ΔV EMA Electro Magnetic Applications, Inc.
7655 West Mississippi Avenue, Suite 300, Lakewood, CO 80226-4332 (303) 980-0070, Fax: (303) 980-0836

# EMA3D

## version 3.1

## Software Installation Guide

## for 64-bit Linux (x86_64)

EMA3D version 3.1.3 15-January-2008

# EMA3D version 3.1 Software Installation Guide for 64-bit Linux

## C O N T E N T S

## Introduction

This Installation Guide is for the 64-bit Linux version of EMA3D.
For other platforms, including 32-bit Linux, see the appropriate Installation Guide for that platform.

## EMA3D Installation Documentation

A copy of this document is also on the EMA3D CD, in the subfolder "unix/installdocs".

## Installing CADfix – Use the "CAE Modeller" Setup Type

EMA3D uses the software product CADfix as a graphical front-end and CAD model import facility. The installations of EMA3D and CADfix are separate. The two products may be installed in either order.
When installing CADfix, the user is usually presented with a choice of "Setup Type" to install. The choices are usually:

1: CADfix Data Exchange (or sometimes called "DX")
2: CADfix CAE Modeller
3: CADfix license manager only

Use "CADfix CAE Modeller" when installing CADfix for use with EMA3D.

The "Data Exchange" or "DX" setup type is for automated CAD database translation and repair and does not contain certain features necessary for preparing a model for use with EMA3D.

The "CADfix license manager only" option can be used to install just the CADfix license manager on a machine without installing the full set of CADfix application files.

## Installing EMA3D - Overall Procedure

The overall procedure for installing EMA3D is:

1) install the software - see section "Installing EMA3D"
2) install a license key - see section "Installing a License Key File"
3) source the setup scripts - see section "Running EMA3D"
4) locate the documentation - see section "EMA3D Documentation"
5) Additional Information:

- See the section "gnuplot" for more information about gnuplot, a free third-party plotting program included with EMA software.

- See the section "Adobe Acrobat Reader" for instructions on obtaining and installing Adobe Acrobat Reader if you do not already have Acrobat Reader on your system.

## Installing EMA3D

Perform the following steps to install EMA3D on a UNIX or Linux system:

1) Load the EMA3D CD into the CD-ROM drive. You may have to "mount" the CD-ROM (see your system documentation).

2) In a shell command prompt or terminal window, go to the "unix" subdirectory of the CDROM.

example:

```
% cd /cdrom/cdrom0/unix
```

3) Run the setup script "install.sh".

example:

```
% ./install.sh
```

The setup program will prompt you for some choices, including choice of platform (depending on what is on the CDROM), installation directory, and installation type.

- The installation type "EMA3D" includes all of the EMA3D installation plus the license server software and licensing utilities.

- The installation type "EMA3D License Manager Only" can be used to install just the license server software without installing all of the EMA3D application files.

## Running EMA3D

### Install a License Key

Before running EMA3D you must either install a standalone license, or set up the license server with a floating network license. See the sections "License Server Installation and Startup" and/or "Installing a License Key File" for more information.

### Source the Setup Script

Before attempting to run EMA3D, you should source the set-up script "ema3d_setups_csh" (for C-shell (csh)) or "ema3d_setups_sh" (for Korn or Bourne or Bourne-again shells (ksh or sh or bash)).

example:

```
# (sh or ksh or bash)
% . /opt/ema/ema3d313/linux64/ema3d_setups_sh

# (csh)
% source /opt/ema/ema3d313/linux64/ema3d_setups_csh
```

NOTE: The path name of the setup scripts in the example above will vary depending on the version of EMA3D and where you have installed it.

You should also source the setup script before running CADfix. You can run CADfix without sourcing the EMA3D setup script, but the additional EMA-provided toolboxes and tools for setting-up an EMA3D problem from within CADfix, will not be present.

These scripts do the following:

1) Add EMA3D "bin" subdirectory to the PATH environment variable so that EMA3D may be run from the command-line.

2) Add some EMA3D "man" subdirectories to the MANPATH environment variable so that certain man pages are available (see "documentation" section of this Installation Guide).

