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hyperI/O LLC

**hIOmon™**

Disk I/O Ranger

Version 7.0.229.0 (March 2012)

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\*\*\*\* hIOmon ReadMe File \*\*\*\*

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## NOTICE !

The "Late-breaking news" section contains information that might affect the installation and use of the hIOmon software product.

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# 1. INTRODUCTION

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## 1.1 PURPOSE OF THIS README FILE

This ReadMe file provides a brief product description and operation overview, installation instructions, support information, and software release notes for the hIOmon™ Disk I/O Ranger software product from hyperI/O LLC.

To print this ReadMe file, choose the Print command usually found under the File menu.

## 1.2 DISTRIBUTION AND USE POLICY

Please read the hyperI/O LLC Software License Agreement (EUSLA) for the conditions and terms associated with the use (including installing and copying) of the hIOmon software product from hyperI/O LLC. The EUSLA can be found in the “license.pdf” document file; the “license.pdf” along with the “license.rtf” and “license.txt” document files (which are all equivalent in content) are copied to the installation directory as part of the hIOmon software installation process. The “license.pdf” can be found within the “Documents” directory.

Do not use hIOmon software until you have carefully read this EUSLA. Copying, installing, or otherwise using the hIOmon software indicates that you have read, understand and accept this EUSLA and agree to be bound by all of the terms of this EUSLA. If you do not accept this EUSLA, do not copy, install or otherwise use the hIOmon software.

## 1.3 PRODUCT DESCRIPTION

### Overview

hIOmon is an innovative, unique performance analysis software tool that enables disk I/O

operations and their performance to be both measured and monitored up at the application level upon a specific, individual file (as well as disk and process/application) basis. It can examine and efficiently record the activity and performance of the file (and device) I/O operations associated with user-selected files and devices.

The hIOmon “Disk I/O Ranger” software enables you to collect “Performance Threshold Range Metrics” upon an individual logical device, physical device, file, and process/application basis during the normal, everyday use of your computer system. The hIOmon “Disk I/O Ranger Display” application can be used to display and export these metrics in real-time.

The hIOmon "Disk I/O Ranger Display" application is run as a Microsoft® Windows® HTML Application (HTA). The metrics displayed are those **currently** collected by the hIOmon I/O Monitor, which must be properly configured to collect the particular types of metrics displayed by the hIOmon "Disk I/O Ranger Display" application.

## Features

The many features provided by hIOmon Disk I/O Ranger include:

- **Individual application/process, disk, and file-level perspectives.**
- **Specific file and device selection.**
- **Raw device support (with a “Physical Device Extended Metrics” option).**
- **Essential I/O performance statistics - at the individual file level, including the hIOmon “Performance Threshold Range Metrics” and “DataTransferred/Time Index (DXTI)” metric along with sequential detection!**
- **Summarized file I/O performance metrics available on a specific process basis.**
- **Automatically summarized performance metrics - no collection nor post-processing of I/O operation trace information required!**
- **Easy-to-use with a simple windows-type GUI display interface.**
- **Export capability (including selectable export field options).**
- **Configurable display and setup options.**
- **“Code-signed” (i.e., digitally-signed) installation files and kernel-mode component.**
- **Extensive help information.**

Please refer to the “hIOmon Disk I/O Ranger User Guide” document (HMG-1094) for more information about the many features listed above. The document is included in the “Documents” directory as “hIOmonDIORUserGuide.pdf”.

## Uses

You can easily use the powerful features of hIOmon to quickly and effectively handle such tasks as:

- **Identify files/devices with poor I/O performance.**

As the first step in analyzing performance problems with key applications, you can quickly use hIOmon to determine if the associated files are experiencing poor I/O operation performance (and to exactly what extent if so); you can even get summarized file I/O operation performance metrics upon a specific process basis.

