

EQS 6.4 for Mac Installation Guide

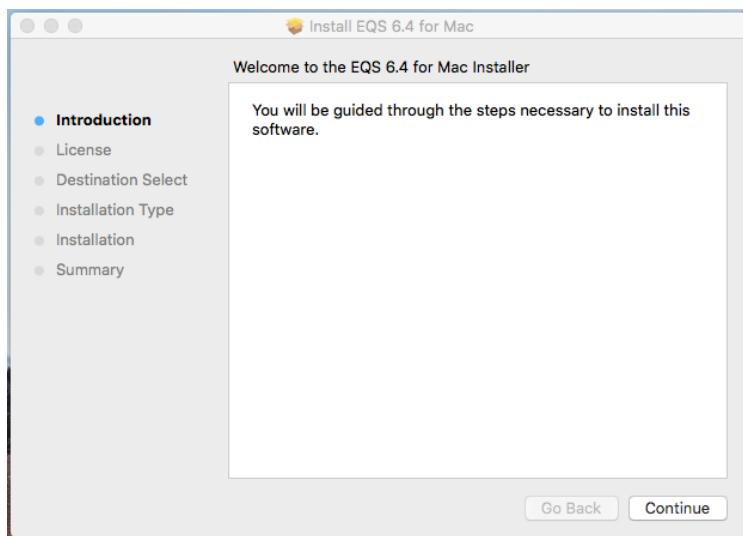
(2020-04-17)

Download the Install Package

Go to <http://www.mvsoft.com/eqsdownload.htm>, click on [*installation file*] related to EQS 6.4 for Mac to download. You will see the Download window popup and the file ***EQS64SetupMac.pkg.zip*** starts to download. Once the install package is completely downloaded, it is converted into ***EQS6SetupMac.pkg*** automatically in your download folder.

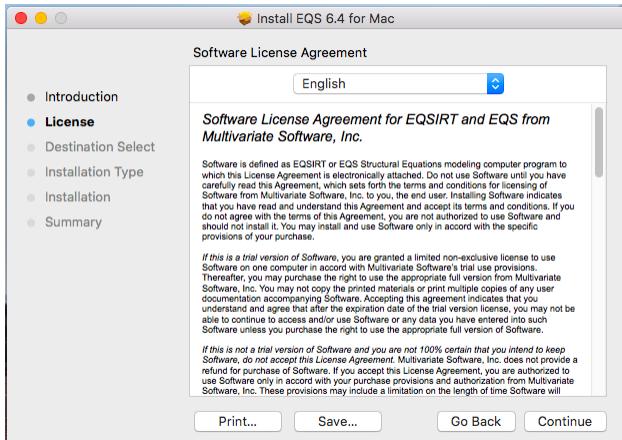
Install EQS 6.4 for Mac

Double click **on *EQS64SetupMac.pkg*** to initiate the install process. You will see the startup screen as the one shown below.

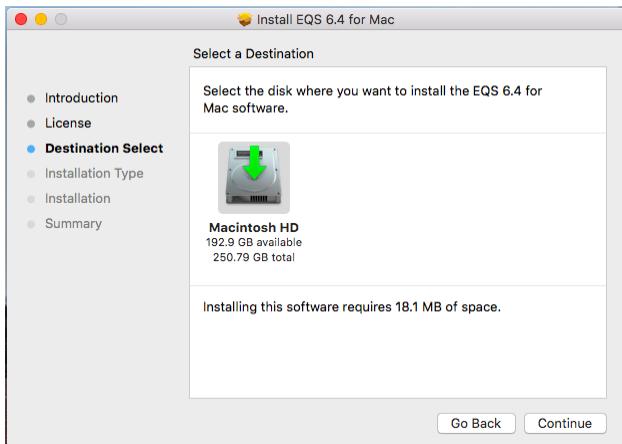


Click the **Continue** button to continue. You will be prompted a license agreement screen. You should read through the agreement to make sure that you agree with terms and conditions before you proceed. If you determine that you cannot abide the conditions set forth by this agreement, you should quit this setup process and arrange a refund for your purchase.