3) Define certain environment variables that convey to CADfix the location of certain EMA files and tools that are incorporated into the CADfix GUI for use when CADfix is used as the front-end to EMA3D.

These scripts are placed in the top-level installation directory by the installation program. The setup script can be sourced from a system login script or from individual users' login scripts or shell startup scripts. See your system documentation for instructions on how to do this.

See "Appendix A: EMA3D Environment Variables" near the end of this document for more information on the use of environment variables by EMA3D/CADfix.

## Running EMA3D

Once the script has been sourced to include the EMA3D "bin" path in the PATH environment variable, EMA3D can be executed at the command line:

```
$ ema3d
```

EMA3D will prompt you for the name of an input file. The input file name can also be given as a command-line argument:

```
$ ema3d testmodel.emin
```

After checking the information in the input file for consistency and errors, EMA3D will begin the computation.

See the User Manual Set for EMA3D for extensive, detailed information about using EMA3D and CADfix.

## EMA3D version

The exact version of EMA3D that is installed can be determined with the following command:

```
$ e3dver
```

It is a simple shell script that echoes the EMA3D version and date release.

## Running the EMA3D/CADfix interfaces

Traditionally, EMA3D has been accompanied by two interface programs that enable it to interoperate with CADfix: the program "famtoema3d", which translates geometrical information and EMA3D problem information from the CADfix model database file to the EMA3D input file format; and the program "famfromema3d", which translates simulation result data from the EMA3D output file format to a CADfix result database file.

In the current release of EMA3D, the function of "famtoema3d" is performed by a GUI tool within the CADfix GUI. To find this tool, select the toolbox named "EMA3D_ReviewTool" from the drop-down list of toolboxes in the CADfix GUI, and click the button "EMA3DREV". The "Model Review Tool" will open, displaying summary information about the EMA3D simulation data in the CADfix database. The button at the bottom labeled "FTE" performs the "famtoema3d" conversion.

The function of "famfromema3d" is still a separate, command-line program. If the EMA3D setups script has been sourced as described earlier, you can run famfromema3d at the UNIX command prompt:

```
% famfromema3d
```

famfromema3d will prompt you for the name of an EMA3D output file. You can also supply the output file name as a command-line argument:

```
% famfromema3d testmodel.emout
```

The EMA3D output file (*.emout file), and the corresponding CADfix database from which the model was build (*.fbm file), must both be in the current working directory to run famfromema3d.

> NOTE: CADfix was called "FAM", for "Field Analaysis Modeller", in earlier releases. The name "FAM" or "fam" still persists in some places. The naming convention "famfromanalysis" or "famtoanalysis" is still the standard convention for programs that translate information between CADfix and an analysis program.

## famfromema3d for Different Versions of CADfix

famfromema3d is built using some CADfix executable code, and is therefore somewhat dependent on the version of CADfix being used for correct operation. The version of famfromema3d that is executed when you run "famfromema3d" as shown above, is built for CADfix 7.0. The EMA3D installation also includes versions of famfromema3d for CADfix 5.1 and 6.0. These versions have names that indicate which version of CADfix they are built for, and can be executed as follows:

For CADfix 5.1, use the following:

```
% famfromema3d510
```

For CADfix 6.0:

```
% famfromema3d600
```

For CADfix 7.0, you can use the following:

```
% famfromema3d700
```

Or, for CADfix 7.0 you can just use "famfromema3d" as indicated before. "famfromema3d" and "famfromema3d700" are two copies of the same executable file with different names.

## EMA3D Documentation

The following user manuals and documentation are part of the EMA3D software installation:

### Installation Documentation

docs/install_ema3d.pdf
- EMA3D Installation Guide for UNIX and Linux (this document)

docs/install_ema3d.txt
-text file version of install_ema3d.pdf

### EMA3D User Manual Set

docs/EMA3DGettingStartedManual.pdf
docs/EMA3DOverviewManual.pdf
docs/EMA3DTrainingManual.pdf
docs/EMA3DProjectObjectivesManual.pdf
docs/EMA3DPreparationManual.pdf
docs/EMA3DReviewToolManual.pdf
docs/EMA3DExecutionManual.pdf
docs/EMA3DPostProcessingManual.pdf

