BurnInTest by PassMark Software - Overview

Passmark's BurnInTest is a software tool that allows all the major sub-systems of a computer to be simultaneously tested for reliability and stability. Anyone who has used computers for any period of time knows the importance of having a stable system. The cost of a hardware failure can be enormous. If you are lucky your data will only become inaccessible while faulty components are replaced. If you're unlucky you can lose your files completely or have them permanently corrupted. Even if you have good backups, you can still lose days of work returning the PC to its pre-failure state. In many cases the lost data can never be replaced and businesses can be brought to their knees, with the loss of documentation, customer details and financial records.

What BurnInTest does is thoroughly exercise the hardware in a PC in a short period of time, in the same way as normal applications use a PC over a long period of time. This takes advantage of the fact that computer hardware tends to fail either very early in its life or after many thousands of hours of use.

Typically BurnInTest should be used before a PC is put into service, as a failure of a computer that isn't being used for a critical application and doesn't have any critical data is much less damaging, (especially if it is still under warranty).

BurnInTest will bring to the surface intermittent or hidden problems so that after a successfully run the computer can be used with a much higher level of confidence.

BurnInTest tests the CPU via mathematical operations and MMX calculations, Hard drives, CD ROMs, CD burners, Sound cards, 2D graphics, 3D graphics, Video playback,   Printers, Memory & Network connection. (BurnInTest Pro additionally tests Tape drives, Serial ports, Parallel ports and USB 1.x and 2.0 ports with loop back connectors). All these tests can be done simultaneously as the application is multithreaded.

- The best value professional Burn In tool on the market !!

- Avoid delivering D.O.A. (Dead on Arrival) hardware to your customers.

- Dramatically reduce your burn in times with multithreaded simultaneous testing of components.

- Build your image as a supplier of quality systems.

- Avoid costly downtime, system rebuilds and lost data.

- Test the stability of a system after configuration changes or hardware upgrades (critical for overclocking).

- Interfaces for logging temperature and laptop battery charge levels (additional software required).

- Use BurnInTest to help with Electromagnetic Compliance Testing (EMC) to ANSI C63.4-1992

For more information.

To get started quickly see the Quickstart page

See Test Descriptions for information about each test

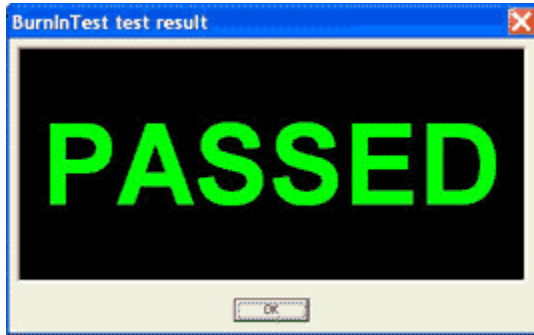Learn how to interpret the results

Have a look at what each menu option does

Get the answers to Frequently Ask Questions.

Find out how to purchase the software

Quickstart – How to start testing

Here's a summary of the steps to go through to start testing.

1) Use the Configuration, <u>Test Duty Cycles</u> window to select the type of tests you wish to perform.

2) Use the Configuration, <u>Test Preferences</u>window to set any parameters that you wish to use, e.g   which hard drive to use.

3) Put paper in the printer, a data CD in the CD-drive and a floppy disk in the disk drive. (if you selected these tests)

4) Click on the Go button

That's it.

Test descriptions

Several tests are built into the software. Each of these tests contains one or more sub-tests designed to exercise different aspects of your computer system. These tests can be run concurrently, with each test having its own window and using its own CPU thread or as individual tests. It is also possible to vary the load mix by increasing or decreasing the duty cycle for a particular test.

Each test keeps an error counter, a cycle counter and an operations counter. The significance of each of these counters is detailed with each test.

The following tests are currently available.

Maths tests

Integer & floating point mathematical operations

2D Graphics tests

Video adapter memory testing

Tests of standard two dimensional graphical functions

Monitor EMC testing

Hard Disk and floppy disk tests

Reading, writing files

CPU MMX & SSE tests

Tests of the MMX (multimedia extensions) and SSE extensions within newer CPU's

3D Graphics test

Tests the DirectX 3D graphics system

Printer test

Tests the default printer

CD ROM, CD-RW burn and DVD test

Tests the CDROM, CD burner, DVD and optionally the sound card

Network test

Tests the Network connection

Memory (RAM) test

Tests the Memory in the computer

Sound card test

Test wave form and midi audio play back

Video play test

Test the playback of different video files

Serial port test

Tests the serial ports connected to the computer

Parallel port test

Tests the parallel port connected to the computer

USB port test

Tests the USB ports on the computer

Tape drive test

Tests the tape drive

Interpreting the results

This part of the main window displays a summary of all the results of all the tests that are currently running.

Test Name

This column shows a picture depicting the test type and the name of the test. Only those tests actually running are displayed.

It should be noted that:

(i) The USB test picture will be of the PassMark USB2 loopback plug if a USB2 loopback plug is connected, otherwise it will be of a picture of the PassMark USB1 loopback plug. The USB pictures also have an "F" (FullSpeed) or "H" (HighSpeed) indication to the bottom right of the picture displayed. These indicate the speed that the USB port has connected at, either FullSpeed (up to 12Mb/s) or HighSpeed (up to 480Mb/s).

(ii) The CD/DVD picture has a "B" indicator if the CD test is a CD Burn test.

Cycle

The number of test cycles that have been executed for a particular test. The meaning of a 'test cycle' varies from test to test. For example for the Printer test it is the number of full pages printed, for the Hard disk test it is the number of file write / verify cycles that have occurred. See the test description for more details about the significance of this field.

Ops (Operations)

The number of test operations that have been executed for a particular test. The meaning of a 'Operation' varies from test to test. For example, for the Printer test it is the number of characters printed, for the Hard disk test it is the number of bytes that have been written or verified. See the test description for more details about the significance of this field. The values are expressed in Units, Millions, Billions, Trillions and Quadrillions.

Errors

The number of errors that have been encountered while the test has been executing. This value should normally stay at zero. A value of greater than zero indicates there has been an error in the hardware or the software controlling the hardware. In some cases it is possible for the computer to self-detect an error. (such as the math's and disk tests). In other cases the user must check themselves that no error has occurred (eg. Is there sound coming from the speakers? Are printouts complete, clear and legible?).

Last error description

This is the description of the last error that occurred. This will give some indication as to the cause of the error. See Common Errors for a description of the errors that may be encountered.

Menu Options

File

Save test log

Save the recent results as a text file or an HTML file.

Save as Image

Allows the main window (or its contents) to be saved in one of 3 different graphics file formats. Bitmap (BMP), GIF and Enhanced Meta file format (EMF). See the save as image dialog box for more information.

Print

Allows the contents of the main window to be printed. The standard Print dialog window will be displayed allowing the user to select a printer, etc..

Exit

Exits from the application.

Edit

Copy

Allows the contents of the main window to be copied to the clipboard in an Enhanced MetaFile. Format (EMF). The results can then be pasted as a graphical image into other documents that support this format, eg. Microsoft Word

Some applications may not accept a pasted EMF format image. In this case it is better to use the Save as Image menu option (above) to create an image file, which can then be imported into another application.

Clear

Clear the results produced so far, resetting all values and log files to zero. This is done automatically each time a new test run is started (unless the accumulated logging option is set in the preferences window).

Machine ID and Notes

Displays the machine identity and notes window.

View

Error log file

Opens the log file window. The log file window contains status & error messages.

Error by categories

Toggles the main display between the following two error table views:

1. Number of error and last error description per TestName, and

2. Number of errors for each category per TestName (that is, CRITICAL, SERIOUS, WARNING AND INFORMATION).

Configuration

Test duty cycles

Displays the test setup dialog which allows automatic stopping of tests to be configured, a subset of tests to be selected for execution and a duty cycle to be set for each test.

Test Preferences

This option allows the user to customize some aspects of the way BurnInTest works. See the description of the preferences dialog box for more details.

Load Config

A test configuration that has been previously saved to disk can be loaded using this menu option. The loaded configuration will set all the parameters available in the 'test duty cycles' and 'test preferences' windows (see above) to the values contained within the file. Using this menu option in conjunction with the 'Save Config as' function it is possible to create a number of standard test configurations. See Maintaining multiple test configurations, for more information.

Save Config as

This option allows the current configuration settings to be stored in a file for later use. All the values available in the 'test duty cycles' and 'test preferences' windows (see above) will be saved into a file, whose name is selected by the user. Using this menu option in conjunction with the 'Load config' function it is possible to create a number of standard test configurations. See Maintaining multiple test configurations, for more information. Saved configuration files can also be loaded automatically by including them on the command line. See Command line arguments for more details.

Test

Start test run

Runs the tests selected in the 'Test duty cycles' window. Each test will be run in its own window using its own execution thread. This allows multiple tests to be executed simultaneously. The results from each test are summarized in the main window. Depending on what tests are being started, the speed of the machine and the selected duty cycles; the tests may take several seconds to start.

After tests have been started the menu's and buttons are 'Greyed' out, and no another actions can take place until the tests are stopped manually or automatically.

Stop test run

Stops all the tests that are currently running. It may take several seconds to stop all the tests, remove test files from the disk and de-allocate system resources. If one of the test windows is the active window, Alt-F4 can also be used to stop all the tests. Individual tests can not be stopped after they have been started, as all tests will be stopped at the same time.

Help

A series of options that allow access to this Online help file and to the PassMark home page.

Contacting PassMark Software

On the Web

You can contact PassMark on the web at

> http://www.passmark.com

E-Mail

For technical support questions, suggestions

> help@passmark.com

For sales & commercial issues

> sales@passmark.com
>
> {button Purchase BurnIntest Online Now,EF(`http://www.passmark.com/sales',`',1)}
>
> See also, the Ordering information page.

For any other issues

> info@passmark.com

FAQ

You may also want to check out the list of Frequently Asked Questions .

System Requirements

Operating System: Windows 98, 2000, ME, XP, 2003 server (*)

RAM: 32 Meg

Disk space: 2 Meg of free hard disk space (plus an additional 10Meg to run the Disk test)

DirectX 8 (or above) software for 3D graphics and video tests (plus working DirectX drivers for your video card)

MMX compatible CPU for MMX tests

A printer to run the printer test, setup as the default printer in Windows.

A CD ROM + 1 Music CD or Data CD to run the CD test.

A CD-RW to run the CD burn test.

A network connection and the TCP/IP networking software installed for the Network Tests

A serial port loop back plug for the serial port test. (Pro version only)

A parallel port loop back plug for the parallel port test. (Pro version only)

A USB port loop back plug for the USB port test. (Pro version only)

A USB 2.0 port loop back plug for the USB 2.0 port test. (Pro version only)

(*) – Windows98 and Windows Me do not support the Tape drive, Video playback , CD-RW burn, USB2 or the Disk test mode of Butterfly seeking (all other test modes supported) tests. Windows 2000 does not support the CD-RW burn test. The advanced RAM test is only available under Windows 2000 and Windows XP professional (the other RAM tests are supported under the other OS's).Users must have administrator privileges in 2000 and XP.

Ordering information

Price

US Dollars:	$49	(Professional version, single user)
US Dollars:	$22	(Standard version, single user)

See the PassMark website http://www.passmark.com/sales to order the software and for details of special offers, multiuser pricing, site licenses, upgrades from previous versions and pricing on loopback plugs.

What happens when you order

After the order is accepted a License Key will be returned (via E-Mail). This Key is then entered with the User Name into the initial, 'Welcome' window. At this point the program then changes permanently into the full licensed version. Keys are normally returned within 12 hours or less.

What you get when you purchase the software

Free Technical support via the Web and E-Mail

> http://www.passmark.com/support

Free minor upgrades & bug fixes as they become available

> http://www.passmark.com/download

The removal of the initial shareware startup window

The removal of the 15minute burn per run time restriction and 30day evaluation period associated with the evaluation version.

How to order Online and Offline

If you would like to register BurnInTest, you can do the registration online using a credit card via a secure connection on the Internet at.

> http://www.passmark.com/sales

You can also order over the phone, via Purchase Order, or fax, see our web page for details

> http://www.passmark.com/sales

Other information

Confidentiality

All personal details supplied when placing an order will be strictly confidential. Online orders will only be accepted over a secure, encrypted connection.

Multi-user & Site Licenses

Contact PassMark software, asking about our attractive rates for Multi-user and site licenses.

> http://www.passmark.com/sales
>
> sales@passmark.com

Questions & more information

If you have any questions we would be happy to hear about them. Contact

> sales@passmark.com

Copyright & License information

Ordering information

See the information on the <u>Ordering information page</u> for details about the different options available for purchasing a license.

Copyright & End User license

This End-User License Agreement ("EULA") is for the PassMark BurnInTest software.

EULA is a legal agreement between you (either an individual or a single entity) and PassMark Corporation for the PassMark software product identified above, which includes computer software and may include associated media, printed materials, and "online" or electronic documentation ("SOFTWARE PRODUCT").   By installing, copying, or otherwise using the SOFTWARE PRODUCT, you agree to be bound by the terms of this EULA.   If you do not agree to the terms of this EULA, do not install or use the SOFTWARE PRODUCT.

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- The primary user of the computer on which the licensed SOFTWARE PRODUCT is installed may make a second copy for his or her exclusive use on a portable computer.

- When a site license is purchased, the purchasing organization may make unlimited use of the SOFTWARE PRODUCT within that organization. An organization is a single legal entity and does not include affiliates, partners, subsidiaries or franchises of the organization.

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<u>LIMITED WARRANTY.</u>

PassMark warrants that (a) the licensed SOFTWARE PRODUCT will perform substantially in accordance with the

accompanying written materials for a period of ninety (90) days from the date of receipt, and (b) any Support Services provided by PassMark shall be substantially as described in applicable written materials provided to you by PassMark, and PassMark support engineers will make commercially reasonable efforts to solve any problem issues. Some states and jurisdictions do not allow limitations on duration of an implied warranty, so the above limitation may not apply to you. To the extent allowed by applicable law, implied warranties on the SOFTWARE PRODUCT, if any, are limited to ninety (90) days.

No warranty of any sort of offered on the evaluation version of the software, until a license fee is paid.

Additional information

For questions regarding the copyright, end user license contact, multi-user licenses and site licenses, contact.

info@passmark.com

Precautions for thorough and careful testing

For a hardware test to be useful several precautions need to be taken. Failure to take into account these factors may result in tests being misleading or other unwanted results.

- Stop all other applications before running BurnInTest. BurnInTest can be run in the background but it just doesn't seem prudent to do any important work when you're testing a computer to see if it will fail. In any case BurnInTest will place such a load on the system that any other applications will run at a snails pace. Not having other applications running also frees up more RAM that can be used by the Memory test.

- Back-up any important files before you start. BurnInTest can simulate many days of typical office PC use in a few hours, this increases the risk of hardware failure. Note that the testing process itself doesn't touch any existing files on the hard disk or floppy disk. It does however overwrite the contents of tapes used in the tape drive test (Pro version only)

- When testing multiple disk drives at the same time you may not want to test multiple partitions that are on the same physical drive at the same time. Doing this can result in an enormous amount of seeking between partitions and not as much reading and writing.

- PassMark recommends running BurnInTest just after you install a PC for the first time, as this is the ideal time to find a problem. The PC will be still under warranty and you can't lose any of your data (because you haven't loaded any). Any disruption caused by a failure will be minimal.

- Remember that BurnInTest does not create problems in your hardware, it just helps you find them in a controlled manner. BurnInTest doesn't use any nasty programming tricks to try and make your hardware fail. It uses the same functions and procedures that standard Windows applications and file servers use. If your computer fails when running BurnInTest, it was going to fail in the near future anyway !

- If you only want to test a particular component of the computer, turn the other tests off. There's no point using the CD-Drive when you only wanted to test the new hard drive.

- Doing a successful test run doesn't mean that the computer will never fail. Software problems, viruses, and the fact that no computer component has an unlimited life span means that precautions need to be taken. Having good BurnInTest results is NOT a substitute for making good file backups in the future.

- Because BurnInTest doesn't delete any of the existing files from a disk, this occupied portion of the disk will not be tested. Thus the more free space that the disk has before the test, the larger the portion of the disk that will be tested.

- For the Printer test, inspect printed pages by hand. Check the text is complete and legible.

- When using the CD test with a music CD verify that the music is being played clearly though the PC's sound system.

- On some new computers, the warranty may be voided if you open up the case. Check your warranty before you start poking around in the case.

- Old computers tend to fill up with dust over the period of many years. This dust layer can cause heat build up and even short circuits. Check for dust build-up in old computers before you start.

- Check the computer has adequate ventilation & check all the fans are in good working order.

- Check that the computer isn't full of bugs. (i.e. the insect type). Depending on where you live, insects can be a real problem. The term 'Computer Bug' was coined after a dead moth was found to have shorted out one of the first computers build. In Australia, cockroaches are the most common cause of failure in microwave ovens. Recent studies have even suggested that some insects are attracted to electro-magnetic fields. So watch out !

- There are many cases where a software bug may appear to be a problem with the hardware. Knowing who or what to blame isn't easy. Check with your hardware manufacturer(s) from time to time in case they have released new software that fixes some problems they may have found. The hardware components that in general have the most problems with their, 'Driver' software are, Video cards (especially the 3D functions), Sound cards and CDs.

- By using the Network test you can test both your computer and the network it is connected to. If an error does

occur it may be difficult to determine the location of the error. If you are using an Internet address then it is very likely that any transient errors are the result of problems on the Internet. The best compromise is probably to set the test address to the address of a machine on your local area network, (if you have one).

- (Pro version only) When selecting a Serial or Parallel port to use for loopback testing, ensure that the port selected is not already in use by the system. (e.g. by a mouse or printer). Also check the BIOS mode for the parallel port is correct.

- Because of limitations in the memory test, faulty RAM errors may not be picked up by the test and faulty RAM can often manifest itself in different ways. These include disk I/O errors, system crashes and lockups.

Frequently Asked Questions (FAQ)

See the Passmark web site www.passmark.com for the most up to date version of this FAQ

Q. The test run stops after 15minutes, why ?

With the shareware version the tests will only run for 15minutes at a time. After the software has been purchased, the time is unlimited. Note that you can still get a much longer test run in the shareware version by clicking on the Go button each 15minutes. After the software has been purchased the test duration can be increased from the, 'Auto Stop' field in the 'Test preferences' window.

Q. My License key doesn't seem to work

Both the User Name and Registration Key must be correctly entered before the software turns itself into the registered version. Be careful because the Key is case sensitive (upper case characters must be entered in upper case and lower case characters must be entered in lower case). The user name must be exactly the same name as when the software was registered. There must also be no space or tab characters before the User name or Key. The best way to avoid typing errors is to Copy and Paste the User name and key from the registration E-Mail. This can be done using the mouse to highlight the text and the keyboard shortcuts, CTRL-C for Copy and CTRL-V for paste.

The User Name and Key should be kept in a safe place in case the software ever needs to be reinstalled (and for upgrades).

Q. Does BurnInTest run from a floppy disk under DOS ?

Yes and No, BurnInTest will run from a floppy disk but only under Windows. There is no version of BurnInTest that runs under DOS. While there are some advantages of running tests under DOS, there also plenty of disadvantages. Not all devices are supported under DOS, DOS is not multithreaded and the user interface is poor.

Q. How can I setup BurnInTest to run from a floppy disk under Windows ?

- Install BurnInTest on any PC using the normal setup program.

- Run BurnInTest and enter the License Key and User name associated with the license. (if you don't have a license then the floppy version will only work for 30days)

- Exit BurnInTest.

- Copy all the files (for V4.0 and above, excluding the help file, "bithelp.hlp") from the BurnInTest installation directory to an empty floppy disk. Depending on the version of BurnInTest, normally the installation directory is C:\Program Files\BurnInTest

- That's it, you're finished. Using the Windows Start / Run menu option you can for example enter the following 'a:\bit.exe' to start BurnInTest from the floppy disk.

You can now uninstall BurnInTest from the PC hard disk and use the floppy in the future on other machines. When running BurnInTest this way, there will be no files left on the PC after BurnInTest has finished. The floppy disk must be left writeable however. You can also get more sophisticated by having multiple test configurations, there is some information about this in the online help file. NOTE: If you are using the unlicensed evaluation version you need to be careful that the date and time is set correctly on all the PC's.

Q. How does BurnInTest work? Doesn't it just wear my computer out ?

Societies' reliance on computers means that the cost of hardware failure can be enormous (and embarrassing). BurnInTest thoroughly exercises PC hardware in the shortest period of time so intermittent or hidden problems are

found before they turn into a disaster. The typical life span of the main moving component in a PC, the hard drive, is quoted at around 300,000 hours by manufacturers such as Seagate. The use of BurnInTest for a 6 to 12 hour period would thus have a no significant impact on the life of the drive. On the other hand, it would allow manufacturing faults and intermittent faults to be detected in a controlled manner when to consequences of failure are minimal.