- **Impact of system changes upon file and device I/O performance.**

hIOmon allows you to determine the actual impact (with precise measurements as evidence) of changes within the computer system (such as the addition, replacement, or modification of: disk subsystems, computer memory, file systems, processors, operating systems, etc.).

- **Product/system comparisons, particularly amongst vendors.**

Without having to rely only upon benchmarks (and needing to correlate how closely these benchmarks match your particular applications), hIOmon allows you to use your actual applications and associated files just as you normally would with the products and/or systems that you want to compare (such as different disk subsystems, servers, etc., perhaps from different vendors) to see their effect on (even specific) file and device I/O operation performance.

- **Monitor and confirm Quality of Service (QoS) for file and device I/O performance.**

hIOmon allows you to (independently) monitor the actual I/O operation activity of your (specific) files and devices; you can easily confirm whether these files and devices are meeting your expectations as regards I/O performance.

- **Development and support aid**

For a broad range of developers and "troubleshooters" (including application developers concerned about file and device I/O performance; file system and device driver developers; disk subsystem developers; etc. - as well as for all of the respective associated support personnel), hIOmon provides an easy way of seeing exactly what (of interest) is happening in the file and device I/O activity.

With all of its features and benefits, hIOmon is “The I/O Speedometer and Odometer for your Files, Devices, and Applications”™ and is the essential tool required to help you qualify, validate, maintain and monitor the I/O operation performance of your files and devices.

Please send questions or comments about hIOmon to [hIOmonSupportInfo@hyperIO.com](mailto:hIOmonSupportInfo@hyperIO.com).

## **Architecture**

hIOmon Disk I/O Ranger features a very flexible and scalable architecture. It is comprised of the following three (3) main components:

### **Disk I/O Ranger Display Application**

The hIOmon "Disk I/O Ranger Display" is a Microsoft Windows HTML Application (HTA) that provides a standard windows-type graphical user interface (GUI). This GUI communicates with the hIOmon Manager to set the various control options of the hIOmon I/O Monitor (such as which particular files/devices are to be monitored and the particular types of I/O operation performance metrics to be collected). The "Disk I/O Ranger Display" is also used to display the collected file and device I/O operation performance statistics in real-time.

### **Manager**

The hIOmon "Manager" runs as an operating-system service (daemon). It manages the hIOmon "I/O Monitor" component (largely based upon control option requests from or set by the hIOmon "Disk I/O Ranger Display" application); it also transforms, records, and transfers the collected file and device I/O operation performance metrics to the "Disk I/O Ranger Display". The hIOmon "Manager" allows the "I/O Monitor" to be much more simpler, faster and efficient in operation.

### **I/O Monitor**

The hIOmon "I/O Monitor" is a lightweight component that performs the actual monitoring of the selected I/O operations; based upon such monitoring, it collects the requested I/O operation performance metrics. The "I/O Monitor" is very efficient and introduces negligible overhead into the overall file and device I/O operation (especially when compared to the time durations of I/O operations); moreover, the “I/O Monitor” does not require any file system modifications nor does it require any operating system code changes (nor application or file changes).

The hIOmon Disk I/O Ranger software also includes a hIOmon “WMI Support DLL” component (that provides Windows Management Instrumentation support for the hIOmon "Disk I/O Ranger Display” application) along with a hIOmon “Client Communication DLL” (that acts as an interface between the hIOmon Manager and the hIOmon WMI support components).

## 1.4 OPERATING SYSTEMS AND ASSOCIATED SOFTWARE

### System requirements

Note: See the "Late-breaking news" section for more information on using and configuring the product in the Windows 7, Windows Vista, Windows XP, Windows Server 2003 and Windows Server 2008 operating system environments.