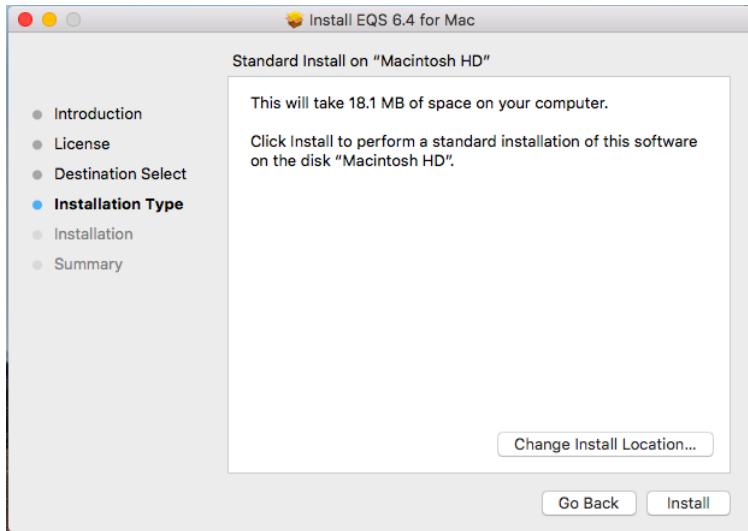
By proceeding with this installation process, you have implicit and explicit agreed with the license agreement. Next two screen shots are examples of what you will see on license issue.



Of course, you have to agree to continue. Next you will be asked to confirm where EQS 6.4 will be installed. By default, it will install into your hard drive. You will click on the **Continue** button on Select a Destination screen.



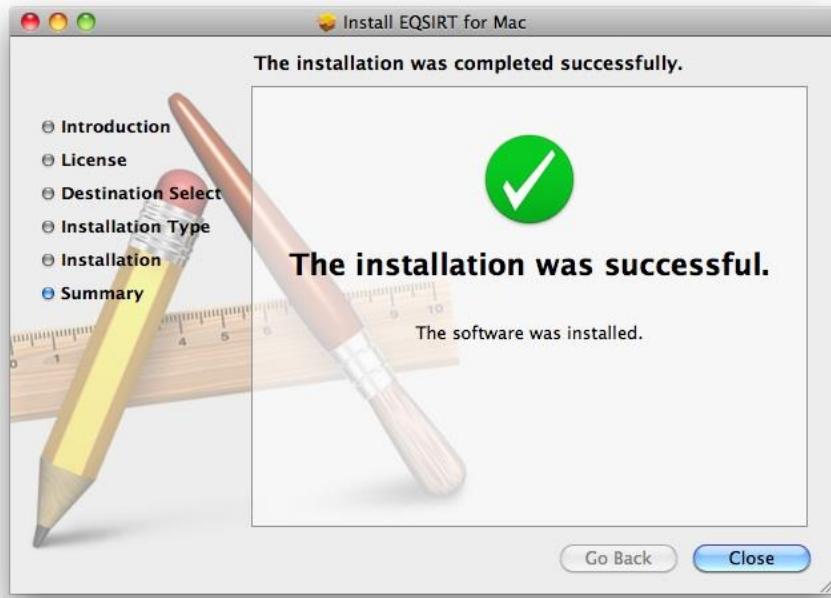
Subsequently, you have the chance to change the destination of the install files.



After the destination of all EQS 6.4 files is determined clicks the **Install** button, you will be asked for the password of your computer. This is the security feature built into your Mac. Enter your password and click the OK button.



The EQS 6.4 installation package will start to unpack files and copy them to your hard drive. By default, all EQS 6.4 files are copied to **/Applications/EQS64** folder. **The installation was successful** screen will appear. This concludes the file preparatory stage of the installation. You are ready to enter your license number. You are given a license number when you purchase the program. The license number needs to enter into the program so that it becomes functional.



Configure EQS 6.4 for Mac License

EQS 6.4 for Mac installation procedure only copies programs and examples to **/Applications/EQS64** folder. It does not enter appropriate license information into the command files in order for the program to work. Here are the procedures how you enter the license number.

