



## DOWNSTREAM CAM350 15.0 RELEASE NOTES

Build: 2068  
Date: 5/21/2024

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## **RELEASE SUMMARY**

CAM350/DFM 15.0 build 2068 is a minor update to the currently released CAM350 15.0 product. This release includes several customer defect fixes and enhancements as well as language releases for the Japanese and Chinese markets. The new product features in 15.0 are described later in this document. They include a new CAM350 Stencil Kit, a new Auto Align feature and a New Cadence Allegro interface as well as several enhancements.

## **INSTALLATION AND LICENSING**

The installer for the client software (CAM350 15.0 and BluePrint 7.0) will create new folders and you can run both your previous release (CAM350 14.6 and BluePrint 6.6) and your new Release software side by side on the same PC if you wish. There is a new 15.0-7.0 License Manager and License that must be installed. This new License Manager and License will run your 15.0-7.0 software as well as previous releases (ie BluePrint 6.6 and 6.5).

Note: The CAM350 15.0 – BluePrint 7.0 License Manager will NOT run CAM350 12.2 – BluePrint 5.2 product licenses.

For many users your installation should be as simple as this:

1. Run the installation executable
2. Choose “Install or Update Licensing” to install your new License Manager and License File.
  - a. If you are an existing customer on maintenance, choose “Install license from media” to install your new license file.
  - b. If you are a new user or your license is not found on media, get your new license from DownStream, copy it to your PC and then choose “browse to find License File”.
3. Choose “Install DownStream Products” to install the new CAM350 15.0 and BluePrint 7.0 software on your PC.

If you are installing to a Virtual Machine or have any questions, reference our DownStream Installation Guide or contact us at [support@downstreamtech.com](mailto:support@downstreamtech.com).

## **SYSTEM REQUIREMENTS**

Your PC should meet or exceed the following requirements:

OS: Windows 10, 11 (**64 bit only**)

Processor: 2GHz or faster

Memory: 8-16GB+

Disk Space: 2GB available, SSD Recommended

Graphics: Discrete graphics card with on-board memory preferred (for best 3D performance)

## CAM350 15.0 NEW FEATURES

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- ✓ New Stencil Designer
- ✓ New Auto Layer Align
- ✓ New Cadence Allegro Interface
- ✓ Netlist Compare enhancements
- ✓ Design Compare enhancements
- ✓ Licensing support for Nutanix AHV Virtual Machine

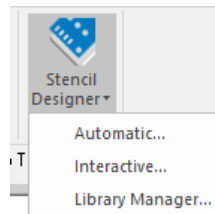
## CAM350 15.0 – NEW FEATURES DETAILED

### NEW STENCIL DESIGNER

Use the new Stencil Designer to create custom paste stencils sourced from paste mask, solder mask, Top or other layer types. Source a stencil from a selected patterns of flashes or pads or select a footprint. Saved the stencil definition to a stencil library and reuse defined stencils across multiple designs. Use the Application Programming Interface to automate the stencil design process.

**EXAMPLE A** – In this example, you will use the new Stencil Designer to create stencils for a design using the change shape creation mode.

1. Start CAM350 and choose **File > Open**.
2. Browse to and select the demo file DST Demo 2018.cam from the Demos folder.
3. In the **Layers Display** pane, double click the **Paste Mask Top** layer to make it the only visible layer.
4. On the **View** ribbon, turn off **Top** and **Bottom Parts** (outlines) to hide them.
5. Choose **Design > Stencil Designer**. There are two modes of using Stencil Designer:



**Automatic** – Create stencils from a library of stencil conversion history.

**Interactive** – Select pads, flashes or footprints in the design and create stencils.

In addition, use Library Manager to manage stencil libraries.

6. For this sample, select **Interactive**. The Select Pattern and Creation Mode dialog appears. Use the dialog to set source layer for selection, mode of selection and creation mode.

7. Set Source Layer to **Paste Mask Top** and set Create Duplicate Layer option disabled.

The Selection modes are:

**Select Pattern** – interactively select pads or flashes, commonly in a pattern.

**Select Footprint** – Select a footprint (if present) – must be sourced from a Top or Bottom Layer.

**Select Library** – Select a stencil library item and create stencils that match its pattern.

The Creation Modes are:

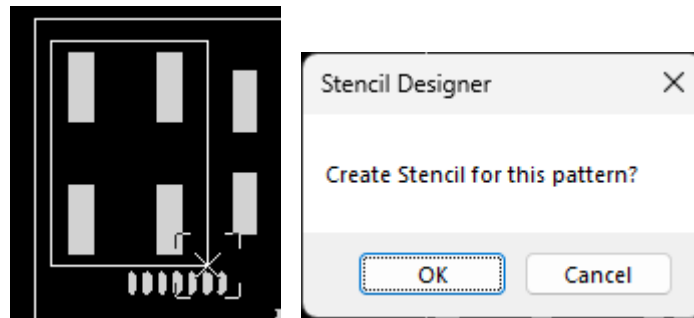
**Change Shape** – change the shape of the selected pad or flash.