EMA3D tools/utilities documentation

docs/ema3d_utilities_ref.pdf

- reference manual for the command-line utilities included with EMA3D (PDF format)

docs/ema3d_utilities.README

- list and overview of the command-line utilities

docs/addfiles.README
docs/derivfile.README
docs/fft.README
docs/filter.README
docs/makesource.README
docs/multisource.README
docs/shiftsource.README
docs/source.README
docs/source2.README
docs/sumfile.README
docs/tfunc.README
docs/writenode.README
docs/writeprobe.README
docs/xferNewSource.README

docs/compute_Pavail.README
docs/compute_Pin.README
docs/compute_Pout.README
docs/compute_Prefl.README
docs/compute_Skn.README
docs/compute_Snn.README
docs/compute_TrFn.README
docs/compute_Vin.README
docs/compute_Znn.README
docs/RCS.README
docs/RXS.README

- individual read-me files for each utility (same information as in the utilities reference manual

docs/man/man1

- this directory contains man page versions of all the utility read-me files above

gnuplot documentation

docs/man/man1/gnuplot.1
- man page for gnuplot, a third-party plotting program frequently used with EMA3D

gnuplot3.7.3/man/man1/gnuplot.1
- duplicate copy of the above man page

Reprise RLM license manager documentation (for system administrators)

lic/docs/RLM_Enduser.html - end-user manual for RLM

Viewing Documentation

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

HTML documentation (*.htm, *.html) can be viewed in any web browser.

Files with extension .pdf are Adobe Portable Document Format (PDF) files. They require Adobe Acrobat Reader to view them. To view these files, first launch Adobe Acrobat Reader:

```
% acroread
```

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.

## EMA3D Utilities

Several command-line utilities, useful in working with column-formatted ASCII data files produced by and used with EMA3D, are part of the EMA3D distribution. They are located in the "bin" subdirectory of the EMA3D installation.

If the setups script has been sourced (see the section "Running EMA3D"), you can run them from a command prompt the same way you run ema3d. For example,

```
% writeprobe
```

## EMA3D Utilities Documentation:

Documentation on the meaning and usage of the EMA3D command-line utilities is installed in the "docs" subdirectory of the EMA3D installation:

```
<install_dir>/ema3d313/docs
```

The file "ema3d_utilities.README" contains a list and overview of all of the utilities.

The file "ema3d_utilities_ref.pdf" is a complete reference guide to the EMA3D utilities.

See the section "EMA3D Documentation" for a full list of the utilities documentation.

## EMA3D Utilities Documentation - man pages:

man page versions of the utilities reference pages are available. If the setups script has been sourced, which sets the MANPATH (see the section "Running EMA3D"), you can access the man pages from the command-line, for example:

```
% man writeprobe
```

The following man page:

```
% man ema3d_utilities
```

gives a list and overview of all utilities. The command "man utility_name" gives the man page for a specific utility.

NOTE: If a man page does not come up, you may need to run "catman" to create the "windex" databases in the MANPATH directories. See your system administrator or UNIX or Linux documentation for details.

## gnuplot

### gnuplot installed automatically

EMA3D result waveforms may be viewed with any available third-party plotting package. The freely-available "gnuplot" is fit for this purpose, and is included with the EMA3D software distribution. gnuplot is installed automatically by the installation script along with the EMA3D software.

If you wish to not have gnuplot installed on your system, you can remove the gnuplot directory and all its contents from the hard drive without disturbing the rest of the EMA software installation. The gnuplot directory will be something like

<install_location>/ema3d313/gnuplot4.0.0

(The version designation in the directory name may vary).

The EMA3D setup scripts "ema3d_setups_sh" and "ema3d_setups_csh" (see the section "Running EMA3D") add the directory path containing the gnuplot executables to the PATH environment variable. They also add the path containing a gnuplot man page to the MANPATH environment variable. If the setup script has been sourced, you should be able to run gnuplot from the UNIX command prompt:

```
% gnuplot
```

NOTE: some systems (particulary Linux) may already have a version of gnuplot installed. In this case, you might get the pre-existing installation when you enter "gnuplot" at a command prompt, because the EMA3D setup scripts put the EMA-installed gnuplot directory at the end of PATH.

