



## The Hardware Reviewer's Guide for 3DMark®03

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### Introduction

This manual is an in-depth guide for the professional hardware reviewer in using 3DMark03. It helps you understand the 3DMark03 benchmark result and it will also help you to properly setup consistent benchmark runs and avoid pitfalls in today's changed benchmarking landscape.

It is very important that consumer who read hardware reviews can trust the benchmark numbers. Being the publisher of the world's most popular benchmarking software, we want to make sure that you have all the information and tools at your disposal that enable you to obtain those trusted results.

On November 11th 2003, Futuremark released a new build for 3DMark03. We also maintain a list of approved drivers for benchmarking with 3DMark03 Build 340 on our web site (<http://www.futuremark.com/community/drivers/?approved>).

These actions were necessary because various 3DMark03 specific optimizations were found in some graphics card drivers. These 3DMark03 specific optimizations in drivers invalidate the results. Futuremark wants to make sure that you can continue to use our product and know that you can trust the results you will get.

### Preparation

Before going to the actual testing procedures, please do the following:

- Download and install 3DMark03 Build 340 (<http://www.futuremark.com/download/>).
- Download and install any suitable graphic card drivers, which have been approved to be used with 3DMark03 Build 340 (<http://www.futuremark.com/community/drivers/?approved>)  
IMPORTANT: Do not use any other drivers than those listed, since otherwise we cannot guarantee the comparability of results.

You can get a valid and comparable 3DMark03 result only by using the combination of 3DMark03 Build 340 and approved drivers. Results gained with any other drivers, or versions of 3DMark03 are not valid and it is not allowed to publish those results.

In any case of uncertainty, please contact Futuremark before publishing any 3DMark03 results.

### Basic Testing Procedure

Please follow these steps to run the benchmark:

1. Make sure that you have installed all the latest drivers including DirectX9.0b, motherboard chipset drivers and sound card drivers.
2. Restart the computer before running the benchmark and after making any driver/hardware changes.
3. Set all your display properties settings to "Application Specific" under Direct3D. That includes any LOD Bias settings, filter settings, or any other image quality altering settings. The only exception is V-Sync. During all tests, 3DMark03 will instruct the graphics adapter drivers to disable V-Sync OFF. However, some driver revisions and older pieces of hardware will ignore such instructions. We therefore recommend that users make additional checks to guarantee that V-Sync is disabled.



4. Close any open applications, background programs and automated tasks such as antivirus utilities, email software, online chat applications etc. Some applications in the background might cause the benchmark to stall for a short moment, which may affect the result.
5. Repeat each test at least three times. When using the 3DMark test repeat functionality, each test is repeated the set amount of times and the given result is the average of the repetitions. This will help to ensure that the effect that any anomalous result has on the final result is kept to a minimum.
6. Do not attempt to initiate any other system activity while 3DMark03 is running. If you do, the program may exit or the result may be affected.
7. Always use the exact same system when comparing various graphics cards.

## Additional Testing Recommendations

These measures help to ensure that your results are consistent.

1. Compare hardware and detailed settings only by running benchmarks on "clean" systems. This can be done using applications (such as Norton Ghost <http://www.ghost.com/>) that can restore a system configuration to an exact format for each testing run.
2. Disable the System Restore feature on Windows ME, Windows 2000 and Windows XP. For more detailed information about System Restore, please refer to the Microsoft Knowledge Base article Q267951 (<http://support.microsoft.com/support/kb/articles/Q267/9/51.ASP>).
3. Disable any networking connections and file sharing. Any network activity is likely to affect the tested system and its performance.
4. It is highly recommended that you only use the latest official version of DirectX. Please note that no beta versions of DirectX are supported by Futuremark. You can find the latest DirectX version for your operating system at <http://www.microsoft.com/directx/>.
5. Make sure you have all the latest updates installed for your operating system. Use the "Windows Update" from your operating system start menu for more information.

## Using Image Quality Enhancing Features

If you want to run a benchmark run using Anisotropic Filtering and/or Anti-Aliasing, please only use the settings found within 3DMark03. That way you can be sure that the correct type of filtering and/or Anti-Aliasing will be applied. It is recommended to verify that the selected type of filtering and/or Anti-Aliasing actually was in use.