**Offset** – keep the shape and shift the stencil shape off of the pad.

**Scale/Resize** – keep the shape but shrink or grow its size.

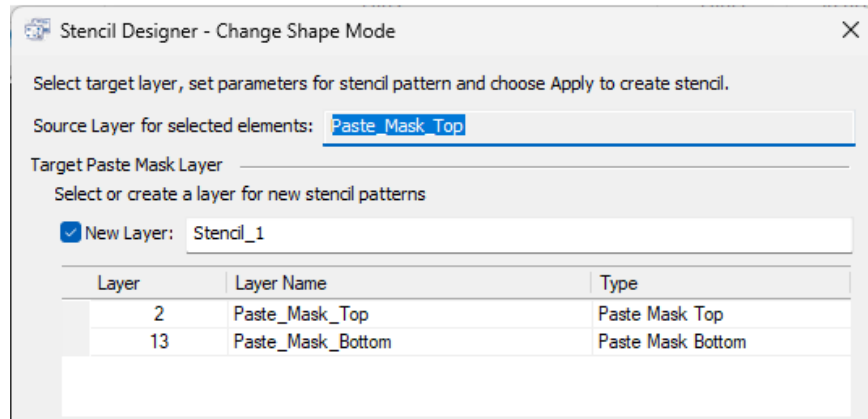
**Heel and Toe** – keep the shape and shrink the heel or toe (For PLCCs, SOICs, etc.)

8. Set Selection Method to **Select a Pattern** and set Creation Mode to **Change Shape**. The source layer is set to the active and only visible layer.
9. In the upper left corner of the board, area select the 4 pin oscillator pattern and press right mouse button to accept the selection. The pattern is highlighted.



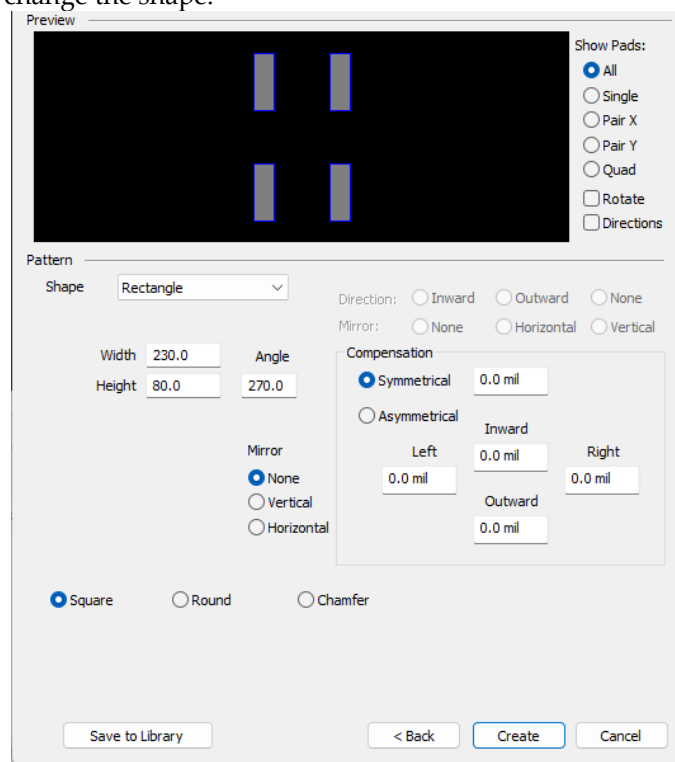
10. Click right mouse button to accept the selection. Click **OK** to start stencil creation. The Stencil Design dialog appears in Change Shape Mode.

The Stencil Design dialog is comprised of two sections. The first area is for selection of the target layer for new stencils. You can choose to create a new layer, or add to an existing Paste Mask layer.



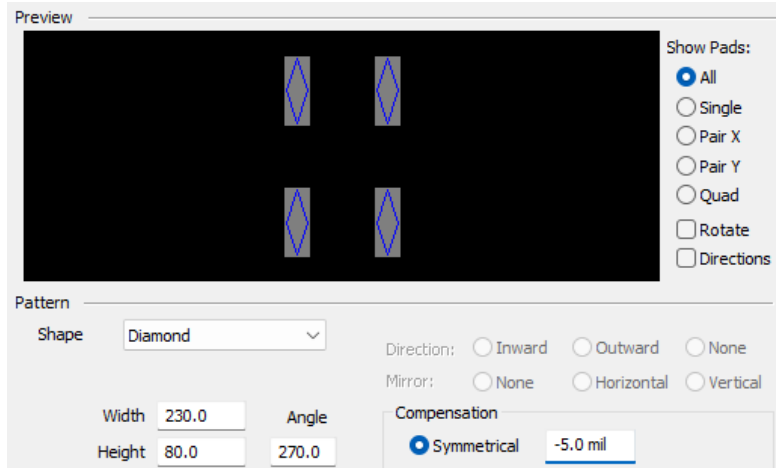
11. For this example, choose New Layer and accept the default name.

The second area is where you define the new shape and preview the stencil design before you create it. Initially, change shape mode presents a stencil shape identical to the selected pattern. Use the settings to change the shape.

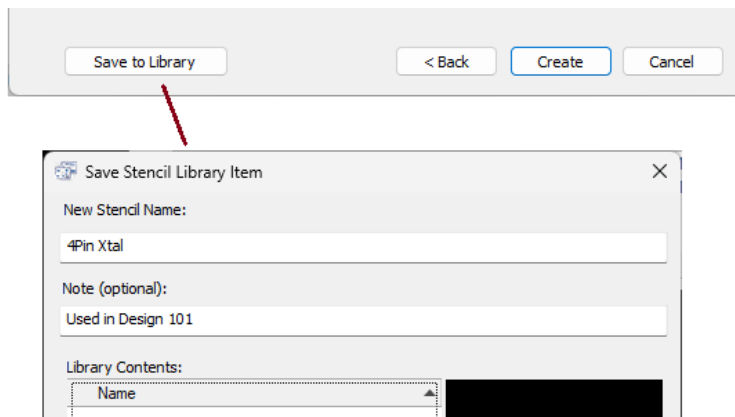


12. Change the shape from Rectangle to **Diamond**.

13. Compensation is for enlarging or shrinking the shape. Set **Symmetrical Compensation** to -5.0 mil (shrink).



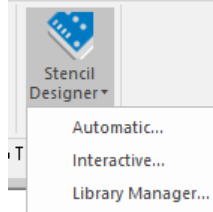
14. Saving to a library is optional. However, it does allow you to reuse stencil design content across designs with similar patterns or footprints. Use **Save to Library** to preserve this definition for use on another design. Enter a Stencil Name and optionally a Note.
15. Be sure Internal Library is selected as the target library. Click **OK** to close the Library Save dialog. The stencil definition is saved to the internal stencil library.