If you wish to use the EMA-installed version instead (for example, if the EMA-installed version is a more recent version), you can edit the setup scripts to put the EMA-installed gnuplot location at the beginning of PATH. The setup scripts already contain a line to do this, which is commented-out by default. Just comment-out the line that puts the directory at the end of PATH, and un-comment the line that puts the directory at the beginning of PATH. There are comments in the setup scripts that tell you how and where to do this.

You should also be able to read the gnuplot man page:

```
% man gnuplot
```

NOTE: If the man page does not come up, you may need to run "catman" to create the "windex" databases in the MANPATH directories. See your system administrator or UNIX or Linux documentation for details.

Special Note for SuSE Linux Enterprise Desktop 10

The default installation of Gnuplot for 64-bit Linux was compiled for Red Hat Enterprise Linux 3, and may not work properly on SuSE Linux Enterprise Desktop 10, due to some differences in the libraries with which Gnuplot is linked on the two different systems.

An installation of Gnuplot for SLED 10 is also included. It can be found at

<install_location>/ema3d313/gnuplot4.0.0-suse10

To use the SuSE version of Gnuplot, edit the EMA3D setup script "ema3d_setups_sh" or "ema3d_setups_csh" as follows:

1) Find the lines in the setup script that set the following environment variables:

PATH
MANPATH
GNHELP
GNUPLOT_DRIVER_DIR

2) Edit each of these lines to use the "gnuplot-4.0.0-suse10" directory instead of the default "gnuplot4.0.0" directory.

gnuplot source code distribution included

The installation script installs a copy of gnuplot that has been pre-compiled by EMA, from the gnuplot source code distribution, for the appropriate platform and using the default set of terminal drivers.

A copy of the raw gnuplot source code distribution is also included on the EMA3D CD but is not installed by the installation script. This can be used, if desired, to compile a version of gnuplot for some other platform, or to add or remove terminal drivers for particular terminal types.

The source code is set-up to compile more or less automatically on a variety of systems. For more information, look on the EMA3D CD in the following directory:

unix/gnuplot-4.0.0

and read the file "gnuplot-4.0.0.readme". You will find instructions for both compilation and installation on a wide variety of platforms.

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

http://www.gnuplot.info

DISCLAIMER

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

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

## Adobe Acrobat Reader

Most of the manuals included with the EMA3D distribution are in Adobe Portable Document Format (PDF). Viewing them requires Adobe Acrobat Reader, which is available for free.

### Acrobat Reader from Adobe

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

http://www.adobe.com

### Acrobat Reader from the EMA3D CD

Acrobat Reader is included on the EMA3D 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 subdirectory "unix/acrobat" of the the CD-ROM. Look for a directory corresponding to your platform, for example "unix/acrobat/solaris8" or "unix/acrobat/irix6.5", then look for a directory called "install", then look for a file called "README" in the "install" directory for further instructions.

## License Server Installation and Startup – Reprise License Manager

The 64-bit Linux version of EMA3D uses the Reprise License Manager (RLM) from Reprise Software.

To use a floating/network license key, you will need to install and start the license server.

Use the following instructions to install the RLM license server on a Linux machine.

If you are using a standalone license key, setting up the license server is not necessary, and is not recommended, as it may confuse things.

### License Server Installation

1) Select a machine to be the license server

2) Run the EMA3D installation script to install the license server software on this machine.

- Selecting the "EMA3D" installation option will install all the EMA3D application files plus the license server software.

- The "EMA3D License Manager Only" installation option will install just the license server software and utilites without installing the entire set of EMA3D application files.

### License Server Startup

Once the licensing software has been installed on a machine, the license server can be started by changing dir to the "lic" subdirectory of the EMA3D installation and using the following command:

```
% ./rlm
```

If you wish you can use the "-dlog" option to specify the debug log file; and the "-c" option to specify the license file:

```
% ./rlm –d /opt/ema/ema3d313/linux/ema3d313/lic/debug_log.txt \
      -c /opt/ema/ema3d313/linux/ema3d313/lic/ema.lic
```

To run the license server in the background, use "&":

```
% ./rlm –d /opt/ema/ema3d313/linux/ema3d313/lic/debug_log.txt \
      -c /opt/ema/ema3d313/linux/ema3d313/lic/ema.lic &
```

A command like the above can be put in a system startup script so that the license server is started every time the machine boots. In this case use full path names for everything:

```
% /opt/ema/ema3d313/linux/ema3d313/lic/rlm \
      –d /opt/ema/ema3d313/linux/ema3d313/lic/debug_log.txt \
      -c /opt/ema/ema3d313/linux/ema3d313/lic/ema.lic &
```

See your system documentation for more information on system startup scripts.

## License Server Control Script

A system startup script is provided which can be used to start, stop and control the license server. It can be found at:

<installation_dir>/ema3d313/lic/rlm_ema_daemon

This script is a template or example which should be edited to fit your site before use. In particular, the location of the license server binary files, and possibly of the license file, will need to be set. See the comments in the script for further instructions.

The script can be placed in the proper init.d directory with links into the appropriate rc.d directory(ies) in order to start and stop the license server automatically upon system startup or shutdown.

For Linux, it is recommended to put a "start" script in runlevels 3, 4, and 5, and a "kill" script in runlevels 0, 1, 2 and 6.

DISCLAMER: Since daemon control scripts might be used differently on different systems, EMA does not guarantee that this script might not cause some undesirable effect on your system, or that it will work as-is without being edited to fit your site and system. You should read the script before using it to understand what it is doing, and edit it to fit your installation.

NOTE: The script launches the license server daemon process as user "rlm". Running application daemons as user "root" is not recommended as a general precaution. You should either create a user "rlm" on your system for running the daemon, or edit the appropriate line(s) in the startup script to run the daemon as some other user.

## Querying the License Server with "rlmstat"

The status of the license server can be queried with the utility "rlmstat", one of the licensing utilities in the "lic" folder of the EMA software or license server installation.

This is useful after installing a new license key file, to verify that the license server has correctly loaded the license keys from the file.

rlmstat can be run on the license server machine, as follows:

example:

```
$ ./rlmstat –c 2764@localhost –a
```

You can also query the license server from another machine by replacing "localhost" in the above example, with the license server machine name.

NOTE: 2764 is the port on which the RLM license server listens for license requests and status inquiries.

## Managing the License Server with the Embedded Web Interface

The RLM license server has an embedded web interface which can be used to perform some management functions and check its status.

To use this feature, start a web browser on any machine and go to the following URL:

http://server-name:9000

NOTE: "server-name" should be replaced with the name of the machine on which the license server is running. The RLM embedded web server interface accepts connections on port 9000.

## Installing a License Key File

### Licensing Overview

The 64-bit Linux version of EMA3D uses Reprise License Manager (RLM) from Reprise Software.

EMA3D using RLM supports either a standalone license or a floating/network license.

### Overall Procedure for Obtaining and Installing a License Key

1) Generate locking information for the license server machine (for a floating/network license) or for the individual machine(s) (for a standalone license).

2) Transmit the locking information to EMA. You will receive one or more license key files (usually by e-mail).

3) install the key file(s) in the correct location(s)

4) For a floating license, start or re-start the license server to pick up the new key file.

For instructions for installing and starting the license server, see the section "License Server Installation and Startup".

Follow the instructions below for steps 1-4 above:

**Step 1) Obtain machine locking codes and transmit them to EMA**

Machine Locking Codes

To generate the machine lock code(s) on Linux:

1) Start a command-line prompt or terminal window and change directory to the folder containing the licensing utilities. This should normally be the "lic" directory of the EMA software or license server installation.

example:

```
% cd /opt/ema/ema3d313/linux/ema3d313/lic
```

2) Run the utility "rlmhostid":

example:

```
% ./rlmhostid

rlmhostid v3.0 Copyright (C) 2006-2007, Reprise Software, Inc. All rights
reserved
Hostid of this machine: 83cc5fc1
```

NOTE: Do not confuse "rlmhostid" with any native UNIX or Linux command. "rlmhostid" is a utility supplied by Reprise Software for use with Reprise License Manager; it may or may not give the same information as some other native UNIX or Linux "hostid" command.

3) Transmit the resulting information to EMA.

Return the resulting locking code(s) to EMA and EMA will send the appropriate license key file(s).

