

MADYMO

Installation Instructions

Release 7.2

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MADYMO Manuals

An overview of the MADYMO solver related manuals is given below. From Acrobat Reader, these manuals can be accessed directly by clicking the manual in the table below. Manuals marked with a star (*) are also provided in hard-copy (major releases only).

Theory Manual	The theoretical concepts of the MADYMO solver.
Reference Manual*	Detailed information on how to use the MADYMO solver and how to specify the input.
Model Manual*	Dummy, Dummy Subsystem and Barrier Models with simple examples.
Applications Manual	Example applications using Dummy, Dummy Subsystem and Barrier Models.
Human Model Manual	Human Models and applications that make use of Human Models.
Tyre Model Manual	Documentation about Tyre Models.
Transition Manual	Describes the translation from MADYMO 5.4 format (DATA) to MADYMO 6.0 format (XML), including a description on how to handle Dummy Models in the conversion. A full conversion table is available.
Utilities Manual	User's guide for MADYMO/Optimiser, MADYMO/Scaler, MADYMO/Dummy Generator, MADYMO/Tank Test Analysis, MADYMO/XML Translator, MADYMO/XML Reformatter and MADYMO/XML Expander.
Folder Manual	Describes the use of MADYMO/Folder.
Programmer's Manual	Information about user-defined routines.
Release Notes	Describes the new features, modifications and bug fixes with respect to the previous release.
Installation Instructions	Description for the system administrator to install MADYMO.
Coupling Manual	Description of the direct coupling with ABAQUS, LS-DYNA, PAM CRASH/SAFE and Radioss and the TCP/IP coupling with MATLAB/Simulink.

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1 Introduction

This manual provides detailed installation instructions for MADYMO R7.2 on UNIX and Windows computer systems.

The user is expected to have a general knowledge of the UNIX or Windows systems (the locations and contents of system files).

2 Conventions in this manual

The data that must be entered on the command line is indicated with typewriter font (courier). The conventions are:

(UNIX) Commands are typeset in a box, and put in `typewriter font`.

A part of a command that is variable will be in underlined font. The user must enter the appropriate data.

Most UNIX commands can normally be used for all UNIX systems. However, if a specific system dependent UNIX command is needed, it is preceded by an underlined name identifying the computer system, followed by a colon.

The UNIX system prompt is shown as a % (C-shell) or a \$ (Bourne shell) sign.

When a line within a script does not start with the shell prompt sign, the line is a continuation of the previous line.

3 Downloading MADYMO products

Downloading MADYMO products, patches and models requires access to the MADYMO web pages at www.tass-safe.com. Authorization is required to access the software download area. To obtain access, contact your MADYMO support office.

4 MADYMO installation

4.1 Installing MADYMO

Read the installation document README.TXT and follow the instructions to carry out installation on the desired operating system. This document can be found on the CD-ROM or can be downloaded from www.tass-safe.com (see Section 3) for the appropriate MADYMO release.

Before starting the installation procedure, first check if the system hardware and operating system version match the requirements listed in Appendix A and Appendix B.

4.2 Setting up the Command Line Interface under UNIX

With the MADYMO Command Line Interface (CLI), **madymo_cli**, all MADYMO release R7.2 executables can be launched.

madymo_cli is a platform specific executable, and can be found in the directory **madymodir/madymo_72/platformid/bin**.

The CLI can be made accessible to users in two ways. Read the following section, and select the method that best suites your computing environment.

1. Create a symbolic link in a directory that is normally found in a users PATH, linked directly to the **madymo_cli** executable. Since **madymo_cli** is platform dependent, a link must be created for every platform that is installed. This method is best suited to computing environments that support only one or two platforms.

```
% cd /usr/local/bin
% ln -s madymodir/madymo_72/platformid/bin/madymo_cli madymo72
```

2. Add the directory **madymodir/madymo_72/share/run** to the PATH environment variable. A wrapper script called **madymo72** was created in this directory during the installation. This script first determines the platformid of the computer in use, and starts the correct **madymo_cli** executable. This method may be appropriate for sites that support MADYMO on many different machine architectures.

```
% setenv PATH ${PATH}:madymodir/madymo_72/share/run
```