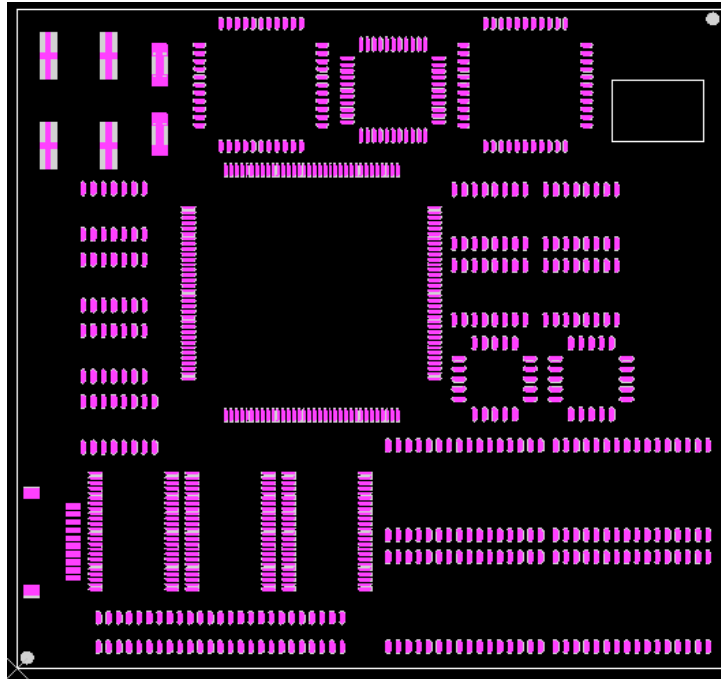
16. In the Stencil Designer dialog, choose **Create**. The Stencil is created and added to the new stencil layer.
17. In the layers pane, double click the new Stencil\_1 layer to view the new stencil. Select the Paste Mask Top layer to make it visible also.
18. Experiment on your own with making pattern selections and using the three other creation modes to create stencils.

**EXAMPLE B** – In this example, you will use the new Stencil Designer to create stencils for a design using the change Automatic creation mode.

1. In CAM350 choose **File > Open**. Do not save your last opened file.
2. Browse to and select the demo file DST Demo 2018.cam from the Demos folder.
3. In the **Layers Display** pane, double click the **Paste Mask Top** layer to make it the only visible layer.
4. On the **View** ribbon, turn off **Top** and **Bottom Parts** (outlines) to hide them.
5. Choose **Design > Stencil Designer**.



6. Choose **Automatic**. The Stencil Designer Automatic Creation dialog appears.
7. This dialog has four sections. The source layer selection, target layer selection, stencil library source selection and stencil library processing area.
8. As in the previous example, set **Source Layer** to **Paste Mask Top** and enable **New Layer** as the target layer and leave the default name of **Stencil\_1**.
9. In the Library area, select **External Library**. The Open Library dialog appears.
10. Browse to and select the demo library **dst demo.dststlib** and click **Open**. This loads the external library and presents them in the Library Contents column.
11. Each item in the library is a previously created stencil. It is possible some or all of these stencils can be used for this design. Choose **Add All** to add all library items to the column of stencils to process.
12. Click **Create**. The matched stencil library entries are compared to the design and if the patterns match, a stencil is created for each match.

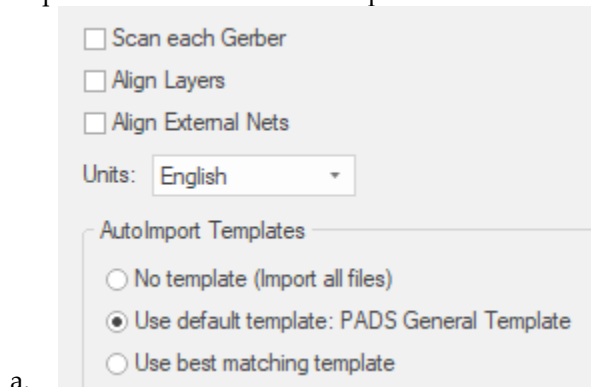


### NEW AUTO LAYER ALIGN

Use new automated layer alignment features to align all layers and external netlist during automated import. Alternatively, use the new alignment commands to align content post import.

**EXAMPLE A** – In this example, we will automatic import a collection of misaligned Gerber, NC Drill and external netlist files and use the new interactive features to align them all.