**IMPORTANT:** In the driver's control panel, set the display adapter's AF & AA properties to "Application Specific" or similar.

## Publishing Results

Only those 3DMark scores obtained with 3DMark03 build 340 and approved graphic card drivers are valid scores. They may be published according to the rules and requirements found in the software's end user license agreement.

Generally, you will need to identify the exact system setup that was used for benchmarking. This is important so that your readers – and other benchmarkers – can replicate the results if they want. This adds a great deal of credibility to your review.

Especially, the exact driver version, with which the scores have been obtained, must be clearly presented in conjunction with the score. It is also recommended to clearly point out if any of the graphic cards have been overclocked!



We also offer a nifty free service to you that many reviewers have already found very useful: Submit the result to the Online ResultBrowser, and provide your readers with a compare URL. If the review/article includes more than one result, using the MultiCompare feature in the Online ResultBrowser may be very useful. For more detailed information about the MultiCompare, go here [http://service.futuremark.com/servlet/Index?pageid=/orb/multicompare\\_help](http://service.futuremark.com/servlet/Index?pageid=/orb/multicompare_help)

Please refer to the license agreement for more detailed information about publishing results. There are situations when for example new unannounced hardware is in for preview, and the manufacturer has shipped non-public drivers with the package. In that situation it is not allowed to post 3DMark03 results unless Futuremark has approved the use of those specific drivers. Please contact Futuremark if you receive new hardware for review with beta/unofficial non-WHQL drivers and want to publish 3DMark03 results.

## Default Settings

In order to keep the reported scores comparable, we highly recommend that the default setting is used for baseline results (1024x768, etc) in addition to the possible other reported results. Referring to the default settings will make comprehending the results easier for the mainstream end users who run 3DMark03 in their own systems. Please make sure that image-enhancing features such as Anti-Aliasing, or Anisotropic Filtering are not forced on.

## Image Quality Comparison Tool

3DMark03 has a very useful image capture system built in for extensive image quality comparisons. This feature is available for Pro users only. The system can render any frame from any tests, or a sequence from any test. The images are stored into your 3DMark03/iq folder as frame based numbered .bmp files. We also have available online all rendered frames from all game tests using the Reference Rasterizer. By comparing the image rendered with the hardware and the Reference Rasterizer, you can easily spot any possible rendering anomalies/differences. It is highly recommended to include in any public presentation at least 1 frame from each game test, and the same frame rendered by the Reference Rasterizer for comparison.

## Texture Filtering Test Tool

3DMark03 ships also with a Filtering Test, from which any Pro user can view and study the graphic cards' filtering capabilities. It is again important to have the graphic card drivers' settings at "default", and only use the settings found in the Filtering Test tool.

More information about the Image Quality Tool and Filtering Tool can be found on 3DMark03 Whitepaper ([http://www.futuremark.com/companyinfo/3dmark03\\_whitepaper.pdf](http://www.futuremark.com/companyinfo/3dmark03_whitepaper.pdf)).

## Screen shots

You can easily take screen shots for publishing or comparison by pressing F12 at any time when running any part of the program. All screenshots are automatically captured and stored into your 3DMark03/shots folder as sequentially numbered .bmp files.

NOTE: Taking a screenshot during a benchmark run affects your test result by a temporary performance drop. Therefore the result of the current test will be discarded, when you take a screenshot.

## CPU Tests

3DMark03 comes with two separate CPU tests. When comparing CPUs, it is important to keep the graphics card and drivers the same. For example: If you want to compare AMD Athlon +3200 vs. Intel Pentium 4 3.2GHz, please use the same graphics card & drivers in the two different systems. Otherwise the graphics card performance may affect the CPU score, which invalidates any comparability.



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## More Information

We have published an extensive 3DMark03 whitepaper. It contains detailed descriptions of each test and documents the scoring methodology. The whitepaper is available at our web site: [http://www.futuremark.com/companyinfo/3dmark03\\_whitepaper.pdf](http://www.futuremark.com/companyinfo/3dmark03_whitepaper.pdf)

## Any Questions?

If you have any questions about the 3DMark03 Usage Guidelines, or need more information about of anything of the above, please contact us at:

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