Q. BurnInTest crashes (with rubbish on the screen or a black screen) when the monitor powersave feature turns on after X minutes of running.

Some video cards' device drivers seem to have a bug that causes this crash when the monitor goes into powersave mode. If you disable the monitor powersave feature (from the Power Management window in the Windows Control panel) this resolves the problem.

Q. I have a dual CPU system, does BurnInTest test both CPU's ?

Yes. Process scheduling in Windows 2000 and XP shares the load between the two processors. Window98 does not support multiple CPU's. In the Pro version of the software it is also possible to target just one of the CPU's installed. The same principles apply for systems with more than 2 CPU's.

Q. My system is unstable. What can I do ?

See general instructions for tracking down a fault.

Q. I get the error, "No permission to open RAW network socket" with the Network test.

If you don't have administrator privileges and are logged onto a Windows NT 4.0, Windows 2000 or XP system you will get this error with the Network test. You need to have administrator privileges to run this test. In Windows 2000, there is no way to disable this security check. Access to Raw Sockets is granted on a per-transport basis. For the address family AF_INET, only administrators have the access necessary to create Raw Sockets.

Q. When I click on the Preferences & Duration toolbar button (or menu item) nothing happens

Your comctl32.dll library is out of date. The version of Windows that you are using is old and needs to be updated before all the functionality of BurnInTest can be used. If you are using Windows95 or WindowsNT4, you can install Internet Explorer 4.0 or later to update the comctl32.dll library and fix this problem.

Q. Why aren't the MMX, SSE, or 3DNow! tests available on my computer

These three sets of new CPU instructions only became available in later model Processors (e.g. The Pentium II). If you don't have one of these CPU's then the test can not be run. 3DNow! is only available on AMD processors.

Q. A message like "DDRAW.DLL could not be found" appears when I try and start the program

The 3D tests rely on having the full version of DirectX installed. (versions above 8 are required). Windows 2000 and XP have a good version of DirectX included.

The latest DirectX drivers are available free from Microsoft.

http://www.microsoft.com

Q. I've downloaded and installed DirectX and BurnInTest now starts but the 3D test still doesn't work.

As the 3D graphics test is running in a window (and not full screen) BurnIntest attempts to find 3D hardware that supports the current color depth used by Windows. (eg. 16, 24 or 32bits). If your 3D hardware doesn't support the current color depth an error may appear. This is normally only a problem in 32 color. The solution is to change the Window's display mode back to 16bit color and try again. This can be done from the Window's Control panel, Display Properties dialog box.

Q. I have a problem with the 3D tests. Just as the 3D test starts up, my computer crashes and I'm forced to reboot.

There are a small number of video card drivers that don't support hardware accelerated DirectX correctly or have bugs. What you should do is.

- Check that you are using the latest certified video driver for your video card. (ask your computer / video card supplier or check their web page)

- If you are using DirectX 7 then use the "DxDiag" program to verify your drivers and test Direct3D. You should find "DxDiag" in c:\windows\system or in c:\program files\directx\setup

A number of hardware manufactures produce video cards have very poor software support for 3D graphics (DirectX). This is especially the case for the cheaper, bottom of the range video cards. Poor drivers can result in strange visual artefacts appearing on the screen, poor 3D performance and system crashes. The old saying of, "you get what you pay for", seems especially true for video cards, Beware.

Q. Clicking on the help menu option "PassMark Homepage" doesn't work.

You will need to start a browser manually and point it to http://www.passmark.com

Q. The colors on the toolbar look strange as do the objects in the 3D test?

Your computer may be set-up only to use a 256 color display. Changing the display depth from the Windows control panel to a higher value will fix the problem.

Q. I don't need to do any more tests, how do I uninstall BurnInTest

Use the "add / remove programs" icon in the Windows control panel.

Q. I've lost my registration key, how can I get it back

Mail us at help@passmark.com telling us the name that was used to register the software, your E-Mail address, the name of the product (BurnInTest), and roughly the date when the software was purchased. We will mail your key back out to you.

Q. My system crashes from time to time, any idea why?

Here are some general comments about occasional system crashes.

Problems can occur if your computer runs out of system resources because there is some process or driver that doesn't release memory, handles, semaphores, etc.. back to the operating system. After a long period of uptime Windows runs out of resources and dies a terrible death. What can you do about this? Identify the offending software, if you can, and disable it. This can even be a bug in the Operating system however.

Computer can have a Random Crash. What do we mean by this? Many things can bring down a computer. Typical things would be a spike on the power line, a strong burst of Electromagnetic interference (eg Mobile phones, electric motors, etc..). If your system is running at its limits due to overclocking or your components are running at the top

of their temperature range, small external influences can push your system over the edge, resulting in a terrible death. If you believe in Chaos theory (and most scientists now do), then you also have to believe that computers will just crash unexpected from time to time, how often would depend on the design tolerances built into your hardware. What can you do about this?

- Do as the military do. Buy military specification computer hardware that has higher tolerances.

- Do what NASA does. Run 3 computers at the same time, expecting one to give the wrong answer or crash.

- Do what most big banks do. Run a hot standby system, that can takeover the job of the main computer in a few seconds.

- Do what the Telecommunications industry does. Buy equipment with N+1 redundancy and switch traffic off the faulty hardware. Almost all Telecommunications hardware also has a built in Auto-reboot function. Why? Because they know it will eventually fail.

Timing issue. Some software / hardware bugs only show up in very very rare occasions. Classic examples of this are Hardware or Software Interrupts occurring in a critical section of code. What can you do about these types of bugs? Almost nothing as a user. They have plagued software since the first line of code was written they are very difficult problems to find and are almost never picked up during software testing. Problems can occur in Drivers, the operating system, your hardware, everywhere. As everyone is always on a tight deadline, endurance testing often doesn't make it into a software developers test plan.

Also Window 98 just is not designed to run for a long period without the whole system crashing. Windows 2000 is better and some versions of Unix are even better again (in this authors humble opinion).

Mundane program bugs are also a major cause of failure.

Q. How long should I run BurnInTest for?

Not an easy question. In our opinion, the chances or finding a problem in the first hour are relatively high, (the system gets hot, it's the first run across the disk / CD and the first use of the of some of the drivers). Then every hour after that, the chance of finding a hardware problem drops significantly. The extra benefit of doing 12hours compared to 6hours is thus probably not great. Other nice technique is temperature cycling. All major manufactures of electronic equipment do this, they have large ovens and fridges in which they test equipment. The expansion and contraction of components and solder joins brings to light many problems. You could do 6 hours On, 6 hours Off, then 6 hours On, to get some limited temperature variation like this. NASA and the Army load their equipment on to vibration machines, but this may be going to far home / office use :-)

Maths test

This test contains two sub categories (integer and floating point) that contain 8 different tests in total.

For each of the integer tests, a large array of random 32Bit integers are processed using the particular mathematical operations list below.

For the floating point test single precision floating point numbers are used.

The following tests make up the suite.

Addition

Subtraction

Multiplication

Division

Floating Point Addition

Floating Point Subtraction

Floating Point Multiplication

Floating Point Division

Each mathematical calculation is performed twice and the results compared to each other. If the results obtained from the two calculations are different then this is flagged as an error. The numbers displayed in the window for this test represent how many millions of mathematical operations have been performed and verified. Each different math's test is run for half a second. After all 8 tests have been run the cycle count is incremented. The duty cycle and the CPU speed determine how many operations can be processed during the half second period.

2D Graphics – Video memory test

This test directly writes, reads and verifies data to the primary display device using the Microsoft DirectDraw interface. As such, DirectX 8.0 or higher must be installed on the machine under test.

You may test…

- Just the local video memory – that is the graphics adapters onboard memory.
- All video memory – this includes the local video memory and any other video memory, such as RAM reserved for graphics.

In each case, the test first determines how much of the appropriate memory is free and then fills this memory with a series of test patterns. Each test pattern is written to video memory and then displayed in the test window. After display, the test pattern data is read back from video memory and verified. Any errors are reported.

The screen color depth must be set to a minimum of 16 bits.

The test patterns used are similar to the memory test, plus some color specific patterns.

- White   11111111
- Black   00000000
- Binary 1   10101010
- Binary 2   01010101
- Sequence   (1, 2, 3, …)
- Red
- Green
- Blue

2D Graphics – Graphics functions

This suite contains a number of tests that exercise the standard Windows graphics functions and the video card.

Line Drawing

Lines are drawn into window. The color is changed every 500 lines to enable the lines to been seen in the test window.

Painting Bitmaps

A bitmap is painted into a window as quickly as possible.

Outline shapes

Two different shapes are drawn into a window

- An ellipse

- A square with rounded corners

The color is changed every 64 shapes to enable the shapes to be seen in the test window.

For each graphical operation the Windows return code is checked to verify that the operation was successful. The numbers displayed at the top of the window for this test represent how many millions of graphical operations have been performed. Each different math's test is run for half a second. After all 3 tests have been run the cycle count is incremented. The duty cycle, the CPU speed and the video card speed, determine how many operations can be processed during the half second period.

The codes used at the top of the windows are,

LI = Millions of lines drawn

SH = Millions of shapes drawn

RE = Millions of rectangles (Bitmaps) drawn

The total of these three values is displayed in the main window.

Monitor EMC Testing

(Applicable to BurnInTest Pro version only)

BurnInTest can be used to help with Electromagnetic Compliance Testing (EMC) to ANSI standard C63.4-1992. Section 11.1.3 of this standard details the requirements for testing of Visual Display Units.

In brief, this standard requires that screens of scrolling 'H' characters be displayed while EMC testing takes place. The monitor and the image displayed need to be adjusted by the tester in order to maximize the electromagnetic output of the monitor. (eg, by selecting maximum brightness and black text on a white background).

BurnInTest provides the ability to display a screen of Scrolling 'H' characters and the possibility to adjust,

- The color of the text
- The color of the background
- The Scroll speed (via the duty cycle window, slide bar)
- The character used, as a replacement for 'H'
- The font face and font size

The 2D Graphics preferences window can be used to either select the standard 2D graphics load test or the EMC testing scrolling 'H' pattern.

When activated, the Scrolling 'H' pattern fills the entire screen but Alt-Tab can be used to switch back to the main Window or other applications. Scrolling only takes place when the test window is the active window.

Disk test (Floppy and hard)

This suite contains a number of tests that exercise the mass storage units (Hard disk or otherwise) connected to the computer. By default drive C: is used for the hard disk and drive A: for the floppy disk but this can be changed from the Preferences Dialog. and up to twenty drives can be selected for simultaneous testing. From this twenty it is possible to select any combination of available floppy disk and hard disks.

The user can select one of the following patterns or choose to automatically cycle between the patterns. This selection is done in the preferences window. Possible test mode patterns are,

- Default (Cyclic)

- Sequential data pattern (0,1,2...255)

- Random data with random seeking

- High Low freq data overwrite (10101 then 00001)

- Butterfly seeking

- Binary data pattern 1 (10101010)

- Binary data pattern 2 (01010101)

- Zeros data pattern (00000000)

- Ones data pattern (11111111)

- Random data pattern

During each test cycle (except butterfly seeking) a file is created and verified on the disk. The size of the file is equal to a certain percentage of the disks capacity and all files are created in the root directory of the drives selected. The default file size is 1.0% of the disk size. For small capacity drives, like floppy disks, there is a minimum file size of 32KB. It is possible to change the default file size percentage from the preferences window.

Each test file is filled with a coded number sequence (a Pattern) that is used to verify the correct operation of the disk when the file is verified (read). Files are created in the free space on the disk until the disk is 94% full. When the disk has reached this limit, all the test files are deleted and the test starts again. A limit of 94% is used to ensure that some space is kept for use by other applications (including the windows swap file).

A number of test modes perform additional testing to that described above. These are described below:

Random data with Random seeking generates 7 blocks of random data for each test disk and sequentially writes a file using the first block of random data, followed by the second, third then first, until the file size specified is reached. This file is then verified with sequential reads of data blocks from the file just written. This is followed by seeking to a block within any of the created files, selected at random. At random either a read and verify or a write will occur at this position on the disk. This random seek and random read/verify or write will be repeated the number of times specified by the user in the disk preferences "seek count" field. New files are written and verified with this process until the disk full level is reached. At this point, all the test files written to disk will be deleted and the cycle will be repeated.

High Low frequency data overwrite works by first writing a file with a high frequency pattern (10101010101010010101…), then overwriting this with a low frequency pattern (00001000010000100001…) and then verifying that the low frequency pattern has been fully and correctly written.

Butterfly seeking works by detecting the hard disk geometry (number of cylinders etc) and then seeking between

cylinder 0 and cylinder X and back to cylinder 0. This is repeated the user specified 'seek count' times, before X is incremented by 1. This is repeated until the last cylinder on the Volume is reached. The number of operations reported refers to the number of combined Seek/Read operations. Note (1) that this test is only supported in Windows 2000, XP and above on non-Floppy/CD/DVD drives. (2) Performing a seek in many cases does not move the disk driver head, to ensure the disk drive head is moved to the seek position, a small read (of the Sector size) is done at each seek position. Also, incremental offsets of the sector size are used for the 'X' seek and the return to '0' seek, to ensure that the disk drive cache is overflowed and physical disk seeks consistently occur (once the disk cache has overflowed). (3) Disk drive geometry may be faked or translated by hard disks/ device drivers and may not be the actual drive geometry. (4) The Cylinders, track and sector size used are typically logical values provided by the hard disk.   (5) Up to 8 different physical extents per Volume (or Drive letter) are supported in the butterfly-seeking test. (6) As with other disk tests, if a physical disk is partitioned into multiple volumes (drives) and testing is simultaneously carried out on these volumes, the nature of the test will change. In the case of Butterfly seeking, the movement of the physical disk drive head will not reflect butterfly seeking, but something between butterfly seeking and random seeking, as the seeks for volume 1 go from its logical cylinder 0 to X and the seeks for volume 2 go from its logical cylinder 0 to Y are mixed in time. (7) Some disk drive device drivers do not support the supply of disk geometry information that is needed for this test. Error reporting may be configured not to report "Butterfly seeking test not supported for this disk" errors. This can be achieved by editing the Error Classifications file (BITErrorClassifications.txt) for Error Number 160 to NONE. For example, changing the line from:

> 160,"Butterfly seeking test not supported for this disk",INFORMATION,

> to

> 160,"Butterfly seeking test not supported for this disk",NONE,

The default setting is to cycle between the patterns. In this case a new pattern will be selected each time the disk has reached the 94% full level. Where the disk drive is a floppy/CD/DVD or the operating system is less than Windows 2000, Butterfly seeking will be skipped in the Cyclic testing.

The user can chose to log SMART errors. To learn more about SMART, see section <u>What is S.M.A.R.T?</u>

Each of the following settings: Slow drive warning threshold, File size, Test pattern and the logging of SMART errors may be configured differently for each disk drive. The disk drive Duty Cycle setting will be used for all drives when the Duty Cycle Override entry is set blank (no value). If a different duty cycle is required for a particular disk drive, a value may be entered in the Duty Cycle Override entry.

The following settings can be configured differently for each drive: Slow drive warning threshold, File size, Test Pattern and Log SMART errors. To use the general disk drive Duty cycle for each disk just set the Duty Cycle override value to blank (no value), otherwise set the required value per disk.

If an error is detected in the coded number sequence then the error count is incremented. The numbers of bytes written and read from the disk are displayed in the test window. The addition of these two values is displayed in the main window.

Graphical progress bars indicate if the test is currently writing or verifying (reading) information, the percentage complete for the particular file and the space remaining on the disk.

The speed of the hard disk and the duty cycle determine how quickly test files are created.

When multiple copies of BurnInTest are used to test shared or networked drives at the same time, care must be taken to avoid file name collision on the drive being tested. File name collision will manifest itself as file creation errors. As the name of the test files created in the root directory of the disk being tested contains the drive letter, collisions can be avoided by assigning different drive letters to the network drive on each machine running BurnInTest.

There are a few issues to aware of when interpreting the results of the disk test. These are covered in the <u>precautions section.</u>

Note (1) To test Firewire ports using BurnInTest it is recommended that an external hard disk via the Firewire port is used in conjunction with the BurnInTest disk test. (2) Similarly, to test external memory card readers/writers or other

removable drives, it is recommended that the BurnInTest disk test is used.

MMX / SSE / 3DNow! Test

First some definitions

MMX = Multimedia Extensions

SSE = Streaming SIMD extensions

SIMD = Single Instruction Multiple Data

3DNow! = The name that chip maker AMD, gave to their new CPU instructions.

MMX, SSE & 3DNow! are all sets of new CPU instructions that have been introduced into recent CPU's to enable blocks of data to be processed at higher speeds. At the moment only AMD chips support 3DNow! and only Intel chips support SSE. This may change in the future.

MMX allows 64bit Integer mathematical and logical operations. SSE allows 128bit floating point mathematical and logical operations. 3DNow! allows 64bit floating point mathematical and logical operations.

For each test a large array of random numbers are processed using the particular mathematical operations list below.

MMX Addition (64bits)

MMX Subtraction (64bits)

MMX Multiplication (64bits)

SSE Addition (128bits)

SSE Multiplication (128bits)

3DNow! Maths (64bits, floating point addition, multiplication and subtraction)

Each mathematical calculation is performed several times and the results compared to each other. If the results obtained are different from each other then this is flagged as an error. The numbers displayed in the window for this test represent how many millions of calculations have been performed and verified. Each different test is run for half a second. After all tests have been run the cycle count is incremented. The duty cycle and the CPU speed determine how many operations can be processed during the half second period.

3D Graphics Test

This test creates and animates a 3D image to test the 3D functions of the video card and its associated software.

The test creates 20 texture-mapped spheres. Each sphere contains 20 'slices' and 20 'segments'. Making a total of 16,000 triangular polygons rendered for each scene.

For the 3D test a cycle is defined to be 200 frames of 3D animation. The 'operations' count represents the number of polygons displayed.

The test makes use of the Windows DirectX8 3D interface. If DirectX8 is not installed on your PC you will not be able to run this test (in fact you may not even be able to start BurnInTest). DirectX8 can be downloaded from Microsoft and comes standard with all new versions of Windows.

Some video cards don't support hardware acceleration at high color depths and you may have to reduce the color depth to 16bit color to get the test to run.

Warning: A number of manufactures produce video cards have very poor software support for 3D graphics (DirectX). This is especially the case for the cheaper, bottom of the range video cards. Poor drivers can result in strange visual artifacts appearing on the screen, poor 3D performance and system crashes. The old saying of, "you get what you pay for", seems especially true for video cards.

Network Test

The Network test, tests your networking hardware and software. This is done by sending special ICMP_ECHO message using the Internet Control Message Protocol (ICMP). The ICMP_ECHO message is more commonly known as a 'ping'. This message is echoed but to your computer by a remote host. This allows the reliability of the network connection to be determined. Up to 4 remote hosts can be selected by setting the Destination Network address in the Test Preferences window. These values are used for the Network test. Each one must be a URL or an IP address (or left blank).

A URL is the name of a network host, eg. www.hostname.com

An IP address is a sequence of 4 numbers that correspond to a network host. eg. 169.192.0.1

The host selected must be accessible from the computer and capable of responding to the 'ping' command. PassMark recommends the selection of a local host to minimize data link problems, which are fairly common on the Internet. The IP address 127.0.0.1 can also be used for local loop back testing.

The packet sent to the remote host contains a data payload and a checksum. Every time a packet is echoed from the remote host the checksum is verified and the data payload is compared byte by byte with the data that was sent. Any differences in the payload or an incorrect checksum will result in an error. The data payload is 64 bytes in length.

To use this test the TCP/IP Internet protocol must be installed on your computer. This can be determined from the Windows Control Panel, Network Window. If you try and use this test without the Internet protocol being installed, you will get a message like, "Could not create a Network Socket".

The amount of time BurnInTest will spend waiting for a packet can also be set in the Test Preferences window

The meaning of the information displayed in the network test window is given below.

Packets Sent

The number of packets sent to the remote host

Packets Received

The number of packets received back from the remote host. This should remain at the same level as the Packets Sent counter. If after 2 second a sent packet is not echoed, this causes a timeout error and Packets Sent will be greater than Packets received.

Average Delay

The average round trip time in milliseconds for a packet.

Max Delay

The maximum round trip time in milliseconds for a packet. The maximum values often happen at the very start of the test session. This is because Windows is still loading and caching the required networking software.

Current delay

The round trip time in milliseconds for the last packet sent.