- 1) Go to the terminal window (e.g. Click on **Terminal** from **/Application/Utilities** folder) and use a UNIX command “`cd /Applications/EQS64/pgm`” and press the **Enter** key. You will be taken to the target folder.
- 2) Enter the command “`./EQS64MacLicense.app ser=xxxxx`” then press the ENTER key. The “xxxxx” is the 18-digit license number that you received from Multivariate Software, Inc. Alternatively, you can enter the “`cd /Applications/EQS64/pgm`” command and press the **Enter** Key and enter the license number when it is prompted.
- 3) You will be notified “EQS 64 Setup Successfully” if the setup is complete. Two files are created as the result of this installation. The “`runeqs`” is the UNIX command script to simplify the running of EQS. The “`runeqs.r`” is the R script allows you to paste it to the R console to run EQS. Their details will be illustrated in next section. (please see the figure below)

```

Erics-MacBook-Air:~ ericwu$ pwd
/Users/ericwu
Erics-MacBook-Air:~ ericwu$ cd /applications/eqs64
Erics-MacBook-Air:eqs64 ericwu$ ls -al
total 128
drwxrwxr-x  9 root  admin   288 Apr 14 16:13 .
drwxrwxr-x+ 55 root  admin  1760 Apr 17 11:37 ..
drwxrwxr-x  6 root  admin   192 Apr 14 16:13 Docs
drwxrwxr-x  52 root  admin  1664 Apr 14 16:13 Examples
-rwxrwxrwx  1 root  admin  62501 Oct  7  2012 License.rtf
drwxrwxr-x  2 root  admin   64 Apr 14 16:13 formula
drwxrwxr-x  3 root  admin   96 Apr 14 16:13 log
drwxrwxr-x  4 root  admin  128 Apr 14 16:13 pgm
drwxrwxr-x  3 root  admin   96 Apr 14 16:13 tmp
Erics-MacBook-Air:eqs64 ericwu$ cd pgm
Erics-MacBook-Air:pgm ericwu$ ls -al
total 12448
drwxrwxr-x  4 root  admin   128 Apr 14 16:13 .
drwxrwxr-x  9 root  admin   288 Apr 14 16:13 ..
-rwxr-xr-x  1 root  admin  5786372 Apr 17 11:37 EQS64Mac.app
-rwxr-xr-x  1 root  admin  583656 Apr 17 11:37 EQS64MacLicense.app
Erics-MacBook-Air:pgm ericwu$ ./EQS64MacLicense.app
sh: /Users/ericwu: is a directory

Please enter your EQS64 for Mac/OSX license number
[REDACTED]

EQS64 for MAC/OSX has setup successfully
Erics-MacBook-Air:pgm ericwu$ 

```

Run EQS 6.4 for Mac as an Unix program

You are ready to run your EQS program from the system. This requires you to open a terminal window by clicking **Terminal** from **/Application/Utilities** folder. Once you are in the terminal mode (it is a unix command window, for those who does not familiar with unix commands, please ignore the “\$” since it is the unix system prompt and you don’t have to type it).

Option 1: Using Native UNIX commands

Enter the following two commands

```
$ cd /Applications/EQS64/Examples
$ /Applications/EQS64/pgm/eqs64mac.app in=manul3.eqs out=manul3.out
len=2000000 ser=xxxxxx
```

Please note the “xxxxxx” is your 18-digit license number (without spaces). On finishing the command, you will have to press the **Enter** key to launch the program.

If you are not familiar with the Unix system, the first command “`cd /Applications/EQS64/Examples`” will take you to “`/Applications/EQS64/Examples`” folder. Please note that the “`cd`” command (stands for Change Directory) and the folder “`/Application/EQS64/Examples`” has a space character in between them. We do this because all the EQS examples files are installed in the “`/Applications/EQS64/Examples`” folder. We just make this folder as the default folder for easier to work with. If your data and model files are stored in “`/users/myaccount/eqs_project`” folder, you will issue

```
$ cd /users/myaccount/eqs_project
```

Note: the dollar sign “\$” is the system prompt and you do not need to enter it in your command.

The second command “/Applications/EQS64/pgm/eqs64mac.app in=manul1.eqs out=manul1.out len=2000000 ser=xxxxxxxxxxxxxxxxxxxxx” is to run the EQS program (eqs64mac.app, and it is stored in /Applications/EQS64/pgm folder) with the following input arguments

IN= the input model file name. This input file is usually created with .eqs extension.
OUT= the output file name
LEN= internal working space. You start with 2000000 and can be increased if needed
SER= a 18-digit license number without spaces.

You have to enter this command every time you run the EQS program. Of course, you should specify the appropriate input model and output file names.

