



**E M A**

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# MHarness

version 3.2

Software Installation Guide

for Windows

# MHarness version 3.2 Software Installation Guide for Windows

## CONTENTS

MHarness Installation Documentation.....	- 2 -
EMA And Software Information on the CD-ROM.....	- 2 -
Overall Procedure .....	- 2 -
Installing MHarness .....	- 2 -
Running MHarness .....	- 3 -
MHarness Examples .....	- 4 -
MHarness Documentation.....	- 4 -
MHarness Utilities .....	- 5 -
gnuplot .....	- 6 -
Adobe Acrobat Reader.....	- 7 -
Setting Up Licensing.....	- 8 -
Appendix A: Windows PATH Environment Variable.....	- 13 -
Appendix B: Platform Compatibility & System Requirements .....	- 14 -
Appendix C: Gnuplot Copyright.....	- 15 -

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## MHarness Installation Documentation

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A copy of this document is also on the MHarness CD, in the folder "win\installdocs".

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## EMA and Software Information on the CD-ROM

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In addition to the MHarness software, the MHarness CDROM also contains a number of documents, in several electronic formats, containing a variety of information about EMA, its various software products, software features and prices, consulting and other activities, and other information. Look in the "EMAandSoftwareInformation" folder on the CD-ROM.

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## Overall Procedure

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The overall procedure for installing MHarness is:

- 1) install the software - see section "Installing MHarness"
- 2) install a license - see section "Setting Up Licensing"
- 3) test run the program - see sections "Running MHarness" and "MHarness Examples"
- 4) locate the documentation - see section "MHarness Documentation"
- 5) Additional Information: - see section "gnuplot" for more information about gnuplot, a free third-party plotting program included with EMA software.  
- see section "Adobe Acrobat Reader" for instructions on obtaining and installing Adobe Acrobat Reader if you do not already have Acrobat Reader on your system.

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## Installing MHarness

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Use the following procedure to install MHarness on Windows:

- 1) Using Windows Explorer, navigate to the folder win\mharness on the MHarness CD. Find the installation program "Setup.exe" and launch it by double-clicking on it.
- 2) The installation program will guide you through the setup process and ask you to make some choices such as installation location and setup type. The setup type "typical" is recommended for most users and will install the standard set of files necessary for using MHarness. The "License Manager Only" option should be used if you want to install just the license manager on a machine on which you do not want to install MHarness. See the section "Setting Up Licensing" for more information.

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## Running MHarness

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### Installing a License

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Before running MHarness you must either install a standalone license, or set-up the license server with a floating network license. See the section "Setting Up Licensing" for more information.

### Running MHarness

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If the installation has proceeded successfully, you can run Mharness from the shortcut(s) on the Start Menu; and you can also run it by name from a Windows command prompt:

```
windows prompt> mharness
```

MHarness will open a dialogue box for you to locate and open an MHarness input file. You can also give the input file name as a command-line argument:

```
windows prompt> mharness testmodel.inp
```

### MHarness version

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The exact version of MHarness that is installed can be determined with the following command:

```
windows prompt> mhver
```

It is a simple batch script that echoes the MHarness version and date release.

This information can also be displayed from the following shortcut on the Start Menu:

Start Menu→Programs→EMA→MHarness v3.2→About MHarness

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## MHarness Examples

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The subfolder "\examples" of the installation contains input and output files for the examples described in the MHarness manual, as well as modifications of those examples for use in MHarness training sessions. These files can also be used to test an installation of MHarness to see if everything is working correctly. Running MHarness on any of the example input files will produce output files that will over-write any existing output files in the same folder. So, if you wish to compare your outputs with the pre-existing output files, make a copy of the input files in a separate test folder first so as not to over-write the pre-existing output files. For example, suppose all the example files have been copied to a folder named "examples", and a sub-folder "examples\test" has been created, and all the example files have again been copied to the "\test" folder. Then you can run MHarness on one of the example files in the "\test" folder and compare it with the pre-existing ones as in the example below:

```
windows prompt> chdir examples\test
windows prompt> mharness ex2.inp
```