**Step 3) Install license key file(s)**

License Key File Installation – standalone license

A standalone license key file for EMA3D will usually be named "ema3d.lic". To install a standalone EMA3D license key file:

1) Place the license key file "ema3d.lic" in the "bin" directory of the EMA3D software installation. This is the same directory containing the EMA3D executable, "ema3d".

2) Set the environment variable "RLM_LICENSE" to the full path name of the license key file.

example (bash):

```
$ export RLM_LICENSE=/opt/ema/ema3d313/linux/ema3d313/bin/ema3d.lic
```

NOTE: The environment variable must be exported; in bash, you can use either "export" or "declare –x".

NOTE: The full path name of the license key file, including the file name, must be used; not just the directory containing it.

NOTE: If you already have RLM_LICENSE set for some other purpose (such as products from other vendors using RLM), you can use the environment variable emalm_LICENSE instead:

example (bash):

```
$ export emalm_LICENSE=/opt/ema/ema3d313/linux/ema3d313/bin/ema3d.lic
```

NOTE: emalm_LICENSE must be spelled exactly as shown: "emalm" is lowercase, "LICENSE" is uppercase.

You can put a command to set RLM_LICENSE or emalm_LICENSE in a system login script, or in users' login scripts or shell startup scripts, so that the license key file is available when users log on.

You can test whether RLM_LICENSE or emalm_LICENSE is set correctly, by logging on as an ordinary user (not root) and attempting to read the license key file by using the environment variable.

example:

```
% cat $RLM_LICENSE
or
% cat $emalm_LICENSE
```

and you should be able to see the contents of the license key file.

License Key File Installation – floating license

A floating license key file will usually be named "ema.lic". Before installing a floating license key file, set up the license server as described in "License Server Installation and Startup".

To install a floating EMA3D license key:

1) Place the key file "ema.lic" in the license server directory. This is the same directory containing the license server executables "rlm" and "emalm", and other licensing tools. It will normally be the "lic" directory of the EMA software or license server installation directory.

2) Set the environment variable "RLM_LICENSE" to the full path name of the license key file.

example (bash):

$ export RLM_LICENSE=/opt/ema/ema3d313/linux/ema3d313/bin/ema3d.lic

NOTE: The environment variable must be exported; in bash, you can use either "export" or "declare –x".

NOTE: The full path name of the license key file, including the file name, must be used; not just the directory containing it.

NOTE: If you already have RLM_LICENSE set for some other purpose (such as products from other vendors using RLM), you can use the environment variable emalm_LICENSE instead:

example (bash):

$ export emalm_LICENSE=/opt/ema/ema3d313/linux/ema3d313/bin/ema3d.lic

NOTE: emalm_LICENSE must be spelled exactly as shown: "emalm" is lowercase, while "LICENSE" is uppercase.

You can test whether RLM_LICENSE or emalm_LICENSE is set correctly, by logging on as an ordinary user (not root) and attempting to read the license key file by using the environment variable.

example:

% cat $RLM_LICENSE
or
% cat $emalm_LICENSE

and you should be able to see the contents of the license key file.

NOTE: Setting RLM_LICENSE or emalm_LICENSE on the server machine is not necessary if the "-c" option to the rlm startup is being used (see the license server startup script and the section "License Server Installation and Startup"). However, setting RLM_LICENSE or emalm_LICENSE will help with some of the licensing tools such as "rlmstat" (see "License Server Installation and Startup").

3) If the license server is already running, you should stop and re-start it to pick up the new key file. Otherwise, start the license server.

NOTE: If the license server is to manage licenses for several EMA products, you can put the the various .lic files for the different products into the license server directory and the license server should find them all.

Client Configuration for Floating License

After the license server is installed and started, and a floating license key file has been installed, the client (machine on which EMA3D is running) must be configured to enable it to find the license server machine and check out a license.

To do this, set the environment variable RLM_LICENSE on the client machine to 2764@server-name as follows:

example (bash) (on the client machine):

```
$ export RLM_LICENSE=2764@server-name
```

NOTES:

- "server-name" should be replaced by the name of the license server machine running the RLM license server on your network.