Bytes sent

The total number of bytes transmitted to the network.

Flow rate

The number of packets being set per second. The duty cycle set for the Network Test determines how many packets are being sent per second.

Errors

The number of errors that have been detected and the percentage of packets that had an error are displayed. The definition of what an "error" is can be changed from the <u>Test Preferences window</u> window. Depending on the settings in the preferences window, the error count can be incremented for every detected error or alternatively it can be set to only increment when the specified error ratio is exceeded.

When the specified error ratio is exceeded, the ratio is reset to zero to avoid triggering a continuous stream of errors. Thus the ratio value displayed is the ratio of bad errors to good packets since the last time the threshold was crossed.

For the purposes of detecting a crossing of the threshold and signalling an error, the ratio is ignored until a sufficient number of packets have been sent to make the ratio valid. For example, if the ratio is set to 2%, at least 50 packets must be sent before the ratio is deemed to be valid. If the ratio is set to 0.1%, at least 1000 packets must be sent before the ratio is deemed to be valid.

Compatibility issues

If you are running Windows 2000, XP or above, you need to have administrator privileges to run this test.

Memory Test

The Memory test, tests the reliability of the RAM installed in the computer. As BurnInTest runs within windows some of the available RAM is being used by windows and any other applications running. Any memory that is not already in active use will be grabbed by the Memory test.

The memory test works by writing a pattern numbers in the RAM, then verifying the numbers read from the RAM match this sequence. The pattern used will change automatically from one cycle to the next. Possible patterns are,

Sequence (0,1,2...255)

Binary 1 (10101010)

Binary 2 (01010101)

Zeros (00000000)

Ones (11111111)

There are 3 sequences that the test goes through,

1/ Memory allocation. The test will dynamically grab and release memory depending on how much is currently available. The amount that has been grabbed and is under test is displayed in the Test Ram Field.

2/ Writing the number sequence.

3/ Verifying the number sequence.

The total amount of free RAM is displayed in the Memory Test Window. This number should always be bigger than the Test Ram number. Some memory is always left available to avoid Out of Memory Errors, and disk thrashing caused by Windows swapping to disk.

For the Memory test a cycle is defined to be the number of times the above 3 step sequence is completed. The 'operations' count represents the number of bytes read or written.

It should be noted that not all RAM faults will be detected by this test. This is especially the case if Windows or the Windows cache is using a large proportion of the available RAM. RAM faults may show up as system crashes or disk errors however.

Standard & Advanced memory test

There are two different versions of the memory test, standard and advanced. The advanced test is a more effective test but requires some additional administrator user rights. It will also only work in Window 2000 and XP. See the description in the RAM test preferences window for more details. The advanced memory test is only available in the Professional version of the software.

Torture test (Memory over-allocation & disk swapping test)

The torture test is a multi-process memory test. Multiple processes are started in their own virtual address space and each process allocates and tests a block of RAM. This avoids the problem of virtual memory fragmentation which the standard test can experience trying to allocate a single large block of RAM. Each process runs asynchronously, so writing and reading of various memory blocks will take place at the same time in different processes. The other advantage over the standard test is the possibility to over-allocate the RAM. (The standard test attempts to prevent this to avoid disk swapping). Over-allocation takes place when more RAM is used by the torture test than is currently available in the system. This then results in Windows disk swapping memory blocks into a paging file on the disk. This continual swapping to and from the disk places a very heavy load on the system. The I/O activity on the disk will increase dramatically but CPU load can actually decrease as more and more time is spent waiting for the paging activity to complete. Depending on the level of over-allocation Windows may need to extend the paging file or may even fail as it runs out of available RAM.

See also

RAM test preferences

<u>Setting administrator user rights</u>

Printer Test

```
PassMark BurnInTest V1.0 Printer test Page
PQRSTUVWXYZ[\]^_`abcdefghijlmnopqrstuvwx`
abcdefghijlmnopqrstuvwxy{|}~!"$%&'()*⊥
stuvwxy{|}~!"$%&'()*+,-./01234567°¨
```

This test verifies the correct operation of the printer by either sending a standard page of text, or a sending a command file, to the printer.

Standard test

This test verifies the correct operation of the printer. The test sends pages of text to the default Windows printer. (See Start, Settings Printers in Windows to define a default printer). The pages printed by the printer should be a page of solid text in a fixed point font filling the printable area of the page. There should be a small margin (usually under 1cm) around the block of text.

The number of pages printed during a period of time depends on the print duty cycle. For each duty cycle increment there will be an additional 20second delay between each page. This means that a Duty Cycle of 1 corresponds to a delay of 33minutes between pages. A duty cycle of 50 corresponds to a delay of about 16minutes between pages

The pages printed should be visually inspected to check if they are complete.

The cycle count for the printer test corresponds to the number of pages printed. The 'ops' count corresponds to the number of characters printed.

Printer command file

The user can define a printer command file to be used in place of the standard test. A printer command file is a file containing a series of printer commands which is used by the printer to carry out certain actions. For example a printer command file could contain instructions on how to print an image or page of text. Specialized printer command files can also be created by printer manufacturers in order to run their printers through a particular test routine.

See the Print Preferences section for more details about how to create and select printer command files.

CD ROM, CD-RW burn and DVD Test

Tests the CD-ROM, CD-RW burner and DVD and optionally the sound card (when used with a music CD). This test can be used with many different types of CD / DVD media, including the following types.

- Music CD

- Data CD-ROM

- Data CD-R

- Data CD-RW

- Specialized test CD (see below for details)

- Data DVD-ROM

- Data DVD-R

- Data DVD-RW

- Specialized test DVD (see below for details)

The type of disc being used must be suitable for the test mode set in the CD / DVD preferences window however. If multiple CD / DVD players are installed in your system, you can select all or some of them from the Preferences window.. Up to twenty drives can be selected for simultaneous testing.

Test modes

Music CD playback

For a music CD, the test verifies the operation of the CD ROM and the PC's sound system by repeatedly playing a music CD. The number of cycles corresponds to the total number of times the entire CD has been played. The number of 'ops' corresponds to the number of bytes read from the CD in order to generate the sound. The duty cycle affects the time spent waiting between tracks. Choose a band you like and turn the volume up loud.

Data CD / DVD

For a data CD/DVD, the CD/DVD is scanned with each file being read in turn. A 32bit checksum is created for each file as it is read from the CD/DVD. The CD/DVD is then re-read and the checksums verified to complete the cycle. The best data CD/DVD's to use are those, which are full and contain a good variety of files. Some large ones and some small ones. If the CD has more than 10,000 files only the 1st 10,000 will be scanned.

PassMark Test CD / DVD

This test method is the most advanced CD-ROM test mode and provides a level of in depth testing not available with the other two methods. When possible this method should be selected in preference to the other two. It allows a complete read and verify of the data on the CD, and optionally random seek testing (see Additional seeking and Seek count below).

There is the possibility to create CDs and DVDs especially for use with BurnInTest. These specialized CDs and DVDs contain a set of files that have been specifically created to thoroughly check your drive. With these CDs and DVDs, BurnInTest is able to know the layout and exact content for each file on the CD/DVD. This allows BurnInTest to read back each file and test every bit for accuracy.

PassMark sells these specialized CDs and DVDs but you can also make your own file set using a utility called CD-Maker. You will still need 3rd party CD or DVD burner software to actually create the disc however.

CD-Maker creates a set of files that can be burned to CD or DVD. More information about this tool can be found on the PassMark Software web site. (http://www.passmark.com/products/cdmaker.htm)

No CD in Drive

This test method only attempts to detect the presence of a CD/DVD drive. No attempt is made to read from the drive. This can be a useful option when there are no discs available for testing but a basic check is still required to

ensure that the drive was detected and enumerated by Windows. This test option is not as though as the other options and, if possible, one of the other options should be used.

Burn CD-RW

This test method provides testing of a CD burner through continuously erasing, burning, verifying then randomly seeking across a CD-RW.

PassMark 650MB or 700MB (user specified) Test CD data (see *PassMark Test CD / DVD* above) is created temporarily on the hard disk. For the period of the test, the following testing is then repeated:

- Erase the CD-RW media (User specified Quick or Full format). The quick option erases content type information in typically less than two minutes. The Full option additionally erases all user data on the disc, however this can take a considerable amount of time (over 1 hour) and the test cannot be cancelled during this stage.

- Burn the PassMark Test CD data to the CD.

- A complete read and verify of the data on the CD.

- And optionally random seek testing (see Additional seeking and Seek count below).

Additional seeking and Seek count

When *Additional seeking* is selected (for PassMark CD/DVD's and Burn CD-RW only), seeking to different positions on the CD/DVD or CD-RW and verifying the data at this position will occur *Seek Count* number of times for each cycle of a file read and verify.

<u>Display</u>

Depending on the test the following information is displayed in the test window.

<u>Progress bar</u>

Displays the progress graphically for the longer CD burn phases.

<u>Phase</u>

Data CD and specialized CDs :

- Starting
- Checksum creation
- Searching for files
- Opening file
- Reading Test CD
- Verifying checksums
- Seeking

CD burn:
- Starting
- Creating test data files
- Setting active CD burner
- Erasing CD-RW media
- Erasing CD-RW media retry

- Preparing to Burn CD
- Adding staged image data
- Burning image to CD
- Closing the CD
- Finished CD Burn
- Checksum creation
- Searching for files
- Opening file
- Reading Test CD
- Verifying checksums
- Seeking

Files scanned

This is the number of files that have been scanned during the current cycle

Current file

This is the name of the file that is currently being scanned. If this is in the seek phase, this will display the file and block within the file that the drive has seeked to.

Bytes read

This is the total number of bytes read from the CD

CD burn:
This is the total number of bytes written or read from the CD (depending on the phase).

Throughput (Current and Average)

This is read speed from the CD in Megabytes per second and a conversion to standard CD Drive speed (eg. 4x). It should be noted that this measurement includes the seek and rotational latency time, so that the speed reported will always be lower than the maximum drive speed. This is especially the case for a CD with many small files. Also most drive manufacturers quote the maximum speed for their drives, the actual transfer rate is usually significantly lower than the quoted maximum. E.g. It is not unusual for a 32x speed drive to only reach a speed of 2MB/Sec, 13x.

CD burn:
This is the write or read speed (depending on the phase).

Errors

Data CD and specialized CDs :

The number of errors detected. See Common Errors for a description of the errors that may be encountered.

Sound card test

This test operates in two different modes. The standard mode verifies that the sound card can play back wave form audio and MIDI (Musical Instrument Digital Interface) sound.

There is also a loopback mode, which requires a loopback cable. Loopback mode measures the distortion between audio input and audio output. Loopback cables are available from http://www.passmark.com

Standard Test:

Two small sound clips are played by in a loop. The duration of play back is determined by the duty cycle setting selected by the user. A larger duty cycle setting will result in a longer playback period. The sound test window displays the amount of time remaining in the playback. If the sound clip is shorter than the test period, then the sound will be played in a loop until the test period is complete.

You may select the files that are played during the test in the Sound preferences window. The default test files are in the BurnInTest installation directory.

C:\Program Files\BurnInTest\Testsound.mid   (Midi file)
C:\Program Files\BurnInTest\Testsound.wav   (Wave file)

While the test is running the user should verify that the sounds produced are clear and without distortion. If no sound is heard and BurnInTest detects no errors, check

- The mute and volume settings in the Windows mixer / volume control window

- The speakers are plugged into the correct plug on the sound card

- The speakers volume control is turned up

Loopback Test:

Loopback testing involves connecting the audio out and line in plugs of your computers sound card together with an audio loopback cable.

The test uses a single channel (mono), 8 bit sound format with telephone quality sample rate (11025Hz). It outputs a sin wave tone with a frequency of 300Hz and measures the input values for distortion. It is possible to set the maximum level of distortion before an error is logged in the Sound preferences window.

Before beginning a loopback test, there are a few important configurations, which must be carried out in Windows in order for the test results to be meaningful.

Getting ready for the loopback test

1. Open the mixer.

This can be done from Control Panel =>Sounds and Audio devices. Alternatively, the mixer can be started by double clicking on the small speaker icon on the task bar. Note that the mixer device has two properties sections, Playback and Recording, which contain different volume controls depending on your sound card. It is possible to toggle between the two sections through the Options =>Properties menu item of the mixer device.

*2. Check that Wave output is enabled.*
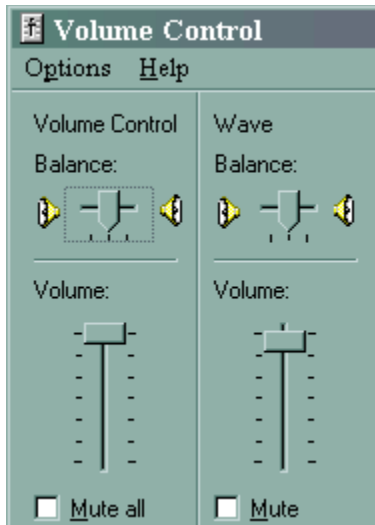
Look at the settings for the overall Volume Control and Wave volume control. The slide bars should be near the centre of the range and the Mute check boxes should be unchecked. It is advisable to Mute all other output devices (e.g. Midi, CD Audio) in order to maintain a pure output signal. In particular, the Line In volume control should be muted to prevent feedback loops in some sound cards. Initially leave the balance setting in the middle. If these settings are not correct, there will be no sound output.

3. Switch to the mixer recording (input) window.

From the mixer window select the Options => Properties menu item, and then select the Recording option and the volume control check boxes. After clicking on OK the recording volume controls for the mixer inputs are displayed.

4. Check that Line In input is enabled.
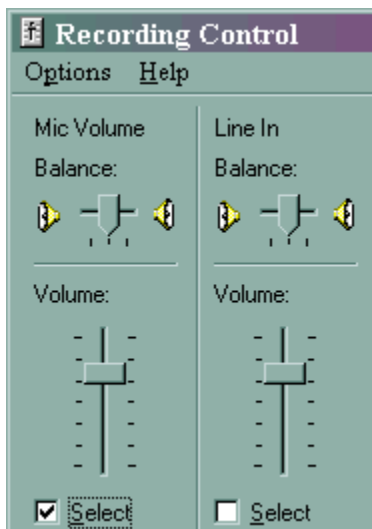
This volume control is the most important setting for the loopback test. If the volume setting is too low, the input signals will be correspondingly vague and therefore distortion will be high. If the volume setting is too high, the input signal may become "capped" as the sound waves become truncated. This will also lead to high distortion and errors being logged. You may need to play with this control while the test is in progress in order to find the "sweet spot". A useful tool for calibrating your input and output audio levels is PassMark SoundCheck, available from http://www.passmark.com.

Once the Volume Controls and Recording Controls have been configured correctly, the test is ready to begin. BurnInTest measures the level of distortion between the output signal and the input signal on a wave-by-wave basis. If the distortion measured exceeds the value set in the Sound Preferences window and an error is logged and the output and input waves are displayed in the Sound Test window. Waves that exceed 0.5 of the maximum distortion

level are also displayed, but no error is logged.

Video play test

This test allows video files to be played as a BurnInTest test. This allows for the detection of numerous error conditions that a PC might exhibit, from lack of media codec support, playback errors and dropped samples (reduced quality due to the PCs inability to process the video quickly enough) and Bit Error Rates. From the Video Playback Preferences window, up to 3 video files can be selected for playback, with each video being played in turn (1st, 2nd, 3rd, 1st etc).

Video files come in a number of different file formats and within these file formats, video and audio are encoded using different compression methods.

The file formats supported include:

- Audio-Video Interleaved (AVI)
- Motion Picture Experts Group (MPEG, MPG)

The Video Compression formats supported (where installed) include:

- Cinepak
- Intel Indeo
- DivX
- MJPEG
- MPEG-1
- MPEG-4 video: ISO version 1.0 , Microsoft version 3
- Microsoft Windows Media Video codec version 7.0

MPEG-2 is not supported.

Note: Each of the above formats are registered trademarks of their respective owners.

Sample test videos are available from the PassMark Web site.

A test window will be opened when the tests are started. This will be sized with width based on the BurnInTest test window size and height such that the aspect ratio is maintained (ie. so it is not squashed). The window may moved, resized or made Full screen.

The title bar will show the native video size (Width x Height). BitErrorRate will be logged to the detailed log, where available and greater than 0.

The number of operations will indicate the number of seconds of Video played. A cycle represents each video file that is played, eg if Videos 1,2,3,1,2 were played, this would represent 5 cycles.

Duty cycle sets the amount of delay between each of the video files played.

Error reporting may be configured not to report reduced quality of Video playback (dropped samples) errors. This can be achieved by editing the Error Classifications file (BITErrorClassifications.txt) for Error Number 182 to

NONE. For example, changing the line from:

182,"Video Playback is dropping samples",WARNING,

to

182,"Video Playback is dropping samples",NONE,

Serial port test

(Applicable to BurnInTest Pro version only)

Tests the serial communications ports connected to the PC. Up to 12 serial ports may be tested simultaneously. The serial ports and test speed can be selected from the Test Preferences window.

A serial port loop back plug per port is required to run this test. These can be purchased from the PassMark web site (www.passmark.com) or you can make them yourself.

Each loopback test cycle corresponds to about 10 seconds of data transmission followed by a signal pin test phase. The signal pin test phase checks that the following pins on the serial port are functioning correctly.

RTS – Request to Send

CTS - Clear to Send

DTR – Data terminal ready

DSR – Data set ready

The number of 'ops' corresponds to the number of bytes sent and received. The duty cycle affects the time spent waiting between cycles.

The serial port selected must not already be in use by Windows (for example by the mouse or an active modem), for the test to be carried out.

The speed that the serial port operates at is independent from the modem speeds. Even if you have a 56Kbit/s modem your serial port may operate at a higher speed. The maximum serial port speed depends on the type of chip installed on your motherboard. Most PC's will only do up to 115Kbit/s, so don't be alarmed if the test fails at 128Kbit/s or above.

If the "detect only" option was selected in the preferences window then the loopback test will not be performed. The presence of the serial port in the system will still be checked for however.

The following information is displayed for each port being tested.

Serial Port

This is the Windows name for the serial port being tested. The port can be selected from the Test Preferences window. Any port between COM1 and COM12 is supported.

Speed

This is speed that the serial port is configured for. The speed can be selected from the Test Preferences window.

To cycle through each speed setting starting from the lowest to the highest, select either "Cycle to 115K" or "Cycle to 256K". In these cases a test of approximately 30 seconds will be carried out for each of the following speeds, in the following order:

> 300 Baud
>
> 600
>
> 1200
>
> 2400
>
> 4800
>
> 9600
>
> 14400
>
> 19200
>
> 38400

56000

57600

115200 (Cycle back to 300 Baud for "Cycle to 115K" option)

128000

256000 (Cycle back to 300 Baud for "Cycle to 256K" option)

Bytes Sent

This is the number of bytes that have been sent to the serial port.

Bytes Received

This is the number of bytes that have received from the serial port.

Errors

This is the number of <u>errors</u> detected.

Throughput

This is the real measured throughput for the port. This will generally be less than the Speed (see above) as there is some overhead in the code and in the data transmission itself (e.g. Stop bits).

Parallel port test

(Applicable to BurnInTest Pro version only)

Tests the parallel communications port connected to the PC. The parallel port to be tested can be selected from the Test Preferences window.

A parallel port loop back plug is required to run this test. These can be purchased from the PassMark web site (www.passmark.com) or you can make them yourself.

Each test cycle corresponds to 500,000 bytes of data transmission. The number of 'ops' corresponds to the number of bytes sent and received. The duty cycle affects the time spent waiting between cycles.

The parallel port selected must not already be in use by Windows (for example by the printer or other external device), for the test to be carried out.   The default on-board Parallel port settings are that Port1 is named LPT1 and corresponds to the physical IO memory address 0378. Depending on the version of Windows you are using you may be able to change a number of Parallel Port settings, including the port name (eg. You may have renamed LPT1 to LPT2) and the IO address (eg. You may have changes port1 to use 0x3BC instead of 0x378). BurnInTest will automatically detect the changes for the on-board parallel port. For W2000 and later versions of Windows, PCI and ISA parallel ports will also be automatically detected and available for testing. For W98 and ME, PCI and ISA parallel ports will need to be manually configured by writing the required IO address (eg. 0xB400) into a file named "ioports.dat" and placing this in the executable directory. Contact help@passmark.com if you need help to do this.

Note: That the Windows operating system may block exclusive access to the Parallel port. This is reported with the error "Unable to lock Parallel Port". When this occurs there is a retry pattern over a number of minutes to try and lock the port. Regardless of the result, the parallel port test will then commence. If you wish to ignore the "Unable to lock Parallel Port" message the BITErrorClassifications.txt file can be edited to change this error message classification (Number 138) to NONE.