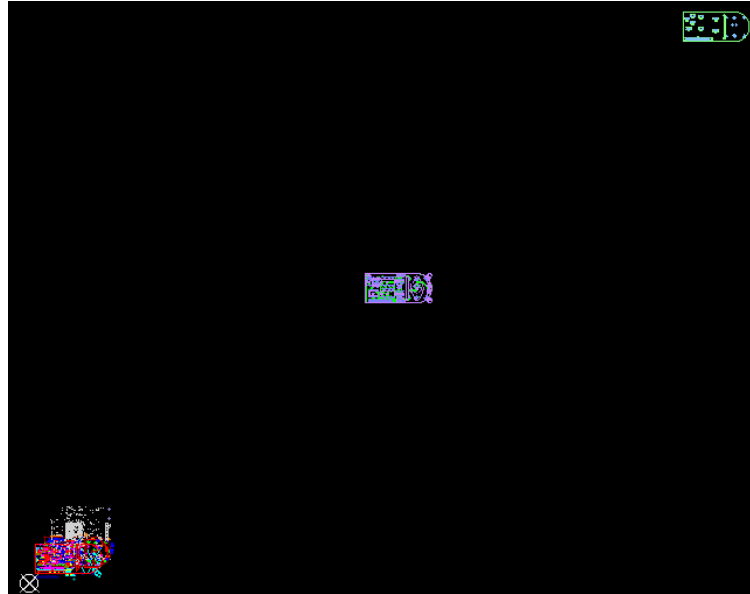
1. Start CAM350 and choose **File > Import**.
2. Choose **Automatic Import**.
3. Browse to and select the layer\_offset folder.
4. At the bottom of the page there are options to align layers and external netlist. Ignore those for the moment. We will use them in a later step.
5. Set the AutoImport Template to PADS General Template



6. Set AutoImport Templates to **PADS General Template**.
7. For the purpose of this sample, we will skip the remaining pages. Click **Finish**.



8. Click **No** to decline Netlist Extraction.
9. When the imported content is viewed, you will note all layers were imported with variable origins and as a result are all misaligned.

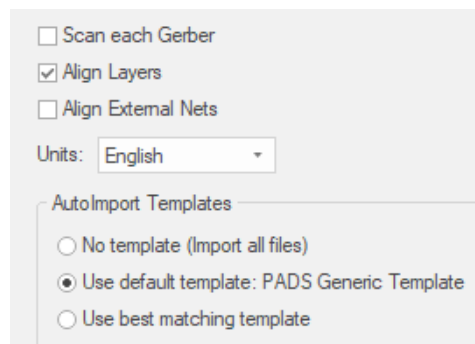


a.

10. On the **Tools** ribbon, select **Auto Align Layers**. All imported layers and external netlist are aligned to a common origin.
11. On the **View** Ribbon, select **Zoom All** (or press Home).
12. Choose **File > New** to clear the imported data and do not save the file.

**EXAMPLE B** – In this example, we will automatic import the same collection of misaligned Gerber, NC Drill and external netlist files and use new automated features to align them all.

1. In CAM350, choose **File > Import**.
2. Choose **Automatic Import**.
3. Browse to and select the layer\_offset folder.
4. At the bottom of the page there are options to align layers and external netlist. Enable **Align Layers**. We will align the netlist in a later step.
5. Set the AutoImport Templates to **PADS General Template**.



Scan each Gerber  
 Align Layers  
 Align External Nets  
 Units: English  
 AutoImport Templates  
 No template (Import all files)  
 Use default template: PADS Generic Template  
 Use best matching template

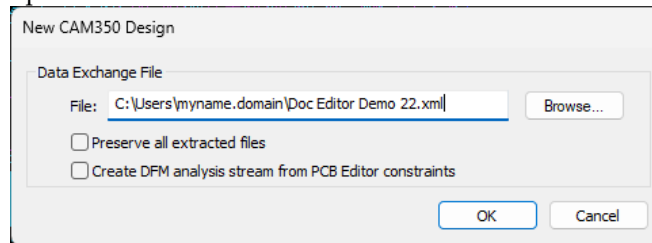
6. For the purpose of this sample, we will skip the remaining pages. Click **Finish**.
7. Click **No** to decline Netlist Extraction.
8. When the imported content is viewed, you will note all imported layers are aligned to a common origin.
9. On the **Analyze** ribbon, select **Netlist Tools > Align External Netlist**. The external netlist is aligned to the common design origin.

### **NEW CADENCE ALLEGRO INTERFACE**

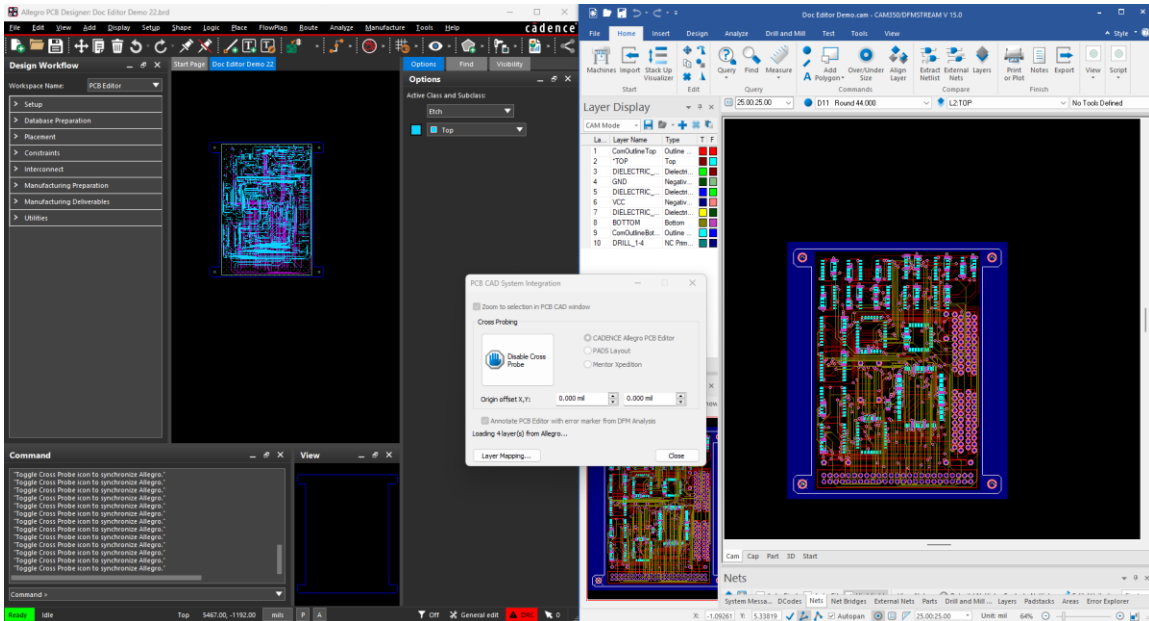
Use the new Cadence Allegro Interface to initiate a new CAM350/DFMStream session directly from the Allegro menu. When selected, an IPC-2581 file is extracted from Allegro, a new session of CAM350 started and the file imported into CAM350. Additionally, crossprobing between CAM350 and Allegro is initiated.