Then start a plotting program, for example, gnuplot, and compare the output file produced, with the previously-existing one:

```
gnuplot> cd "examples\test"
gnuplot> plot ".\ex2voltout", "..\ex2voltout"
gnuplot> exit
```

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## MHarness Documentation

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The MHarness User Manual, and a few other MHarness documents, can be accessed from shortcuts on the Start Menu. There are also some other documents, for which there is no shortcut on the Start Menu, which are accessed by finding their location under the MHarness installation on your hard drive and opening them directly. Here is the full listing of the user manuals and documentation that are part of the MHarness software installation:

### Installation Documentation

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```
docs\install_mharness.pdf
  - MHarness Installation Guide for Windows (this document)
docs\install_mharness.txt
  -text file version of install_mharness.pdf
```

### MHarness User Manual

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```
docs\MHv3.2_User_Manual.pdf
  - MHarness User Manual
```

## MHarness tools/utilities documentation

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docs\utilities.readme

- README file documenting the function of the MHarness utility programs

docs\writewcur\_readme.pdf

- README file to accompany the tool "writewcur", one of the utility tools included with the MHarness distribution

## MHarness examples problem assignments

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examples\ProblemAssignments.pdf

- description of problems to be worked with the MHarness example files. Used primarily for MHarness training.

examples\ProblemAssignments.txt

- text file version of ProblemAssignments.pdf

## gnuplot documentation

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gp400win32\gnuplot\docs\gnuplot.pdf

- gnuplot manual

gp400win32\gnuplot\docs\gpcard.pdf

- gnuplot reference card

gp400win32\gnuplot\docs\tutorial\tutorial.pdf

- gnuplot tutorial

Documentation for gnuplot is also available in the form of the help system within gnuplot, after you start gnuplot.

## Rainbow SLM license manager software (for system administrators)

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docs\SLM71sys.pdf

- Rainbow Sentinel License Manager System Administrator's Guide (for use by system administrators)

Files with a name like "README", "\*.readme", "\*.README" or "\*.txt" are text files that may be viewed with any text file viewer.

Files in PDF format (\*.pdf) are Adobe Portable Document Format files. They require Adobe Acrobat Reader to view them. To view these files, first launch Adobe Acrobat Reader, then click the "File" menu, choose "Open...", and navigate to the location of the desired document listed above. Check the installation location or consult your system administrator if you are not sure where to find the documents listed above.

If you do not have Adobe Acrobat Reader on your system, see the section "Adobe Acrobat Reader", below, or consult your system administrator.

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## MHarness Utilities

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### running utilities

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The MHarness installation includes a standard suite of command-line utilities useful in working with Mharness input and output files and data files. These programs are in the same folder as the other executable files: the subfolder "\bin"

of the installation. You can run any of the utilities at a Windows command prompt, similar to the way you run MHarness. For example,

```
windows prompt> tfunc
```

The file "utilities.readme", in the "\docs" folder of the installation, contains a brief description of the functionality of each utility. The utilities prompt the user for inputs and are largely self-explanatory.

source code included

-----  
Source code for most of the utilities is also included; it is in the subfolder "source\utilities" of the installation. The source code may be freely modified, re-distributed, etc.

This source code is included as a convenience for those customers who may be interested in creating their own modifications of these programs. However, it is not guaranteed to compile on any particular platform, or to produce predictable results when it does compile. EMA, Inc. cannot officially or fully support such efforts, since they are beyond the scope of basic end-user support; however, EMA will attempt to provide what assistance it can. You are welcome to do what you want with it but you are basically on your own.

Users interested in using this source code should view it as a time-saving starting point for their own software tools, rather than as something that is guaranteed to produce a particular result. Those using the source code should study it carefully and understand it thoroughly when using it, modifying it, or incorporating it into their own software tools.

