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 Windows

EMA3D version 3.1.3 15-January-2008

EMA3D version 3.1 Software Installation Guide for Windows

C O N T E N T S

Introduction

This Installation Guide is for the Windows (32-bit) version of EMA3D. For other platforms, see the appropriate Installation Guide for that platform.

EMA3D Installation Documentation

A copy of this document is also on the EMA3D CD, in the folder "win\installdocs".

Installing CADfix - Use the "CAE Modeller" Setup Type

EMA3D uses the software product CADfix as a graphical front-end. 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 used to install the CADfix license manager on a machine without installing the full set of CADfix application files.

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) locate the documentation - see section "EMA3D Documentation"
4) 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.

Installing EMA3D

Perform the following steps to install EMA3D on Windows:

1) Log on as the Windows Administrator.

2) Load the EMA3D CD into the CD-ROM drive.

3) Using Windows Explorer, go to the "win\ema3d" folder on the CD-ROM. Double-click on "Setup.exe" to begin the installation.

The installation program will give you some choices including installation location and setup type.

The default installation location is

C:\Program Files\EMA\EMA3D3.1.3

The "Typical" setup type is recommended.

The "Custom" setup type gives you more control over what to install.

If you wish to install just the license server without installing any of the EMA3D application files or accessories, choose the "Custom" setup type and select just the licensing components of the installation. (See the section "License Server Installation and Startup").

NOTE: Even if you will not be running the license server on the machine on which you are installing EMA3D, it is recommended to install the licensing components if you choose a "Custom" installation type. The licensing components include some tools that are useful for working with license key files and querying the license server.

Runnning EMA3D

Introduction

EMA3D is a batch-style, non-interactive numerical simulation tool. Unlike most Windows programs, EMA3D is command-line-oriented rather than window-oriented. This means that it is run by entering the name of the program, and the name of an input file, at a Windows command prompt, rather than by clicking on an icon or a program shortcut.

The software program CADfix serves as a graphically-oriented, window-oriented, user-interactive front-end program for building/importing geometrical models and assigning properties for the EMA3D simulation. EMA3D itself, however, is a numerical solver that simply runs non-interactively for some period of time, performing computations based on information created within CADfix and generating output data files suitable for further analysis.

The general idea is to build or import a geometrical model within CADfix, assign properties for the electromagnetic simulation (also within CADfix), then export all this data to an input file for EMA3D. EMA3D reads the input file and runs non-interactively until the computation is finished.

Running EMA3D

To run EMA3D, type the name of the program, "ema3d", at a Windows Command Prompt:

```
windows prompt> ema3d
```

If nothing happens, or if you get an error message like "The name specified is not recognized...", see "Appendix B: Windows PATH Environment Variable" near the end of this document.

EMA3D will prompt you for the name of an input file. You can give the input filename with or without the ".emin" extension (the file extension for EMA3D input files).

After checking the information in the input file for errors and consistency, EMA3D will proceed with the computation. See the User Manual Set for EMA3D for detailed information about using EMA3D and CADfix.

You can also supply the input file name as a command-line argument:

```
windows prompt> ema3d testmodel.emin
```

EMA3D version

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

```
windows prompt> e3dver
```

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

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

Start Menu→Programs→EMA→EMA3D v3.1.3→About EMA3D

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 parameters 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, which is run from a Windows command prompt:

```
windows 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:

```
windows prompt> famfromema3d testmodel.emout
```

NOTE: The EMA3D output file (*.emout file), and the corresponding CADfix database from which the model was built (*.fbm file), must both be in the current working directory when running 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, 6.0, and 7.0. 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:

```
windows prompt> famfromema3d510
```

For CADfix 6.0:

```
windows prompt> famfromema3d600
```

For CADfix 7.0, you can use the following:

```
windows prompt> famfromema3d700
```

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

EMA3D Documentation

The main EMA3D User Manual set can be accessed from the Start Menu. Look under

Start Menu→Programs→EMA→EMA3D v3.1.3

for the shortcuts to the EMA3D Manuals in Adobe Portable Document Format.

Some documentation does not have a shortcut on the start menu and is accessed by going directly to its location on your computer. Here is a full listing of the user manuals and documentation that are part of the EMA3D software installation:

Installation Documentation

docs\install_ema3d.pdf
- EMA3D Installation Guide for Windows (this document)

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

EMA3D User Manual Set

(listed in order):

docs\EMA3DGettingStartedManual.pdf	(#1)
docs\EMA3DOverviewManual.pdf	(#2)
docs\EMA3DTrainingManual.pdf	(#3)
docs\EMA3DProjectObjectivesManual.pdf	(#4)
docs\EMA3DPreparationManual.pdf	(#5)
docs\EMA3DReviewToolManual.pdf	(#6)
docs\EMA3DExecutionManual.pdf	(#7)
docs\EMA3DPostProcessingManual.pdf	(#8)

EMA3D tools/utilities documentation

docs/ema3d_utilities_ref.pdf

- EMA3D Utilities 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 (text format) (same information as in the EMA3D Utilities Reference manual)

gnuplot documentation

docs\gnuplot.pdf
- Gnuplot manual
docs\gpcard.pdf
- Gnuplot reference card
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 Sentinel LM license manager software

lic\docs\SLM71sys.pdf

- Rainbow Sentinel License Manager System Administrator's Guide (for system administrators or advanced users)

Files with a name like "README", "*.readme", "*.README" or "*.txt" are text files that may be viewed with any text file viewer (such as Notepad or Wordpad on Windows).

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, go the the "File" menu, "Open..." command and navigate to the location of the desired document.

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

EMA3D Utilities

Several command-line utilities, useful in working with data files produced by and used with EMA3D, are part of the EMA3D distribution. They are located in the "bin" folder of the EMA3D installation. You can run them from a command prompt the same way you run ema3d. For example,

windows prompt> 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 (default installation location shown):

C:\Program Files\EMA\ema3d3.1.3\docs

The file "ema3d_utilities.README" contains a listing and top-level description of all of the utilities. Each utility also has its own README file, and all of them are documented in the EMA3D Utilities Reference Manual. See the section "EMA3D Documentation".

You can also access the EMA3D Utilities Reference Manual from a shortcut on the Windows Start Menu:

Start Menu→Programs→EMA→EMA3D v3.1.3→EMA3D Utilities Reference

gnuplot

EMA3D result waveforms may be viewed with any available third-party plotting package. The freely-available "gnuplot" is suitable for this purpose, and is included on the EMA3D 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. If you wish to not have gnuplot installed with the EMA software, choose the "Custom" installation type and un-check the gnuplot component.

The installation program adds the gnuplot "bin" folder to the value of the environment variable PATH, so that gnuplot may be run from a command line. The name of the Windows version of the gnuplot program is "wgnuplot".

example:

windows prompt> wgnuplot

There will also be a shortcut on the Start Menu:

Start Menu→Programs→EMA→EMA3D v3.1.3→gnuplot 4.0.0

install gnuplot separately

gnuplot may be installed separately from the EMA software at any time. To install gnuplot separately, go the 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.

DISLCAIMER

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 EMA3D CD and in the EMA software installation.

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

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

http://www.gnuplot.info

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 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.

License Server Installation and Startup – Sentinel LM - Windows

Overview

The Windows (32-bit) version of EMA3D uses the Sentinel License Manager (SLM) from SafeNet Technologies.

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

To use a floating/network license key, you will need to install and start the license server. Use the following instructions to install and start the SLM license server on a Windows machine.

If you wish to run the SLM license server on another platform, see the EMA3D Installation Guide for that platform for instructions.

If you are using a standalone license, setting up the license server is not necessary, and is not recommended, as it may confuse things. If you are using a standalone license, skip this section and go to the section "Installing a License Key File".

License Server Installation

1) Select a machine to be the license server

2) Run the EMA3D setup from the EMA3D CD to install the license server software on this machine.

   - The "Typical" installation type will install all of the EMA3D application files plus the license server software.

   - To install just the license server software and associated utilities without installing all of the EMA3D application files, select the "Custom" installation type and make sure only the "License Server & Tools" component is checked.

   NOTE: If you have already run a "Typical" installation to install EMA3D and also wish to use this same machine as the license server, you do not need to run the installation again.

License Server Setup – Register as a Windows Service

Before being used, the license server must be loaded as a Windows service. To do this:

1) Log on as the Windows Administrator.

2) Using Windows Explorer, go to the license server folder. This should normally be the "lic" folder under the EMA3D software or license server installation location. It will typically be something like:

   C:\Program Files\EMA\EMA3D3.1.3\lic

3) Run the program "loadls.exe" in the "lic" folder by double-clicking on it.

4) "loadls" will prompt you for the directory where the license server executable "lservnt.exe" is. This should be the same "lic" folder where you are running "loadls.exe" from. Check the location displayed under "Executable Path" in the "loadls" dialog box; and check the contents of the

license server folder to make sure "lservnt.exe" is there. When you are sure the path is correct, press "Add".

5) Quit the "LoadLS" program.

The license server is now registered as a Windows service and can be controlled from the Windows Services control application.

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.

License Server Startup

The last step is to configure the startup of the license manager.

1) Find the Services management application for managing Windows services.

NOTE: This can typically be found somewhere like

Control Panel→Services;

but varies slightly for different versions of Windows. Consult your system administrator or Windows documentation, or contact EMA for assistance, if you do not know where to find this.

2) Find "SentinelLM" in the list of services. Double-click on it to display the startup-configuration dialog. Choose "automatic" or "manual" startup type as desired.

- "Automatic" is recommended; this will start the license server service whenever the machine boots.

- If you choose "manual", you will have to manually start the server each time you reboot the computer, either from the "Services" control application, or from a command prompt using the Windows "net start" command.

NOTE: You can press "Start" to start the license server now without re-booting the machine.

3) Click "OK" to dismiss the dialog box; then you can close the Services management application.

License Server Query – command-line tool - lsmon

You can use the command-line utility "lsmon", in the license server directory, to query the license server and check its status.

example:

```
windows prompt> cd /d C:\Program Files\EMA\EMA3D3.1.3\lic
windows prompt> .\lsmon
```

lsmon will find and contact the license server and show the status of the licenses.

You can also specify the license server machine name:

example:

```
windows prompt> .\lsmon server-name
```

NOTE: "server-name" should be replaced by the name of the machine running the SLM license server.

License Server Query – graphical tool - Wlmadmin

You can also use the tool "Wlmadmin" to query the license server and check its status. WLmadmin is a graphical tool which displays the status of any SLM license servers on your network and shows the licenses in use.

1) Using Windows Explorer, go to the license server or license tools folder (the "lic" folder of the EMA3D or license server installation).

2) Find the program "Wlmadmin.exe" and double-click on it to start it.

Installing a License Key File

Overview

The Windows (32-bit) version of EMA3D uses the Sentinel License Manager (SLM) from SafeNet Technologies.

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

Overall Procedure for Obtaining and Installing a License Key File

1) Generate locking information for the machine(s) on which you are running EMA3D (for a standalone license key), or for the license server machine (for a floating/network license key).

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 key, start or re-start the license server to pick up the new key file.

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

Follow the instructions below for steps 1-4 above:

Step 1 & 2) Obtain machine locking codes and transmit them to EMA

Machine Locking Codes

To generate the machine locking code(s) for Windows, use ONE of the following two methods.

NOTE: If you are using a floating/network license key, do this on the license server machine only. If you are using a standalone license key, do this on each of the machine(s) where you are running EMA3D.

METHOD #1: Shortcut on Start Menu

Click on the following shortcut on the Start Menu:

Start Menu --> Programs --> EMA --> EMA3D v3.1.3 --> Show Machine ID (for licensing)

If there is no such shortcut on your Start Menu, use METHOD #2 below.

METHOD #2: Run "echoid" from Windows Explorer

Using Windows Explorer, navigate to the license server and tools folder of the EMA3D or license server installation. This will typically be something like:

C:\Program Files\EMA\EMA3D3.1.3\lic

Find the program "echoid.exe" and double-click on it to run it and display the locking codes:

example output from "echoid":

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

METHOD #3: Run "echoid" from EMA3D CD

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 EMA3D or the licensing software, "echoid" can be run directly from the EMA3D 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.

When you have obtained the "Locking Codes" for your machine(s), transmit the information to EMA and EMA will send the appropriate license key file(s).

NOTE (for advanced users or system administrators):
When running "echoid.exe", 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 created by the installation program, or by navigating to its location using Windows Explorer.
If you run "echoid.exe" from a Windows Command Prompt, make the "lic" folder your current working directory before doing so. Running "echoid.exe" from some other working directory will result in incorrect locking codes.
(As an alternative, the file "echoid.dat" could be copied to the current working directory from where you are running "ecohid.exe".

Step 3) Install license key file(s)

License Key File Installation – standalone license key

The license key file will be named "lservrc".

To install a standalone license key file, place the key file "lservrc" in the "bin" folder of the EMA3D installation. This should be the same folder containing the EMA3D executable, "ema3d.exe". It will typically be something like:

C:\Program Files\EMA\EMA3D3.1.3\bin

Now the application should automatically find the license key file when you run it.

IMPORTANT NOTE: The license key file name MUST be spelled "lservrc", with no file extension; not "lservrc.dat" or "lservrc.txt" or any other file extension. Some e-mail programs automatically add an extension such as ".txt" or ".dat" when saving an attachment that does not have a file extension.

You may need to un-select "Hide Extensions for Known File Types" in the "Tools→Folder Options" menu of Windows Explorer when viewing the contents of the "bin" folder, to see if the file name has an extension. If so, re-name the file to just "lservrc" with no extension.

License Key File Installation – floating license key file

A floating license key file will be named "lservrc".

To install a floating EMA3D license key:

1) Place the key file "lservrc" in the license server directory. This should be the directory containing the license server executable "lservnt.exe", and other licensing-related tools. It will typically be something like:

"C:\Program Files\EMA\EMA3D3.1.3\lic"

2) If the license server is already running, stop and re-start the license server to pick up the new key file. Otherwise, start the license server (you can start it from the Windows services control application).

NOTE: If you already have a floating license key file named "lservrc" containing license keys 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. Make sure there is exactly one license key string on each line of the file (see "License Key File Format" below).

IMPORTANT NOTE: The license key file name MUST be spelled "lservrc", with no file extension; not "lservrc.dat" or "lservrc.txt" or any other file extension. Some e-mail programs automatically add an extension such as ".txt" or ".dat" when saving an attachment that does not have a file extension.

You may need to un-select "Hide Extensions for Known File Types" in the "Tools→Folder Options" menu of Windows Explorer when viewing the

contents of the "bin" folder, to see if the file name has an extension. If so, re-name the file to just "lservrc" with no extension.

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.

If the format becomes altered or if you experience trouble, check the following:

- Every line in the license key 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.

License System Documentation and Further Information

For more detailed or advanced information about the Sentinel License Manager, refer to the "Sentinel License Manager System Administrator's Guide", located in the EMA software installation at:

<install_dir>\lic\docs\SLM71sys.pdf

A copy of the guide is also included on the EMA software CDROM, in the folder:

win\license\docs

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.

These variables are set automatically by the installation program, so normally you do not need to worry about them.

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. Typical value: C:\Program Files\EMA\EMA3D3.1.3\FAMmacros
FAMMACROPATH	Conveys to CADfix the location of the custom EMA macros invokable from within CADfix either by name, or (for some macros) from a tool button inside an EMA toolbox. Typical value: C:\Program Files\EMA\EMA3D3.1.3\FAMmacros
EMATCL	Conveys to CADfix the location of TCL source files that implement the functionality of some of the EMA CADfix GUI tools that appear in some of the EMA toolboxes within CADfix. Typical value: C:/Program Files/EMA/EMA3D3.1.3/TCLsrc IMPORTANT NOTE: the value of this particular environment variable must contain forward-slashes, as shown, not

backwards-slashes like a typical Windows directory pathname. This is due to the way CADfix reads this particular environment variable. Forward-slashes are necessary for the value of the EMATCL environment variable only; other environment variables can use the typical Windows backwards-slash.

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.

Typical value:

C:\Program Files\EMA\EMA3D3.1.3\TCLsrc

Additional 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 run from the command line. Typical values added by installation program: C:\Program Files\EMA\EMA3D3.1.3\bin C:\Program Files\EMA\EMA3D3.1.3\gp400win32\gnuplot\bin

Environment variables used by Sentinel License Manager

Normally the application or license server finds the license key file automatically if it is placed in the correct location, which is the application binary directory for a standalone license, or the license server binary directory for a floating license. For a floating license, the application automatically finds the license server using a subnet broadcast.

However the following environment variables can help SentinelLM find the license key file, or help the application find the license server, if things are not working. For example, if the license server is on a different subnet (or if a router or switch does not relay broadcasts), the application will not automatically find the license server and LSHOST should be set as described below.

Variable	Meaning and required value
LSERVRC	Specifies the location of the license key file "lservrc". This should normally not be necessary unless you wish to install the license key file in a non-standard location. In this case, set LSERVRC to the full path name of the license key file. For the typical location of a standalone license, this would be: C:\Program Files\EMA\EMA3D3.1.3\bin\lservrc A typical location for a floating license would be: C:\Program Files\EMA\EMA3D3.1.3\lic\lservrc NOTE: LSERVRC must be set to the full path name of the key file, including the file name; not just the directory containing it.