The hIOmon software has the following minimum system requirements:

- IBM PC (or 100% compatible);
- 10 MB (megabytes) or more of free hard disk space for the hIOmon software components at installation.
- Microsoft Windows 7/Vista/XP (Final Release or above) or Windows Server 2003/2008/2008R2 (Final Release or above).
- The Windows Management Instrumentation (WMI) Core 1.5 software package is required for the hIOmon "WMI Support". This WMI core software package is already installed by default on Windows 7/Vista/XP/2003/2008. Internet Explorer version 5.5 or higher is required for use of the hIOmon "Disk I/O Ranger Display" application.
- The Microsoft Visual C++ Runtime Libraries. Note that these libraries are automatically be installed as part of the hIOmon software installation process.
- Pentium® 233 MHz or faster processor;
- 64MB or more RAM (Windows XP), 128MB or more RAM (Windows Server 2003), 512MB or more RAM (Windows 7/Vista/2008).

### Components

The hIOmon software contains the following principal components:

- Installer software –  
Installs all of the other software files.
- hIOmon Manager -  
Runs as an operating-system service (or daemon). It is used to manage the hIOmon I/O Monitor (largely based upon control option requests received from the hIOmon "Disk I/O Ranger Display" application). It also transforms and transfers the collected file and device I/O operation performance metrics to the hIOmon "Disk I/O Ranger Display" application.

- hIOmon I/O Monitor -  
Performs the actual monitoring of the selected file and device I/O operations; implemented as a "filter device driver" under Windows 7/Vista/XP/2003/2008.
- hIOmon Windows Management Instrumentation (WMI) Support DLL -  
A "WMI Support DLL" that provides the support required to interface with Windows Management Instrumentation (WMI).
- hIOmon Disk I/O Ranger Display -  
Enables the real-time display and export of the hIOmon "Performance Threshold Range Metrics" for an individual device, file, or process; these metrics are a selected set of automatically-summarized I/O operation performance metrics that are specifically focused upon the ranges of I/O operations per second (IOPS), megabytes-per-second (MB/s) data transfer rates, response times, and I/O operation queue depths/lengths actually observed by the hIOmon I/O Monitor for individual files, devices, and processes.
- hIOmon Service Install -  
A utility program used to complete the load/unloading of the hIOmon Manager and hIOmon I/O Monitor service/driver programs.

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## 2. LATE-BREAKING NEWS

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This section contains information that might impact the installation and use of the hIOmon product. It also includes a brief description of new features incorporated in the latest version of hIOmon.

**NOTE:** All released hIOmon version components are General Availability (GA) versions of hIOmon. If you encounter any errors or difficulties, please let us know by contacting hyperI/O LLC Technical Support (see section 6 for contact information).

### 2.1 NEW FEATURES

Version 7.0.229.0 of the hIOmon Disk I/O Ranger software introduces the new standalone hIOmon "Disk I/O Ranger Display" application, which is now available within its own integrated hIOmon software package that is separate from the hIOmon "I/O Performance Monitor" software product. The hIOmon "Disk I/O Ranger Display" is an HTML application that enables the real-time display and export of the hIOmon "Performance Threshold Range Metrics" for an individual device, file, or process.

The "Performance Threshold Range Metrics" are a selected set of summarized I/O operation performance metrics that are specifically focused upon the ranges of I/O operations per second (IOPS), megabytes-per-second (MB/s) data transfer rates, response times, and I/O operation

queue depths/lengths actually observed by the hIOMon I/O Monitor for individual files, devices, and processes. These metrics are automatically included within the summarized I/O operation performance information that can be collected by the hIOMon I/O Monitor.

Please note that the hIOMon “Performance Threshold Range Metrics” reflect the actual I/O operation activity observed by the hIOMon I/O Monitor. For instance, the “IOPS < 100” Range Count for read I/O operations reflects the number of one-second intervals during which the hIOMon I/O Monitor actually observed a total number of monitored read I/O operations that was less than 100 read I/O operations.

Similarly, the “MBS 100 < 200” Range Count for write I/O operations reflects the number of one-second intervals during which the hIOMon I/O Monitor actually observed a total amount of data transferred by write I/O operations that was 100 000 000 bytes (i.e., 100 megabytes) or more, but less than 200 000 000 bytes (i.e., 200 megabytes).