5 MADYMO License information

5.1 Introduction

In order to run a MADYMO Product, authorization must be received from TASS. Authorization is checked via the Flexera FLEXnet Publisher software licensing mechanism (website: www.flexerasoftware.com). Authorization is managed by a license file. Here we will designate the license file with the name **madymo.lic**

5.2 MADYMO Token licensing

TASS provides two schemes for the licensing of its software products, i.e. feature licenses and MADYMO Token licensing:

- **MADYMO Tokens:** In this scheme, a collection of tokens are provided in a pool. All MADYMO software use a number of tokens from the same pool, i.e. the tokens are stacked, provided that (free) INFO lines for the specific product are included in the license file. The customer is provided with maximum flexibility to use and evaluate the different MADYMO software products through this concept. The MADYMO Tokens are available from R7.2
- **Feature licenses:** This scheme allows specific products and features to be run. Feature licenses can be node-locked to a local machine, or served through a license server that makes licenses available on all machines in the network. All MADYMO Solver software released prior to R7.2 uses feature licenses.

Both licensing schemes can be combined to facilitate simultaneous usage of both R7.2 MADYMO software and MADYMO software released prior to R7.2.

All R7.2 MADYMO software uses MADYMO Tokens, provided that both MADYMO Tokens and license INFO lines are present in the license file. The INFO lines provide the MADYMO software with the information needed to determine the amount of MADYMO tokens to be used for each product.

Without INFO lines the R7.2 MADYMO Workspace software will not run and the R7.2 MADYMO Solver will use feature licensing. When MADYMO Tokens or INFO lines are not available, R7.2 MADYMO Solver software falls back to feature licenses, given that TASS_Info line is present. TASS_Info line is necessary for Tokens and/or Modules.

Note that all R7.2 MADYMO software products and features can be licensed through MADYMO Tokens. Human models and tyre models are included in the MADYMO

token licensing system. The FE Human model and the Swift tyre model are not available by default. If access to these modules is desired, please contact your local TASS office.

For more information on R7.2 MADYMO Workspace licensing, see the MADYMO Workspace R7.2 Releasenotes. In the remainder of this document, all licensing behavior is for MADYMO Solver products only, unless specified otherwise.

5.3 Queuing

When insufficient MADYMO Tokens are available the MADYMO software will queue and wait up to a user-defined time for MADYMO Tokens to become available. The environment variable `MADLIC_QUEUE_MAX_MINUTES` specifies the maximum queue time in minutes. The default value is 60 minutes (one hour). The minimum queuing time is 1 minute, the maximum queuing time is 1440 minutes (24 hours). example:

```
% setenv MADLIC_QUEUE_MAX_MINUTES 10
```

will set the maximum queue time to 10 minutes.

If the maximum queue time has expired and no MADYMO Tokens became available, the R7.2 MADYMO application will abort.

For R7.2 MADYMO Solver products, queuing behavior is similar for feature licensing.

5.4 MADYMO License manager system

The MADYMO license manager system comprises four main components of FLEXnet, i.e.,

- License manager daemon (lmgrd)
- Vendor daemon (madlic)
- License file (madyo.lic)
- Application program (MADYMO/Solver)

A brief discussion of each follows.

5.4.1 License Manager Daemon (lmgrd)

The license manager daemon, `lmgrd`, is one of the two components (the other being the vendor daemon described below), which comprise the license server. The license manager daemon `lmgrd` runs in the background, handles the initial contact with a MADYMO application, passes the connection to the vendor daemon `madlic` and starts and maintains the communication with this vendor daemon. FLEXnet Publisher permits the application to use multiple license servers for redundancy on different machines. This allows some, or all, of the licenses to be available even if one or more server nodes fail. The FLEXnet version requirements are the following:

The version of...

