Getting Started in Genesys 2012-2015

Introduction. One of the big challenges is finding the right screens, buttons, and commands. The main menus usually aren't sufficient. Right clicks on items listed in the Workspace Tree window, normally docked on the left, are more likely to be useful, along with right clicks on the schematic and components in the schematic, and in either case it's often necessary to follow sub-menus that are brought up. The small icons at tops of all the small windows docked around the perimeter of the workspace often lead to submenus that provide needed functionality.

The best way to learn your way around is to go through the videos. Most are quite good, though they go too fast – but that's what the pause and rewind buttons are for. Most were recorded using a 2005 version, so some of the screens shown are a little different, but the videos are still much better than the on-line help (though it is ok in places). Most of these videos were written more for promotional purposes at trade shows, and often they spend too much time on preference options that are really of no interest, but they still contain a lot of very useful information.

Start by going through the introductory videos available from the Welcome page at least once before trying to create and analyze a schematic, perhaps in the following order:

Tutorial (2009), Genesys User Environment (2008), Schematics (2005),
IntroPlacingParts (2008), **IntroLinearAnalysis** (2009, very important), DataSets (2006),
Intro to Using Genesys (2005, contains a better intro to using graphs than the "Graphs" video),
Graphs (2005, not very helpful, focused more on HB analysis until near the end),
 (It is not initially easy to get it to create bandwidth markers that work, but it can be done. Normally, you'll want to **_not_** select "Mark all traces" under Graph.)

The following assume a little more background and experience:
ParameterEntry (2005),
Equations A (2006, quite long, goes into automating filter design)
Tuning (2005, may not work on first try)
Parts (2005, changing models the right way)

Most of the above videos follow the first portions of the User Manual, which is available in short sections (with poor titles and poor indexing) from the help menu.

Then after working with Genesys for a while, you'll want to go through most of the above again before going into the more advanced tutorials.

UserModel (2005), CustomPart (2005)
ModelImport (2008, importing Spice models)
IntroUsingSData (2008)
CustomSymbol (2005, not very helpful)

There are probably better videos for most of the more advanced functionality now available on-line, accessible via the link on the welcome page.

The written documentation (from the Help menu) on Keystroke commands, the Design Environment, Graphs, and some other functionality is good, but the index and searching is just plain bad. (Perhaps better user and reference manuals are available than what I've found.)

However, one must use the written documentation of Equations to really learn how to use them. (Again, the search and Index are really useless. Under Contents/User's Guide/Using Genesys/Equations one can find some useful information. The most useful information is found under **Using Engineering Language and Engineering Language Function Reference**. There, for example, one can find some reserved words (including the all important FREQ) and syntax rules.) Note: the Math Language Functions must be entered in lower case. Reference is not relevant to equations.)

It's also necessary to use the User's Guide/Using Genesys/Examining Datasets to figure out how to add the variables needed to the DataSets for calculating voltages at various nodes for determining power dissipated in various components, including the sample coil.

Custom Models. One of the trickier processes can be finding the right parts or models libraries – at least if custom parts or models are being used for the first time. This will generally require finding the very small "**Libraries Manager**" icon, which is below several other option selectors on the Part Selector window, then selecting the right option near the top of the Library Manager screen that then appears, adding the desired libraries, and then going back to the Part selector window and selecting the right options to bring up the desired library.

It is easy to make new models (follow the UserModel video, with many pauses), and it is easy to make and save new parts (follow the CustomPart video) – at least to a library that's been used recently. It is not quite so easy to apply the model created to a new part. Some of the screens have changed since the UserModel video was made. Applying a new model to a part begins with the "Manage Models…" on the component properties screen. From that, find the button to add the new model. Then go back to the properties screen and find the button to select the new model. Then go back to the manage models screen and delete the original model. The new model should then apply properly. The description and designator should then be updated appropriately.

