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## **Version 5.1** (2017-01-31)

- **Solder Joint Fatigue**
  - Support for “**Column Grid Array (CGA)**” modeling for *Solder Joint Fatigue* FEA analysis and the *Solder Fatigue* tool has been added to Sherlock. CGA package type is supported which will use the new *CGA Solder Joint Fatigue* model. A new high-temperature solder type “**Pb90Sn10**” has also been added in support of the CGA model.
  - Added a new solder type “**SN100C**” to the solder library.
- **Calculix**
  - The version of Calculix used by Sherlock has been upgraded to 2.11. This version will automatically be selected if no user-defined version has been already specified in the *FEA Settings* dialog.
- **Lead Modeling**
  - Added the “**Grid**” option for the Lead Layout part/package property. The Grid layout defines one or more rows of through-hole leads specified by the Lead Long Count and Lead Short Count part/package properties. See the *FEA Lead Modeling* user guide section for details and examples.
  - Added the “**Rectangular**” option for the Lead Layout part/package property. The Rectangular layout is similar to the Quad layout, except that the number of pins along each side can be individually specified using the Lead Long Count and Lead Short Count part/package properties. The Rectangular layout is available for all SMT lead types. See the *FEA Lead Modeling* user guide section for details and examples.
  - Added the “**L\_Lead**” option for the Lead Geometry part/package property to allow users to define parts with L-shaped leads arranged in SIP, DIP or CIRCULAR layouts. See the *FEA Lead Modeling* user guide section for details and examples.
- **Life Cycles**
  - Updated life event editor to allow, if desired, the phase duration to automatically be updated if the event duration exceeds the phase duration instead of having to lose any work made in the event to go back and update the phase duration.
- **Part Modeling, Parts List, and Package Editor**
  - Added the “**Corner Face**” part/package property to specify the plane in which a mitered or rounded corner is drawn. This allows users to more accurately model parts such as resistors and disc capacitors, with or without leads.

- Added “**Overmold Thickness**” and “**Package Laminate Thickness**” part/package properties used by the BGA model for *Solder Joint Fatigue*. When no value is specified for these, Sherlock will automatically use the previously defined default values for these properties during BGA Solder Joint Fatigue analysis.
- Some Part Editor fields have been reorganized into different tabs for better organization and function.
- **Sherlock Internal Architecture**
  - Updated how PCB outlines are parsed, stored, modified and displayed so that outline coordinates can be stored in inches or millimeters. This eliminates problems associated with converting between millimeters and inches. In particular, it allows manually assigned node metric coordinates from losing precision when re-editing these nodes.
- **Sherlock Installer and Launcher**
  - Updated the Sherlock installer to include an option to install Start menu items and desktop shortcuts for all users of the PC.
  - Modified the way Sherlock determines the location of Java by querying the operating system instead of using the SetJava.cmd file. The location of Java can be updated through the *Launcher Settings* found in the *Settings* menu. Sherlock will use a 64-bit version of Java before a 32-bit version of Java. A 64-bit version of Java is preferred as 32-bit support will be removed in a future release. **ANSYS Workbench** users must load a new version of the Sherlock Plugin because of this change. The version numbers of the Sherlock Plugin have been modified to match the major version of the ANSYS Workbench version with a minor version of “1”.
- **Bug Fixes**
  - Fixed a problem which caused the Lead Layout property in the Part Editor to be changed to “SIP” or “SINGLE” (depending on the valid options for the geometry) when multiple parts were edited.
  - Fixed a performance issue which would significantly slow down updating of the components when using the component editor in the *Layer Viewer* when a board had many components.
  - Fixed an issue when modeling BGA elements on a part and the part is then converted to a non-BGA part without disabling BGA modeling for the part. This would result in either the BGA elements to continue to be modeled for FEA analysis or result in a FEA model error if lead modeling was enabled after converting it from a BGA part.
  - Fixed a performance issue which would pause the user interface when adding a circuit card or circuit card files, especially when there were multiple circuit cards in the project.
  - Fixed a bug that would prevent a saved result name from being changed if the only thing that changed was the case of any of the characters in the name of the result.
  - Fixed the ODB++ parser to handle version 8 PKG and CMP records where units other than the default may have been specified.

### **Version 5.0.3** (2016-11-18)

- **Solder Joint Fatigue**
  - Updated the BGA model in the Solder Fatigue tool to allow for the selection of the overmold material. Overmold material has also been added as a part and package property and used during Solder Joint Fatigue analysis for the BGA model. The default value remains as OVERMOLD-BGA.
- **Bug Fixes**
  - Updated the ODB++ parser to handle version 8 CMP records which may have an unique ID appended to the record.
  - Fixed an “Out of Memory” error that could sometimes occur when viewing the “**Stackup**” when drill holes overlapped each other.
  - Fixed a problem where sub-assemblies did not always share PCB nodes in a Merged model which would result in the sub-assembly not being connected during FEA analysis.
  - Fixed a problem where parts on the bottom of the PCB would not always be connected in a Merged model.
  - Fixed a bug that prevented a project from being imported if the location of the project file was browsed from a user's “Libraries” folder.
  - Corrected a bug that affected parts contained by potting regions which prevented a FEA model from being generated if the component has a heat sink or causes a wirebond attachment point on the component to not be placed on top of the potted component.
  - Fixed a bug in the Sherlock installer that could result in the other directories defined at the same level as the Sherlock main installation directory to be removed during the installation.

### **Version 5.0.2** (2016-09-21)

- **Part Wizard Patterns**
  - Updated part wizard code fields to allow any properties defined for the code to allow the use of mathematical expressions as is allowed for the part wizard properties.
  - Included “**sqrt**”, to find the square root of a number, as an available function when using mathematical expressions in part wizard patterns.
  - Updated the part wizard code field table to allow multiple cells to be copied to the clipboard and pasted from the clipboard to allow for modification in an external spreadsheet program. See the “Editing Part Wizard Field Codes” section of the “PL-05 – Part Wizard” user guide for more information.
- **Reports**
  - Updated the project report score summary to report the life cycle using the defined life cycle units instead of always using “years” to avoid displaying “0 years” when a life cycle was defined to be less than a year in length.
- **Stackup**
  - Added a dialog to allow the Stackup Symmetry property to be modified without having to regenerate the stackup. The **Stackup Properties** dialog is accessed from the popup menu on

the Stackup entry of the CCA Inputs menu.

- Added an “**Update Copper**” button to the Stackup listing to allow the copper values to be recomputed without having to edit a layer to force the copper values to be recomputed.
- **User Interface**
  - Updated the “Solder Units” field label in the Part Editor to “Stencil Units” to be consistent with the “Stencil Thickness” label.
- **Bug Fixes**
  - Corrected a problem with the “Layer Editor” where the “Exclude Region” function did not function correctly if the area being excluded included certain types of arcs.
  - Corrected a “null” error that occurred when searching the Part Library when a matching part also matched a part in the Approved Vendor List (AVL).
  - Corrected a problem with Trace Layer exporting when dielectric regions are recursively contained by conductor regions.
  - Fixed a bug when saving results if the CCA or project had been renamed since adding layers where the results file may be missing layers or show incorrect layers if the originally named CCA or project still exists when saving the results.
  - Fixed a problem that would prevent mechanical parts from being converted to a Polygonal shape in the mechanical part editor.
  - Fixed a bug when lead or ball modeling was enabled for harmonic or random vibration analysis which could result in the overall results not matching the component results table as far as the number of passing components. This also affected the life prediction curve for the analysis and would result in duplicate analysis scores in the project report which may contradict each other.
  - Fixed a bug when editing multiple mount points at once with different FEA constraints which resulted in the FEA constraints being removed from the mount points.
  - Fixed a bug when editing multiple mount pads from various sides of the PCB which resulted in the updated mount pads being placed on the top side of the PCB.
  - Fixed a problem with concave shaped polygons for mount points near the edge of the PCB that could result in FEA analysis from being performed because the center of the mount point was determined to be outside the PCB outline.
  - Fixed an error that occurred when exporting a NX Nastran FEA model for Mechanical Shock, Random Vibration, or Harmonic Vibration.

### **Version 5.0.1** (2016-07-29)

- **Plated Through-hole Analysis**
  - Plated through-hole analysis now allows the IMEC Plated Through-hole Fatigue model to be used for analysis and with the PTH Fatigue calculator in addition to the existing default IPC-TR-579 model. ***Support for the IMEC Plated Through-hole Fatigue model requires a Sherlock license option to be enabled. If you would like to use it, please contact your DfR Solutions sales representative.***

- **Solder Fatigue Analysis**

- Updated solder fatigue analysis to ensure the DIE dimensions are not larger than the FLAG dimensions for the QFN model.

- **Bug Fixes**

- Corrected a bug with solder fatigue analysis where the default DIE material was not set as SILICON for a given part. This would happen when running solder fatigue analysis on an upgraded project without having modified any part properties before running analysis.

## **Version 5.0** (2016-07-25)

- **NX Nastran Support**

- Added support for the NX Nastran FEA engine, allowing Sherlock to perform FEA analysis tasks using that engine and to export mesh models to that engine using the NX Nastran Bulk Data File (BDF) format. *Support for NX Nastran requires a Sherlock license option to be enabled. If you would like to use it, please contact your DfR Solutions sales representative.*

- **Modeling Regions**

- Added support for user-defined PCB modeling regions for FEA analysis or model export. Modeling regions allow users to specify different meshing properties for different PCB areas which can be used, for example, to increase model accuracy in certain areas without significantly increasing the overall FEA model complexity. See the *Modeling Regions* user guide section for details and examples.

- **FEA Model Export**

- Users can now export FEA models containing elements generated by the Sherlock meshing algorithm to Abaqus and Ansys Mechanical. Abaqus models are exported as a Python script that defines the mesh elements and then creates individual Abaqus parts from those mesh elements. Ansys Mechanical models can be exported as either a pair of APDL/CDB files that defines a model that can be imported using the “Read Input From ...” GUI menu option or a single CDB file that can be imported using the “cdread” command.
- Users can now export “hybrid” FEA models to Abaqus or Ansys Mechanical that use elements generated by both Sherlock's meshing algorithm and the native FEA tool meshing algorithm. See the *Modeling Regions* user guide section for details and examples.

- **Heat Sinks**

- Added the ability to create attachment points for heat sinks from mount points. See the *Heat Sinks* user guide section for more details.
- Modified the *Heat Sink Editor* to allow properties for multiple heat sinks to be modified at the same time.

- **Mechanical Parts**

- Added the ability to create attachment points for mechanical parts from mount points. See the *Mechanical Parts* user guide section for more details.
- Modified the *Mechanical Part Editor* to allow properties for multiple mechanical parts to be modified at the same time. Mechanical part multi-edit is only allowed when the selected

mechanical parts all have the same shape type.

- **Mount Points and Fixtures**

- Modified the *Mount Point Editor* and *Fixture Editor* to allow properties for multiple mount points to be modified at the same time. Mount point multi-edit is only allowed when the selected mount points are of the same mount and shape type.

- **Lead Modeling**

- Added the “Leads” filter to the 2D Layer Viewer to allow users to display lead outlines for parts which have the “Lead Modeling” or “Ball Modeling” part properties enabled. This can be used to more accurately align components with underlying solder masks, pads or traces. See the “*2D Lead Viewing*” sub-section of the *Lead Modeling* user guide section for details and examples.

- **ODB++ Support**

- Added an option in the file properties dialog for Pick & Place (ODB++) files to indicate from which direction the rotation values for bottom side components are relative to. By default, Sherlock assumes the rotation value is as if looking down from the top side of the board. By changing the “**Bottom Rotation View**” property to a value of “**BOTTOM**”, Sherlock will take the values as if the observer is looking at the bottom components from the bottom of the board.

- **Potting Regions**

- Added support for potting through-hole parts with 90 degree bent leads.
- Added support to the Ansys Plugin for assigning potting region materials.

- **Part and Package Editor**

- Modified the Part and Package editors to gray out part properties / tabs that are not applicable because of other property settings instead of disabling them. This allows users to view and/or edit such properties even though they are currently unused. Users who prefer to have such properties / tabs disabled should use the “**disableUnusedPartProperties**” debug setting.
- Added a read-only Package Type field to the Part Editor to indicate which package type is chosen by Sherlock for the selected part package. The Solder Fatigue Model chosen by Sherlock may also be displayed by adding the “**includePackageTypeSolderModel**” debug setting.

- **Package Library**

- Added *Die Material* package property to allow specific materials other to be specified for the die instead of the default of silicon which is used during Solder Joint Fatigue analysis.

- **Plated Through-hole Analysis**

- Plated through-hole analysis now allows the IMEC Plated Through-hole Fatigue model to be used for analysis and with the PTH Fatigue calculator in addition to the existing default IPC-TR-579 model.
- Updated Plated through-hole analysis for the IPC model to include elastic strain range.

- **Shared Data Files**

- The location of Sherlock data files for managing items like materials, laminates, packages, and others may now be specified so that these files may be shared amongst users by using a network shared drive. See the *User Data Files* user guide section for more information.
- **User Interface**
  - Added a “Show File Location” menu option to the popup menu of the Files listed for a CCA and for saved results to make it convenient to quickly find the files on the file system.
  - The FEA analysis property dialogs are now displayed when selecting “Run Analysis Task” similar to the “Edit Properties” option to allow the user to verify that everything is correct before starting an analysis task.
  - The FEA analysis property dialogs now include “Select All” and “Clear All” convenience buttons in the event list panel if more than one event is defined.
- **Bug Fixes**
  - Corrected Harmonic and Random Vibration results with Abaqus where only the real component was used for determining the displacement and strain instead of using the complex component.
  - Fixed a bug in the Ansys Plugin that prevented materials from being assigned properly to leaded parts in some cases.
  - Fixed a bug with the editor dialog of circular shaped objects such as mount points, ICT fixtures, mechanical parts, and potting segments that would display a diameter value that was smaller than the actual diameter of the circle when a small number of nodes was selected for the circular object.
  - Corrected exported geometry models that contained mount holes that weren't circular from always making those mount holes as a circular shape.
  - Fixed a bug in the test point editor where test point layers weren't properly selected when starting the editor and test points could be selected from inside the editor even if the side they were on wasn't selected.
  - Updated the part library export to remove leading and trailing spaces around the part manufacturer and part numbers in the resulting XML file to prevent issues during import with values that have leading escape sequences.
  - Corrected a problem with importing ODB++ Pad (P) records that specified a specific rotation value for pad definitions 8 and 9 which caused the specified rotation to be rounded to the nearest 90 degrees.
  - Fixed a bug that prevented the layer viewer from working when an ODB++ surface definition does not contain at least one polygon definition. Such surface definitions are now ignored and indicated as errors when parsing the file.
  - Corrected 3D PDF generation to display Potting elements in a transparent color.
  - Fixed a problem with the *3D Viewer* which caused the viewer application to abort if the window was re-sized multiple times.
  - Fixed a problem with report generation where any image related to the bottom side of the CCA always showed the silk screen, solder mask, or copper layer from the top side.