FLEXnet Licensing Utilities (*lmutil*)

must be greater than or equal to that of

License Server Manager (*lmgrd*)

which must be greater than or equal to that of

Vendor Daemon (*madlic*)

which must be greater than or equal to that of

FLEXnet Client Licensing Library (*madymo solver*)

which must be greater than or equal to that of

License File Format (*madymo.lic*)

The FLEXnet[®] versions used for each supported platform are given below.

Platform-ID	FLEXnet [®] version	Platform-ID	FLEXnet [®] version
win32p	11.6.0	linux24-x86	11.6.1
em64t-win	11.6.0	linux24-ia64	11.6.1
hp1100ia64	10.6.1	linux24-x86_64	11.6.1
ibmrs51	10.6.1	linux26-x86_64	11.6.1
		linux24-em64t	11.6.1

5.4.2 Vendor Daemon (madlic)

Each vendor who has a FLEXnet licensed product on the network has one background process on the machine where the license manager daemon (`lmgrd`) is running, called the vendor daemon. For MADYMO products, the vendor daemon is the `madlic` process. The vendor daemon `madlic` is started automatically by the FLEXnet license manager, `lmgrd`, and keeps track of how many licenses are checked out, and who has them. If the `madlic/lmgrd` daemons terminate for any reason, all users of MADYMO

software will be disconnected from the license server. Users will automatically regain their licenses, and not notice any difference, if the application can re-establish the connection with the `madlic`. If the connection cannot be established within the timeout period, the applications will prompt users to save their work and quit.

The client node (where the application runs) and the license server (the `lmgrd` daemon and `madlic` daemon processes) can run on separate nodes on your network. Also, the traffic between the `madlic` and the license manager daemon is machine-independent, allowing for heterogeneous networks. This means the license server and the workstation that is running the application can be different hardware platforms or different operating systems.

5.4.3 License File (`madymo.lic`)

A text file, called the license file, stores the licensing data. It contains information about the server nodes and vendor daemons. The general name MADYMO products use for this license file is **`madymo.lic`**.

The default location of the license file **`madymo.lic`** for MADYMO R7.2 is in the directory **`madymodir/madymo_72/share/etc`**. End users can also set the environment variable, `MADLIC_LICENSE_FILE`, to point to the license server serving MADYMO licenses, for example

```
% setenv MADLIC_LICENSE_FILE <port number>@hostname
```

The first line in a new single server license file contains the line:

```
SERVER hostname <host-id> <port number>
```

For three-server redundancy there are three `SERVER` lines in the license file:

```
SERVER hostname1 <host-id1> <port number>  
SERVER hostname2 <host-id2> <port number>  
SERVER hostname3 <host-id3> <port number>
```

where `hostname1-3` has to be replaced with the host name of the machine on which the license server runs (e.g. using a text editor). `hostname` must match the outcome of the 'hostname' command.

Multiple license servers are supported (for example global and local license servers) for floating licenses.

For additional information on installing a license file, see the FLEXnet End User Guide.

5.5 The host-id

The FLEXnet licensing system uses an identifier that is unique to a computer system as part of the authentication. This identifier, or host-id, is either the system ID or the Ethernet address (MAC address, not the IP address), depending on the system architecture.

Use the command **madymo72 -printhead** on each server you wish to run a FLEXnet license server and record the host-id reported. To obtain a valid license, contact your MADYMO support office and provide the list of host-ids and machine types.

When no MADYMO installation is present the above command for host-id extraction cannot be used. To obtain this stand-alone tool (called printhead), contact your MADYMO support office, or download the tool from the public download section on www.tass-safe.com.

5.6 License server under Unix/Linux

The Unix/Linux license server **lmgrd** and vendor daemon **madlic** can be found in the directory **madymodir/madymo_72/platformid/bin**. The newest license manager files (not the vendor daemon) can also be downloaded from Flexera at: www.globes.com/support/fnp_utilities_download.htm

Start the license manager **lmgrd**, for example:

```
% madymodir/madymo_72/platformid/bin/lmgrd -c madymo.lic -l logfile
```

The **-c** argument specifies the MADYMO license file, the **-l** specifies the log file. The log file can be checked for set-up success or issues.

5.7 License server under Windows

The Windows license server **lmtools.exe**, **lmgrd.exe** and vendor daemon **madlic.exe** can be found in the directory **madymodir\madymo_72\platformid\bin**. The newest license server files (not the vendor daemon) can also be downloaded from Flexera at www.globes.com/support/fnp_utilities_download.htm

To setup a license server under Windows follow these steps:

1. Run **lmtools.exe** in the **madymodir\madymo_72\win32p\bin** directory

2. Under the 'Config services' tab:
 - Set up the 'Path to the lmgrd.exe file' (this file can be found in **madymodir\madyo_72\win32p\bin**)
 - Set up the 'Path to the license file' (the **madyo.lic** file can be found in **madymodir\madyo_72\share\etc**)
 - Setup the 'path to the debug file' (eg c:\temp\flex.log). Note that this is required to successfully start a license server!
 - Enable the 'Use services' check box
 - Click on 'Save service'
3. Under the 'Service/License File' tab, enable the 'Configuration using services' check box and select the service which was set up under the previous step.
4. Start the server under the 'Start/stop/reread' tab Under the 'Server status' tab, pushing 'Perform status inquiry' will generate a server status report.

6 Installation of MADYMO/MPP

6.1 Installation of MADYMO/MPP

Supported platforms to run MADYMO in MPP mode are shown in Appendix B.

MADYMO/MPP uses the Message Passing Interface (MPI) library to exchange data between parallel processes. For details on specific platforms, please see Section 6.2 and further.

For the linux intel and amd platforms (linux24-x86, linux24-x86_64, linux26-x86_64 and linux24-em64t), MADYMO uses HP-MPI which is downloadable separately from the download section on www.tass-safe.com as HPMPI.ZIP.

To start a parallel simulation with MADYMO/MPP, the user has to specify the option **-mpp** and the number of CPUs using the MADYMO command line interface **madymo72 -mpp -nrproc n** where n is the number of CPUs. Please make sure that **madymodir/madymo_72/share/run** is appended to the PATH environment variable and that the MADYMO command line interface is executed in a directory that is accessible by all CPUs. Otherwise, not all MADYMO/MPP processes will be able to read the input file and the simulation will be aborted. Please only use the MADYMO commandline interface to run MADYMO/MPP and do not directly use the **mpirun** program.

6.2 SGI and HP Platforms

- For SGI Altix machines (platformid linux24-ia64) the MPI library that is part of the Message Parsing Toolkit which is included in SGI Propack 3 and 4 can be used. Note that this is part of the operating system and thus probably already present on Altix systems.
- For HP Itanium machines (platformid hp1100ia64) the native MPI library can be used (mpi version: HP MPI 02.00.01.00 B6060BA - HP-UX 11i 1A major version 200 minor version 0).

6.3 Linux Clusters

Before installing MADYMO/MPP on a linux cluster, please make sure that the cluster is set up correctly. When installing MADYMO/MPP, the installation directory `madymodir` has to be accessible by all CPUs in the cluster.

HPMPI version 02.02.07.00 is included in the MADYMO installation for 32-bit Linux systems (platformid `linux24-x86`) and 64-bit Linux systems for Opteron (platformid's `linux24-em64t`, `linux24-x86_64` and `linux26-x86_64`). For detailed information on HP-MPI see: www.hp.com/go/mpi.

To perform MPP computations, the environment variables `MPIRUN` and `MPI_ROOT` have to be set to:

```
% setenv MPI_ROOT /path/to/hpmpi
% setenv MPIRUN "$MPI_ROOT/bin/mpirun -hostfile myhostfile"
```

where `$MPI_ROOT` point to the top level directory where `hpmpi` is installed (for example: `/usr/local/mpp/hpmpi227`) and the file 'myhostfile' contains a (user-defined) list of node names and number of CPUs available in each node.

Furthermore, the `MPI_REMSH` environment variable need to be set to `rsh` if `ssh` is not available. Please also adapt the `.rhosts` file accordingly.