In Windows 2000 and XP you need to be the administrator to run this test.

If the port is not detected by BurnInTest check the BIOS settings for the port. Note that the old 'bi-directional' BIOS mode is not supported. ECP or EPP mode is required.

Parallel Port

This is the port name for the parallel port being tested. The port can be selected from the Test Preferences window.

Bytes Sent

This is the number of bytes that have been sent to the parallel port.

Bytes Received

This is the number of bytes that have received from the parallel port.

Errors

This is the number of errors detected.

Throughput

This is the measured throughput for the port.

USB port test

(Applicable to BurnInTest Pro version only)

Tests the USB (Universal Serial Bus) communications ports connected to the PC. The USB devices that are connected can be viewed from the Test Preferences window.

A USB port loop back plug is required to run this test. There are two versions available, USB1 and USB2 loopback plugs. The USB1 loopback plug supports a range of testing for the USB1.x (USB 1.x supports rates up to 12 Mb/sec), while the USB2 loopback plug provides a wider range of test for USB 1.x and 2.0 (USB 2.0 supports rates up to 480Mb/sec). These can be purchased from the PassMark web site (www.passmark.com).

Using a USB loopback plug (USB1 or USB2 loopback plugs) and BurnInTest, it is possible to,

- Quickly check if a USB port is powered (the red LED)
- Check that data can be sent and received from the port
- Check USB errors rates and transmission speed.
- Check that the system remains stable under long periods of load
- Test that USB support in Windows has been correctly installed
- Check USB cabling
- Concurrently check multiple USB ports at the same time.

In addition, with the USB2 loopback plug and BurnInTest (V4.0 and above), it is possible to test:

- Check if your PC ports are high speed 480Mbits/sec (USB 2.0), or full speed 12Mbits/sec (USB 1.x) via a LED or the BurnInTest USB test Window
- Check USB errors rates and transmission speed (using the USB2.0 Highspeed protocol)

It is worth noting that with the USB2 loopback plug and the PassMark USB2Test software it is possible to:

- *Benchmark the maximum speed of your PC's USB ports*
- *Measure the level of recovered data (retransmitted frames)*

Using these plugs on a system that is functioning correctly, you can expect error free loopback transfer speeds of around:

- USB1 loopback plug: 700 - 800 Kbits/sec per port
- USB2 loopback plug: 5 – 7 Mbits/sec per port. *(Note: With benchmarking functionality provided in the USB2Test software you can expect to see between 250Mb/sec and 380Mb/sec for a USB2 port connected to the motherboard).*

To reach this level you need to have the USB test duty cycle set to 100%. Up to 10 of these USB test plugs can be simultaneously connected to a PC (providing that free USB ports are available on the PC or on a down stream hub). Note: If required, both USB1 and USB2 loopback plugs can be used to test different USB ports simultaneously.

To use the plugs they must be correctly installed with their device driver. See the installation and users guide that is supplied with the plugs for more details. Additional information about the plugs is also available on the PassMark web site.

Each test cycle corresponds to:

- USB1 loopback plug: 300 data blocks (Roughly 600KB)
- USB2 loopback plug: 8000 data blocks (4000KB)

The number of Operations ('ops') corresponds to the number of bytes sent and received. The duty cycle affects the time spent waiting between cycles.

Each plug also has its own serial number stored in EPROM, on the plug, so it is possible to identify each plug when multiple plugs are connected. USB2 loopback plugs are firmware controlled and upgradeable.

The USB test sends data to the USB loopback plug in:

- USB1 loopback plug: 2KB blocks. The USB loopback plug receives this data, checks the cyclic redundancy checksum is correct, and then re-encodes the data before sending it back to the PC.
- USB2 loopback plug: 0.5KB blocks. The USB loopback plug receives this data, copies it to a new buffer and transmits it back to the PC. The PC compares the data in the block for an exact match, and then builds a new packet of random data bytes before sending it back to the PC.

Any differences between the data send and received is flagged as an error.

As the low level USB protocol has some ability to detect errors and re-transmit bad data it is important to pay attention to the transfer speed. A low transfer speed may be an indicator of an intermittent or partial hardware fault. With the USB2 loopback plug an error LED will be lit when more than a defined number of recoverable bus errors occur (currently set to 4). *(Note: The USB2Test software will report the number of recoverable bus errors per block).* A lack of high quality cabling within or external to the PC is a typical cause of retransmission due to recoverable bus errors.

The USB2 loopback plug Error LED is reset at the start of each test if results are configured to be cleared:

- at the start of each test (Preferences, Logs, Log Clearing, Automatically clear logs at the start of each run),
- on selecting "Edit, Clear All Results" or
- on a power reset (eg. PC sleep mode).

USB test window

The following information is displayed in the USB test window.

USB Identity

An indication of whether the USB port is connected to a USB1 or USB2 loopback plug is shown together with the maximum speed supported by the protocol currently supported by the USB port (eg 12Mb/s or 480Mb/s). The device number and the unique device serial number are then displayed. The device number is determined by the order in which plugs are connected and disconnected and is not linked to a physical USB socket on the PC. (Note that this is different from Serial and Parallel ports). The device serial number is collected during the USB device enumeration process and comes from the memory (EEPROM) in the plug itself.

Bytes Sent

The number of Kilobytes sent to the USB device.

Bytes Rec.

The number of Kilobytes received from the USB device.

Throughput

The number of Kilobits or Megabits of data received and transmitted in the last second.

Ave. Throughput

The average number of Kilobits or Megabits of data received and transmitted per second since the start of the test.

Errors

The number of errors that have occurred (ie. Transmitted data does not match received data).

Tape drive test

(Applicable to BurnInTest Pro version)

Tests the tape drive connected to the PC. Drives can be connected via the SCSI bus, IDE bus or any other method supported by WindowsNT/2000/XP. Note that Windows 2000 and later operating systems no longer supports tape drives that use the floppy disk interface. The tape drive to be tested can be selected from the <u>Test Preferences</u> window.

A blank tape (media) is required to run this test. If the tape is not blank any existing data will be overwritten and permanently lost.

There are three optional steps that can be included as part of each test cycle. See the <u>Test Preferences</u> window for more details.

Test description

The test is carried out by writing a number of files onto the tape, rewinding the tape and then verifying the files were correctly written by re-reading them from the tape. A progress bar shows the percentage complete for the current test cycle. The contents of the files will correspond to a particular data pattern. The following patterns will be used in a cyclic manner in the following order.

> Sequence (0,1,2...255)
>
> Binary 1 (10101010)
>
> Binary 2 (01010101)
>
> Zeros (00000000)
>
> Ones (11111111)

The number of files created and the size of each file can be set in the Preferences window. The tape needs to be large enough to contain the number of files selected plus a small amount of overhead for file marks.

A test cycle is completed each time all the files have been written and re-read. A cycle may end prematurely for some errors conditions. The number of 'Ops' reported in the main window is the total of the bytes read and bytes written.

Pattern

The current data pattern that is being used to fill the test files. (see the list above)

Bytes Written

This is the total number of bytes that have written to the tape

Bytes Read

This is the total number of bytes that have read from the tape

Errors

This is the number of <u>errors</u> detected.

Throughput (R/W)

This is the measured throughput for the tape drive. Measured in MB/Sec. A separate value is maintained for reading and writing. A few large test files will result in better throughput compared to many small ones.

Test Preferences
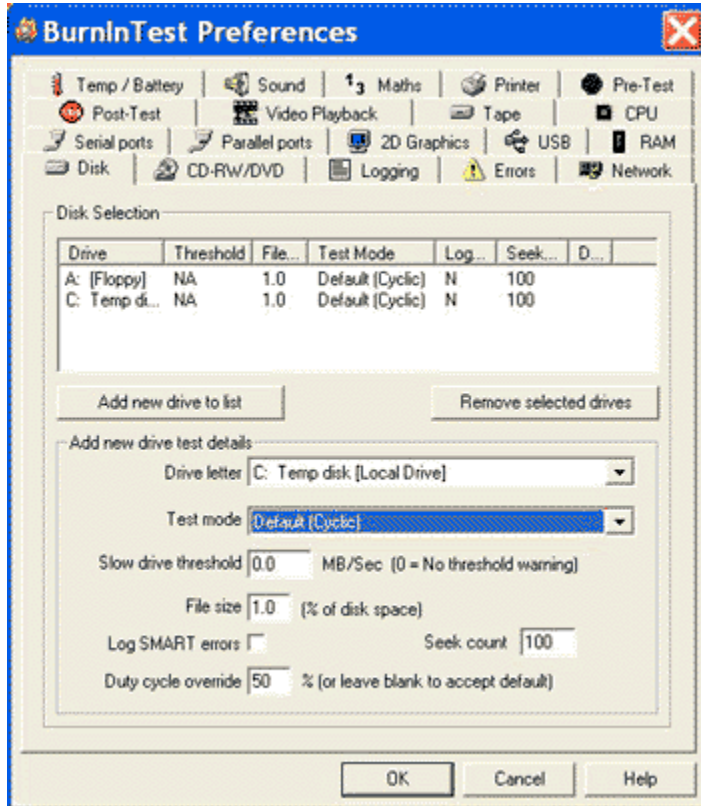
Disk preferences

CD preferences

Logging preferences

Error handling preferences

Network preferences

Temperature and Battery monitoring preferences

Timer and test duration preferences

Print preferences

Pre test preferences

Sound preferences

Video play preferences

Tape preferences

CPU preferences

RAM preferences

Serial port preferences

Parallel port preferences

USB port preferences

2D video preferences

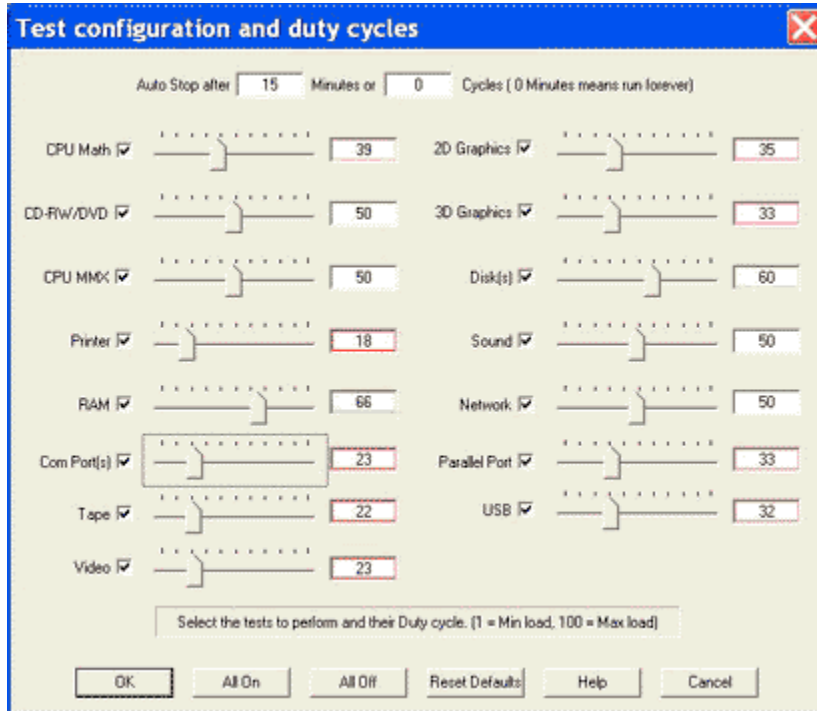# Test Selection and Duty cycles

From this window it is possible to configure the automatic stopping of tests, select the tests to be performed and the level of load placed on the system. The options for Tape, Serial, Parallel and USB port testing will only be displayed in the professional version.

Auto-Stop

BurnInTest can be set to automatically stop a test run by either configuring a test duration or a number of test cycles.

Test duration

This option allows the user to select the period of time that tests are to run for. After the time has expired all windows (except the main window) are closed and all the tests are stopped.

The duration, in minutes should be entered in the "Auto Stop after n Minutes" field. A value of 0 in this field means that the tests will run until a manual Stop command is issued via the button bar/menu or the number of test cycles has been reached. The maximum test time in the unregistered shareware version is 15minutes per test. After the software is registered the maximum auto stop time is 10 days. (the registered version can also run forever if the manual stop option is selected).

Number of test cycles

This option allows the user to select the number of cycles that tests are to run for. After all current tests have undergone the configured number of cycles in testing, all windows (except the main window) are closed and all the tests are stopped.

The number of cycles should be entered in the "or n Cycles" field. A value of 0 in this field means that the tests will run until a manual Stop command is issued via the button bar/menu or the test duration has been reached.

NOTES:

1) Both options are based on the current test run and not accumulated results.

2) The test duration and number of cycles are both used to automatically stop a test run (with a logical OR). For example, if duration is set to 15 minutes and number of cycles is set to 3. The test run will be stopped when the first

of either 15 minutes OR 3 cycles is reached. If you want to automatically stop a test run based only on duration, set the number of cycles to 0 (ie. Run for the set duration OR forever). If you want to automatically stop the test run only based on the number of test cycles, set the test duration to 0 (ie. Run forever OR for the set number of cycles).

3) If you need to run each test a single time, one after the other (ie. In series, rather than in parallel), a script should be created to: Set the number of cycles, run test1, run test2, …, run test n. See SETCYCLES.

Test Check boxes

Each test has an associated check box that can be used to turn the test on or off. Your CPU must support MMX in order for the MMX check box to be activated.

Slide bars & Duty cycle

Each test has a slide bar and an associated edit box. The slide bar allows the user to determine the "duty cycle" for each test. A low duty cycle means that a delay will be inserted during the execution of the test, reducing the load on the system and reducing the number of operations performed during any particular period of time. A high duty cycle corresponds to higher load.

A value can also be directly entered into the edit box. The background color of the edit box will vary from dark red to white to bright green depending on the duty cycle selected.

Note: If required, the Duty Cycle may be overridden per disk drive from the Disk Preferences window.

Buttons

The buttons at the bottom of the window allow all tests to be activated or deactivated with a single click. The default values can also be restored. The settings selected are saved when the OK button is clicked.

Selecting which tests to run

In order to help select which tests to run, here are some general guidelines.

Only select tests that match your hardware

The tests you select should correspond to the hardware installed in the PC. For example, if your computer doesn't have a tape drive installed, there is no point having the tape drive test enabled. This will only result in a lot of errors being generated.

Selecting tests for specific testing

If you suspect a problem with a particular device, (eg the RAM), leave the other tests turned off and just run this particular test at 100%. This will maximize the load on this element.

Selecting tests for general burn in testing

For a general burn in, select a variety of different tests. The RAM and Disk tests are the most important. Select the other tests based on how you plan to use the computer. For example if the machine is to be used as a server, then the Network test, Tape drive test, CPU tests and CD test should also be enabled. In general it is better to test those elements that will receive the most usage once the machine is put into active use. For example the floppy drive test could be left off, (or tested at a low duty cycle), if the floppy drive is not critical for the machines intended use.

Optimise the load

As all the tests run at the same time in different threads. Some care should be taken to ensure that important tests are not starved of the CPU and run too slowly. Thus it can be advantages to initially leave the CPU tests off and run with the other tests. Then add in the CPU tests but adjust the duty cycle down until the CPU load just hits 100%.

For example, assuming that the CD and disk drive are critical parts of your system, run just these tests at 100% duty cycle, then note the load on the CPU. Then add in the RAM and CPU tests at a lower duty cycle in order to fully load the CPU.

Note that there is no point trying load up the CPU to more than 100%. Adding more load once the CPU is running at 100% doesn't result in any more processing being done. The CPUs available processing time is just redistributed and all the running processes run more slowly.

<u>*Experiment*</u>

As just about everyone has different requirements don't hesitate to experiment with the settings to obtain the best result in your environment.

Example ASCII text Log file

ASCII (Text) log files can be created using the logging option in the Test preferences dialog. The ASCII text logfile contains all the information that is in the main test window plus some additional information such as the amount of RAM in the system, the current color depth (in bits), and the level 2 cache size for the CPU(s). For information about the detailed error information that appears at the bottom of the log, see the <u>detailed error log</u>

```
PassMark BurnInTest Log file  -  http://www.passmark.com
========================================================

Logging detail level: Normal

******************
SYSTEM INFORMATION
******************
Network Name: PassMarkXP1

Date: 12/11/03
Time: 11:57:46
Operating system: Windows XP
Number of CPU: 1
CPU manufacturer: GenuineIntel
CPU type: Intel(R) Pentium(R) 4 CPU 2.40GHz
CPU features: MMX SSE SSE2
CPU Serial #: Not available or disabled
CPU1 speed: 2411.1 MHz
CPU Level 2 Cache: 512KB
RAM: 259506176 Bytes
Video card:
Video resolution: 0x0x0

******************
DETAILED ERROR LOG
******************
2003-12-11 11:57:46, Status, PassMark BurnInTest V4.0 Pro
2003-12-11 11:57:53, Tape drive, SERIOUS: Could not access the tape drive selected
2003-12-11 11:57:53, Status, Test run started
2003-12-11 11:57:54, USB, CRITICAL: Could not detect USB loopback plug
2003-12-11 11:57:55, Disk, INFORMATION: A: Not enough free disk space
2003-12-11 11:57:57, Network, SERIOUS: Timeout waiting for packet
2003-12-11 11:58:01, USB, CRITICAL: Could not detect USB loopback plug
2003-12-11 11:58:04, Network, SERIOUS: Timeout waiting for packet
2003-12-11 11:58:08, USB, CRITICAL: Could not detect USB loopback plug
2003-12-11 11:58:10, Disk, INFORMATION: A: Not enough free disk space
2003-12-11 11:58:10, Network, SERIOUS: Timeout waiting for packet
2003-12-11 11:58:13, Tape drive, SERIOUS: Could not access the tape drive selected
2003-12-11 11:58:14, USB, CRITICAL: Could not detect USB loopback plug
2003-12-11 11:58:17, Network, SERIOUS: Timeout waiting for packet
2003-12-11 11:58:20, USB, CRITICAL: Could not detect USB loopback plug
2003-12-11 11:58:23, Network, SERIOUS: Timeout waiting for packet
2003-12-11 11:58:24, Disk, INFORMATION: A: Not enough free disk space
2003-12-11 11:58:25, Status, Test run stopped

**************
RESULT SUMMARY
**************
Test Start time: Thu Dec 11 11:57:53 2003
Test Stop time: Thu Dec 11 11:58:25 2003
Test Duration: 000h 00m 32s

Test Name              Cycles  Operations      Result Errors  Last Error
        CPU - Maths    6       16.320 Billion  PASS   0       No errors
      CPU - MMX / SSE  5       588 Million     PASS   0       No errors
        Memory (RAM)   0       17.715 Million  PASS   0       No errors
        2D Graphics    0       119             PASS   0       No errors
        3D Graphics    3       9.600 Million   PASS   0       No errors
         Disk (A: )    0       0               FAIL   3       Not enough free disk space
Disk (C:  Temp disk)   0       16.646 Million  PASS   0       No errors
         Network 1     0       400             FAIL   5       Timeout waiting for packet
        CD/DVD (D:)    1       7.975 Million   PASS   0       No errors
            Sound      0       529200          PASS   0       No errors
      Serial Port 1    0       36300           PASS   0       No errors
      Parallel Port    0       769             PASS   0       No errors
             Tape      0       0               FAIL   2       Could not access the tape drive selected
        USB Plug 1     0       5.038 Million   PASS   0       No errors
        USB Plug 2     0       0               FAIL   5       Could not detect USB loopback plug
      Video Playback   1       4               PASS   0       No errors

*********************
SERIOUS ERROR SUMMARY
*********************
2003-12-11 11:57:57, Network, SERIOUS: Timeout waiting for packet (x 5)
2003-12-11 11:57:53, Tape drive, SERIOUS: Could not access the tape drive selected (x 2)
2003-12-11 11:57:54, USB, CRITICAL: Could not detect USB loopback plug (x 5)
```

See also
<u>Detailed error log</u>

HID_PREFERENCES_LOGGING

Detailed Error log history

The detailed error log history can be opened from the 'View / Error log file' menu. It contains a record of recent errors and status messages that have occurred during a test run. It is possible to save a copy of this log of recent history using the 'File / Save test log' menu item.

The log can contain up to 1000 messages. After 1000, the oldest messages are overwritten by the newer ones. The log window is updated in real time and can left open while a test run is in progress.

Each log entry can be divided up into 3 fields.

Time stamp

The time stamp records the time when the event occurred. The format is, YYYY-MM-DD HH:MM:SS

Test type

The test type refers t the name of the test which originated the event. Examples are, "RAM", Floppy Disk". The word "Status", indicated that the event is not an error but just a status message.

Error Classification

Where logging records an error, the severity of this error (CRITICAL, SERIOUS, WARNING or INFORMATION) is logged. Where an informational line (related to this error) follows the error line, the error classification is not repeated (to aid determination of the number of unique errors per classification).

