available

No help is available for this area of the window.

No Help Available

No help is available for this message box.



DMI Information

The DMI (Desktop Management Interface) information is provided by the system BIOS. If your system BIOS supports DMI BIOS, the DMI information stored by the BIOS in the flash ROM will be retrieved and displayed.

BIOS Information

Shows vendor's name, version, release date, ROM size, starting address, and which functions the BIOS supports.

System Information

Shows manufacturer's name, product's name, version and serial number.

Base Board Information

Shows manufacturer's name, product's name, version, and serial number.

System Enclosure(Chassis)

Shows manufacturer's name, system enclosure type, version, serial number, and asset tag number.

Processor Information

Shows socket designation, processor type, processor family, processor manufacturer, processor ID, processor version, voltage capabilities, external clock, max. speed, current speed, upgrade information and CPU status.

Memory Controller Information

Shows error detecting method, error correcting capability, supported interleave, current interleave, maximum memory module size, supported speeds, supported memory types, and supported memory module voltages.

Memory Module Information

Shows socket designation, bank connections, current speed, current memory type, installed size, enabled size, and error status.

Cache Information

Shows socket designation, cache configuration, maximum cache size, installed size, supported SRAM type, and current SRAM type.

Port Connector Information

Shows internal reference designator, internal connector type, external reference designator, external connector type, and port type.

System Slots

Shows slot designation, slot type, slot data bus width, current usage, slot length, slot id, and slot characteristics.

On Board Devices Information

Shows device type and device description.

OEM Strings

Shows OEM strings.

System Configuration Options

Shows information required to configure the base board's jumpers and switches.

BIOS Language Information

Shows installable language attributes and current language attribute of the BIOS.

Group Associations

Shows group association information.

The DMI Information window appears:

