



# *Design Studio for Genesis*

A Graphical User Interface  
for the *GENESIS*  
Structural Analysis and Optimization Software

**New Features and Enhancements**

**Version 12.1**

September 2011

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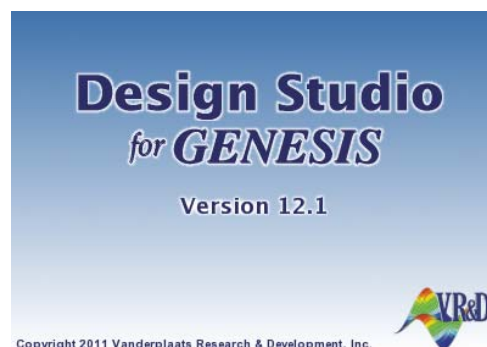
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# 1 Introduction

This document describes the enhancements and new features available in Design Studio for Genesis 12.1.

## Enhancement Summary

- Genesis 12.1 Compatibility
- Recent Files List
- Tab Keyboard Navigation Enhancement
- Select All and Deselect All Edit Menu Toolbar Buttons
- Selected Item Count
- Rotation Center Enhancements
- Select Design Variables by Group
- View/Edit DSCREEN Parameters
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- Animate Frequency Response Displacements/Velocities/Accelerations
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- Post Processing Display Customization
- New Composite Post Processing Capabilities
- Von Mises Stress Post Processing Enhancement
- Oscillate Animation Fidelity Control
- History Plot Enhancements



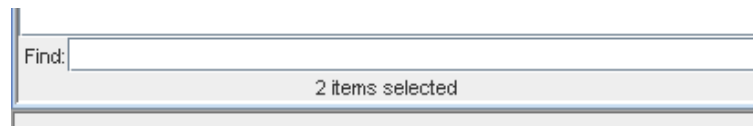
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## 2 General Enhancements

1. Genesis 12.1 Compatibility. Design Studio has been enhanced to handle all of the new capabilities of Genesis 12.1. New features in Genesis 12.1 include: 15-node CPENTA element, SB field on PCOMP, shifted random PSD displacement/velocity/acceleration responses, new built-in functions PNORM2 and SDEV for DRESP3/TRESP3, new FFORM and UNIF options for DTGRID, new PROP continuation form of TSELECT, stress (force) recovery for CGAP elements, new values for DOPT parameter FILTER.
2. Recent Files List. The File menu now contains an **Open/Import Recent** submenu with a list of recently opened or imported files. This list is maintained across invocations of Design Studio, to make it easy to bring back models and results from previous sessions.
3. Tab Keyboard Navigation Enhancement. Now, when using the tab key to move the input focus to another text field, any text already in the field will be automatically selected. This makes it easy to type new data to replace any existing data without having to move a hand to the mouse.
4. Select All and Deselect All Edit Menu Toolbar Buttons. The edit toolbar has been enhanced to have two new buttons representing the **Select All** and **Deselect All** Edit menu items.



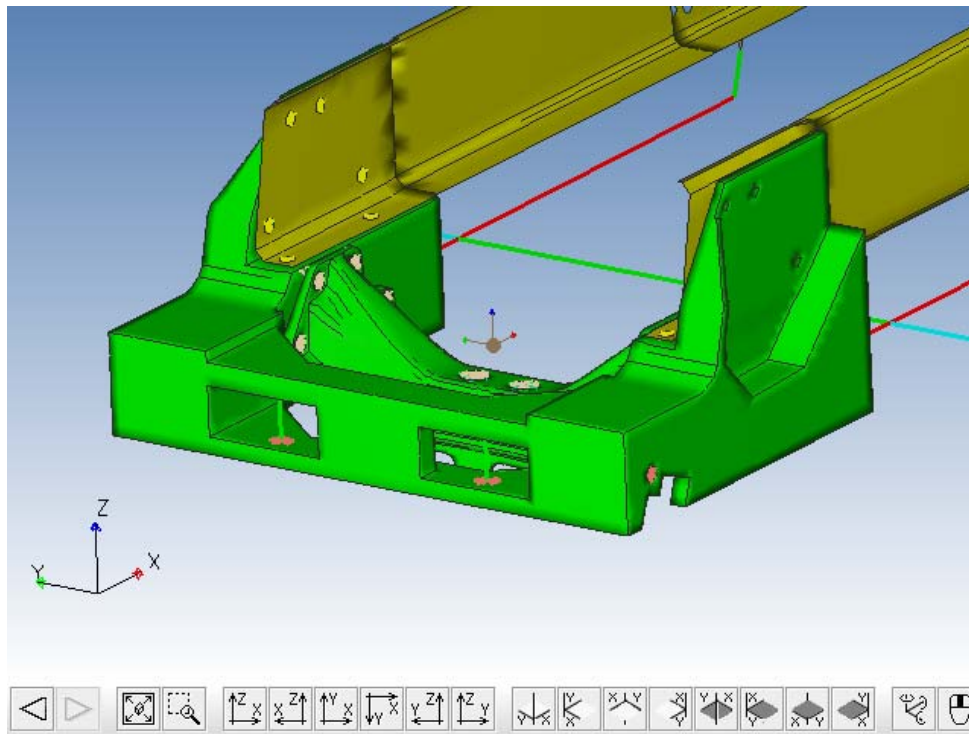
5. Selected Item Count. Now every list has a counter at the bottom that shows the number of selected items. Combined with the Select All toolbar button, this new feature also makes it simple to find the total number of items in any list.



6. New Examples. There are 7 new step-by-step example problems in the Design Studio Examples manual that illustrate new capabilities of Genesis.

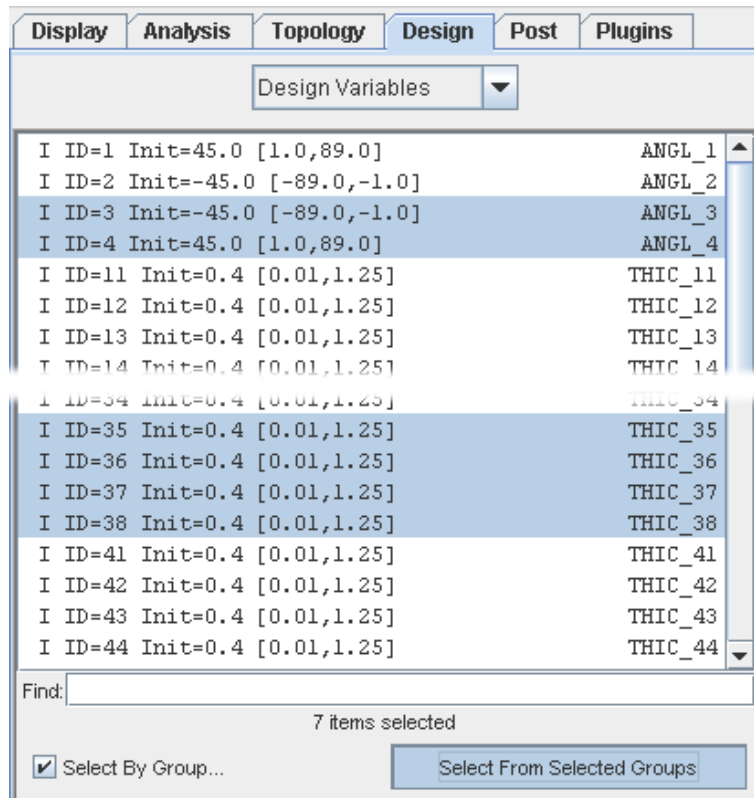
### 3 Display Enhancements

1. Rotation Center Enhancements. Now during dynamic rotation of the view in the viewport window, a marker is drawn to show the rotation center, the point in model space about which the model rotates. The marker resembles a large dot to mark the rotation center and a small triad to show the view coordinate system directions. As before, the rotation center is automatically reset whenever the **Fill** or **Zoom-to-Rect** buttons in the viewport toolbar are used. Now, in addition, the rotation center can be manually relocated by holding the **Shift+Ctrl** keys and clicking the **left-mouse-button** on a grid in the viewport.

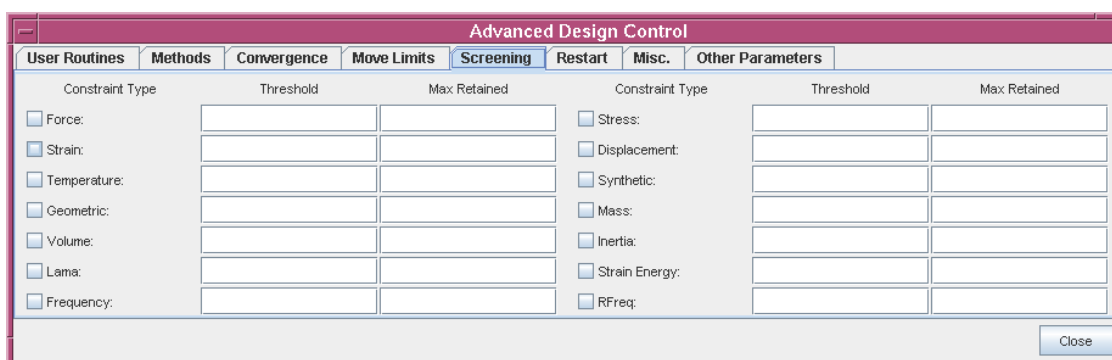


## 4 New Design Preprocessing

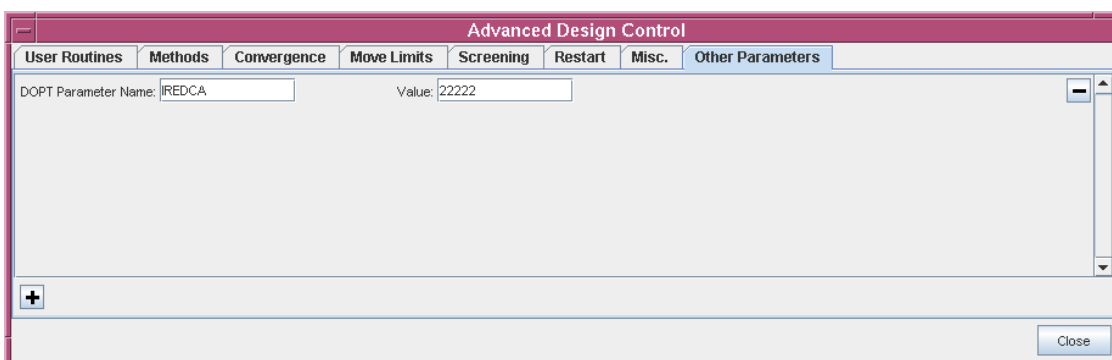
1. Select Design Variables by Group. The Design Variables main page contains two new options for selecting design variables. The **Select By Group...** checkbox enables the ability to select design variables by clicking on groups in the viewport window. When a group is clicked, all design variables used by sizing-design to control that group are selected. If a group (or groups) are already selected, the **Select From Selected Groups** button becomes enabled. When pressed, this button selects all design variables used to sizing-design any group in the current selection. Note that both of these new methods only add to the current design variable selection. To select only the variables used to design a particular group, first use the Deselect All edit toolbar button.



2. **View/Edit DSCREEN Parameters.** Genesis uses screening parameters to improve the efficiency of the optimization process by reducing work for the sensitivity and approximate optimization modules. For most problems, the default values set by Genesis work well. However, for certain models, it may be advantageous to change these parameters. Now Design Studio allows full editing capability for all Genesis DSCREEN parameters.



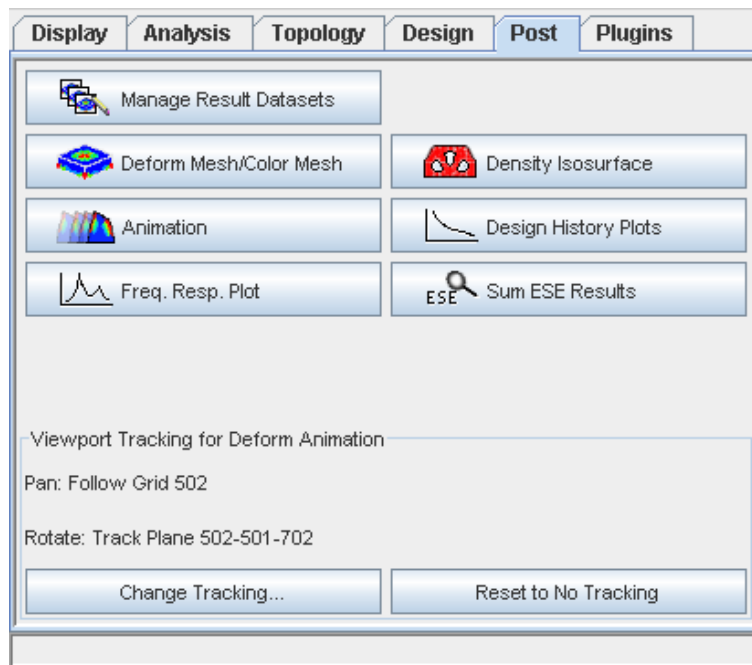
3. **View/Edit All DOPT Parameters.** Design Studio contains custom controls to edit the most commonly used DOPT parameters. Now, DOPT parameter that do not have custom controls can also be set by typing a parameter name and value.



4. **Quick Sizing Report.** Now when the Quick Sizing trail is used, a report is printed in the Messages window showing the initial value, lower bound and upper bound of all new design variables created by the quick sizing process.
5. **Multiple Design Variable Discrete Set Editing.** Now it is possible to modify the discrete set values for multiple design variables simultaneously.

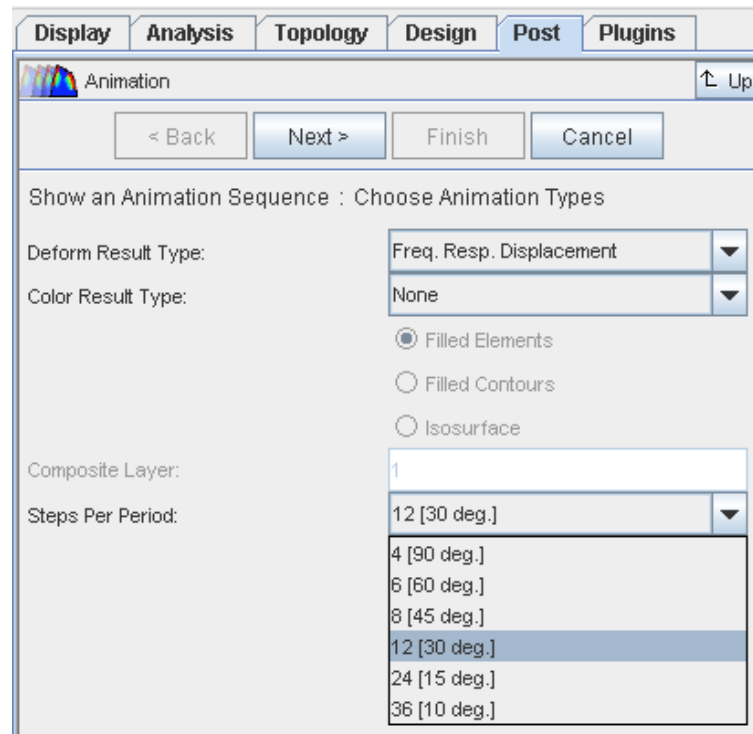
## 5 New Postprocessing Capabilities

1. Viewport Tracking for Deform Mesh Animation. Now animations that deform the mesh have new options to control the display. Pan tracking will automatically pan the view to follow a particular grid as it displaces throughout an animation. This has the effect of making that particular grid appear stationary in the animation, with all of the other grids deforming relative to that grid. Rotate tracking will rotate the view such that a plane through three grids appears to maintain a fixed orientation as the grids displace throughout an animation. Viewport tracking applies to animations created in the **Animation** trail, as well as to Oscillate and Ramp animations made inside **Deform Mesh/Color Mesh** or **Density Isosurface**.



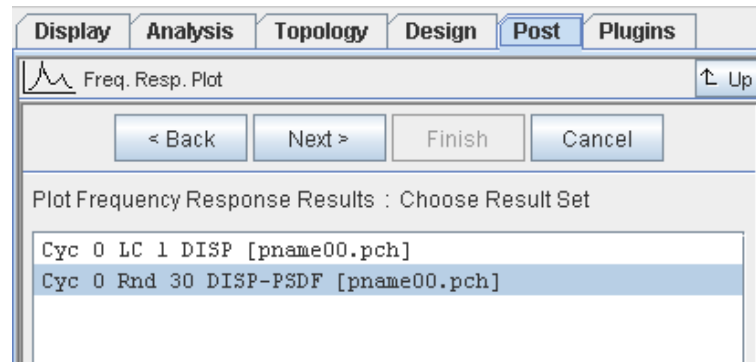


2. Animate Frequency Response Displacements/Velocities/Accelerations. Now Design Studio can efficiently import frequency response results for all the grids in a model. These results can be used to create an animation showing how the model deforms throughout one period of the cyclic loading. Such an animation has been referred to as the **Operating Deformed Shape**. The quality of the animation can be adjusted by setting the desired number of steps to plot for one period (equivalent to selecting a phase angle increment).

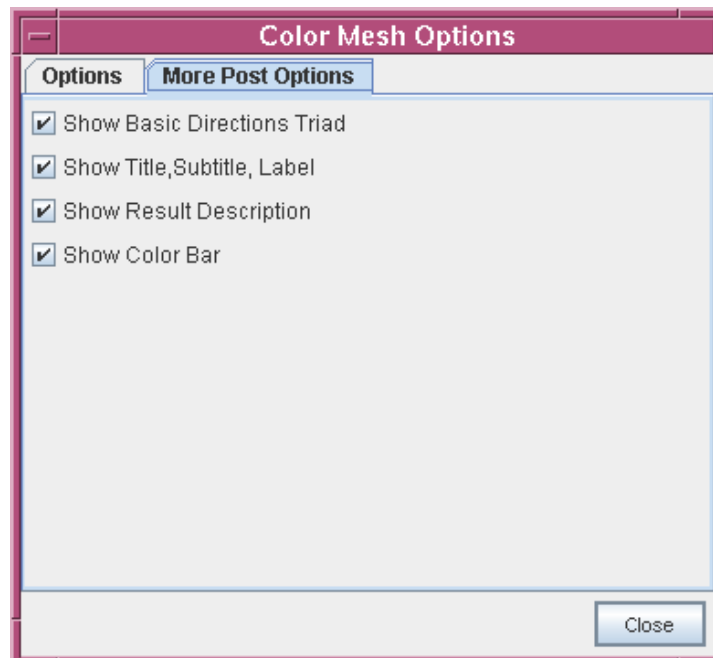


## New Features

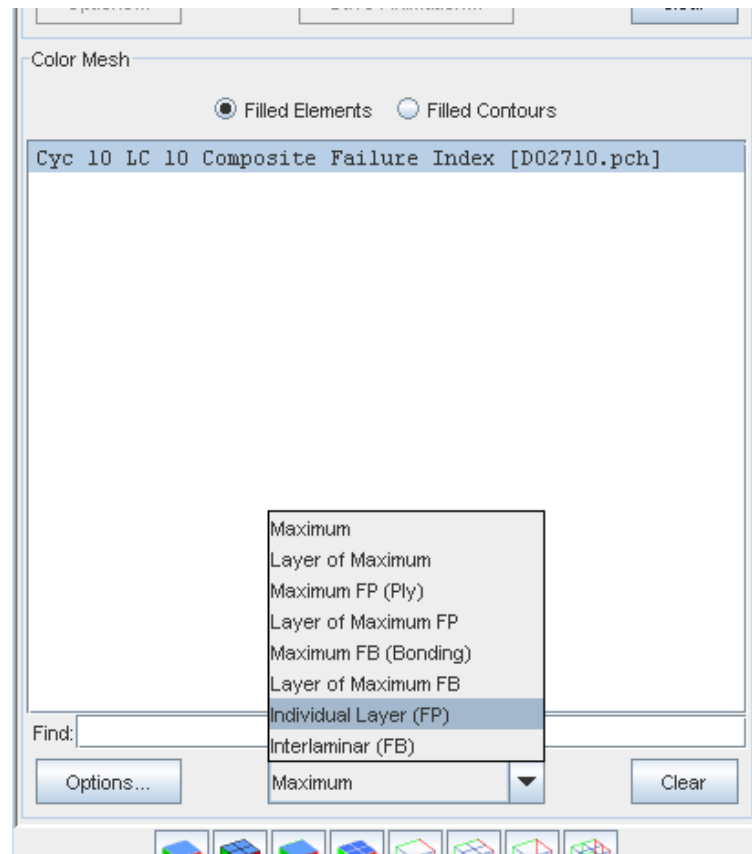
3. Plot Random Displacement/Velocity/Acceleration PSDF Results. Now Design Studio can import random Power Spectral Density Function results for displacements, velocities and accelerations. These results can be selected as curve data for frequency response plots.



4. Post Processing Display Customization. Now Design Studio offers options for turning certain post processing display elements on or off. This applies to the result title/subtitle/label, basic direction triad, color bar and result descriptions. These options can be useful to make uncluttered pictures or animations for reports and/or presentations.



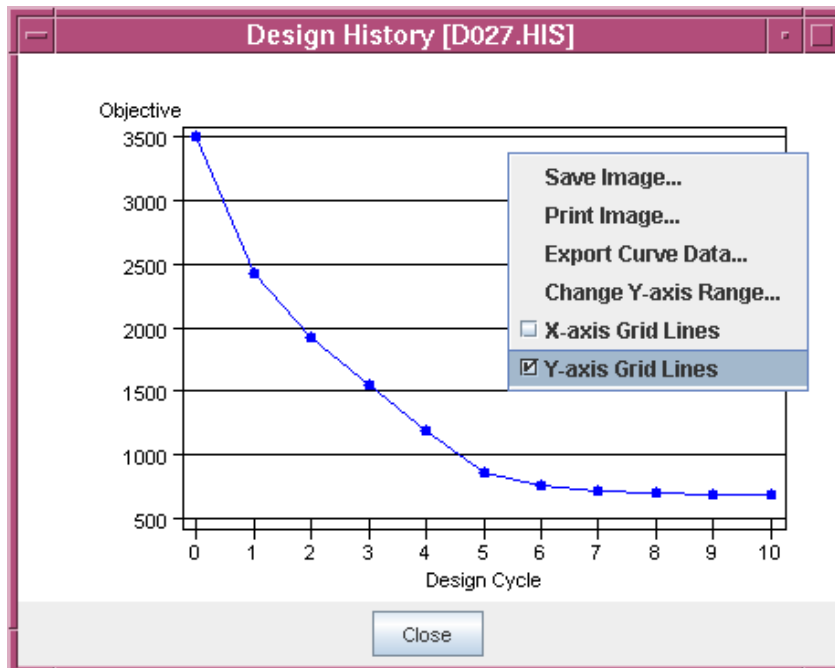
5. **New Composite Post Processing Capabilities.** Design Studio has several new options for post processing composite element analysis results. Now the failure indices of individual layers can be plotted. In addition, the layer number where the maximum failure index occurs can be plotted. Interlaminar shear failure indices can be plotted. Normalized layer stress/strain results can be plotted, using the stress/strain limits of each layer's material as the normalizing factors.



6. **Von Mises Stress Post Processing Enhancement.** Design Studio has been enhanced to provide a more complete von Mises stress plot. Previously, Design Studio would show stress results for only shell elements or only solid elements, with the other element type in grey. Now, when von Mises stresses are selected from either a shell or solid result set, the stress plot will color all shell and solid elements (assuming analysis results are available for both element types).
7. **Oscillate Animation Fidelity Control.** Now when using the Oscillate (or Ramp) style for displaying a Deform Mesh, the quality of the animation can be adjusted by selecting the number of steps for one period of the animation. For example, by reducing the number of steps, a very large model can be made to animate faster. Or, by increasing the number of steps, the animation can be made smoother.

## New Features

- History Plot Enhancements. New options have been added to the right-click popup menu on design history plots. The **Export Curve Data...** option allows the curve values to be written to a plain text file as tab-separated x, y values. There are new options to alter the history plot display by adding grid lines across the x and/or y axes. In addition, the history plot display now has the same mouse-hover x,y value popup that was introduced for frequency response plots in version 12.0. Simply hold the mouse cursor still on top of a curve point for a couple of seconds and a popup will display the exact x,y values of that point.



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## **6 Compatibility with Design Studio for Genesis Version 12.0**

Design Studio database files (\*.dsg) written with version 12.0 are compatible with version 12.1. However, database files written with version 12.1 are not compatible with previous versions.