Details

This is a text field that contains additional information about the error (or status message).

In some cases a log entry may be spread across two lines. The 1st line will contain some general information about the error and the 2nd line will contain more detail.

Some error messages may contain internal program variables (and thus be fair cryptic). These are not always intended to be interpreted by the user can but help us track down faults in our software.

Configuring Error Classifications

Each of the standard errors detected by BurnInTest can configured to include a customer specific string and error classification. The file BITErrorClassification.txt (in the software directory) contains the error text and classification used by BurnInTest.

The file is formatted as a Comma Separated File with four fields:

1. Error number – this must not be changed by the customer;
2. Error description text – this may be changed. This must be a sting enclosed by quotes;
3. Error classification – this may be changed. This must be one of the following text values (not in quotes):

    CRITICAL, SERIOUS, WARNING, or INFORMATION

    A number of errors may be configured to be ignored (not reported as errors), as they may be considered 'below the radar'. These are configured by setting the Error classification to NONE. These are:

    - 138,"Warning: Could not lock parallel port",WARNING,PP
    - 146,"Frame could not be displayed and was skipped",INFORMATION,
    - 160,"Butterfly seeking test not supported for this disk",INFORMATION,
    - 182,"Video Playback is dropping samples",WARNING,

Other errors may not be configured to be ignored in this way.

4. Customer comment – this is optional and may be changed – it is ignored by BurnInTest.

Comment lines may be inserted by using a "#" at the start of the line. These lines will be ignored by BurnInTest.

An example is shown below:

```
# PassMark BurnInTest,,,
# Error message text and classification,,,
0,"No errors",NONE,
1,"Incorrect mathematical addition",SERIOUS,
2,"Incorrect mathematical subtraction",SERIOUS,
3,"Incorrect mathematical division",SERIOUS,
4,"Incorrect mathematical multiply",SERIOUS,
5,"Incorrect MMX addition",SERIOUS,
6,"Incorrect MMX subtraction",SERIOUS,
7,"Incorrect MMX multiplication",SERIOUS,
8,"Failed Windows call - Line Drawing",SERIOUS,
```

Save as Image
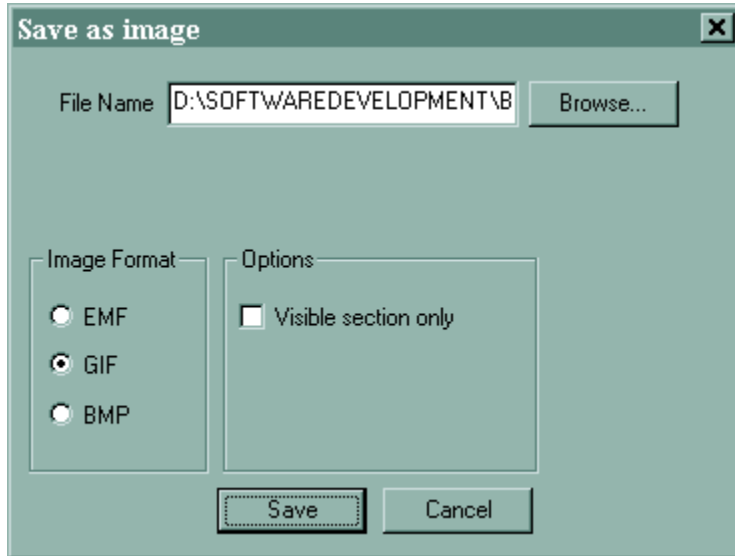
This dialog allows the main window (or its contents) to be saved as an image file which can then be imported into other application or placed on a Web page.

Image format

One of 3 different graphics file formats can be selected.

- BMP. Stores the image in Bitmap format. Many applications support Bitmaps but as no compression is used the file size is very large.

- GIF Stores the image in GIF87a format. Fewer applications support GIF's and only 256 colors can be used. Powerful compression gives small file sizes and it is one of the standard image formats used on the Internet.

- EMF (Enhanced Meta file format). Saves a scalable vector image that can be resized within other applications. File size is very small but only limited support is available in other applications.

Option – Visible section only (or Save entire window as it appears on the screen)

If *Visible section only* is not selected (the default and typical selection), the full results section of the window will be saved, including any part of the results that is currently not displayed in the window (ie. Result information that you need to scroll down to).

If *Visible section only* is selected, the full visible Window as it appears on the screen (including menu bar, button bar, border, etc) will be saved. If result data is now visible (ie. Result information that you need to scroll down to) then this will not be saved.

Fault finding

What follows is some hints on how go about finding the cause of a particular system instability. (ie. The system locks up, you get the windows blue screen, etc..). We don't want to try and explain the steps involved in each of these processes, they are just points that may warrant future investigation.

Check you don't have any viruses.

Check the drive for errors using the built in Window error checker.

Check that space is available on the disk for the windows swap file

Have a look through the issues in the <u>precautions</u> section of this help file.

Don't run all the BurnInTest tests at once. Run just the 2D graphics, then run just the 3D graphics, then just the disk, etc.. This will allow the problem to be isolated to one area.

Boot Windows up in Safe Mode and see if the system is more stable. The Windows98, 'msconfig' tool may also help here.

If you suspect hardware, and you know what you're doing, pull out all the "optional hardware", eg LAN cards, I/O cards and see if the system is more stable.

Once again, if you know what you're doing, start swapping out components of the system to see if the fault can be localized. Obviously you'll need some spare hardware to do this.

If you suspect DirectX 3D problems consider using the dxdiag.exe tool that comes with DirectX.

Faulty RAM may not always be detected by the memory test. It may manifest itself as a disk fault of system crash.

If you're really stuck you may want to try a reinstallation of Windows on a reformatted disk. Think carefully about this option before you attempt it, there are lots of good reasons why you don't want to reformat your hard disk.

Make sure you've got the most up to date software drivers for your hardware. Drivers are a never-ending source of problems.

Check that you haven't ended up with an overclocked CPU and don't know about it.

Check that you haven't purchased the cheapest and nastiest hardware in the hope of saving a couple of dollars (or pounds, francs, etc). Often it may not be the cheap hardware that causes problems but the quality and support of the software drivers that come with the hardware that are a problem. Don't shop on price alone, check out the support and product reviews.

Common Test Error Messages

When BurnInTest encounters an error during a test run a short description of the error is displayed in the main window. What follows is an explanation of the common errors that may be encountered.

Incorrect mathematical addition / subtraction / division / multiply

> The execution of a mathematical operation came up with the wrong result (e.g. $1 + 1 = 3$). This is a very serious error for a computer as it means the computer is incapable of execution the same sequence of instructions to get the same result. Possible reasons are faulty RAM, System bus, CPU or overheating. There is a strong chance that your computer will crash or lock up just after an error like this because if the computer can't add two numbers correctly, there is a good chance that it can't continue to run a program either.

Incorrect MMX addition / subtraction / multiplication
Incorrect 128bit (SIMD-SSE) floating point addition
Incorrect 128bit (SIMD-SSE) floating point multiply
Incorrect 64bit 3DNow! floating point result

> Similar to the above, mathematical faults except that the error occurred while using the extended CPU instructions. (Rather than the standard 32bit Maths)

Failed Windows call - Line Drawing / Bitmaps / Shapes

> The Windows operating system has failed to correctly complete the graphical operation that was requested by BurnInTest. This could indicate that Windows is running low on internal resources or that there is a problem with the software drivers for the video card.

No free memory for buffer

> Windows does not have enough free memory to allow the allocation of a buffer.

Not enough free disk space

> There is not enough free space on the disk to create a test file for the Disk tests.

Test file could not be created

> BurnInTest was unable to create a file on the disk in order for it to be able to run the disk tests. Check that you have access to the disk with Windows explorer, Check file write and create permissions in the root directory of the disk under test.

Error while writing to the disk

> The test file could not be completely written to the disk. This could indicate a hardware error or a sudden lack of free disk space

Error writing to disk - Disk is full

> The test file could not be completely written to disk because the selected hard drive is full.

Test file could not be re-opened

> The test file was created successfully, but could not be reopened for verification. This could indicate a hardware error or a resource problem within Windows.

Error while reading from the disk

> The test file created on the disk can no longer be read. This could indicate a hardware error or a problem within windows.

Data Verify failure

> This is a serious error that indicates that the data read from the disk is NOT the same as the data that was written to the disk. This could indicate a hardware error.

Disk is full or FAT root file system limit reached

A test file could not be created on the disk being tested because the disk is full or the capacity of the file system has been exhausted. Normally this error only happens when the disk is formatted using the old FAT files system. Floppy disks still use the old FAT file system and there is a limited number of files that can be created in the root directory of a floppy disk. The number of files depends on the length of each file name. (and does NOT depend on available disk space). Thus this not really an error, but a limitation of the FAT file system. (Which has now been replaced by FAT32 and NTFS).

Warning - Disk low speed threshold crossed

The disk speed has fallen below the low speed threshold as specified in the Disk test preferences window.

Could not set CD Time format
Could not get number of audio tracks
Could not play the audio track
CD-ROM failed to return status information
Can not detect audio information on CD
No audio media in CD-ROM

These errors relate to one of the following problems.
There is not a CD in the first CD-ROM connected to the computer.
The CD in the CD-ROM is not a Music CD.
The CD is already in use by another application.
The CD has an error on it and is unreadable.
The CD is dirty, dusty or scratched and can not be read
The CD Software drivers are not correctly installed.
The CD-ROM has a hardware error.

Checksum failure for CD/DVD file

This indicates that the file read from the data CD/DVD being tested failed the checksum verification. This means that the CD/DVD Drive is unable to accurately read data from the CD/DVD being tested.

Could not open file on CD/DVD for reading

The CD/DVD drive selected could not be opened for reading as a data CD/DVD.

Error while reading file from CD/DVD

A full block of data could not be read from the data CD/DVD.

Error while searching for files on data CD/DVD

An error occurred while searching for files on a data CD/DVD. This can be the result of a corrupted (Error code 1117) or blank CD/DVD (Error code 21).

Data read from CD/DVD was incorrect

A block read from a specialized PassMark Test CD or DVD was incorrect. There was at least one byte in the block that was not the value expected. In the detailed error log there is additional information that give the number of bytes in error and displays the expected value and the value actual read from the disc. It may be that the drive is faulty but you should check that the disc is not scratched, dusty or damaged before assuming a hardware fault.

Could not determine type of Test CD/DVD

BurnInTest was expecting to find a specialized test CD/DVD in the drive selected. A specialized test CD/DVD has a specific set of files, which all have a specific file size. These disc are normally purchased from PassMark Software or made using the PassMark CD-Maker utility. BurnInTest was not able to find the correct files or the files appear to have the wrong file size. If you don't have a specialized test CD/DVD available, select one of the other two test options in the preferences window.

Error loading DirectX .dll

DirectX 8 or above is not installed correctly.

Error initialising DirectX
Error initializing DirectX device

> These errors relate to one of the following problems.
> DirectX 8 or above is not installed correctly.
> You need to install the most recent driver for your graphics card.
> You've selected an incompatible screen resolution and/or color depth for you desktop.

Error creating DirectX textures
Out of video memory

> This error means that you have exhausted all of your graphic adapters onboard memory.

Warning: Switching to reference rasteriser

> BurnInTest was unable to initialise a hardware accelerated device and is using software emulation to render the 3D graphics test. This will result in a much lower frame rate.

Video memory corruption

> One of the pixel values read from video memory is not the same as that which was written to video memory. This may indicate that your video memory is damaged.

Error initialising DirectDraw

> DirectDraw could not be initialised. Check that DirectX 8.0 or higher is installed. Check that the most recent version of your video adapter driver is present.

Frame could not be displayed and was skipped

> DirectDraw reported an error when displaying one of the test patterns to the test window. If you receive many of these errors, reboot and check that the most recent version of your video adapter is present. There are several instances when this message is expected. One example is when the video display mode is changed or power control settings are altered.

Not enough video memory available for test

> The minimum video memory required for the test (usually 100KB) could not be allocated. Check your display adapter is not carrying out any other resource hungry processes, such as games. Attempt a reboot and ensure that the most recent version of your video adapter is present.

Minimum color depth of 16 bits required.

> Your screen mode is set to a color depth of less than 16 bits. Set the screen mode to 16 bit or 32 bit color and run the test again.

Could not find the default printer
Could not open the default printer
Could not send page to printer
Could not open printer spooler
Error writing data to spooler

> These errors relate to one of the following problems.
> There is no printer defined in the Windows setup.
> There is no default printer selected.
> The default printer is not connected to the printer.
> There is no paper / ink / toner in the printer.
> There was a communications problem to the printer. e.g. The parallel port may not be functioning correctly.

Could not open printer command file

> The printer command file specified by the user was not found on the hard disk. Check the path name and file name are correct in the preferences window.

Error verifying data in RAM

The data written to memory is not the same as the information read from memory. This is a very serious error, much like the "Incorrect mathematical…", error above. It's highly likely that your computer is about to crash or lock up.

Error allocating RAM from Windows

The Windows operating system was not able to allocate the amount of RAM requested by BurnInTest for the memory test. As the RAM must be allocated in a continuous block, this error can sometimes be seen as a result of free memory fragmentation.

Error connecting to network
Could not create a network socket
Could not set socket timeouts

During the establishment of a network connection an error was encountered. The Network address selected has no effect on if these errors occur. They can be the result of the following problems.
– There is no network connection configured for the computer
– The computer is physically disconnected from the network
– The Internet TCP/IP protocol is not installed on this computer

Networking functions aren't available (ws2_32.dll)

During the establishment of a network connection an error was encountered. This error indicates that the Windows Network Socket functions supplied by the library ws2_32.dll are not available on this system. This main mean that
- The Internet TCP/IP protocol is not correctly installed on this computer

Could not allocate memory for packets

Windows is low on resources and cannot allocate any more memory.

Could not resolve host name, check settings

The Network address selected does not seem to be correct. Try another address, or using a TCP/IP address directly. The address 127.0.0.1 is good for testing as it is an internal loop back.

No permission to open RAW network socket

If you are a non-administrator logged onto a Windows 2000 or XP system you will get this error with the Network test. In Windows 2000, there is no way to disable this security check. Access to Raw Sockets is granted on a per-transport basis. For the address family AF_INET, only administrators have the access necessary to create Raw Sockets. The test should be run while logged in as the 'administrator'.

Timeout sending packet
Timeout waiting for packet
Error sending packet
Error receiving packet
Bad packet

These errors relate to one of the following problems.
The Host using the network address selected doesn't reply to 'ping' messages. Try a different host.
There is a configuration problem in your network connection.
Your network card may be faulty.
The network itself is not reliably. The information send was not the same as the information echoed by the remote host.
The network is congested or faulty and the packets are not being echoed within the timeout period specified in the preferences window.

Network test alarm. Error ratio exceeded

The Bad Packet ratio specified in the Network test preferences has been exceeded.

Got someone else's packet

This is not really an error. It's more of an information message. Don't worry about this message.

Bad packet. Checksum incorrect

The checksum in the echoed, incoming data packet is not correct. This indicates data corruption or a fault on the remote machine. Note that this checksum is calculated by the remote machine.

Bad packet. Corrupt data

The contents of the incoming data packet are not correct. Normally this error would not been seen as the checksum should detect the incorrect data before this error occurs.

COM port is already in use by another program

The serial port selected for the test is already is use by Windows. This may be for the mouse, a modem or another serial device.

The requested COM port could not be found

The serial port selected for the test does not exist in this computer. This could happen if COM4 is selected but the computer has only 2 serial ports, COM1 and COM2.

Error while opening COM port

Windows has reported an error while trying to open the serial port selected for the test. This could be a configuration problem in Windows. This error should not normally been seen.

Error getting current COM port configuration
Error while setting new COM port configuration

Windows has reported an error while trying to configure the selected serial port. The most common cause for this error would be the selection of a speed that is not supported by the serial port chips installed in the computer (the UART). Most chips only support speeds up to 115Kbit/s.

Corruption. Data received didn't match data sent

BurnInTest has detected that the data received from the serial port doesn't match the data sent. This could indicate that there is a hardware problem. This type of data corruption would however be a fairly rare type of event. The more common result of a hardware failure would be the total inability to send or receive data. (see below).

Error while setting current COM port timeouts

Windows has reported an error while trying to set the timeout periods for the data transmission and reception. This could be a configuration problem in Windows. This error should not normally been seen.

Error while sending data to the COM port

Error while receiving from the COM port

Windows has reported an error while trying to send / receive data through the serial port. If a device (such as a loop back plug) is not connected to the serial port then no data can be sent. If the loop back plug is connected and is not faulty, then this error may indicate a hardware fault.

COM port Clear To Send (CTS) line stuck high

COM port Clear To Send (CTS) line stuck low

COM port Data Set Ready (DSR) line stuck high

COM port Data Set Ready (DSR) line stuck low

The signal pin test phase of the serial test has failed. This might be because of an incorrectly wired up loop back plug, a cabling problem between the serial socket and the motherboard, a non standard COM port or a problem with the Windows configuration for the COM port. A failure of the CTS pin may be caused by the associated RTS pin, to which it is looped. A failure of the DSR pin may be caused by the associated DTR pin, to which it is looped.

Parallel device driver not initialized

To access the Parallel port under Windows 2000 and XP BurnInTest needs to load a special device driver that allows direct access to the parallel port. If this driver, "DIRECTIO.sys", can not be found or loaded then this is the error message. You need to be logged in as the administrator in order to load this driver. This error may also occur if the file is missing.

Parallel device driver could not detect port

This error usually occurs if the parallel port test attempts to access a parallel port, which doesn't exist (such as perhaps LPT3 or LPT4). It can also happen if the BIOS settings for the port are not correct. Note that the old 'bi-directional' BIOS mode is not supported. ECP or EPP mode is required.

Could not open parallel device driver

This error usually occurs if the parallel port test fails to access a parallel port, which does exist.

Warning: Could not lock parallel port

When the parallel port test initialises, it attempts to lock the port for exclusive access. This is essentially to prevent Windows XP "warm polling" the port, which can produce invalid test results. This error results in a failure to lock the port and does not represent a failure in testing the parallel port.

Corruption. Data received didn't match data sent

The data sent to the Parallel port was not the same as the data received. This may indicate a hardware problem or a missing or faulty loop back connector.

Error while sending data to the parallel port
Error while receiving data to the parallel port

Windows has reported an error while trying send or receive data. This could be a configuration problem in Windows. This error should not normally been seen.

Could not detect the parallel port selected

BurnInTest was unable to find a parallel port at the location selected. Try picking another port and see the Parallel port test description for more details about port selection

Could not access the tape drive selected

The tape drive selected from the preferences window (e.g. TAPE1) could not be found connected to the computer.

Error while formatting tape partition

The tape drive reported an error while trying to format the tape in the tape drive.

Error while loading (rewinding) tape

The tape drive reported an error as a result of a request to load and position the tape for writing.

Error while locking tape in drive

The tape drive reported that it was unable to lock the tape in the drive. Some tape drives may not support this option and this art of the test can be turned off in the tape preferences window.

Tape device is not ready to start test

The tape drive is not in a state where it can accept a new command (but it should be).

No media in tape drive

The tape drive reported that there is no media in the drive.

No free memory for write buffer

There is not enough free RAM to allocate a write buffer.

Error while seeking to new position on tape

The tape drive reported an error while seeking to a new position on the tape.

Error while writing to tape

The tape drive failed to fully write the current data block to the tape.

Error while writing file marker between files

The tape drive failed to write a file marker. (A flag to indicate a new file)

Error while reading data block from tape

The tape drive failed to fully read the current data block from the tape.

Corruption. Data read didn't match data written

The data read from the tape didn't match the data written to the tape.

Unable to get/set tape drive parameters

A request to get/set the tape drive capabilities resulted in an error.

Unable to get/set tape media parameters

A request to get/set the capabilities of the media current in the tape drive resulted in an error.

Tape is write protected

The tape media is write protected and the test cannot continue.

Tape drive has reported that it requires cleaning

The tape drive and/or the media in the drive are dirty. Clean the tape drive before reattempting the test.

Tape partition is too small for test files

The media is too small or the tape drive does not have the capability to fit the requested files on the tape. Select fewer files or smaller files or use a bigger tape.

Could not open MIDI Sequencer or MIDI file

The sound test was not able to open the sound card device or the midi sound file on the disk for playback. This can be because the test file has been moved or deleted from the disk or because the sound card has not been installed correctly.

Failed to play back MIDI via sequencer

The MIDI sequencer was not able to play back the file. This error is normally accompanied with a 2nd error message in the detailed log that gives additional information.