By default, HP-MPI uses the fastest interconnect available. If you want to use another interconnect than the default one selected by HP-MPI, append the following string to the `MPIRUN` environment variable (see above):

- for Gigabit Ethernet: `-TCP`
- for Myrinet: `-GM`

For more options see the HP-MPI documentation, or run: `'$MPIRUN --help'`.

6.4 IBM

For IBM AIX machines (platform-ID `ibmrs51`) the native MPI library can be used which is called POE (Parallel Operating Environment) (`poe` version: 4.2.0.0).

In that case the environment variable `MPIRUN` has to be set to `poe` and the environment variable `MP_HOSTFILE` has to be set to a file containing all the hosts in the parallel environment. See also www-03.ibm.com/systems/p/software/pe.html

A System Requirements

1. For IBM Platforms, download the latest version of libC.a (XIC.rte) from:
<http://www-1.ibm.com/support/docview.wss?uid=swg24011532>

Also, IBM recommends to download any updates from this url:
<http://www-912.ibm.com/eserver/support/fixes/fixcentral>

2. On HP platforms, the following patches must be installed:
 - (a) HP patch *PHSS_33350* must be installed for HP UX-11.23

These patches can be downloaded from www.hp.com.

3. The MADYMO software is developed and validated using the hardware and operating system configurations as specified in Appendix B. Newer versions of the operating system may work correctly with MADYMO, but there is no guarantee. Even when the software installs and runs, reference simulation results might differ beyond quality tolerances on unsupported hardware or operating systems.

Normally operating system vendors provide binary compatibility in the sense that executables generated on a certain version of the operating system will also run on newer (sub-)versions of that operating system. If problems are encountered due to this, install the specified operating system or upgrade to a later version. No support for issues can be given on unsupported hardware or operating systems.

4. MADYMO requires at least 256 Mb RAM to run satisfactorily. However, 512 Mb RAM or more is strongly recommended. However, it strongly depends on the size of the simulation runs, the larger or longer, the more memory is needed.
5. To be able to read the on-line MADYMO manuals, Adobe Acrobat Reader version 4.0 or higher, or xpdf, must be installed. Also the executable *acroread* (*AcroRD32.exe* on Windows) must be found within the PATH environment variable. Acrobat Reader can be downloaded from www.adobe.com.
6. On Windows, FLEXnet license management requires a network transport protocol driver to be installed. Systems that report a *hostid* of 0 or FFFFFFFF need to install either the NETBEUI or NW Link (IPX/SPX) Transport Protocol driver. These are included on the distribution CD of the operating system. To install, Put the Windows system disk in the CDRom drive. Select 'Main'. Select 'Control Panel'. Select 'Network'. Select 'Add'. Add the NWLink IPX SPX or NetBEUI driver.

B Supported Solver platforms

This appendix provides information on the platforms on which the solver is build. The first operating system mentioned for each platform-ID relates to the machine on which the solver is build and tested.

In a separate table is shown what commands can be used to retrieve the version information for the platform of interest.

UNIX platforms:

Platform-ID	Platform	Hardware architecture	Operating system ¹	Parallel
hp1100ia64	HP Itanium	Intel Itanium	HP-UX B.11.23	SMP MPP
ibmrs51	IBM	IBM Power5	AIX 5.3	SMP MPP

Windows platforms:

Platform-ID	Platform	Hardware architecture	Operating system ¹	Parallel
win32p	Windows (32-bit)	Intel Pentium IV Intel Xeon32 AMD Athlon XP	Windows XP Windows 2000 Windows NT 4.0	SMP
em64t-win	Windows (64-bit)	Intel Xeon EM64T INtel Core 2 Duo AMD Opteron AMD Athlon 64	Windows XP 64 bit	SMP

Linux platforms

Platform-ID <i>Platform</i>	Hardware architecture	Operating system ¹ <i>OS version</i> Compatible Operating systems	Parallel
linux24-x86 <i>Linux ia32</i>	Intel Pentium IV Intel Xeon32 AMD Athlon	Red Hat Enterprise 3 (Taroon update 9) <i>2.4.21-50-ELsmp i686</i> Red Hat Enterprise 4 ² SUSE Enterprise 9/10 ²	SMP MPP
linux24-ia64 <i>Linux ia64</i>	SGI Altix HP-Itanium	Red Hat Enterprise 3 (SGI ProPack 3SP1) <i>2.4.21-sgi301r1 ia64</i> Red Hat Enterprise 4 ² SUSE Enterprise 9/10 (SGI Propack 4.0) ²	SMP MPP
linux24-x86_64 <i>Linux x86_64</i> ³	AMD Opteron AMD Athlon64	Red Hat Enterprise 3 (Taroon update 6) <i>2.4.21-37.ELsmp x86_64</i> SUSE Enterprise 9.0	SMP MPP
linux26-x86_64 <i>Linux x86_64</i> ³	AMD Opteron AMD Athlon64	SUSE Enterprise 9.3 <i>2.6.5-7.244-smp x86_64</i> Red Hat Enterprise 4 ²	SMP MPP
linux24-em64t <i>Linux x86_64</i>	Intel Xeon EM64T Intel Core 2 Duo	Red Hat Enterprise 3 (Taroon update 7) <i>2.4.21-40.EL x86_64</i> Red Hat Enterprise 4 ² SUSE Enterprise 9 /10 ²	SMP MPP

¹ See Appendix A for more information on other OS versions.

² To show threads in ps and top, the following environment variable needs to be set manually by the user: **setenv LD_ASSUME_KERNEL 2.4.19**

³ Note that the kernel version is in fact what dictates which x86_64 version can be run. The linux24-x86_64 version is created on a 2.4 kernel, and can run on an OS with a 2.4 kernel (e.g. Redhat Enterprise 3 or SuSE Enterprise 9.0) or on an OS with a higher kernel version.

On an OS with 2.6 kernel (e.g. Redhat Enterprise 4 or SuSE Enterprise 9.1/9.2/9.3/10.0) the linux26-x86_64 is advised (which is created on a 2.6 kernel), as the performance will be 10% higher than the linux24-x86_64 version.

⁴ For more detailed madymo version and platform information, please refer to: [Solver Supported Platforms pdf](#).

How the version information can be retrieved for each platform is shown in the next table:

Platform-ID	Platform	Operating system command for version <i>additional information</i>
hp1100ia64	HP Itanium	uname -rs
ibmrs51	IBM	uname -s; oslevel
linux24-x86	Linux ia32	cat /etc/*release <i>uname -rm</i>
linux24-ia64	Linux ia64	cat /etc/*release <i>uname -rm</i>
linux24-x86_64	Linux x86_64	cat /etc/*release <i>uname -rm</i>
linux26-x86_64	Linux x86_64	cat /etc/*release <i>uname -rm</i>
linux24-em64t	Linux x86_64	cat /etc/*release <i>uname -rm</i>
win32p	Windows	
em64t-win	Windows	

C User Routine Requirements

MADYMO provides the ability to compile and link to user defined Fortran routines. The requirements for the Fortran compiler are the following:

Platform-ID	Platform	Fortran compiler version command for version
hp1100ia64	HP Itanium	HP-UX f90 B.11.23.22 PHSS_32711/PHSS_32712 <i>what 'which f90'</i>
ibmrs51	IBM	xlf 10.1.0.0 5724-M1300 <i>lslpp -i grep xlf</i>
linux24-x86	Linux ia32	Intel Fortran Version 8.1 Build 20050702Z <i>ifc -V</i>
linux24-ia64	Linux ia64	Intel Fortran Itanium compiler Version 9.0 Build 20050912 <i>ifort -v</i>
linux24-x86_64	Linux x86_64	PGI compiler pgf90 6.1-2 <i>pgf90 -v</i>
linux26-x86_64	Linux x86_64	PGI compiler pgf90 6.1-2 <i>pgf90 -v</i>
linux24-em64t	Linux x86_64	Intel Fortran Compiler ifort 9.1 <i>pgf90 -v</i>
win32p	Windows	N/A (<i>no MADYMO libraries provided</i>)
em64t-win	Windows	N/A (<i>no MADYMO libraries provided</i>)