-----  
gnuplot  
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MHarness result waveforms may be viewed with any available third-party plotting package. The freely-available "gnuplot" is fit for this purpose, and is included on the MHarness software CD-ROM. Gnuplot may be installed either by the EMA software installation program along with the rest of the EMA software installation, or separately.

install gnuplot with EMA software installation

-----  
By default, gnuplot is installed automatically by the installation program, and shortcuts are placed on the Start Menu for gnuplot and some gnuplot documentation (User Manual and some other documents). The gnuplot "bin" folder is also added to the Windows "PATH" environment variable, so that gnuplot can be run from a Windows Command Prompt:

```
windows prompt> wgnuplot
```

(the gnuplot executable is "wgnuplot.exe").

If you wish to not have gnuplot installed with the EMA software, choose the "Custom" installation type and un-check the gnuplot component.

install gnuplot separately

-----  
gnuplot may be installed separately from the EMA software at any time. To install gnuplot separately, go to the "win\gnuplot4.0.0" folder of the CDROM, and unzip the file "gp400win32.zip" to some location on your hard drive. The location to which you unzip the .zip file will be the installation location for gnuplot; you

can manually create shortcuts to "wgnuplot.exe" on your desktop or start menu if you wish, or manually add the gnuplot "bin" folder to the PATH environment variable if you wish to run gnuplot from a Windows Command Prompt.

disclaimer

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Gnuplot is free, third-party software provided as a convenience to EMA software end-users in accordance with the Gnuplot Copyright. EMA does not support gnuplot; it is included "as-is" on the CD and in the EMA software installation.

See "Appendix C: Gnuplot Copyright" for the Gnuplot Copyright statement.

For more information on gnuplot, visit the main gnuplot web site at:

<http://www.gnuplot.info>

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Adobe Acrobat Reader  
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Most of the manuals included with the MHarness distribution are in Adobe Portable Document Format (PDF). Viewing them requires Adobe Acrobat Reader, which is available for free.

Acrobat Reader from Adobe

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Acrobat Reader can be obtained from the Adobe web site at:

<http://www.adobe.com>

Acrobat Reader from the MHarness CD

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Acrobat Reader is included on the MHarness CD for convenience. It is not installed by the installation script, but it can be installed separately if you do not have Adobe Acrobat Reader on your system. Look in the subfolder "win\acrobat" of the the CD-ROM. You will find a file named something like "AdbeRdr...exe" (the middle part of the filename will vary). Double-click on this file to begin the Acrobat Reader installation.



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## Setting Up Licensing

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### Licensing Overview

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Software licensing for EMA software is managed by the Sentinel License Manager product, version 7.2, from Rainbow Technologies.

End-users of EMA software may choose between two basic types of licensing: a floating network license (also called a server license), or a standalone license. The type of licensing you wish to use will determine the type of license key you will request EMA, Inc. to issue. It also will determine whether you need to run the license server.

With a floating network license, the license server software is installed on one machine along with a floating network license key for the product(s) purchased. Users may use the EMA software product(s) on any machine on the same subnetwork as the license server machine; the application checks out a license key from the server when it is run. Several machines can share the same license(s) up to the concurrent usage limit (number of licenses purchased).

With a standalone license, the license server is not used. A license key for the software product(s) purchased is installed on each individual machine, and the software application reads the license key directly. Each machine requires its own individual license.

After you have decided which type of licensing you wish to use, follow the instructions below. If you decide to use standalone licensing, you may skip the sections "License Server Installation" and "License Server Startup".

### Obtaining and Installing a License - Overall Procedure

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Use the following overall procedure to obtain and install a license for MHarness.

- 1) install the license server if you are using floating network licensing
- 2) generate locking information for the license server machine (for network licensing) or for the individual machine(s) (for standalone licensing)
- 3) transmit the locking information to EMA
- 4) receive one or more license key files (usually by e-mail)
- 5) install the key file(s) in the correct location(s)

Follow the instructions below to perform each step of the procedure:

## Step 1) License Server Installation and Startup (floating network license only)

License Server Installation (floating network license only):

-----

If you wish to use a floating network type of license, you must install the license server on one machine of your choice. In the MHarness installation program, if you chose the "Typical" setup type, or if you chose the "Custom" setup type and left the license-related installation components checked, the license server files are automatically installed in the subfolder "lic" of the MHarness installation folder. If the machine on which you installed MHarness is the machine on which you wish to run the license server, you need do nothing more to install the server.