**EXAMPLE A** – In this example, we start with a design in Allegro, initiate a new session of CAM350, and initiate crossprobing with CAM350.

1. Open “Doc Editor Demo.brd” in Cadence Allegro.
2. In Allegro, select **Tools > New CAM350 Design File**. The New CAM350 Design dialog appears.
3. Accept the default path and filename for the IPC-2581 file, leave other options disabled and click **OK** to proceed.



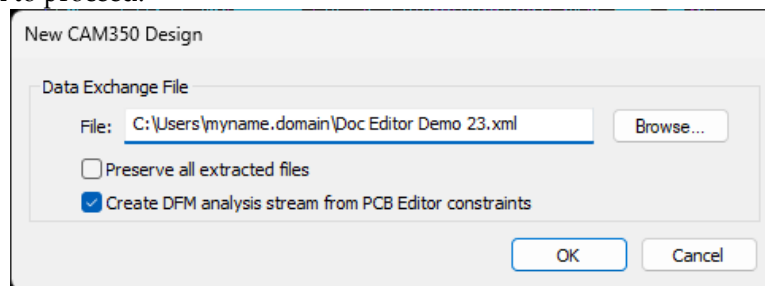
After a few moments, the IPC-2581 is extracted and CAM350 is started. In addition, the data is imported into CAM350 and the System Integration dialog opens with Allegro crossprobing enabled.



4. **Double-click** the **Top** layer to make it the only visible layer in CAM350 and note how the layer display updates identically in Allegro. This is an example of the crossprobing features.

**EXAMPLE B** – In this example, we start with a design in Allegro, initiate a new session of CAM350, and initiate crossprobing with CAM350. In addition, a custom DFM analysis stream will be derived from the current allegro constraints, and if present, constraint areas. You will then run a DFM Analysis using the stream, select analysis errors and crossprobe back to Allegro to see the error location there.

1. Open “Doc Editor Demo.brd” in Cadence Allegro.
2. In Allegro, select **Tools > New CAM350 Design File**. The New CAM350 Design dialog appears.
3. Accept the default path and filename for the IPC-2581 file.
4. Enable the **Create DFM analysis stream from PCB Editor constraints** option.
5. Click **OK** to proceed.



After a few moments, the IPC-2581 is extracted and CAM350 is started. In addition, the data is imported into CAM350 and the System Integration dialog opens with Allegro crossprobing enabled. You will run the custom DFM stream analysis.

1. Click **OK** to proceed.

2. Once CAM350 is started and crossprobing initiated, choose **Analysis > Streams Editor**. The Streams Editor pane opens.
3. The list of Active Streams will contain two streams. The first Stream titled as Stream 0 is the default stream. The second stream titled as Doc Editor Demo is the custom DFM Stream.
4. Select the custom stream and note the last two checks. These are custom outer signal layer and inner negative plane checks derived from design data in Allegro.
5. Uncheck Run for Signal 1 and Negative 0 checks to skip these checks that are duplicates of the custom check.
6. Select **Run Selected > Inside Board Outline Only** to initiate the analysis. Several errors should be detected. Choose **OK** to Switch to Error Explorer.
7. Close the Stream Editor Pane.
8. Arrange the Allegro and CAM350 applications on your display so that both are visible and sharing screen space.
9. In Error Explorer, select any error in the list and note the reaction of Allegro and CAM350 to center the view in both applications on the selected error. Also note the addition of a CAM350 specific error marker in Allegro.

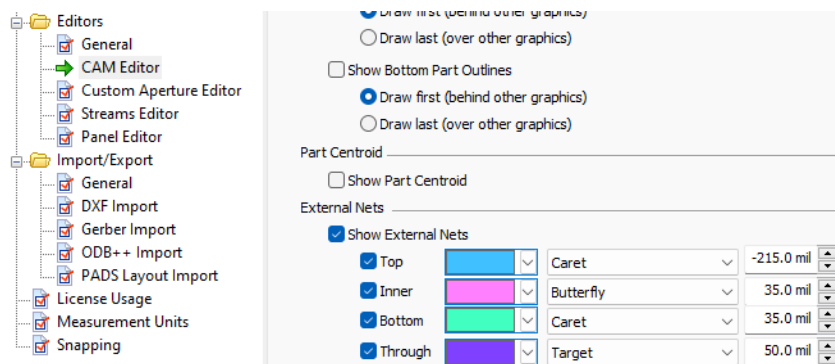
### NETLIST COMPARE ENHANCEMENTS

New features were introduced to aid in the exploration of netlist compare errors. Enhancements were made to both Error Explorer and the display of nets involved in netlist compare errors.