It is not easy to make a custom symbol. I did finally make some very simple ones, but didn't figure out how to get them to stay with the part in a new simulation – had to put a copy of the custom symbols into the new workspace.)

Bugs and Tips!

Never try to start from scratch on a complex circuit simulation, especially with attached equations. It's too easy to make mistakes, and the error handling will not be very helpful in helping you find them – it may generate hundreds of meaningless error messages. Always start from a related working simulation, build from it, checking often along the way that it still runs.

Genesys will sometimes generate many false error warnings after making major changes in the equations if no analysis recalculations are selected to run. Sometimes it's a matter of waiting up to a minute in a very complex simulation for it to figure out it's wrong. Hitting F5 to force it to recalculate all analyses will often reduce the wait period. After a long enough wait, it should figure out there aren't errors if there really aren't.

If the variables are not all calculated (in the list on the left panel in equations), it means an error has been encountered in the equations. Turn on the error messages, display the error log, and fix the error(s). (An exclamation point is displayed in the tool bar inside a yellow triangle icon if

there are warnings (which are very annoying). It is inside a yellow triangle. There doesn't seem to be a way to just turn off the warnings. The error log can be moved off to the side (floating) so it doesn't take up as much as screen space as the default window.)

Under Options, Schematic, there's an icon to toggle back and forth between "Snap to Grid", which you'll want to use often. Under Connections, you'll probably want to check "allow dragging wires from terminals", but un-check "Keep parts connected".

The scroll bars may not appear sometimes when needed. You should be able to get the scroll bars to appear by maximizing and then restoring down. Other actions also usually work.

One of the annoying features of Genesys is that it allows you to re-open the file you are working on in another workspace (without any warning). Of course, it's important to be able to open multiple simulations, but then it's easy to mistakenly re-open the file you were working on and begin working on an earlier version in a new workspace, and lose track of what work was done in which workspace.

If attempting to run an analysis (F5) generates no new data or does not replace old data with new data, it usually means there was something in the schematic or in the equations the processer didn't know how to handle. Sometimes no clues are provided in the error log. (Have fun trying to find it!) It may mean Genesys didn't find a model it needed (because it was moved from where it was expecting to find it).

The equations interpreter usually behaves as a primitive single-pass interpreter. Occasionally, for some particular conditions, it acts like a two-pass interpreter for some specific variables. However, in general, it's necessary to assume it's a single-pass interpreter. That is, the variables should always be defined before they are used. This is perhaps the single most limiting aspect of Genesys and what perhaps sets it apart from other modern software.

It's important to save good files fairly often when working with very complex simulations, particularly with very long equations files, as sometimes some minor mistake will be made, and there will be no useful error messages to help you find it. You will sometimes need to go back to a previously saved version that ran.

Genesys sometimes forgets how your have sized and arranged the various objects (graphs, schematic…). This happens often if a Genesys window is saved or closed when a portion of it extends off the side of the monitor screen. (It also sometimes happens when this is not the case.) If Genesys has forgotten your window settings on one file, it has probably also forgotten them on all your files. Try closing Genesys, open one file, re-size and arrange all the objects the way you want them, save it, and shut down. It will probably then remember how your screens have been arranged, at least for a while. If that doesn't work, sometimes a fix is to shut down, remove the hardware license key, re-insert it, and restart.

If a variable is not calculated in the equations but is called for and was previously defined in the schematic, the value used in the schematic may be the value previously defined rather than the new un-defined value.

The bandwidth calculated by the Bandwidth-type marker on graphs gives -3dB widths that can vary by at least 15% depending on the vertical scale. The results seem to be more reliable when the peak height is at least 70% of full scale.

Try to avoid resizing schematic pages. Changing paper size (not zooming) can sometimes cause some parts to move around and break connections – though it is generally easy to fix. Centering schematic also often doesn't work as expected and can move part of the schematic off the page. A section of the schematic may be moved by selecting it with a box, cutting it, and pasting it into the desired new location.