LSHOST	For floating/network licensing only (on client machine): Specifies the name of the license server machine. Normally this should not be necessary. However, if the license server is on a different subnet than the application, or if the application is otherwise not finding the license server for some reason, you can set this to the name of the machine running the license server. You can also set this, if you wish, to bypass the broadcast mechanism of finding the license server and direct the application to directly contact the specified machine for a license. The license server machine can be specified either by name or by IP address.

LSFORCEHOST — For floating/network licensing only (on client machine): Specifies the name of the license server machine.

This environment variable has the same meaning as LSHOST, but is stronger. LSHOST gives the application a specific machine to contact when trying to check out a floating license, so as to not have to rely on a broadcast to locate a license server; but the application will also try other mechanisms to get a license, such as looking for a standalone license key file. LSFORCEHOST disables all other mechanisms of trying to get a license and forces the application to only try to get a floating license, from the specified machine.

LSFORCEHOST can be used when all else fails, if the application is not successfully finding the license server. When using LSFORCEHOST, remove any other SLM environment variables such as LSERVRC or LSHOST.

Appendix B: Windows PATH Environment Variable

Unlike most Windows programs, EMA3D is command-line oriented rather than window-oriented. This means that EMA3D and its utilities are used by typing the name of a program at a Windows Command Prompt, rather than opening the program by clicking on an icon on the Windows Start Menu or Desktop.

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 EMA3D using the automatic installation program, the installation program adds the full path name of the EMA3D "bin" folder to the PATH environment variable. The "bin" folder is where the EMA3D executable files are located.

If you get an error message saying something like "The name specified is not recognized..." when you try to run EMA3D as instructed in the section "Running EMA3D", this probably means the installation program was not able to add the EMA3D "bin" folder to the value of PATH. (If you get an error message from EMA3D indicating that it cannot obtain a license to run, this is a different error and only means that you must install a license key.) If this happens, you can manually add the EMA3D "bin" folder to the value of PATH.

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

C:\Program Files\EMA\EMA3D3.1.3\bin

The installation program also adds the gnuplot "bin" folder to PATH. This is typically:

C:\Program Files\EMA\EMA3D3.1.3\gp400win32\gnuplot\bin

NOTE: The procedure for editing environment variables can vary somewhat for different versions of Windows, so instructions are not included here. Consult your Windows documentation or system administrator, or contact EMA for assistance.

IMPORTANT NOTE: DO NOT REPLACE OR DELETE ANY EXISTING VALUE OF PATH!

If you edit the PATH environment variable, it is important to remember that you should only ADD one 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 one folder path name to the value of PATH, separated from the rest of the list of values by a semicolon (;).

Appendix C: Platform Compatibility & System Requirements

The following are the system requirements for EMA3D version 3.1 for Windows.

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.

Hardware Platform:

processor:	Intel x86-family processor or compatible
hard disk space (installation):	150 MB
hard disk space (user)*:	1 GB minimum, 5 GB or more recommended
system memory**:	256MB minimum, 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 or display requirement

Software Platform:

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

*Disk Space: 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. In fact, 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 other factors. Since disk space is rather cheap, a good rule of thumb is "the more, the better".

**Memory: 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 here are rough guidelines only, and should allow you to solve a variety of useful EMA3D problems.

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.

***Graphics: EMA3D is a command-line, non-interactive batch style computational tool and has no particular graphics requirements; it can be run in an ASCII terminal mode if desired.

On the other hand, CADfix has its own graphical requirements which should be consulted for best results with CADfix. See the Installation Guide for CADfix for graphics and other system requirements for CADfix.

Appendix D: 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 E: Gnuplot Copyright

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

GNUPLOT 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.
]*/
```