If you wish to install the license server separately on a different machine from the machine(s) on which you have installed EMA software, or if you chose to not install the licensing-related files as part of the EMA software installation, there is a separate setup program which can be used to install just the license server. To install the server, perform the following steps:

- 1) Log on as Windows Administrator and insert the MHarness CDROM into your CDROM drive.
- 2) Using Windows Explorer, navigate to the following subdirectory of the MHarness CDROM:

```
win\license\server\setup
```

Double-click on "Setup.exe" and the installation program will guide you through the installation. When you are finished, re-start the computer.

License Server Startup (floating network license only)

-----

Once the license server is installed on a machine, it must first be registered as a Windows service, and then started. The server is registered as a Windows service with the command "loadls". "loadls.exe" is one of the commands installed by the license server installation program. To register the server:

- 1) Log on as the Windows Administrator. Using Windows Explorer, locate the command "loadls.exe" under either the subfolder "lic" of the EMA software installation folder, or a separate directory where you installed just the license server software. Double-click on "loadls.exe" to launch it.
- 2) "loadls" will prompt you for the directory where the license server executable is. This will probably be the same directory as where "loadls.exe" is. The license server executable is "lservernt.exe". Double-check the location displayed under "Executable Path" in the "loadls" dialog box. When the path is correct, press "Add". "loadls" will register the server as a Windows Service. Quit the "loadls" program. (NOTE: When you press "Add" to register the service, you may get an error message titled "LoadLS", saying "Unable to add the SentinelLM system Service to the System Service Registry. Is the service already installed?" This is OK, and just means that the install program already registered and started the service. Press OK and press Cancel to quit the LoadLS program.)
- 3) The last step is to configure the startup of the license manager. Find the Services management application for managing Windows services (the location of this varies for different versions of Windows; consult your system administrator or contact EMA for assistance if you do not know where to find this). Find "SentinelLM" in the list of services, and double-click on it to display the startup-configuration dialog. Choose "automatic" or "manual" startup type as desired. "Automatic" is recommended as this will start the license server service whenever the machine boots. If you choose "manual", you will have to manually start the server from the Services management application (or from the

command prompt, using the Windows "net start" command) after each time you reboot the computer. Click "OK" to dismiss the dialog box, then close the Services management application.

### **Step 2 & 3) Obtain machine locking codes and transmit them to EMA**

Machine Locking Codes:

-----  
In order to obtain a license or licenses for the software you have purchased, you will need to obtain some machine locking codes for the machine on which the license server will run (in the case of network licensing), or the machine(s) on which the EMA software will run (in the case of standalone licensing). This is done with the utility "echoid", which is part of the Rainbow licensing software.

If you have installed all the licensing tools along with the EMA software (the default choice), there will be the following shortcut on the Start Menu for this utility.:

Start Menu --> Programs --> EMA --> MHarness v3.2 --> Show Machine ID (for licensing)

Find this shortcut and click on it to display the "Locking Codes" for your machine.

If this shortcut does not exist on the Start Menu, you can run "echoid" by locating it in the "lic" folder of the MHarness installation on your hard drive, if you have installed the licensing tools (the default choice). Use Windows Explorer to navigate to the "lic" folder of the MHarness installation, and double-click on "echoid.exe" to run it and display the "Locking Codes" for your machine.

example output from "echoid":

Lock Code 1	4-213D4
Lock Code 2	10-4E7DD

If you have not installed the licensing tools, or if you need to use "echoid" on a machine on which you have not yet installed MHarness or the licensing software, "echoid" can also be run directly from the MHarness CDROM. Use Windows Explorer to navigate to the following subdirectory of the CDROM:

win\license\tools

Find "echoid.exe", and double-click on it to display the "Locking Codes" for your machine.