The hIOMon “Performance Threshold Range Metrics” provide a quick and easy way to assess the **actual** “speeds and feeds” I/O performance of your particular files, devices and applications in everyday, normal usage! And the hIOMon “Disk I/O Ranger Display” provides a quick and easy way to display and export these metrics!

This version also includes the hIOMon “DataTransferred/Time Index (DXTI)” metric, which provides a “high-level” means for a relative comparison of I/O operation performance, where “higher is better” (i.e., the higher the Index number, the better the performance). This Index metric is provided upon an individual file, device, and process/application basis; it resembles the “fuel economy” index for an automotive vehicle (i.e., “miles-per-gallon” or “kilometres/litre”) as an overall measure of “performance efficiency”.

The new hIOMon “DataTransferred/Time Index” metric can be displayed and exported by the hIOMon Disk I/O Ranger Display application.

Please refer to the “hIOMon Disk I/O Ranger User Guide” (HMG-1094) for additional details about this new release of the hIOMon Disk I/O Ranger software package.

Also please be sure to read the “Hints and Issues” section 4 below for additional suggestions about using the hIOMon software.

## **2.2 KNOWN PROBLEMS**

None to report at this time. Please report any problems to hyperI/O LLC (see section 6 for contact information).

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### **3. OPERATION**

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#### **3.1 GETTING STARTED**

Once you have completed the installation of the hIOmon software, you can perform a simple set of basic steps to start using hIOmon. Please refer to the steps described within the “Getting Started” section of the “hIOmon Disk I/O Ranger User Guide” (HMG-1094), which is included within the “Documents” directory as “hIOmonDIORUserGuide.pdf”.

#### **3.2 DISK I/O RANGER CONTROL AND DISPLAY DESCRIPTIONS**

As an HTML-application, the hIOmon "Disk I/O Ranger Display" application provides an easy-to-use method of controlling the overall operation of hIOmon and displaying, in a clear and organized fashion, the collected file and device I/O operation performance information. It supports a “real-time” display mode.

Please refer to the “hIOmon Disk I/O Ranger User Guide” (HMG-1094), which is included in the “Documents” directory as “hIOmonDIORUserGuide.pdf”, for a complete description of the various Disk I/O Ranger Display control commands and display features.

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### **4. HINTS AND ISSUES**

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#### **4.1 HINTS**

The hIOmon Disk I/O Ranger software allows you to take a “top-down” approach to analyzing, evaluating, and understanding the actual I/O operation performance of your particular files, devices, and processes/applications of interest. This approach enables you to empirically view the file and device I/O operation performance of your particular system from an overall perspective, and moreover using your own specific system as you normally do.

Please visit the hyperI/O LLC website for the latest “hIOmon Best Practices” information.

#### **4.2 SOFTWARE ISSUES**

None to report.

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## 5. INSTALLATION

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This section contains instructions for installing the hIOMon software under Windows 7, Windows Vista, Windows XP, Windows Server 2003, and Windows Server 2008.

NOTE: The hIOMon Manager and hIOMon I/O Monitor components support Windows 7, Windows Vista, Windows XP, Windows Server 2003, and Windows Server 2008.

See the "Hints and issues" section to solve issues that might occur when installing the software.

### 5.1 INSTALLATION NOTES: ALL MICROSOFT(R) WINDOWS PLATFORMS

The hIOMon Installer software makes use of the Microsoft Windows Installer to perform the basic installation of the hIOMon software. The hIOMon Installer software will automatically install the proper version of the Windows Installer if the Windows Installer is not found (in which case the computer system might require a reboot).