It is not always easy to rename and/or move data in the work-space tree without screwing things up. The best way is to start with a file that works, and rename or move components cautiously, checking to be sure it is still working after each re-naming or move. The Schematic can be re-named easily. Then select the new schematic file name under "Design" in each linear analysis. Do not attempt to tell Genesys where to put the data under "Data set name" in an Analysis. It doesn't work. Just leave that entry blank. It will put the data into a file name that it creates based on the name of the Analysis, which can be changed. Renaming those Data Sets is problematic. Best to just use the names it creates. Then select the proper data set in the graph under properties>context. Genesys will create the standard parameters in the data set, but special variables will need to be added manually.

You can't use the same name for a graph file used for anything else (analysis, data…), but you can put whatever you want in the graph title.

Avoid using TLE4, TLP4, or TLE4_SPICE, transmission line models. They are usually completely wrong. For coupled lines, use CPL or CPLX.

Expect minor difficulties if trying to use more than 9 ports. The short-cut notation that works with port numbers below 10 (such as S41) doesn't work for port numbers above 9. The more formal notation must be used, such as S[10,4]. Also, the more ports, the longer it takes to solve.

Beware the use of the switch. It has an open resistance which can really mess things up!
If in doubt – disconnect it. Genesys will run with open leads.

The voltage_gain function gives results that can be very confusing and probably not very accurate when there is a transmission line at the input to a matching network. It works as expected in simple circuits without transmission lines, and the results may still be correct when there is high VSWR, but will probably be such that the peak marker function can't be used – because of the reflected wave. Using the S parameters is more predicable.

None of the names chosen in the Workspace Tree (schematics, models, equations, graphs…) can be identical to names already used by Genesys for a model or part (and there are many hundreds of these names) or trouble can be expected.

There are many predefined variable names that cannot be used, but a list of these does not seem to be available. It is sometimes not easy to add new variables to a data set – it thinks everything you suggest is already in use. The variable name must be unique to both those used in the equations and those used in the data files.

You will probably be less frustrated with the operation of the workspace environment if you always drag the context-sensitive tool bars to the top line of the workspace (adjacent to the menu bar). Otherwise, every time they come and go, the windows jump up or down a little, which is more than annoying. You will have to do this repeatedly to get it to keep the toolbars out of the way.

It is risky to define net (node) numbers. Defined net numbers will sometimes stay with the respective terminal of a part that is moved and lead to net shorts that can be very difficult to find. Genesys assigns a different number to every ground added. They can all be re-numbered to zero manually. Some problems may arise if the net number of a port is not equal to its port number. Also, the ports must be numbered sequentially beginning at 1. The only difference between an input and an output port is the direction of the arrow in the symbol. They are functionally identical.

Genesys' decision on which units to use is not perfectly consistent, and not necessarily in accordance with what has been selected under options. On rare occasions, the units used in the values displayed in the left column under attached equations were not the same as those used on the schematic, and there seemed to be no way to fix this. The only approach found to work when Genesys has the units screwed up is to start over from a file in which Genesys does not have units screwed up.

Graphing is supposed to be able to take data from the equations, but that does not seem to work.

The "No Data" tag on graphs may just mean the analysis frequency range is outside the graph frequency range.

Genesys includes the ability to keep note files within the workspace, but I find it better to keep notes in a separate rich-text file using WordPad, primarily because the WordPad file can be moved outside the Genesys workspace on the screen, but also because WordPad has more of the features generally desired in a text editor.

It's best to leave automatic calculations in equations **off** during development, but it might be good to turn it on before leaving a file, or it can be confusing when coming back to it and nothing at first seems to be working right.

The traces colors don't match the legend colors very well, especially when the colors are changed. The problem is only partially from the way the trace colors add to the graph background color. It helps a little to use white background when there are a lot of different color traces.

On several different occasions, Save and SaveAs have not updated the time stamp when overwriting an earlier file. Genesys was re-installed, and this fixed this problem for a while. But then it returned.