For network licensing, obtain the locking code(s) for the machine on which you are running the license server. For standalone licensing, obtain the locking code(s) for each individual machine on which you will run the EMA software application. "echoid.exe" must be run on each machine for which you need a locking code.

When you have obtained the "Locking Codes" for your machine(s), transmit the information to EMA and EMA will issue license keys based on those locking codes.

NOTE: When running "echoid", the file "echoid.dat" MUST be in the current working directory in order to generate the correct locking codes! This will be true if you run "echoid" as described, either from the start menu shortcut or by navigating to its location using Windows Explorer.

## Step 4 & 5) Receive and install license key file(s)

### License Key File Installation:

-----  
You will be issued one or more license codes to activate the EMA software you have purchased. Each license code is an alphanumeric string, usually e-mailed as an ASCII text license key file. When you receive a license key file, save it as (or save a copy of it as) a text file named "lservrc" (no file extension). Where you place the key file depends on whether you are using network or standalone licensing.

For standalone licensing, place the key file "lservrc" in the "bin" folder of the MHarness installation. This folder will be "C:\Program Files\EMA\MHarness3.2\bin", the same folder containing the MHarness executable program files. MHarness will find the license key file when it runs by looking in the same directory where it lives. Do this on each machine on which MHarness is installed and for which you have been issued a license.

For network licensing, place the file "lservrc" in the "lic" folder of the MHarness installation. This folder will be "C:\Program Files\EMA\MHarness3.2\lic", the same folder containing the license server executable program and other license manager files. If you are installing a new license key file, you must stop and restart the license server (from the Control Panel→Services applet) to pick up the new keys.

If you already have a network license key file named "lservrc" containing licenses for other EMA products, or for products from other vendors using the Sentinel License Manager license server, append the contents of the new key file to the existing file instead of replacing it.

### License Key File Format

-----  
The format of the license key file is important in order for the EMA software or license server to successfully read it. License keys issued by EMA will be in the correct format when they are sent. However, if the format becomes altered or if you experience trouble, the following are the important points to observe:

- Every line in the file consists of a license code string, optionally followed by a comment. A '#' denotes the beginning of a comment.
- There should be exactly one license code string in each line of the file.
- Every line in the file must begin with a license code string and not some other text, not even a comment.
- The permissions of the file must be set so that the users (in the case of standalone licensing) or the license server (in the case of network licensing) have permission to read it.

Documentation:

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For more detailed information about the Sentinel License Manager, refer to the "Sentinel License Manager System Administrator's Guide". A copy of the guide is included on the EMA software CDROM in Adobe Acrobat format, under the subdirectory:

win\license\docs

The file is named "SLM71sys.pdf". A copy of the guide is also installed in the "docs" folder of the EMA software installation, if you choose a "Typical" setup type when you install the EMA software, or if you choose "Custom" and choose to install the "License Files" installation component.

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## Appendix A: Windows PATH Environment Variable

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Like Most Windows programs, MHarness can be run by clicking on the shortcut on the Windows Start Menu. However, unlike most Windows programs, MHarness is also command-line oriented, which means it can be used by typing the name of the program at a Windows Command Prompt. In fact, this probably the most frequently used method of running the program. (Input files can be processed in batch mode this way.) The MHarness utilities described in the section "MHarness Utilities", are only command-line oriented and can only be run from a command prompt; there is no shortcut or icon to click on to launch any of the utilities programs. When you run a program by typing its name at a command prompt, Windows must have a way to find the location of the program in order to run it. This is accomplished through the Windows environment variable called PATH. PATH contains a list of folders, which are the locations of programs that a user might want to run from the command prompt.

When you install MHarness using the automatic installation program, the installation program adds the name of the MHarness "bin" folder to the PATH environment variable. The "bin" folder is where the MHarness executable files are located.

If you get an error message saying something like "The name specified is not recognized..." when you try to run MHarness from a Windows command prompt as instructed in the section "Running MHarness", this probably means the installation program was not able to add the MHarness "bin" folder to the value of PATH. (If you get an error message from MHarness indicating that there is not a valid license installed, this is a different error and only means that you must install a license key.) If this happens, you can manually add the MHarness "bin" folder to the value of PATH.