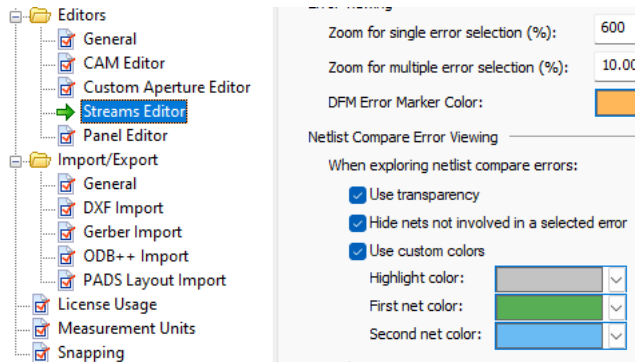
**EXAMPLE** – In this example, you will open a design that contains netlist errors and use the new features to explore the errors. First, let's review the new options for external nets and netlist compare.

1. Start CAM350 and Browse to and open the **open-shorts.cam** file.
2. Choose **Home ribbon > Options**.
3. Select **Editors > CAM Editor** options.
4. Scroll down until **External Nets** options are visible.

Here you will note the addition of viewing inner net points in support of newer ODB++ and IPC-2581 netlist standards. Additionally, the default graphics and colors for net points have been updated.



5. Select **Editors > Streams Editor** options.
6. Scroll down until the new **Netlist Compare Error Viewing** options are visible.



These new options were added to facilitate improved exploration of netlist compare errors. When you select a netlist error in error explorer, the display is temporarily updated until the error is unselected. The display of nets involved in an error is determined by three new options.

**Use transparency** – make all non-involved nets transparent.

**Hide nets not involved in a selected error** – hide all non-involved nets.

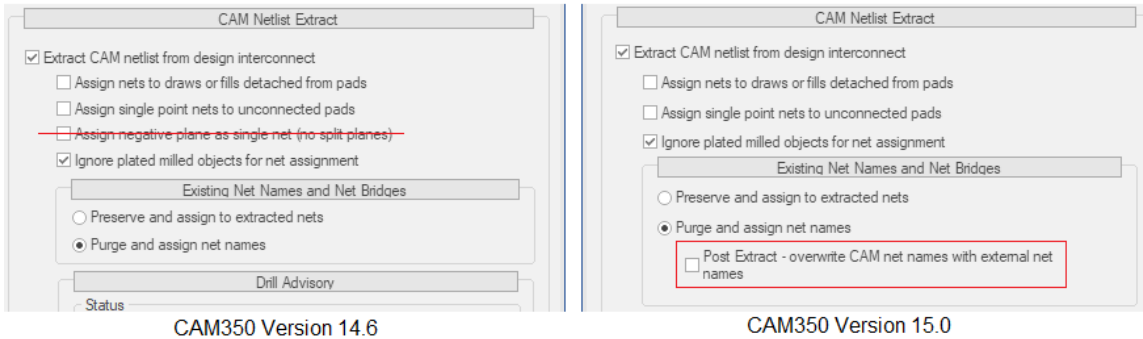
**Use custom colors** – replace current layer and highlight colors for involved nets with the assigned colors.

7. Select **Cancel** to close the Options dialog without making changes.
8. Select the **Nets** pane to make it active and note the addition of a **Show** column to control visibility of individual CAM nets.
9. On the **Nets** pane choose **View Nets > Hide All Nets**. This hides all design elements that belong to a CAM net. Note the presence of some partial net data. These pins are not associated with any CAM net.
10. On the **Nets** pane choose **View Nets > Hide No Net Elements**. The remaining elements are hidden.
11. On the **External Nets** pane, use **View Nets** to toggle the display of all external nets to Hide and then back to Show. Leave all external nets visible.
12. On the **Nets** pane choose **View Nets > Show All Nets** and uncheck **Hide No Net Elements**. All net and no net elements are made visible again.

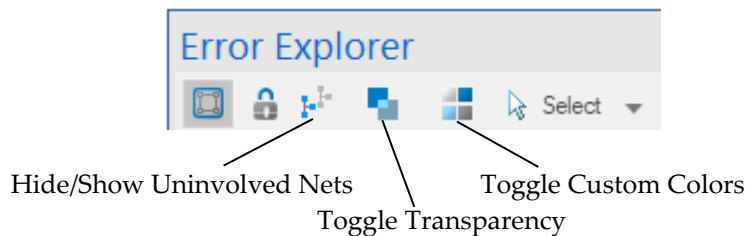
Now let's experiment with the usage of these new options.

1. On the **Analysis** ribbon, choose **External Nets**.

There are changes to the CAM Netlist Extract options as highlighted below. The Assign Negative plane as single point net was removed. It was no longer necessary. A new Post Extraction option was added to overwrite CAM net names with external net names. This should be used whenever Net Bridges are present in your design. It will preserve external net name associations with the net bridges.



2. Disable **Compare Against External IPC-D-356 Netlist File** option.
3. Leave the remaining options unchanged and choose **Run Now > Inside Board Outline Only**. After a few moments, you are prompted that errors were found. Choose **OK** to make the Error Explorer pane active.
4. Close the External Nets pane.
5. In the **Error Explorer** pane, click error ID 0 to choose the **first error** in the list. Note how the display changes to use the custom color option.
6. On the **Error Explorer** pane, choose **Use Custom Colors** again to restore the previous state.
7. On the **Error Explorer** pane, choose **Hide Uninvolved Nets** and note how all nets disappear except those involved in the net.



8. On the **Error Explorer** pane, choose **Hide Uninvolved Nets** again to restore the previous state.
9. On the **Error Explorer** pane, choose **Use Transparency** and note how all nets are transparent except those involved in the net.
10. On the **Error Explorer** pane, choose **Use Transparency** again to restore the previous state.
11. Another improvement is the ability to zoom to a net involved in a netlist compare error. For the first error, click each individual hyperlinked CAM net name and External Net name. Note how the display is updated to show the selected net.

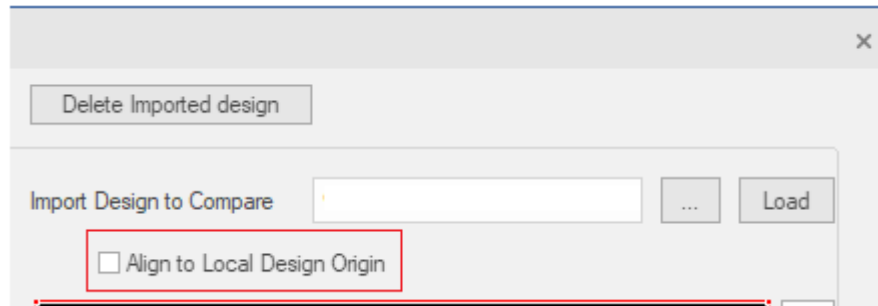
Cam Net(s)	External Net(s)
<a href="#">\$Net23,\$Net57</a>	<a href="#">\$\$\$22731</a>
<a href="#">\$Net15,\$Net18</a>	<a href="#">\$\$\$22774</a>
<a href="#">\$Net1</a>	<a href="#">A12,\$\$\$7636</a>
<a href="#">\$Net2</a>	<a href="#">GND,A00</a>
<a href="#">\$Net2</a>	<a href="#">GND,A00,A02,A04</a>
	<a href="#">+5V</a>

### DESIGN COMPARE ENHANCEMENTS

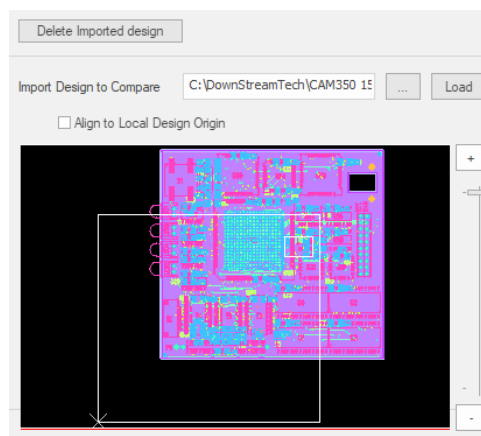
New features were added to Design Compare to expedite the compare process. Enhancements include automated alignment of the designs to compare and simplified layer mapping. In addition, Design Compare is now available as a licensed option that can be added to lower level CAM350 configurations.

**EXAMPLE** – In this example, you will open a design and compare it against another design and use new automatic design alignment and improved layer mapping features.

1. Start CAM350 and open the DST Demo 2018.cam file from the Demos folder.
2. On the **Analyze** ribbon, choose **Design** (Compare). The Design Compare pane appears.
3. Note the new **Align to Local Design Origin** option. For the purpose of this training, disable the option.



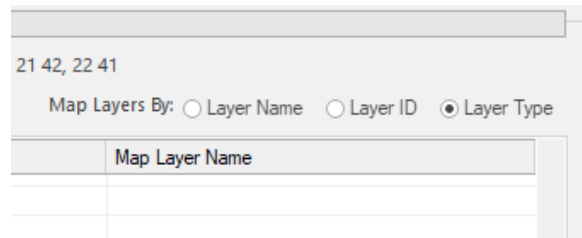
4. In the Import Design to Compare, choose Browse and browse to and select the DST Demo 2018 gerber.cam file from the same folder as the previously opened file.
5. After a few moments the design is opened and you will clearly see the design origins are different as evidenced by the board outline of the design in memory overlaid over the newly opened compare design.



6. Choose **Delete Imported Design** to purge the imported design from memory.
7. Enable the **Align to Local Design Origin** option and click **Load**. The design is loaded, but now the design is aligned to the local design origin.

Improvements were also made to layer mapping to make it easier to map layers for comparison between designs to compare.

1. Scroll down the Design Compare pane until the layer mapping area is fully visible.  
Hint: You may have to expand the size of the pane.
2. Note the new layer mapping preference choices of Layer Name, Layer ID or Layer Type.



These options are design to make layer mapping more expedient. In this design compare example, Layer type mapping does not work for all layers because of the variance in layer type assignment per design.

3. Scroll vertically the list of layers to map until you reach the top of the list. The default option is to map by layer type. Note that some, but not all layers are mapped. This is because the designs to compare did not have identical layer type.
4. Choose Map Layer by **Layer ID**. Note how the layer mapping instances improve somewhat, but the mapping is not correct because of differences in layer order.
5. Choose Map Layer by **Layer Name**. Note how the layer mapping is now empty because there are no matches between layer names in the designs to compare.
6. Choose Map Layer by **Layer Type** and we will use other features to map mismatched layers.