Option 2: Using UNIX Shell Script

An UNIX command file “runeqs” is installed in /Applications/EQS64/pgm folder. The command file has following lines

```
#  
#      Command to run EQS 6.4 for mac  
#  
/Applications/EQS64/pgm/eqs64mac.app in=$1.eqc out=$1.out len=2000000 ser=xxxxxx
```

As you can see, the license number has been inserted when this file is created during license initialization process. To run EQS, you first go the folder where your EQS model and data file reside and enter the command

```
$ /Applications/EQS64/pgm/runeqs manul3
```

where “manul3.eqc” is your EQS input model file. The program will run and the output file is stored in manul3.out. Alternatively, you can copy the UNIX scrip “runeqs” to you working folder then issue the command

```
$ runeqs manul3
```

to run the model manul3.eqc.

Option 3: Using R Package

The R statistical computing project (i.e. <http://www.r-project.org/>) provides a rich set of environment for statistical computing. One of the benefit of R is it can launch any program from its console window. We take advantage of this capability and use it to run EQS 6.4 for Mac. Unlike previous two options, this method allows us to work with EQS input model files, output files and running the program without the need of using any native UNIX commands. This

method is not for everyone. For those who are more technical savvy and/or knows R, this is a good alternative.

First of all, you have to download and install R for Mac. Using its built editor, you can open a R script run_eqs.r (this R file is also installed with your EQS 6.4 for Mac in the program folder). They are shown on the following figures. The left hand side is the R command windows or R console. The right hand side is the R editor to edit any text files.

The screenshot shows two windows side-by-side. The left window is the 'R Console' with a title bar 'R Console'. It contains the standard R startup message and help text. The right window is titled 'runeqs.r' and contains the R script code for running EQS 6.4. The code is as follows:

```

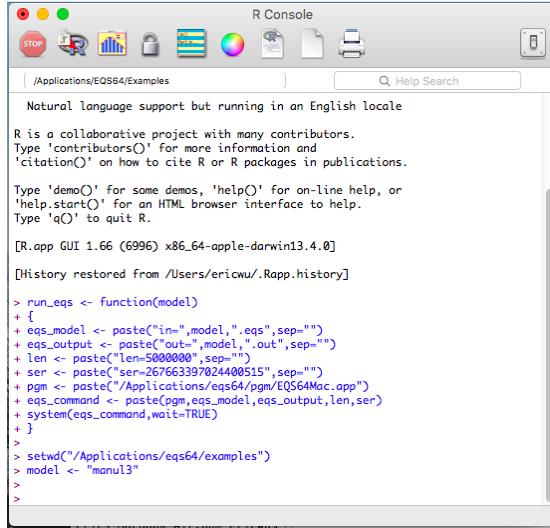
1  ##
2  ##
3  ## R SCRIPT FOR RUNNING EQS 6.4 FOR MAC/OSX
4  ##
5  ##
6  ## SET DEFAULT WORKING FOLDER
7  setwd("/Applications/eqs64/examples")
8  ## go to the folder where EQS model and data resided
9  ## before issuing the following two commands
10 ##
11 model <- "manul3"
12 run_eqs(model)
13 ##
14 ## SYSTEM COMMAND TO LAUNCH EQS 6.4 FOR MAC
15 ##
16 run_eqs <- function(model)
17 {
18   eqs_model <- paste("in=",model,".eqs",sep="")
19   eqs_output <- paste("out=",model,".out",sep="")
20   len <- paste("len=5000000",sep="")
21   ser <- paste("ser=",model,".ser",sep="")
22   pgm <- paste("/Applications/eqs64/pgm/EQS64Mac.app")
23   eqs_command <- paste(pgm,eqs_model,eqs_output,len,ser)
24   system(eqs_command,wait=TRUE)
25 }
26

```

We must run (or called source) the ***run_eqs*** function copied from the R editor (on the right hand side windows) and paste it to the R console so its procedures can be activated and preserved in the memory and ready to be called. To source run_eqs, we need to copy from “***run_eqs<-function(model)***” down to the end of the file and paste the contents to the R console (at the left hand side window).