The typical location of the "bin" folder will be something like:

```
C:\Program Files\EMA\MHarness3.2\bin
```

The installation program also adds the gnuplot "bin" folder to the value of PATH; this can also be added manually if desired, if the installation program fails to do so or if you install gnuplot separately (see the section "gnuplot"). The typical location of the gnuplot "bin" folder will be something like:

```
C:\Program Files\EMA\MHarness3.2.1\gp400win32\gnuplot\bin
```

The procedure for editing environment variables varies from one version of Windows to another, so instructions are not included here. Consult your Windows documentation or system administrator, or contact EMA Inc. for assistance.

**IMPORTANT NOTE:** It is important to remember that you should only ADD a folder path name to the value of PATH. DO NOT REPLACE OR DELETE ANY EXISTING VALUE OF PATH! If you do you will harm your system configuration. Just ADD a folder path name to the value of PATH, separated from the rest of the list of values by a semicolon (;).

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## Appendix B: Platform Compatibility & System Requirements

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The following are the system requirements for MHarness version 3.2 for Windows.

### Hardware Platform:

processor:	Intel x86-family processor or compatible
hard disk space (installation):	45 MB
hard disk space (user)*:	1 GB or more recommended
system memory**:	64MB minimum, 128MB - 256MB recommended
swap file size:	appropriately proportional to system memory (for example, 100% to 150% of system memory size is one commonly used rule of thumb)
graphics card/display:	no graphics card or display requirement

### Software Platform:

operating system:	Windows NT4SP6a, 2000 or XP.
graphics system***:	no graphics requirement

\*User disk space requirements vary significantly, depending on the size and number of input data files and/or output data files for a particular problem, and the size and number of associated data files that may be created in pre- or post-simulation analysis. Most MHarness problems require relatively little user disk space for the problem files. 1 GB is probably more than enough for the files associated with several average MHarness problems; however, this is very little disk space by today's standards and since disk space is rather cheap, a good rule of thumb is "the more, the better".

\*\*System memory requirements vary significantly depending on the MHarness problem you are solving. The memory image size of an MHarness problem depends on the complexity and size of the harness and how you choose to model it. Most MHarness problems will take much less space in memory than the minimum indicated. However, you may want to have enough memory for multiple MHarness jobs, very large jobs, etc.

\*\*\*There is no particular graphics requirement for running MHarness itself. MHarness results are typically viewed with any data-plotting program of the user's choice (such as the free "gnuplot" that is included). The graphics requirements for "gnuplot" are very basic. If some other third-party plotting package is being used to plot/visualize result waveforms, the graphics requirements for that package should be considered.

---

Appendix C: Gnuplot Copyright

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Gnuplot is distributed with EMA software in accordance with the Gnuplot Copyright, quoted here:

GNU PLOT v4.0.0 COPYRIGHT

```
/*[
 * Copyright 1986 - 1993, 1998, 2004 Thomas Williams, Colin Kelley
 *
 * Permission to use, copy, and distribute this software and its
 * documentation for any purpose with or without fee is hereby granted,
 * provided that the above copyright notice appear in all copies and
 * that both that copyright notice and this permission notice appear
 * in supporting documentation.
 *
 * Permission to modify the software is granted, but not the right to
 * distribute the complete modified source code. Modifications are to
 * be distributed as patches to the released version. Permission to
 * distribute binaries produced by compiling modified sources is granted,
 * provided you
 * 1. distribute the corresponding source modifications from the
 * released version in the form of a patch file along with the binaries,
 * 2. add special version identification to distinguish your version
 * in addition to the base release version number,
 * 3. provide your name and address as the primary contact for the
 * support of your modified version, and
 * 4. retain our contact information in regard to use of the base
 * software.
 * Permission to distribute the released version of the source code along
 * with corresponding source modifications in the form of a patch file is
 * granted with same provisions 2 through 4 for binary distributions.
 *
 * This software is provided "as is" without express or implied warranty
 * to the extent permitted by applicable law.
]*/
```