### 5.2 INSTALLATION INSTRUCTIONS: WINDOWS 7/Vista/XP/2003/2008

To install the hIOMon software on Windows 7/Vista/XP/2003/2008:

1. If the "New Hardware Found" screen has opened, click Cancel.
2. Quit all open programs.
3. If you are installing from a CD-ROM, insert the hIOMon CD-ROM into the CD-ROM drive (usually D). When the welcome screen opens, follow the instructions on the screen. If the welcome screen does not open, click Start, and then Run. Type X:Setup, replacing "X" with the letter of your drive, and click OK.

If you are installing the downloaded version of the hIOMon software, click Start and then Run. Open the "setup.exe" file that is located within the directory containing the downloaded hIOMon software (NOTE that you must first extract/unzip the downloaded hIOMon software). When the welcome screen opens, follow the instructions on the screen.

**NOTE:** To install the software on Windows 7/Vista/XP/2003/2008, you must log on with administrator privileges. Also note that the hIOMon software installation files are "code-signed" (i.e., digitally-signed), which ensures that these files came from hyperI/O LLC and protects them from alteration after publication by hyperI/O LLC. Finally note that if you had previously uninstalled the hIOMon software but **not yet restarted** the machine, then you must reboot the machine before attempting to re-install the hIOMon

software.

4. Follow the instructions on the screen. When you are prompted for a **serial number**, please be sure to correctly enter the serial number from the CD-ROM label (or the serial number that you obtained from hyperI/O LLC if you are installing the downloaded version of the hIOmon software).

The hIOmon Manager and hIOmon I/O Monitor software components must be loaded as services under Windows 7/Vista/XP/2003/2008. The Windows Installer installation process provides a “Custom Installation Option”, which is to have the Windows Installer installation process automatically load (as part of the installation process) these hIOmon software components. This “automatic load” installation option is a **recommended** option (and so is enabled by default).

However, if you decide not to enable this “automatic load” installation option, then you must manually load the hIOmon Manager and hIOmon I/O Monitor software components before you can use the hIOmon software. To manually load these hIOmon software components, click on the “Manually Load the hIOmon Manager and IO Monitor” shortcut found within the “hIOmonSI” directory where the hIOmon software was installed as part of the Windows Installer installation process. Also note that on operating systems such as Windows 7, “administrator privilege” level must first be enabled prior to clicking on this shortcut. This can be done by going to the shortcut using Windows Explorer, selecting the shortcut and then right-click, select the “Properties” menu option, click on the “Compatibility” tab, and then check the “Run this program as an administrator” checkbox under the “Privilege Level” section. Then double-click on the shortcut to run the shortcut.

In addition to loading the hIOmon Manager and hIOmon I/O Monitor software components as services under Windows 7/Vista/XP/2003/2008, the “load” process (whether invoked automatically as part of the Windows Installer installation process or manually thereafter) also uses the hIOmon “Service Installation” program to perform the following:

- Invoke the Windows 7/Vista/XP/2003/2008 Service Control Manager to immediately start both the hIOmon Manager and hIOmon I/O Monitor.
- Compile/load the hIOmon WMI MOF file (into the WMI Repository) and register the hIOmonWMI DLL component, both of which are required for the hIOmon WMI Support that is used by the hIOmon “Disk I/O Ranger Display” application.

**NOTE** that the hIOmon Manager is loaded such that it will automatically be started when Windows 7/Vista/XP/2003/2008 starts. While the hIOmon I/O Monitor is loaded such that it will not be automatically started by Windows 7/Vista/XP/2003/2008, the hIOmon Manager is configured by default (by the software installation process) so that the hIOmon Manager will automatically start its associated hIOmon I/O Monitor when the hIOmon Manager is started. Enabling/disabling the “automatic-start” of the hIOmon I/O

Monitor by the hIOmon Manager can also be performed through the hIOmon WMI Browser.

The setup takes a few minutes. When it is complete, remove the CD-ROM.

Please check the System Event Log “Application Log” to see the results of the hIOmon software installation process.