## CAM350 7.0 CUSTOMER DEFECT FIXES AND ENHANCEMENTS

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### CAM350 15.0 BUILD 2068 DEFECT FIXES

72999	CAM350 15.0 Netlist Compare navigation features not working properly
72981	The older CAM350 macro language does not report Stream Errors
72979	When user deletes a layer, errors referring to layer should be removed as well
72971	Auto Detect Text Areas fails on this design
72943	DFM Analysis – Backdrills that are internal to the stackup are not being found during drill to copper checks
72924	Stencil Designer – Footprint is not available until the file is saved and reopened
72863	Mill Tab import failure
72860	CAM350 API – various defects and enhancements:
72859	DXF Import – Full circles imported as half circles for this DXF
72856	CAM350 API – Enh to Pause and Resume script playback
72855	CAM350 API – Enh to force redraw during VB script playback
72854	CAM350 API – CAM350 12.2 DXF Import dialog incorrectly appearing in 15.0
72851	Wheel Mouse Panning is different in CAM and World views
72846	CAM350 15.0 Japanese UI text corrections
72836	ODB++ Import – precision issue
72815	Draw to Flash – Interactive any-angle misses some rotated pads
72811	Draw to Flash – Conversion results in oddly rotated flashes for this design
72805	Draw to Flash – Fails to convert pattern when selected after a previous pattern conversion
72558	Analysis – Copper spacing check fails to find unplated drills shorted to copper on this design
72510	DXF Export – Failure on mirrored CAM350 data
72715	Panel Editor – panel exported to gerber and reimported has data inverted
72706	Circle Mill Paths – Incorrect display using OpenGL
72098	Custom Apertures: Pad Mask to Pad Ration failure



## CAM350 15.0 BUILD 2059 DEFECT FIXES

72797	ODB++ Import – Copper voids missing after import for this Altium design
72787	Regression - File SaveAs sets the wrong CAM version in the CAM file.
72784	IPC2581 import missing internal pads for this design
72782	IPC2581 Import does not correctly mirror padstack element instances
72781	IPC2581 import failure on this Zuken CR8000 design with slot cavity
72774	API macro playback improvement for drill import
72749	Drill to Flash using “any angle” is missing some angles
72743	Install - DisableEnv not Getting Set Properly in CAM350 ini file
72742	ODB++ import failure for this design
72728	Stencil Designer – layer is sometimes not visible in this design
72718	DXF import failure for this design
72698	Stencil - Patterns being applied to previously completed pattern
72670	New Cadence interface improvement if there is data loaded already in the associated CAM350 window
72663	IPC-2581 import problem
72596	Oblong pads dropped on netlist extract
72542	Automatic mode in Stencil designer should sort with the highest "pin" (or pad) count to the top
71948	This design displays incorrectly using OpenGL
70895	ODB++ import - Pad lost

## CAM350 15.0 BUILD 2053 DEFECT FIXES

Defect	Description
72658	Mill Circle – Add Mill Circle only adds ½ circle
72656	Allegro – CAM350 interface ODB++ does not work for filenames with embedded spaces
72654	Extra pad causing shorts in this IPC2581 rev C file from Allegro.
72630	CAM350 15.0 Wizard Cancel does not work
72595	Licensing updates for new 15.0 features
72591	Auto Save - Auto Options not working as expected
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72461	Enhancement to Via and Backdrill Templates – symmetric column creation should not align vias in adjacent layers
72460	Backdrill Stackup template drawing elements shift on execution
72448	Stencil - When you have one layer turned on before going into Stencil creation mode, it should default to that layer in the pulldown.
72469	Gerber Export default decimals should be 5
72462	CrossProbing for PADS and Expedition reconnect failure after Streams execution
72426	Enhancement to make ODB++ import (panel dialog) resizable
72418	Stencil - DogBone aperture created with wrong shape for some parameters
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72045	CAP library Delete all
71949	VB Recording - script is incorrect for adding layer sets
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71571	PADS Layout .REP files should not be selected for RS274X Gerber files
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71345	SUV - Context menu commands in the Stackup Table disable the table
71335	SUV - Refresh issue on SUV grid in Autoimport mode when scrolling horizontally
71158	DXF Import - TTF fonts does not match AutoCAD size and position
70911	Enhancement to Query External Net - report layer and location for external net point
70623	IPC-2581 import - layer mapping for ALL LAYERS stackup not initialized
70514	Compare layers not working on this design data, but worked in CAM350 12.2
70421	Japanese version only - Negative Plane check does not work in DFM for this design
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70310	File Auto Import command does not work for this design

70309	Macro Recording - Recording and execution of Streams Analysis does not work
70218	Auto hide stops working in error explorer after answering dialogue
70179	OpenGL display issue - Test points and Probes not visible for this design
70157	Clarification in user interface for "Paste Mask to Copper" check
70148	Bad mapped drive on PC causes CAM350 File open delay
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70099	IPC-2581 import - Invalid REV C warnings for IMPEDANCE and LogicalNet SPECREF definitions
70082	This old CAM database gets no results in streams
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69967	Cannot import stackup XML for this design
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68510	AutoImport failure
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68091	Nelist Compare enhancement to cover unplated drills, drill slots and mill paths
67603	Draw 2 Flash not working correctly
66025	DXF import - Failure on this DXF with hatches
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65440	Composite to layer failure
64714	Auto-import - Multiple layer type assignment problems.
62733	Draw to Flash - Interactive does not work on circle
56294	Improve layer mapping in design compare



## HOW TO CONTACT

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Please send any defects, feedback or questions to [support@downstreamtech.com](mailto:support@downstreamtech.com).

## PATENTS, COPYRIGHTS, AND TRADEMARKS

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### PATENTS

“AUTOMATED PCB MANUFACTURING DOCUMENTATION RELEASE PACKAGE SYSTEM AND METHOD”, United States Patent No. 7,409,666 B2

“ADAPTIVE TEMPLATE SYSTEM FOR AN AUTOMATED PCB MANUFACTURING RELEASE PACKAGE SYSTEM”, United States Patent No. 8,875,072 B2

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