- 2764 is the RLM port number

- the environment variable must be exported

NOTE: If RLM_LICENSE is already in use for some other purpose (such as a license server or key file specification for a product from some other vendor using RLM), the environment variable emalm_LICENSE can be used instead:

example (bash):

```
$ export emalm_LICENSE=2764@server-name
```

NOTE: emalm_license must be spelled exactly as shown: "emalm" is lowercase, "LICENSE" is uppercase.

You can put a command to set RLM_LICENSE or emalm_LICENSE in a system startup script or users' startup scripts or shell initialization scripts, so that things are set up for the application to check out a license when users log on.

## License System Documentation and Further Information

For more detailed or advanced information about Reprise License Manager, see the RLM End User Guide, located in the EMA software installation at:

<install_dir>/lic/doc/RLM_Endser.html

## Appendix A: EMA3D Environment Variables

EMA3D is tied together with CADfix through several environment variables. These environment variables convey to CADfix, the locations of certain files provided by EMA, which are incorporated by CADfix into the operation of the CADfix GUI.

Shell scripts to set these variables are created by the installation program and placed in the top-level installation directory, so setting these variables is automatically done if these scripts are sourced.

If you experience trouble with environment variables, or wish to do something unusual with your installation, the following is a list and description of the required EMA3D environment variables, and their required values.

Symptoms of trouble with EMA3D environment variables may include:

- EMA3D CADfix GUI toolboxes or tools not appearing under the drop-down list of toolboxes in the CADfix GUI

- EMA3D macros not being found when you try to invoke them from CADfix (either from a tool button or by name from the CADfix command-prompt)

- a TCL error to the effect of "unknown command" or "command not found" when you try to launch an EMA3D CADfix GUI tool.

**EMA3D Environment Variables for CADfix**

| Variable | Meaning and required value |
|---|---|
| CADFIXSITECONFIG | Conveys to CADfix the location of the custom site-level CADfix configuration file, named "CADfix", which contains the definitions of the EMA-provided CADfix toolboxes and tool buttons which should appear in the CADfix GUI.<br><br>Typical value:<br><br><install_dir>/ema3d313/fammacros |
| FAMMACROPATH | Conveys to CADfix the location of the custom EMA macros which can be run from within CADfix either by name, or (for some macros) from a tool button inside an EMA toolbox.<br><br>Typical value:<br><br><install_dir>/ema3d313/fammacros |
| EMATCL | Conveys to CADfix the location of the EMA TCL source files, which are the source code for some of the EMA CADfix GUI tools that appear in some of the EMA toolboxes.<br><br>Typical value:<br><br><install_dir>/ema3d313/tclsrc |
| EMABITMAPS | Conveys to some of the EMA CADfix GUI tools, the location of bitmaps which are displayed for illustrative purposes in some of the EMA CADfix GUI tool dialog boxes.<br><br>Typical value:<br><br><install_dir>/ema3d313/tclsrc |

**Additional EMA3D environment variables not related to CADfix:**

| Variable | Meaning and required value |
|---|---|
| PATH | Conveys to the system, the locations of directories in which to look for executable programs invoked from the command line.<br><br>Typical value added to PATH for an EMA3D installation:<br><br><install_dir>/ema3d313/bin |
| MANPATH | Conveys to the system, the locations of directories in which to look for man pages.<br><br>Typical value added to MANPATH for an EMA3D installation:<br><br><install_dir>/ema3d313/docs/man |

**Additional environment variables used by the EMA installation of gnuplot:**

| Variable | Meaning and required value |
|---|---|
| GNUHELP | Conveys to the gnuplot, the location of the gnuplot help file, so that interactive help is available from within gnuplot.<br><br>Typical value:<br><br><install_dir>/ema3d313/<br>gnuplot4.0.0/share/gnuplot/4.0/gnuplot.gih |
| GNUPLOT_DRIVER_DIR | Conveys to gnuplot, the location of the directory containing the gnuplot X11 driver file which is necessary for the proper operation of gnuplot.<br><br>Typical value:<br><br><install_dir>/ema3d313/gnuplot4.0.0/libexec/gnuplot/4.0 |

**Environment variables used by the Reprise License Manager (RLM) licensing system:**

| Variable | Meaning and required value |
|---|---|
| RLM_LICENSE<br>or<br>emalm_LICENSE | Specifies the location of the license key file.<br><br>typical value:<br><br><install_dir>/ema3d313/bin/ema3d.lic<br><br>or<br><br>2764@server-name<br><br>emalm_LICENSE can be used instead of RLM_LICENSE if you are already using RLM_LICENSE for something else (such as products from other vendors using RLM). |

For more information or assistance with environment variables, consult your Linux documentation or system documentation or contact EMA, Inc.