After the ***run_eqs*** function is sourced (or activated) we can run the EQS program now. It is a two-step process

- Step 1, define the EQS model
- Step 2, launch the EQS program



Above picture shows that a EQS model file manul3.eqs is used to be analyzed. The commands are

- 1) `setwd("/Applications/eqs64/examples")` to set the default working folder for models and data.
- 2) `model<-"manul3"` to pass the manul3.eqs as the model file to the keyword “model”.
- 3) `run_eqs(model)` to run the R program “run_eqs” and using “model” as the input EQS model file.

When we run any model, we need to know where the model and data files reside. Then we make that folder as the default working folder. The R command “`setwd`” is the way to set the default working directory. The command `setwd("/Applications/eqs64/examples")` makes the “/Applications/eqs64/examples” folder as the default working folder. This folder is created when the EQS for Mac was installed. Next step is to define the EQS model. EQS model files consist two sections; first is the file name and the second is the extension. The manul3.eqs is the typical way to specify an EQS command file. The keyword “model” is used to define the EQS model file. We only need to use its file name part. The eqs extension is automatically attached when the model file is defined. The command `model<-"manul3"` defines the model file as manul3.eqs. After all the modeling information are prepared, we are ready to run the EQS model. When the model is run, you will see the following window.

```

R Console
/ Applications/EQS64/Examples
> run_eqs(manul3)
+ ser <- paste("ser=267663397024400515",sep="")
+ pgm <- paste("./Applications/eqs64/pgm/EQS64Mac.app")
+ eqs_command <- paste(pgm,eas_model,eqs_output,len,ser)
+ system(eqs_command,wait=TRUE)
+
>
> setwd("./Applications/eqs64/examples")
> model <- "manul3"
>
> run_eqs(model)

Model ==>manul3.eqn
Output==>manul3.out
Length==>5000000
Iteration : 1 Function : .58538
Iteration : 1 Function : .05461
Iteration : 2 Function : .00411
Iteration : 3 Function : .00318
Iteration : 4 Function : .00318
...
... EQS is done ...
>

```

The command `run_eqs(model)` would run the EQS model and create the output file as `manul3.out`. You can use the R editor to open the output file `manul3.out`. The output file is displayed in the following window.

```

manul3.out
1 EQS, A STRUCTURAL EQUATION PROGRAM      MULTIVARIATE SOFTWARE, INC.
2 COPYRIGHT BY P.M. BENTLER           VERSION 6.4 (C) 1985 - 2020 (B120).
3
4 PROGRAM CONTROL INFORMATION
5
6 /TITLE
7 1 /TITLE
8 2   FACTOR ANALYSIS MODEL (EXAMPLE IN EQS MANUAL P.29)
9 3 /SPECIFICATIONS
10 4   CAS=932; VAR=6; ME=GLS;
11 5 /LABEL
12 6   V1=ANOMIAG7; V2=POWRLS67; V3=ANOMIA71; V4=POWRLS71;
13 7 /EQUATIONS
14 8   V1 = 2*F1 + E1;
15 9   V2 = 2*F1 + E2;
16 10  V3 = 2*F2 + E3;
17 11  V4 = 2*F2 + E4;
18 12 /VARIANCES
19 13   F1 TO F2 = 1.0;
20 14   E1 TO E4 = 3*;
21 15 /COVARIANCES
22 16   F2,F1=.3*;
23 17   e3,e1 = *;
24 18   e4,e2 = *;
25 19 /MATRIX
26 20   11.834
27 21   6.047 9.364
28 22   6.819 5.091 12.532

```

Let's say, if you want to run an EQS model from a different folder, how you customize the R script? Let's assume your target EQS folder is “`/Users/MyAccount/eqs_project`”, the R script would be:

```
setwd("/Users/MyAccount/eqs_project")
```

If you need to change the model file to run, just change the “model” command definition. Using the a new model file “`mymodel.eqn`” as an example, you need to enter `model<-“mymodel”` at R console and then issue `run_eqs(model)` command. You can repeat this process again and again

to run all your EQS models. Due to the lack of a good user interface program, the R solution has made running EQS for Mac a relatively easy task.

For your reference, the complete R command to run EQS if you are to enter the complete command for yourself is

```
##  
## SYSTEM COMMAND TO LAUNCH EQS 6.4 FOR MAC  
system("/Applications/EQS64/pgm/eqs64mac.app in=/Applications/EQS64/Examples/manul3.eqs  
out=/Applications/EQS64/Examples/manul3.out len=2000000 ser=xxxxxxx")
```