**NOTE:** The hIOmon software installation process will not be able to successfully load and start the hIOmon I/O Monitor component if this hIOmon component is already running when the hIOmon “Service Installation” program is invoked to actually load this component as a service. In this case, the hIOmon “Service Installation” program will add an entry to the System Event Log (Application Log) to report that it was unable to successfully load and start the hIOmon I/O Monitor component. You must restart the operating system and then perform this step again for the hIOmon I/O Monitor component to be successfully loaded.

5. Please read the “Read This First!!!” by using the “Start -> Programs -> hIOmon -> Getting Started Help -> Read This First!!!” shortcut, which will display a hIOmon Help html page that includes important information to help you get started using the hIOmon software.

### 5.3 Uninstalling the hIOmon software

Use the Windows “Control Panel” to remove the hIOmon software. Select “Add/Remove Programs” within the “Control Panel”, then select “hIOmon” within the list box and click on “Remove” to remove/uninstall the hIOmon software.

As part of the uninstall process, the Windows Installer will automatically invoke the hIOmon “Service Installation” (ServiceInstall.exe) program, which in turn uses the Windows 7/Vista/XP/2003/2008 Service Control Manager to unload the hIOmon Manager and hIOmon I/O Monitor components as services under Windows 7/Vista/XP/2003/2008; the hIOmon “Service Installation” utility will also automatically unload/remove the hIOmon WMI MOF file from the WMI Repository and un-register/unload the hIOmonWMI DLL component (both of which are required to provide the hIOmon WMI Support).

**NOTE:** The hIOmon Manager is first stopped prior to requesting that it be unloaded by the Windows 7/Vista/XP/2003/2008 Service Control Manager. Also note that if the hIOmon I/O Monitor component is running at the time of this hIOmon Service Installation program invocation, then the hIOmon I/O Monitor will **not** be stopped and will continue to execute; the hIOmon I/O Monitor component will subsequently be unloaded/removed from the system when Windows 7/Vista/XP/2003/2008 is restarted. If you subsequently decide to re-install the hIOmon software, then you must first **restart** the machine before attempting to re-install the hIOmon software (so that the hIOmon I/O Monitor component from the prior installation is completely removed before performing the re-installation of the hIOmon software).

Please check the System Event Log “Application Log” to see the results of this hIOmon Service Installation program invocation.

**NOTE:** When the hIOmon software is uninstalled as described above, several subdirectories (and their contents) will remain within the directory into which the hIOmon software was installed (in addition to the “hyperIO” folder within the “ProgramData” folder and any hIOmon folder that might be located within the VirtualStore folder on Windows Vista and later operating systems); see the “readMe.txt” files in the following subdirectories for additional details: hIOmonGr, FilterSL, and AddOns. The “gadget.parms” file might also remain within the VirtualStore folder; this file is generated and used by the hIOmon Disk I/O Ranger Display application to maintain configuration information related to the use of the hIOmon Disk I/O Ranger Display. **NOTE** that you must **manually** delete this file (along with the files/folders mentioned above) to totally remove the hIOmon software package.

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**6. TECHNICAL ASSISTANCE AND SUPPORT INFORMATION**  
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**6.1 OBTAINING ADDITIONAL INFORMATION FROM hyperI/O LLC**

The hyperI/O LLC website provides additional information about hIOmon (including technical assistance and support information). You can also contact hIOmon Technical Support at hIOmonSupportInfo@hyperIO.com.

**6.2 OBTAINING INFORMATION VIA THE INTERNET**

The hyperI/O LLC website is located at [www.hyperIO.com](http://www.hyperIO.com). You can also reach hyperI/O LLC via the hIOmon website (located at [www.hIOmon.com](http://www.hIOmon.com)).

**6.3 ORDERING SOFTWARE**

To order additional copies of the software, contact hyperI/O LLC:

Request by Phone: +1 303.415.2044

Request by Mail: hyperI/O LLC  
4450 Arapahoe Avenue, Suite 100  
Boulder, Colorado 80303-9102 USA

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**7. LEGAL STATEMENTS**  
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