## Appendix B: Platform Compatibility & System Requirements

The following are the system requirements for EMA3D version 3.1 for UNIX. Please note that these are the system requirements for EMA3D only. CADfix (a separate software package that serves as a graphical front- and back-end to EMA3D) has its own system requirements that are separate from those listed below for EMA3D. Consult the CADfix Installation Guide for system requirements for CADfix.

Some system requirements are platform-specific, others are common to all variants of UNIX.

### SUN Solaris

The SUN Solaris version of EMA3D in this distribution was prepared on a SUN Ultra60 running Solaris 8. Here are the SUN Solaris-specific system requirements:

Hardware Platform:
processor: SUN SPARC family processor.

Software Platform:
operating system: Solaris 8 or compatible.

### SGI IRIX

The SGI IRIX version of EMA3D in this distribution was prepared on an SGI Octane running IRIX 6.5.20. Here are the SGI IRIX-specific system requirements:

Hardware Platform:
processor: SGI MIPS processor or compatible.

Software Platform:
operating system: SGI IRIX 6.5.x.

### Linux - 32-bit

The Linux version of EMA3D in this distribution was prepared on a 32-bit Intel platform running Red Hat Enterprise Linux 3.0. Here are the Linux-specific system requirements:

Hardware Platform:
processor: Intel x86-family 32-bit processor.

Software Platform:
operating system: RedHat Enterprise Linux 3.0 or compatible.

Linux - 64-bit

The 64-bit Linux version of EMA3D in this distribution was prepared on a 64-bit x86_64 Intel platform running Red Hat Enterprise Linux 3.0. Here are the Linux-specific system requirements:

| | |
|---|---|
| Hardware Platform: | |
| processor: | Intel x86-family 64-bit processor (x86_64). |
| Software Platform: | |
| operating system: | RedHat Enterprise Linux 3.0 64-bit x86_64 or compatible. |

UNIX/Linux (all)

Here are the system requirements common to all versions of UNIX:

| | |
|---|---|
| Hardware Platform: | |
| hard disk space (installation): | 180 MB |
| hard disk space (user)*: | 1 GB minimum,<br>5 GB or more recommended |
| system memory**: | 256MB minimum,<br>500MB - 2 GB 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<br>or display requirement |
| Software Platform: | |
| graphics system: | no graphics requirement |

*User disk space requirements vary significantly depending on the amount of input and output data required for a particular EMA3D problem (input/output data file size), and the amount of space required for associated data files that may be produced in the course of pre- or post-simulation analysis. Input and output data file size can vary for the same problem depending on length of simulation, number of output probes and time-spacing of output data points, and many other factors. Since disk space is relatively cheap, a good rule of thumb is "the more, the better".

**System memory requirements vary significantly depending on what types of problems you want to solve with EMA3D. The memory image size of a particular EMA3D problem is affected by many factors related to the nature of the problem and how you are solving it. EMA3D itself imposes no upper limit on the possible memory image size of an EMA3D computation; on the other hand, some useful EMA3D problems can be solved with only a few kilobytes of memory. The requirements mentioned are rough guidelines only, and should allow you to solve a variety of useful EMA3D problems.

For more specific advice regarding memory requirements for your problems of interest, contact EMA, Inc.

Note that these are memory requirement suggestions for the EMA3D problem memory image size by itself, and does not include memory required by the operating system. For best performance, additional memory should be allowed for the operating system and/or other applications or system software.

## Appendix C: CADfix Compatibility

EMA3D version 3.1 is designed for use with CADfix versions 5.1, 6.0, and 7.0. CADfix is a product of Transcendata Europe Ltd.

## Appendix D: Gnuplot Copyright

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

GNUPLOT v4.0.0 COPYRIGHT