Could not play back wave file

The sound test was not able to open the sound card device or the wave sound file on the disk for playback. This can be because the test file has been moved or deleted from the disk or because the sound card has not been installed correctly.

Audio Input doesn't match Audio Output

The data received through the audio line in is in a wave type form, but differs from the output waveform by a greater degree than the Max Distortion value set in the Sound test preferences. It is not rare for occasional high distortion values to occur on certain sound cards, especially if the system load is particularly high.

Corrupt Audio input

This is a more serious error than the previous one. The audio line in data is corrupt and in no way resembles the output wave. Check that the audio loopback cable is connected to the correct ports and the Windows mixer settings are properly configured (*see section 3.11 Sound card test*).

Could not detect USB loopback plug

The USB enumeration process failed to find a USB loopback plug device. This might be because, (1) The USB plug is not physically connected. (2) The USB loopback device driver was not successfully installed.

(3) The USB plug was connected while a test was already in progress and thus was not recognized. (4) The Windows O/S is not installed correctly. (5) The USB socket on the PC is faulty. (6) The USB cable being used is faulty or is prone to errors. (7) The plug itself has become faulty. (8) The USB cable is too long or of poor quality (shielded cables under 5m are recommended). As there are many possible causes for this error it can take some investigation to find the origin of the fault. The first step however should always be to remove the plug, wait a few seconds then reconnect the plug.

USB loopback plug identified itself incorrectly

The USB enumeration process succeeded, but the unique identification information stored in the USB plugs EEPROM memory is incorrect. Under normal conditions this should never happen. The plug can not be used unless it is programmed correctly. Contact PassMark Software for assistance.

Could not allocate RAM for USB I/O buffers

The system is low on memory

USB device open failed

The initial attempt to connect to the device failed. The device might already be open and locked by another process. With all the tests stopped, try removing the plug, waiting a few seconds then reconnecting the plug.

USB device reset failed

Setting USB data rate failed

Setting USB data characteristics failed

Setting USB flow control failed

Setting USB I/O timeouts failed

Purging of USB I/O data buffers failed

Set USB loopback DTR failed

Set USB loopback RTS failed

These errors are all very rare. Normally errors will occur earlier in the initialization process and not at these steps. In addition to the possible causes for errors mentioned above, it is also possible that there is a software configuration problem. If one of theses errors persists, contact PassMark Software for assistance.

Data packet transmission failed

USB driver reported send error

Data could not be sent to the USB device. It may be that the device has an intermittent connection to the host and has disconnected itself. (i.e. a faulty cable). It may also indicate that there is a problem with the device drivers or USB hardware.

Data packet reception failed

USB driver reported receive error

Data could not received from the USB device. It may also indicate that there is a problem with the device drivers or USB hardware.

USB data packet verify failed

A block of data was sent to, and received from, the USB plug but the data was corrupted. What was received did not match what was sent. This could indicate a poor quality cable that is subject to external electromagnetic interference or faulty USB hardware.

Warning: Too many USB errors attempted reset

After 10 errors BurnInTest automatically attempts clear the error condition start by provoking a reset on the device and device drivers. If the error condition does clear after this action the problem was almost

definitely a software problem.

Insufficient rights to lock pages

Either you are not running Windows 2000 or XP or the administrator user rights to lock pages in memory is not set. See the page in the help file called, Setting the <u>Lock Pages in Memory right</u> for more information. This right is required for the advanced memory test and is turned off be default. If you have set this right, make sure you are logged on as the administrator and have rebooted the machine so that the change takes effect.

Could not get extended RAM info. W2000 or XP Req.

The user has selected the advanced RAM test but there was a problem detecting while trying to obtain information about extended RAM. This maybe because the system is not running Windows 2000 or Windows XP

SMART Threshold exceeding condition detected.

One of the drives S.M.A.R.T Attributes has exceeded its threshold. This signals imminent drive failure and indicates the tests should be stopped and the drive replaced. To learn more about S.M.A.R.T, see <u>What is S.M.A.R.T?</u>

Maintaining multiple test configurations

If you are in the business to testing many different computers then you may benefit from maintaining different test configuration. By saving a particular configuration to a file, you can avoid resetting all the parameters each time BurnIntest is used with a different computer setup.

A configuration file contains all the parameters available in the test duty cycles and test preferences windows. The saving and loading of configuration files can be done from the menu options, 'Load Config' and 'Save Config As'. Configuration files can also be used from the command line.

Configuration files normally end in the extension 'cfg. For example the current configuration is stored automatically in the file 'LastUsed.cfg'

Using this feature it is possible to make your own configuration for each computer setup that your business encounters / builds. eg. The heavy load situation, the Disk test only configuration.

After the configuration files have been created they can be transferred between computers where BurnInTest is installed

See also

Calling external programs via Auto stop actions

Logging faults

Command line arguments

The following are the BurnInTest command line parameters…

-D [minutes]
Sets the test duration to the value specified by minutes. Decimal values can be used.

-C [configfilename]
Loads the underline configuration file specified by [configfilename]

-S [scriptfilename]
On startup, BurnInTest will automatically run the script file specified by [scriptfilename]. [scriptfilename] can be an absolute or relative path to the script file, but if the path and/or filename contain any space characters, you should enclose the entire string in double quotes (""). Learn more about Scripting here.

-R
Executes the tests immediately without needing to press the go button. It also skips the pre-test warning message.

-L [x,y,wt,ht]
Starts BurnInTest with the main window located at top-left co-ordinates x, y and with width wt and height ht. It is important that there are no white space characters in [x,y,wt,ht] specifications.

Example 1

Here is an example of a Windows batch file that could be used to start BurnInTest,

```
c:
cd "\program files\BurnInTest"
bit.exe –c "heavyload.cfg"
```

Example 2

Here is an example that could be placed in the Windows Startup folder to run BurnInTest automatically with the current default settings, (after Windows had booted up).

```
bit.exe /r
```

See also

Calling external programs via Auto stop actions

Reboot cycling

Serial port loop back plug

(Applicable to BurnInTest Pro version only)

You can purchase high quality moulded loop back plugs from PassMark or you can make your own. A loop back plug is a small connector that plugs into the serial port on your computer in order to loop the data output line into the data input line. It also sets a few control lines to trick the computer into thinking that an external device is connected to the port. You'll find below the instructions for making your own serial port loop back plug. These plugs are designed to be plugged into the small 9 pin serial ports on your computer. In conjunction with software such as BurnInTest they allow the testing of the port.

Warning: This is the pin outs of the plug which we have made and successfully tested with our own software on our own PC's. You use this information at your own risk! It's easy to make a mistake and we take no responsibility for the potentially serious consequences.

The serial port on IBM compatible PC's conform to the RS232 electrical standard and use a male DB-9 connector. (older PC's may use a DB-25 in which case a converter will be required). The DB-9 connector as the following 9 pins.

DB9 Pin	EIA Description	Description
1	DCD	Data carrier detect
2	RXD	Receive data
3	TXD	Transmit data
4	DTR	Data terminal ready
5	GND	Signal ground
6	DSR	Data set ready
7	RTS	Request to send
8	CTS	Clear to send
9	RI	Ring Indicator

To make the loop back plug the following pins need to be connected together

- Receive and transmit (2 & 3)

- Request to send and Clear to send (7 & 8)

- Data carrier detect, Data set ready and Data terminal ready (1, 6 & 4)

This diagram shows the connections that need to be made. It's the rear view of the female DB-9 connector that's required for the plug. The red lines and gray dots show the connections that need to be made on the back of the plug.
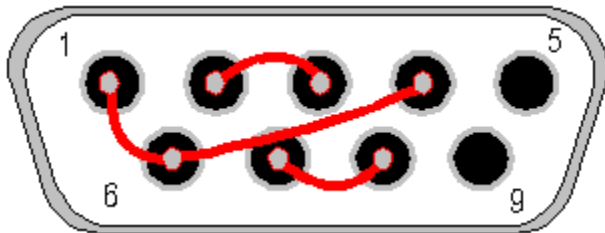
Female DB-9 connector - Rear view

Parallel port loop back plug

(Applicable to BurnInTest Pro version only)

You can purchase high quality molded loop back plugs from PassMark or you can make your own. You'll find below the instructions for making a parallel port loop back plug. These plugs are designed to be plugged into the 25 pin parallel on your computer. In conjunction with software such as BurnInTest they allow the testing of the port.

Warning: This are the pin outs of the plug which we have made and successfully tested with our own software on our own PC's. You use this information at your own risk! It's easy to make a mistake and we take no responsibility for the potentially serious consequences.

The parallel port on IBM compatible PC's have always used a DB-25 connector. However, over time several changes have taken place to the electrical interface with the introduction of enhanced and bi-directional parallel ports. We believe that this plug will work with all styles of parallel ports.

DB-25 Pin	Direction	Description
2	**Out**	Data bit 0 (Least significant bit)
3	Out	Data bit 1
4	Out	Data bit 2
5	Out	Data bit 3
6	Out	Data bit 4
10	In	Acknowledge status
11	In	Busy status
12	In	Paper out status
13	In	Select status
15	In	Error status

To make the loop back plug the following pins need to be connected together

-   Data 0 and Error status (Pin 2 & 15)

-   Data 1 and Select status (3 & 13)

-   Data 2 and Paper out status (4 & 12)

-   Data 3 and Acknowledge status (5 & 10)

-   Data 4 and Busy status (6 & 11)

This diagram shows the connections that need to be made. It's the rear view of the male DB-25 connector that's required for the plug. The red lines and grey dots show the connections that need to be made.
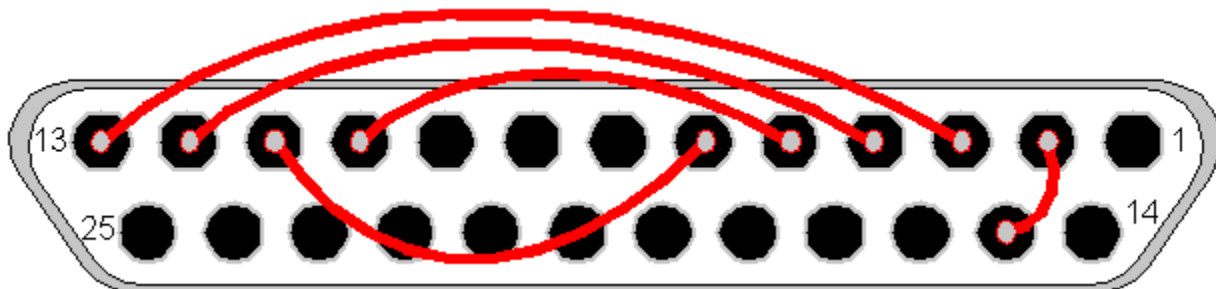
Male DB-25 connector - Rear view

Audio loopback cable

PassMark audio loopback cables contain two 3.5mm gold plated stereo plugs which connect the Audio out and line in ports of your sound card during sound card loopback testing.

The following are the cable specifications.

Dimensions:

Total length: 330mm ± 0.5mm
Plug length: 14mm ± 0.5mm
Plug diameter: 3.5mm

Conductors:

American wiring gauge: (26(10/0.12)x2F, 0.43mm diameter
Insulation: PBC, 1.0mm diameter

Shielding:

Spiral shield: Bare copper wire, 30/0.10

Sheath:

Material: PVC
Color: Black

Audio loopback cables can be purchased from **http://www.passmark.com**

USB port loop back plug

(Applicable to BurnInTest Pro version only)

USB1 port loop back plug

Active USB loopback plugs are the quickest, most effective way to verify that a PC's USB ports are working correctly. The Red, Green and Yellow LED's on the front of this USB adapter plug provide a quick visual indication of I/O activity and if the USB bus is powered.

Using these plugs, error free transfer speeds of around 700 - 800 Kbits/sec per port can be expected on a system that is functioning correctly.

Technical specifications

USB standard:	1.1 (but is forwardly compatible with USB 2.0's FullSpeed)
Plug and play:	Compliant
Physical connector:	4 wire. (2 x Balanced Signal, 1 Voltage [VBUS], 1 Ground [GND])
USB Transfer modes:	Bulk
Voltage:	4.4V – 5.25V
Current:	90mA (typical operation)
Clock speed:	6.00Mhz input to x8 multiplier
Device buffer:	384 bytes Rx, 128 byte Tx
Case:	High impact MABS plastic
Size:	65mm x 50mm x 20mm (2.5 x 2.0 x 0.8 inches)
Weight:	30.5g (1.1oz)
EMC standards:	AS/NZS 3548:1995, EC
Storage Temperature:	-20 ºC to + 70 ºC
Usage Temperature:	0 ºC to + 50 ºC

USB 2.0 loopback and benchmarking plug

USB 2 Loopback plugs can be used to help diagnose, troubleshoot and load test your PC's USB 1.x and 2.0 ports. Five status LEDs on the USB 2 Loopback plug will dramatically improve the troubleshooting and diagnostic ability of computer technicians and system integrators, who have previously been working blind.The Red, Green and Yellow LED's on the front of this USB adapter plug provide a quick visual indication of I/O activity and if the USB bus is powered. The Orange LED will provide a quick indication whether the PC port is currently supporting the higher USB 2.0 speed (up to 480Mb/s) or the lower speed found with USB 1.x (of up to 12 Mb/s). The leftmost red LED indicates whether recoverable bus error (retransmission of data) has occurred.

These plugs are unique! They are the only true USB 2.0 loop back adapters on the market and have been especially designed for use with our BurnInTest Professional software package. They do not require an external power supply and do not require a connection to any other port on a PC. Each plug also has its own serial number stored in EPROM, on the plug, so it is possible to identify each plug when multiple plugs are connected.

Each plug also contains its own CPU and executes its own firmware (which can be upgraded in the future by download)

Technical Specifications

USB standard:	2.0 HighSpeed and FullSpeed
	(and is backwardly compatible with USB 1.1 and 1.0)
Plug and play:	Compliant
Physical connector:	Standard 4 wire USB
	(2 x Balanced Signal, 1 Voltage [VBUS], 1 Ground [GND])
USB Transfer modes:	Bulk
Voltage:	4.4V - 5.25V. (No external power supply is required)
Current:	500mA (less than 100mA during initial enumeration)
Clock speed:	24Mhz
Device data buffers:	3 x 64-byte control. 4Kbyte data available
Device memory:	8KB Firmware code and data available
Case:	High impact MABS plastic
Size:	65mm x 50mm x 20mm (2.5 x 2.0 x 0.8 inches)
Weight:	35g (1.3oz)
Indicators:	Orange LED = USB2.0 (HighSpeed) or USB1.0 (FullSpeed)
	indicator
	Green LED = Transmit data
	Red LED 1 = Power from USB bus
	Yellow LED = Receive data
	Red LED 2 = USB bus transmission error indicator
EMC standards:	AS/NZS 3548:1995, EC
Storage Temperature:	-20 ºC to + 70 ºC
Usage Temperature:	0 ºC to + 45ºC
Max speed:	480 Mbits/sec

Compatibility

Windows 2000 and XP are supported.
Window 95, 98, ME, NT4, Mac & Linux are **not** supported.
In order to use the plugs BurnInTest Professional version 4.0 or above is required or the stand alone test software USB 2.0 and 1.1 ports are supported. (when connected to a USB 1.1 port only the lower speed, USB 1.1, mode will be used)

For further details regarding any of the products in this section please see the PassMark website:
www.passmark.com

See also

USB ports test

USB test preferences

What's new

Please see our version history online at http://www.passmark.com/products/bit_history.htm

Temperature and Battery monitoring

Battery monitoring (via BatteryMon)

BurnInTest can work with another product from PassMark Software called BatteryMon.   BatteryMon allows the charge level in laptop batteries and uninterruptible power supplies UPSs to be monitored. Turning on this feature will cause BurnInTest to log the battery statistics collected by BatteryMon. Both programs need to be active and running for this feature to work. Statistics collected will appear in the HTML, Text and binary log files, where they will be broken down on a per battery basis. There is also a summary charge level displayed in the main window.

For more information about BatteryMon see the PassMark Software web site.

http://www.passmark.com/products/batmon.htm

Temperature monitoring

PassMark software does not produce a temperature monitoring application, however we do provide support for many third party system monitoring applications currently available. By using BurnInTest with these applications, is it possible to Burn in your hardware while monitoring and logging the temperature of your CPU(s) and/or your motherboard.

In the case of each temperature monitoring application…

- Check that your main board supports temperature monitoring. This can be done from the documentation that comes with the board / computer or from the manufacturers web page.

- Ensure that the third party monitoring application is correctly installed. See below for a list of supported applications.

- Check that third party monitoring application supports your motherboard. Each application comes with a list of supported boards. See below for more details on the supported applications.

- Check that the third party monitoring application is a compatible version. See below for a list of compatible versions.

- Run the third party monitoring application, then Run BurnInTest.

- Make sure temperature monitoring is turned on in BurnInTest (from the Test preferences Window) and if required, the temperature source value is selected. For Hmonitor, up to two sources can be selected for display and logging in BurnInTest.

- Start testing.

BurnInTest reads the CPU temperature values from the third party monitoring application, displaying them on the screen and writing them to disk if logging is turned on. Please bear in mind that the accuracy of the temperature values in BurnInTest depend entirely on the third party application in question.

About Hmonitor

Versions tested with BurnInTest: 3.1.2.5 and 4.0.1.2

Hmonitor Pro monitors and displays hardware parameters collected by the several sensor chips, installed on certain motherboards. The program can monitor voltages, CPU temperature, Motherboard temperature and cooler fans RPMs. It is fully customizable with alarms that can be set to go off when the temperature goes too high. In addition to this there is a built in "thermo control" function, that kicks in when the CPU is idle. Hmonitor can be used under Windows 95/98 or NT/2000 operating systems on Intel-based personal computers.

Hmonitor is currently available at http://www.hmonitor.com. PassMark also maintains a Web page that can tell you where to get Hmonitor.

http://www.passmark.com/products/temperature.htm

About Intel Active Monitor

Versions tested with BurnInTest: 1.19

Intel Active Monitor monitors CPU temperatures, motherboard temperatures, voltages and fan speeds. It contains some basic system information and supports programmable alerts. It is compatible with most newer Intel motherboards.

Intel Active Monitor is available from http://www.intel.com

About MBM (Motherboard Monitor)

Versions tested with BurnInTest: 5.3.3.0 and 5.5.5.1

MBM monitors CPU temperatures, motherboard temperatures, voltages and fan speeds. It contains some basic system information and supports programmable alerts (also email alerts or application launch on alert), and logging.

MBM is available from http://mbm.livewiredev.com
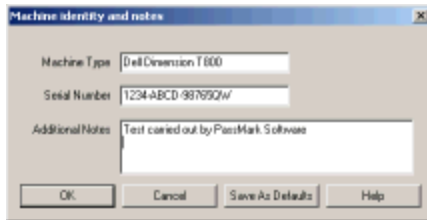
About SpeedFan

Versions tested with BurnInTest: 4.08

SpeedFan monitors CPU temperatures, motherboard temperatures, voltages and fan speeds. It allows the user to alter fan speeds to aid the overclocking enthusiast. It reports system information - in particular SM Bus info and SMART attributes.

SpeedFan is available from http://www.almico.com/speedfan.php

Machine Identity and additional notes

The fields on this screen allow the entry of information related to the identity of the machine being tested. This can be an aid to users that plan to test numerous machines and need to associate the results obtained with a particular machine at a later date. Users would typically do this in order to maintain an audit trail for quality assurance reasons.

Three free form text fields are available. The information entered into this window will be displayed in saved result files, in the main window and on printed results.

Machine Type

Typically the make and model of the machine would be entered in this field, e.g. Dell Dimension T800 XPS

Serial Number

Typically the serial number would be entered here, e.g. D345-789-YT99

Notes

This is a spare text field that users may make use of to save any additional information that needs to be associated with the machine being tested or the organization doing the testing. No more than 300 characters may be entered into this field.

Save As Defaults button

This button will save the contents of these three fields to disk. Each time BurnInTest starts the fields will automatically be reloaded. This can save retyping the same information over and over again.

Test Preferences – Disk

Hard disk and Floppy assignment

These fields and buttons allow the user to select the hard and floppy disks used in the disk test.

Adding a disk

To add a drive letter to the list of disks to be tested, select the drive letter from the drop down list and click on the "Add new drive to list" button. To test a shared network drive, the drives needs to have a drive letter mapped to it. Only those drives detected by the Windows operating system as displayed in the drop down list.

The following settings can be configured differently for each drive: Slow drive warning threshold, File size, Test Pattern and Log SMART errors. To use the general disk drive Duty cycle for each disk just set the Duty Cycle override value to blank (no value), otherwise set the required value per disk.

Removing a disk

To remove a disk from the list. Selection one or more drive letters (using CTRL / ALT while clicking) and then click on the "Remove selected drives button".

Up to twenty drive letters can be selected for simultaneous testing. Note: The simultaneous testing of two partitions on the same physical hard drive will result in a lot of seeking between partitions and slow down the test significantly.

Slow drive warning threshold

BurnInTest can be configured so that a warning message is generated when the transfer speed from a disk device drops below a certain level. The transfer speed is measured in Megabytes / second and a different threshold can be assigned for each drive.

Selecting a level of 0 will disable the feature.

When the measured I/O transfer speed is below the threshold, a warning message will appear in the detailed error log. The entry will be similar to the following,

`2002-08-30 15:01:26, Disk, Threshold level: 20.00 MB/Sec, Measured speed: 18.29 MB/Sec`

The disk test periodically samples the transfer speed every second (600ms when the duty cycle > 90). Every sample below the threshold generates a warning.

The duty cycle for the disk test should be set to 100% when using this feature. Using a lower value doesn't make a lot of sense. Setting a threshold can be useful in helping to determine if the drive is functioning correctly and the correct device drivers have been loaded.

Test File Size

The use can select the test file size and test pattern that is used with the disk test for each disk. The size of the file is equal to a certain percentage of the disks capacity. The default file size is 1.0% of the disk size. So if a disk had a total capacity of 40GB then the default size of each file would be 400MB. Setting a smaller percentage results in more files being created on the disk and the read / verify cycle occurring more quickly.

Test Patterns

The test patterns that can be selected are explained in the section, "Disk test (Floppy and hard).

Log SMART errors

Select this checkbox to have BurnInTest monitor the disk drives SMART attributes. If a SMART attribute for any of the hard drives being tested exceeds its threshold, an error is logged along with the attribute exceeded. To learn more about SMART see What is S.M.A.R.T?

Note: This feature is only available in Windows 2000/XP.

Seek count

For test modes that perform seeking to different positions on the disk drive (eg. *Random data with random seeking*), the seek count specifies the number of seeks for a particular iteration (eg. After *Random data with random seeking* has created 100 test files, the *Seek count* specifies the number of times a seek should occur between blocks within these 100 files).

Duty Cycle Override

To use the general disk drive Duty cycle for each disk just set the Duty Cycle override value to blank (no value), otherwise set the required value per disk.

Test Preferences –CD/DVD

CD/DVD drive assignment

These fields allow the user to select the CD and DVD drives to be used for the CD/DVD test.

Adding a CD/DVD drive

To add a drive letter to the list of disks to be tested, select the drive letter from the drop down list, select the test mode and click on the "Add new CD/DVD to list" button. Only those CD and DVD drives detected by the Windows operating system as displayed in the drop down list.

Up to twenty drive letters can be selected for simultaneous testing. The CD burn test supports a maximum of 1 drive simultaneously   The type of CD used in the actual test should match the setting in this window. See the CD Test description for more details about test types.

Removing a CD/DVD drive

To remove a disk from the list. Selection one or more drive letters (using CTRL / ALT while clicking) and then click on the "Remove selected CD/DVDs" button.

Additional seeking and Seek count

For PassMark CD/DVD's and Burn CD-RW only. When *Additional seeking* is selected, seeking to different positions on the CD/DVD or CD-RW will occur *Seek Count* number of times for each cycle of file read/verify.

Quick Erase and Full Erase

For Burn CD-RW only. Erase the CD-RW media. The quick option erases content type information in typically less than two minutes. The Full option additionally erases all user data on the disc, however this can take a considerable amount of time (over 1 hour) and the test cannot be cancelled during this stage.

650MB and 700MB

For Burn CD-RW only. CD-RWs are available in a number of sizes. The most common are 650Megabytes (MB) and 700MB of data. This option allow the user to specify whether the CD-RW to be tested is supports 650MB or 700MB.

Test data drive

For Burn CD-RW only. PassMark format Test CD data is temporarily created on a harddisk before burning this test data to the CD-RW. This test data is very large. By default, it will be created in the BurnInTest installation directory, and is deleted after the CD-RW burn test. The target drive for this test data may be changed from the "default installation directory" to the root directory of a hard disk on the system. This hard disk drive letter is specified from the drop down "Test data drive" list. The selected drive will be saved as user configuration after selecting "OK" (you do not need to add a CD drive to alter this drive configuration).

This option is provided for when BurnInTest is run from read-only media (CD/DVD's), Floppy disks or other disks with insufficient space and where the hard disk that BurnInTest is installed is to be tested by the BurnInTest hard disk test (writing and reading a large temporary test file to a disk that is being tested with BurnInTest should be avoided).

Blocking autoplay

When a CD or DVD is inserted into a drive, Windows will attempt to auto-play the disc. In Windows XP a window prompting the user to take some action is displayed even if the CD is just a data CD and can not be played. The behaviour can be prevented by selecting the 'block removable storage autoplay' option in the CD preferences window.

For this feature to work the following conditions must be meet.

- The main window of BurnInTest must be the active foreground window.

- Internet explorer version 4.0 or above must be installed.

- The auto-play feature must not already be disabled by some other means (e.g. changes to the registry)

Note: In some cases it is also possible to block the auto-play function by holding down the shift key when a disc is inserted. (This is a feature of Windows and not BurnInTest).

Using the Registry to Disable AutoRun / Autoplay (Experts only)

There are two registry values that can be used to persistently disable AutoRun: NoDriveAutoRun and NoDriveTypeAutoRun. The first value disables AutoRun for specified drive letters and the second disables AutoRun for a class of drives. If either of these values is set to disable AutoRun for a particular device, it will be disabled.

Note The NoDriveAutoRun and NoDriveTypeAutoRun values should only be modified by system administrators to change the value for the entire system for testing or administrative purposes. Applications (such as BurnInTest) should not modify these values, as there is no way to reliably restore them to their original values.

The NoDriveAutoRun value disables AutoRun for specified drive letters. It is a **REG_DWORD** data value, found under the **HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Policies\Explorer** key. The first bit of the value corresponds to A:, the second to B:, and so on. To disable AutoRun for one or more drive letters, set the corresponding bits. For example, to disable the A: and C: drives, set NoDriveAutoRun to 0x00000005.

The NoDriveTypeAutoRun value disables AutoRun for a class of drives. It is a **REG_DWORD** or 4-byte **REG_BINARY** data value, found under the **HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Policies\Explorer** key. By setting the bits of this value's first byte, different drives can be excluded from working with AutoRun.

The following table gives the bits and bitmask constants that can be set in the first byte of NoDriveTypeAutoRun to disable AutoRun for a particular drive type. For Microsoft Windows 2000, you must restart Windows Explorer before the changes take effect.

Bit Number	Bitmask Constant	Description
0x04	DRIVE_REMOVEABLE	Disk can be removed from drive (such as a floppy disk).
0x08	DRIVE_FIXED	Disk cannot be removed from drive (a hard disk).
0x10	DRIVE_REMOTE	Network drive.
0x20	DRIVE_CDROM	CD-ROM drive.
0x40	DRIVE_RAMDISK	RAM disk.

Test Preferences – Logging

Logging to the Detailed Error log history

Errors are automatically logged to the Detailed Error log history. This log is viewed using "View", "Error Log File". This type of logging is not affected by the "Logging on" option, which refers to automatic disk logging.

Note: Text and HTML disk logs can be manually created using "File", "Save test log". This will save System information, a result summary and the recent Detailed Error log history (up to 1000 entries).

Automatic disk logging

Logging to disk is switched on and off with the "Logging on" option. When disk logging is on, BurnInTest will log System information, results, result summaries, and detailed error descriptions to files based on the following user settings.

The log directory allows the directory and filename prefix to be specified. The file will automatically be appended with _*YYMMDD*_HHMMSS.log, .htm or .trace, specifying the Year, Month, Day, Hour, Minute & second that the disk log file was created.

A "Log detail level" may be selected for disk logging to specify the amount of information to be written to disk. The options that may be selected are:

1. Result Summary only. Produces a .log or .htm file containing system information, a summary of the tests run (eg. Which tests, the number of operations and errors per test) and a summary of the serious and critical errors during a test run (cleared at the end of a non-scripted test run or at the end of the script for a scripted test run).

2. Normal. Produces a .log or .htm file containing the "Result Summary only" information and detailed errors (1 or 2 lines per error).

A "Trace level" may be selected for detailed disk logging to specify the amount of information to be written to disk. The options that may be selected are:

1. No Trace log. No trace log is produced. This is the default setting.

2. Activity Trace level 1. Produces a .trace with the "Normal" information and a summary of test activities (eg. The starting and stopping of tests).

3. Activity trace level 2. Produces a .trace file with the "Activity Trace level 1" information and a detailed description of the test activity.

Setting "Max file size" specifies the approximate maximum file size in terms of the number of lines in either the log or trace files.

The format of the Result summary and Normal log files may be specified to be either ASCII text or HTML via the "ACSII Format" or "HTML Format" buttons. Trace logs are always in ASCII text.

A new set of log files will be created when Logging On is switched on, any of the logging options (Log Directory, Detail Level, ASCII/HTML Format) are changed, or when BurnInTest is started with Logging switched on. The only exception is when BurnInTest is automatically stopped with a REBOOT or REBOOTEND scripting command, and then the original log files will be re-opened and appended to.

The log files are closed and available for use by another application when Logging On is switched off, any of the logging options (Log Directory, Detail Level, ASCII/HTML Format) are changed, or when BurnInTest is exited or automatically stopped with a REBOOT or REBOOTEND scripting command.

Log Name Prefixing (Text/HTML)

If you wish to prefix the standard BurnInTest Text or HTML log filenames you can type a prefix string into the "Prefix" edit box. For example, if you want to prefix   the standard BurnInTest log filenames with the text "SPECIAL_TEST_" then just enter,

SPECIAL_TEST_

If you want to prefix using an environment variable, %COMPUTERNAME%,   %USERNAME%, %OS%, %PROCESSOR_ARCHITECTURE% are supported. So, if for example you wanted to prefix log files with a test run description, the computer's name and   the user's name, just enter,

Test123_%COMPUTERNAME%_%USERNAME%_

Pre-test options for test result clearing and log file creation

Test results, including the *detailed error and status log history,* can either be cleared each time a new test run is started or test results can be accumulated across several test runs. Accumulating test results is useful when doing scripted testing, including, reboot testing. If test results are accumulated, the only way test results can be cleared is with the 'Edit / Clear All Results' menu item.

Accumulating test results means that the error count, cycle count and operations count values are the total values that have been accumulated across all test runs on this machine.

Accumulation will also occur across scripted reboots, sleeps and execute commands.

Log files may be appended to the existing log file or a new log file created at the start of each test run.

Three options are available for clearing/accumulating test results and creating/appending log files. These options are:

- Clear test results and create a new log
- Clear test results and append to the existing log
- Accumulate test results and append to the existing log

Note: Regardless of the configuration settings, the *detailed error and status log* history is maintained at a maximum of 1000 lines, with the oldest data cleared if this size is exceeded.

See also

Calling external programs via Auto stop actions

Maintaining multiple test configurations

Test Preferences – Error handling

Action on Error

When BurnInTest detects an error, three options are available.

Continue. The error counter is incremented and testing continues.

Continue and beep. The error counter is incremented, the computer beeps and testing continues.

Stop all tests. All windows (except the main window) are closed and all the tests are stopped. The failed window is then displayed.

Test Preferences – Network

Network addresses

Up to 4 network addresses can be entered for the simultaneous testing of the connection to 4 different locations. These values are used for the Network test. These connections can pass via different network interface cards (NIC) or the same one. The NIC used will depend on the TCP/IP configuration setup in Windows. Each address must be a URL or an IP address.

A URL is the name of a network host, eg. www.hostname.com

An IP address is a sequence of 4 numbers that correspond to a network host. eg. 169.192.0.1

If less than 4 addresses need to be tested uncheck the active check box.

The host selected must be accessible from the computer and capable of responding to the 'ping' command. See the Network Test for more details. PassMark recommends the selection of a local host to minimize data link problems, which are fairly common on the Internet.

Timeout

This value determines how long BurnInTest will wait for a data packet to be sent or received before an error is reported. The value is measured in Milliseconds. 2000ms (2 seconds) is the default value.

Error handling

There are two options for handling errors that occur during the execution of the network test. BurnInTest can either log an error for every bad (or missing) packet or can be set to only log an error when the number of errors exceed a threshold set by the user. This threshold is expressed as the percentage of bad packets compare to the overall number of packets sent.

For more information see the description of the Network Test.

Test Preferences – Temperature & Battery

Battery monitoring (via BatteryMon)

BurnInTest can work with another product from PassMark Software called BatteryMon.   BatteryMon allows the charge level in laptop batteries and uninterruptible power supplies UPSs to be monitored. Click the check box to turn on the feature.

See <u>Temperature and battery monitoring</u> for more details

Temperature monitoring

By using a 3rd party Temperature Monitoring Application and BurnInTest together it is possible to Burn in your hardware while monitoring and logging the temperature of your CPU(s) within BurnInTest. The Monitoring Application you are using with BurnInTest needs to be selected within preferences in the section "Monitoring Application" The choices available are:

- No Monitoring
- Intel Active Monitor
- Hmonitor
- MBM (Motherboard Monitor) and
- SpeedFan

The temperature scale of Celsius or Fahrenheit that is required should be selected.

If you are using Hmonitor, you can select from a range of Hmonitor provided temperature sources, such as CPU1 and CPU2. If you are using other 3rd party product, the first 3 valid sensors available from these applications are used by BurnInTest. By default these are typically CPUs, the Case or hard disks. For example: the default configuration of SpeedFan provided Hard Disk 1, Hard Disk 2 and CPU temperatures in our testing. The default configuration of MBM provided the Case and CPU1 in our testing.

See <u>Temperature and battery monitoring</u> for more details

Test Preferences – Print

Standard test

The standard test sends pages of text to the default Windows printer. The pages printed by the printer should be a page of solid text in a fixed-point font filling the printable area of the page. There should be a small margin (usually under 1cm) around the block of text.

Printer command file

The user can define a printer command file to be used in place of the standard test. A printer command file is a file containing a series of printer commands which is used by the printer to carry out certain actions.

Print cover page before sending job to printer

The user may choose to print a cover page before sending the command file to the printer. This may help troubleshooting possible command file, as opposed to, printer errors.

How to create a printer command file

There is an example printer command file included with BurnInTest. The example file is called "HP Printer file.pcl" and can be found in the BurnInTest installation directory. This file is a list of printer commands used with HP inkjet printers. It moves the print head without actually printing any pages.

The language used for each make of printer is different, but you can still make your own printer command file. You need to create a document, then print this document to a file using the correct printer device driver.

For example in Microsoft word, when printing your document select the "Print to file" checkbox in the Print window. Once a file is created it can then be used with BurnInTest.

Normally printer command files have a '.prn' file name extension but this may vary depending on the printer language used.

PCL = Printer command language (from Hewlett Packard)

PS = Postscript.

Test Preferences – Pre test

Action before running tests

You may specify the default behaviour of BurnInTest before it begins any test cycle.

None (start immediately)

Immediately starts test(s) without any warning message or reminders.

Display warning message (default)

Displays the default warning message reminding the user of some basic precautions, such as possible port conflicts and the presence of loopback plugs and cables.

Run external application

Run another application prior to launching. For instance the user may wish to launch the Windows Performance Monitor to examine the effects of the test on the system.

Application path

The path to the external application above.

Test Preferences – Sound

Sound test type

Select the type of test you wish to carry out.

Wave File; Midi File

Browse to select the files which will be used during the standard test, or enter the path to the audio file.

Max Distortion

Select the maximum distortion allowable for the loopback test. The values available are between 1 and 20 percent. 1% represents a low level of distortion.

For more information see the description of the Sound Test

Test Preferences – Video Play

The Video Playback preferences window allows you to specify up to 3 video files. These may be typed directly into each of the 3 edit boxes (full directory path and file name required), or you can browse to the required video file by selecting the browse "…" button.

1. Video File Path

2. Video File Path

3. Video File Path

The order the videos are specified, is the order they will be played.

Video's in the file formats .avi, .mpg & .mpeg are supported.

Sample test videos with different file formats and video compression are available from the PassMark Web site. To automatically register three samples video files within BurnInTest (rather than typing them in manually) please follow the following steps:

1. Download the videos from the PassMark website.

2. Copy the files into the BurnInTest directory.

3. If you have set up other test video files in preferences, delete these from within Preferences, Video Playback, by simply highlighting the text in each edit box and pressing delete on your keyboard.

4. Exit BurnInTest

5. Start BurnInTest

   If these PassMark Video sample files exist in the BurnInTest directory, you will now see these are configured in Preferences, Video Playback.

Steps 3 & 4 can be skipped if no video files have been previously configured in BurnInTest, Preferences, Video Playback.

If the PassMark video samples are not installed in the BurnInTest directory. BurnInTest will attempt to find the Microsoft Windows "Clock.avi" video, and configure this as Video file number 1.

For more information see the description of the <u>Video play Test</u>

Test Preferences – Post-Test

Action after Auto Stop

There are three different actions than can be taken at the end of a test run.

Option1: Stop Tests

This option will stop all the running tests and close all test windows. This is the normal default setting.

Option2: Close BurnInTest and run an external file

To help with the process of test automation it is possible to have BurnInTest close automatically after the tests have been completed. This could be used, for example, to call an application or batch file that would clean up the hard disk after the completion of testing. The full path name of the application must be entered. E.g.

```
c:\temp\cleanup.bat
```

To close BurnInTest automatically without running an external file, select the Run external file option but leave the file name empty.

Option3: Reboot / Restart the PC

This option is useful for reboot cycling testing. Once configured BurnInTest can be setup so that the PC will reboot itself in a cycle, with test runs occurring between each reboot. See the section on Reboot cycling for more details.

Reboot cycling

BurnInTest can be setup so that the PC will reboot itself in a cycle, with test runs occurring between each reboot. BurnInTest uses another software utility called Rebooter to reboot / restart a PC. Rebooter can be used from within BurnInTest or it can be run by itself (look for the executable called, rebooter.exe in the BurnInTest installation directory).

To use Rebooter from within BurnInTest, go to the BurnInTest Preferences window and then select the timer tab. Clicking on the 'Reboot options' button will open the Rebooter configuration window. You can get additional help about Rebooter options by clicking on the help button in the Rebooter configuration window.

Here is a brief description of how a BurnInTest can be set-up to reboot itself in a cycle.

Step1 – Select and save Rebooter settings

Open the Rebooter configuration window and use the "Clear" button to return the reboot count to 0.

Set the 'Maximum Reboots' value to the number of cycles required.

Set the other parameters in Rebooter. (Reboot type, Delay, etc). Don't set the delay value to be too short, as you want BurnInTest to fully stop before rebooting. 20 Seconds is a good value.

Save the settings, with the 'Save Options' button. Then close the Window.

Step2 – Configure the settings you want in BurnInTest

From the Preferences and Duty Cycle windows enter all the settings that you want for your test runs. When you close these windows, the settings are saved to disk and will become the new default values. Alternatively a separate configuration file could be created (using the 'Save As Config' menu option) and used on the command line.

Make sure you

- Set a test period with the Auto-Stop option in the preferences window.

- Select 'Reboot PC' in the Action after Auto-Stop check boxes.

- Have the log file accumulation option set in the Logging section of the preferences window.

Step3 – Create an autorun shortcut

Create an autorun short cut that points to the BurnInTest executable. You need to do this manually in Windows. The command line in the shortcut should use the '/r' option. This will start tests executing in BurnInTest automatically. The command line for the shortcut should be something like

```
C:\Program Files\BurnInTest\bit.exe  /r
```

The Rebooter help file (Rebooter.hlp) also contains more details about how to start programs automatically with Windows.

Step4 – Start the cycle

Start the 1st test run from within BurnInTest, with the Go button. At the end of the test period you have entered the PC will reboot according to the settings in Rebooter and after the reboot, BurnInTest will automatically re-start and do another test run, then Reboot again.

More about Rebooter

Rebooter is a small utility program developed by PassMark Software to help automate the PC hardware testing process. It has been designed to work with PassMark BurnInTest but will also work with 3rd party application. Rebooter allows you to,

- Shutdown, Reboot or Logout of a PC.

- Reboot a PC from the command line

- Set a timer so that the PC will reboot after a certain amount of time
- Setup a reboot loop, to reboot a PC over an over again in a cycle.
- Force a shutdown or request a shutdown.
- Enable and disable the Windows auto-login feature. (NT/2000/XP only)
- Include reboots into your hardware stress testing plan, (when used with BurnInTest).

Test Preferences – Tape

(Pro version only)

Tape drive

The tape drive ID can be entered into this field. Windows normally assigns the name of the tape drive. Typical names are TAPE0, TAPE1, etc..

File size and Number of files

The number of test files and the size of each file can be selected here. The size of the tape must be large enough to hold the files selected.

Option: Formatting

The formatting step tries to create a new partition on the tape. The size of the partition will depend on the tape drive in use. Some tape drives may not support this option as not all media types require this formatting step to be executed before the tape media is used.

Option: Locking

The locking step attempts to physically lock the tape in the drive, so that it can not be manually ejected during the test. Some tape drives may not support this option.

Option: Writing file marks

File marks are used to separate files on a tape. Normally a file mark is a short section of blank tape. Different tape drives support file marks that are different in length and content. File marks are not required to run this test as BurnInTest knows the exact length of each file written to the tape and thus has no need to be notified when the end of a file is reached. If you get filemark errors when running the tape test, turn this option off as your tape drive probably doesn't support the type of filemarks used by BurnInTest.

Drive info button

This window display information that has been extracted from the tape drive. It allows the user to see which features are supported by a particular tape drive. This window is really only intended for tape drive experts.

Media info button

This window display information that has been extracted from the tape drive and its current media. It allows the user to see some information about the media currently in the drive. This window is really only intended for tape drive experts.

Test Preferences – RAM

Standard Test

The standard memory test allocates RAM from the Windows operating system. BurnInTest then uses the virtual address range supply by Windows. Having RAM allocated in this way means that Windows can swap these RAM pages out to disk and generally move them around in physical memory. As BurnInTest accesses each memory page frequently during a test, this swapping does not happen very much in practice but it does create a small amount of uncertainty about what is actually being tested. Because of the limitations of the Windows virtual address space and fragmentation, only around 1GB of RAM can usually be tested using this method.

Advanced Test (Pro version only)

The advanced memory test directly allocates physical RAM and locks it down to avoid any inference from Windows. The memory allocated is effectively removed from the Windows operating system and can never be swapped or moved (until unlocked). It is still not possible to use all of the installed RAM, as Windows still needs to run. However this is a much better state of affairs as compared to the standard test. There is also a second advantage with the Advanced test. It can use, in theory, up to 64GB of RAM. The standard version of Windows2000 supports 4GB of RAM. Windows Advanced Server and Windows Data Center Server support 8GB and 64GB respectively.

The disadvantage of the Advanced memory test is two fold. Firstly it can only be used with Windows2000 and XP. Secondly you must manually assign an additional administrator right to lock pages in RAM.

Torture Test (Pro version only)

The torture test is a multi-process memory test. Multiple processes are started in their own virtual address space and each process allocates and tests a block of RAM. Disk swapping and the over-allocation of RAM can be tested using this method. The number of test processes to start and the percentage of total RAM that each process will use can be specified by the user.

Log memory allocations

Turning this option on will cause BurnInTest to log memory allocations (and de-allocations) into the detailed log file. This is mainly useful for debugging purposes. (Not applicable for the Torture test)

See also

Memory test description

Test Preferences – CPU

(Pro version only. Multi-CPU systems only)

CPU affinity

Normal task scheduling or CPU targeted testing can be selected here. Normal task scheduling will result in threads being dynamically scheduled on the CPU with the least load. In this way the load is spread between all available CPU's. CPU targeted testing schedules all the threads onto a particular CPU.

Note that CPU selection is only possible if more than one CPU is installed and the user has administrator access rights.

Even if CPU targeted testing is used some load can "spill" onto other CPU's. This is because system processes will still be allocated to other CPU's.

Test Preferences – Serial ports

(Pro version only)

Adding a serial port

To select a serial port for testing, select the COM port number from the right hand drop down list, select the test type, then click on the add button. Up to 12 ports can be selected for simultaneous testing.

Removing a serial port

To remove one or more a serial ports, select the COM port(s) from the left hand list then click on the remove button.

Serial port drop down list

The communications ports that will be used by the serial port test, eg COM1.

Test type

For each serial port it is possible t select either a "Detect and loopback test" or a "Detect only" test. The, Detect and loopback test, requires the use of serial port loopback plugsHID_LOOPBACK. The Detect only test does not require a loopback plug. When possible use the loopback test as it is a more though test.

Send and Receive timeouts

This is the amount of time in milliseconds that BurnInTest will wait for the successful completion of a Serial I/O operation.

Disable RTS/ CTS and DSR / DTR

The checkbox will disable the part of the serial port that checks that the signal pins are functioning correction.

RTS   = Request to send pin

CTS = Request to send pin

DSR = Data set ready pin

DTR = Data Terminal ready pin

This can be useful to avoid errors when testing non-standard serial ports.

Port speed

The communications speed or the cycling through the different speeds can be selected. Note that most serial ports do not support speeds above 115200bits/sec.

See also

See the serial port test for more details.

Test Preferences – Parallel ports

(Pro version only)

Parallel port

The communications port that will be used by the parallel port test, eg LPT1, LPT2 or LPT3 (only ports currently installed will be displayed). See the <u>parallel port test</u> for more details.

Only a single parallel port may be tested at one time.

Test type

It is possible t select either a "Detect and loopback test" or a "Detect only" test. The, detect and loopback test, requires the use of parallel port <u>loop back plug</u>. The, detect only, test does not require a loopback plug. When possible use the loopback test as it is a more though test.

Test Preferences – USB ports

(Pro version only)

Maximum number of USB ports

This is the maximum number of USB devices that BurnInTest attempts to connect to. In general you will want to set this value to be equal to the number of USB loopback devices that you would typically have connected to the machine. A maximum of 10 plugs may be used at the same time. If there are more plugs connected than configured in this section, USB ports will be tested based on the following: Ports with USB2 loopback plugs attached are first allocated for test (lowest device number to highest), followed by ports with USB1 loopback plugs attached (lowest device number to highest).

USB Loopback plugs detected

This is a list of the loopback plugs that have been detected as being connected to the PC. Examples are:

> PMUSB2-0: 480Mb/s (PASSMARK USB2Test, Serial #:PMK5C0KV, V2)
> PMUSB2-1: 12Mb/s (PASSMARK USB2Test, Serial #:PMK5C0SD, V2)
> PMUSB1-0: 12Mb/s (USB Loopback plug, Serial #:PM29K8PH)

PMUSBn-m specifies whether the USB port has a Passmark USB loopback plug connected to it, where n specifies whether the plug is a USB1 or USB2 loopback plug, and m specifies the device number. The device number is just a sequential number (for USB1 and separately for USB2) which is incremented for each plug connected.

The maximum speed supported by the connected protocol for this Port is then displayed Note: (1) that the 2nd port in the list has a USB2 loopback plug attached, but the port only supports USB1 and hence only the lower maximum speed of 12Mb/s is available and displayed. (2) This is not a benchmarked speed, but based on the protocol the plug has been able to connect to the PC with. *(3) Benchmarking speed can be undertaken using the USB2Test software.*

The text after the Maximum Speed is the description of the device that was found in the memory of the plug. This text will normally be, " USB Loopback plug " for a USB1 loopback device and "PASSMARK USB2Test" for a USB2 loopback plug.

The serial number is a unique identification number that is different for each plug. A typical serial number would be, " PMK5C0KV ". This unique serial number is stored in the plug.

For USB2 loopback plugs, the Version of the firmware is then displayed.

See the USB port test for more details.

USB Transmission timeout

Only applies to the USB1 loopback plug.
The user may specify the transmission timeout (in milliseconds). If a reply hasn't been received after this time, an error will be logged.

Test Preferences – 2D Graphics

(Pro version only)

There are three options available for 2D video testing in the professional version of the software.

Video Memory testing

The user can test the video RAM by writing and reading data to and from the RAM on the video card. See Video adapter memory testing for more details.

2D display functions

Tests of standard two dimensional graphical functions

EMC testing

Monitor EMC testing

Test Preferences – Maths

Select maths tests

Using the check boxes it is possible to select which maths tests will be performed and which ones will be skipped. See the maths test for more details.

Select SIMD tests

Using the check boxes it is possible to select which Single Instruction Multiple Data (SIMD) tests are performed and which ones will be skipped. See the MMX /SSE test for more details.

Setting the Lock Pages in Memory right
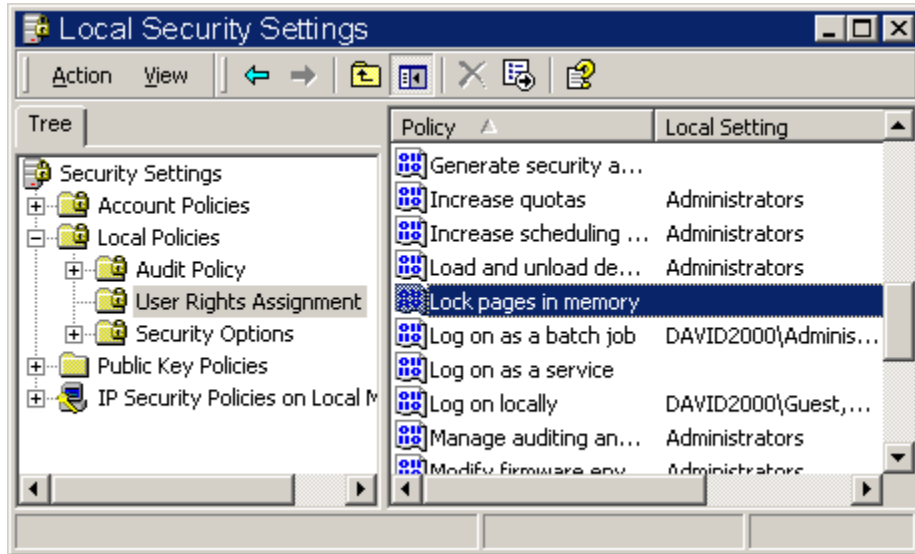
To use the advanced RAM test, the user needs to be logged in as the administrator and have the "Lock pages in memory" right. This right is turned off by default when Windows is installed. To turn it on you need to be logged in as the administrator and complete the following steps.

1/ Open the Windows control panel.

2/ Open the "Administrative Tools" window from the control panel and then open the "Local Security Policy" utility. This should open a new window called. "Local Security Settings".

3/ In the left hand section of the window, click on the "User Rights Assignment", folder. This folder can be found under the "Local Policies" folder.

4/ In the right hand section of the window find the "Lock pages in memory" policy. Then select "Action / Security" from the menu to display the "Local security Policy Setting" window. (In Windows XP, the menu option is now called "Properties" instead of "Security").

5/ Use the add button to assign the right to the administrator. The "Local Policy Setting" check box should now be checked. Click on OK to close the window. (In Windows XP, this is slightly more complex and you will probably need the "Advanced" button to search for users to add).

6/ You now need to log off and log back on (or reboot your machine) for this new setting to take effect.

If you check back in the "Local Security Policy" utility after you login you should now see that the Administrator has "Effective rights" to lock pages in memory.

Note1: This function is only available in Windows 2000 and XP Professional, (but not XP home).

Note2: Windows XP security can be a complex thing. If you have a problem after following this procedure and rebooting, set the "Lock pages in memory" right to "Everyone" and try again.

Scripting

BurnInTest includes a simple scripting language that allows tests to be executed in a sequence.

A PASS/FAIL indication for all of the tests included in the script can be displayed at the end of the scripted test run. To achieve this you should select "Accumulate logs until manually cleared" from the Logging Preferences and results should be cleared before or at the start of the scripted test run.

Script files are ASCII text files that you can create with a text editor (e.g. notepad). The file name must end with the extension '.bits'. To start a script use the 'Test / Execute script' menu item.

Each script command must appear on its own line in the text file and the entire command must appear on a single line. (i.e. a single command can not be split across multiple lines).

The command and its parameters must be separated by one or more spaces.

Comments can be included by starting the line with the '#' character.

The following commands are available in the current version of the software

RUN COMMAND

Syntax:

> RUN   <Test Name>

Parameters:

> <Test Name>   See below for a list of all test names.

Examples:

> #Run the CD test with the current settings
>
> RUN CD
>
> #Run all the tests in the current configuration simultaneously
>
> RUN CONFIG

LOAD COMMAND

Syntax:

> LOAD   <File name>

Parameters:

> <File name>   The full path name to a configuration file. This configuration file must have been previously created from within BurnInTest. A partial path name can be used to load a configuration file from the current directory. A loaded configuration file will over write all preferences currently selected.

Examples:

> #Load the low load configuration file that we created earlier
>
> LOAD "C:\ConfigurationFiles\LowLoad.cfg"

MESSAGE COMMAND

Syntax:

> MESSAGE   <Message Text>

Parameters:

> < Message Text >   A single line of text that will be displayed in a window with an OK button. The user must click on the OK button to continue with the script.

Examples:

MESSAGE "Insert the test disc into the DVD drive then click on OK to proceed with the test"

SLEEP COMMAND

Syntax:

SLEEP   <Delay period>

Parameters:

< Delay period >   An integer that represents the number of milliseconds to pause before continuing with the next command in the script..

Examples:

#Pause 2 seconds

SLEEP 2000

SETDURATION COMMAND

Syntax:

SETDURATION   <Duration>

Parameters:

<Duration>   Sets the test duration in minutes. Using this command is the same as changing the auto-stop period from the preferences window.

Examples:

#Set the test duration to 90 seconds

SETDURATION   1.5

SETCYCLES COMMAND

Syntax:

SETCYCLES <Number of test cycles>

Parameters:

< Number of test cycles >   Sets the number of test cycles that will lead to an automatic stopping of the test runs after all selected tests have reached or exceeded this number of test cycles. Using this command is the same as changing the auto-stop number of cycles from the preferences window.

Example 1:

#Set the number of test cycles to 1

SETCYCLES 1

Example : Run each test one cycle in series.

SETCYCLES 1

SETDURATION 0

LOG "Run Maths Test"

RUN MATHS

LOG "Run MMX Test"

RUN MMX

Etc…

NOTE: Automatic stopping after a set number of test cycles is only supported in the licensed version of BurnInTest.

SETDUTYCYCLE COMMAND

Syntax:

SETDUTYCYCLE   <Test Name>   <Duty setting>

Parameters:

<Test Name>   See below for a list of all test names.

<Duty setting>   Sets the duty cycle for the specified test to the value specified. Values must be between 1 and 100. Using this command is the same as changing the duty cycle value from the Test duty cycle window.

Examples:

#Set the disk test to maximum load

SETDUTYCYCLE   DISK   100

#Set the CPU test to medium   load

SETDUTYCYCLE   DISK   65

<Test Name> Parameter

The test name parameter can takes the following values. The first value "CONFIG" is special because it does not refer to the name of an individual test. When used with the RUN command it causes all tests in the current configuration file to be started simultaneously.

CONFIG

MATHS

MMX

CD

DISK

MEMORY

NETWORK

PARALLEL

PRINTER

SERIAL

SOUND

TAPE

USB

2D

3D

VIDEO

Example

#Load my preferred test configuration

LOAD "MyConfiguration1.cfg"

#Override the test duration for all tests

SETDURATION 60

MESSAGE "Click on OK to start test run"

RUN MATHS

MESSAGE "Insert test discs into both the CD and DVD drive"

RUN CD

#Load my preferred test configuration for disk testing

LOAD "MyDiskConfig.cfg"

RUN CONFIG

EXECUTE COMMAND

Overview:

Executes an external file and continues processing the script.

Syntax:

EXECUTE <Filename> <Parameters>

Parameters:

Filename	The name of the file to execute. The file name must be enclosed in double quotes (""). The file must be an executable.
Parameters	Any command line parameters which you wish to pass to your executable. If any of these parameters are filenames, you should enclose them in double quotes ("")

Examples:

#Start up Notepad with some results before starting tests.

EXECUTE "c:\winnt\system32\notepad.exe" "c:\MyResults\Results.txt"

RUN CONFIG

EXECUTEWAIT COMMAND

Overview:

Runs an executable file and waits for that process to finish before continuing to process the script.

Syntax:

EXECUTE <Filename> <Parameters>

Parameters:

Filename	The name of the file to execute. The file name must be enclosed in double quotes (""). The file must be an executable.
Parameters	Any command line parameters which you wish to pass to your executable. If any of these parameters are filenames, you should enclose them in double quotes ("")

Examples:

#Start up Notepad with some results before starting tests.

EXECUTEWAIT "c:\winnt\system32\notepad.exe" "c:\MyResults\Results.txt"

RUN CONFIG

LOG COMMAND

Overview:

Writes text to the detailed error and status log history.

Syntax:

LOG <Text>

Parameters:

Text   The text to be added to the detailed error and status log history.

Examples:

#Start an S1 sleep and log the start and stop times

LOG "Sleep S1 Duration 60 seconds starting"

EXECUTEWAIT SLEEPER -S1 -D 60

LOG "Sleep S1 Duration 60seconds complete"

REBOOT and REBOOTEND COMMAND

Note: These commands should only be used where multiple reboots within one script are required. The commands are designed in such a way that they ONLY make sense in the following context…

BurnInTest must be launched automatically at start up using a shortcut to bit.exe in the StartUp directory. The shortcut must use the /s command line parameter to automatically run the script, which contains the REBOOT command. So if, for example the script file containing the REBOOT command was called 'Reboot.bits', then the command line 'Target' of the shortcut would look something like

"C:\Program Files\BurnInTest\bit.exe" /s Reboot.bits

These commands require that the Rebooter application is present in the BurnInTest application directory. Any reboots occurring as a result of these commands will use the current Rebooter settings.

Overview:

REBOOT reboots the computer. After the computer boots up, and BurnInTest restarts, the script will continue to execute at the line following the REBOOT command.

REBOOTEND reboots the computer. After the computer boots up, BurnInTest will restart, but the script will no longer continue to execute.

Example:

MESSAGE "Run some 3D tests"

RUN 3D

MESSAGE "Reboot for the first time"

REBOOT

MESSAGE "Run some 2D tests"

RUN 2D

MESSAGE "Reboot for the second time"

REBOOT

MESSAGE "And now one final reboot"

REBOOTEND

MESSAGE "This message will never be displayed"

Note: It is recommended to use "Accumulate logs" when using REBOOT and REBOOTEND.

What is S.M.A.R.T?

S.M.A.R.T. (Self-Monitoring Analysis and Reporting Technology) is an interface between the BIOS and a computers hard disk. It is a feature of the Enhanced Integrated Drive Electronics (**EIDE**) technology that controls access to the hard drive. If S.M.A.R.T is enabled when a computer is set up, the BIOS can receive analytical information from the hard drive and determine whether to send the user a warning message about possible future failure of the hard drive.

S.M.A.R.T monitors a set of drive attributes, such as temperature, throughput performance and the number of hours the drive has been powered on. It compares these attributes to a corresponding set of thresholds. If an attribute drops below its threshold, the drive is no longer considered fit for use and should be replaced immediately. Not all attributes are available on all drives, however - it is the responsibility of the drive manufacturer to include S.M.A.R.T support.

Some of the more common S.M.A.R.T attributes are listed here.

Raw Read Error Rate
Represents the rate of uncorrected read errors. An error condition indicates that there is a problem with either disk surface or read/write heads.

Throughput Performance
Represents the throughput performance of the drive. I.e. The speed at which the drive is reading and writing data.

Spin Up Time
Represents the average amount of time required to spin up the drive spindle to operational speed from a stopped state.

Start/Stop Count
Represents the number of start/stop cycles for the drive. The drive being powered on/off or suspended/woken up are considered as start/stop cycles.

Reallocated Sector Count
Represents the amount of spare sector pool available. Spare sectors are used to replace sectors that became bad for some reason (for instance, if a read error occurs). Therefore the more sectors reallocated, the worse the condition of the drive.

Seek Error Rate
Represents the number of seek errors. Each time the drive attempts a seek operation, but fails to position its head correctly, the seek error rate increases.

Seek Time Performance
Represents how efficiently the drive is performing seek operations. An error indicates problems with the drive subsystem, for instance the servo responsible for positioning the head.

Spin Retry Count
Represents the number of times a drive fails to spin its spindle up to operation speed on the first attempt.

Calibration Retry Count
Calibration is the act of repositioning the drive read/write head to cylinder 0. This value represents the number of times a calibration has failed on the first attempt.

Reallocation Event Count
Represents the number of reallocation events, which have taken place. Sometimes multiple sectors are reallocated together – this corresponds to one reallocation event. (See also: *Reallocated Sector Count* and

Current Pending Sector Count).

Current Pending Sector Count
Represents the number of sectors currently pending reallocation.

Offline Scan Incorrect Sector Count
Represents the amount of errors detected during the last offline scan.

Ultra ATA CRC Error Count
Represents the number of CRC error found in the Ultra DMA high-speed transfer mode. (CRC stands for Cyclic Redundancy Check and is data verification algorithm which uses polynomial checksums).

Write Error Count
Represents the rate of uncorrected write errors. An error indicates that there is a problem with either disk surface or read/write heads.