



dw-2000™

Release Notes

Revision 8.90

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For more information on this and other Design Workshop Technologies products, contact:

Design Workshop Technologies

Tel.: 514-426-6171

Fax: 514-426-6101

Toll-free (USA and Canada): 1-866-590-0770

support@designw.com

<https://www.designw.com>

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Version 8.90 of dw-2000 contains new features and updated functionalities designed to enhance our customers' productivity. In this document we highlight the changes since the release of version 8.75.

dw-2000 Roadmap

It has been about 3 years since the release of version 8.75. This delay is appreciated by our clients as they like keeping the same stable environment and avoid any disruption in their design flow. As usual, over the period between release, Design Workshop provides features and improvement continuously throughout the period, without requiring a version change.

As mentioned in the v8.75 release notes, Design Workshop Technologies has been working on two major software versions. This release is the one where we introduce the Direct2D technology (DirectX) which will increase Layout speed and add valuable editing features to increase productivity.

Direct2D – Improved Layout Experience

As designs become larger in layouts, loading and data display can take time. The added Direct2D technology in dw-2000 significantly increased the drawing speed and allows for richer layout editing experience. Direct2D technology enables access to powerful video card features to render graphics on the display at an amazing speed and image quality. In this release you will have the opportunity to see all the amazing layout aids added to provide a better user experience and reduce layout time.

Data File Conversion

New options are available for the GDSII and OASIS file conversion and some changes to the MEBES and AutoCAD converters. See [Data Conversion](#) section for further details.



Overview

Features And Improvements

Direct2D

Starting with this release, dw-2000 uses the DirectX technology from Microsoft. More precisely its Direct2D which is a module of DirectX. Using Direct2D, the time to load and display layout is significantly reduced while improving the rendered graphics for a better visual effect. In addition, it brought valuable tools to improve layout productivity as you will see in the next section.

Improved Layout Experience

Direct2D opens the door to a new layout experience. In addition to drawing speed, it offers a better color and improves color blending using partial transparency amongst layers. Anti-aliasing improves text readability when used with cursors, rulers, and layout text elements. Here is a short list of new and improved layout features in this release:

- New element drawing
- Path outline display
- Automatic PUT after dragging new Circles and Ellipses
- New Text sizing frame
- New editor outline and features
- New Aref shape modification features
- New editing visuals
- New Rotation icon
- Holding the SHIFT key
- New reference element content display
- New visual for the group stretch
- Boolean Toolbar highlights
- Element transparency control
- Measurement display along the ruler bars
- New quick measurements feature

New Element Drawing

Replacing the solid green line, when digitizing a new element, it will now display the current layer color, fill, and border thickness. You know immediately if you are using the correct layer before putting it. This will save a few steps since you won't need to select it, change its layer, and put it in again.

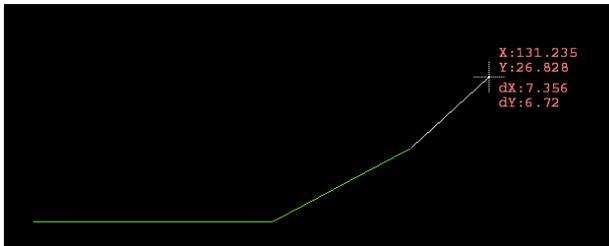


Features And Improvements

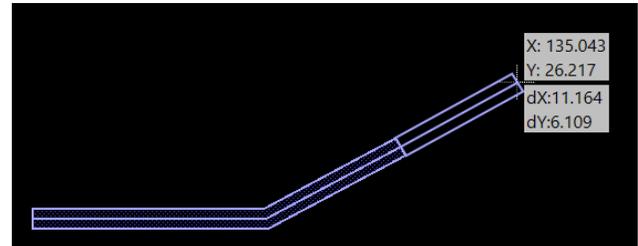
Path Outline Display

In addition to the new element drawing, as you draw a new Path element, it now displays its outline showing its width, endcap style and drawing edge. Upon selection, the outline is also drawn so you can better see where it lands upon any modifications like moving, copying, stretching, rotation, reflection or adding segments.

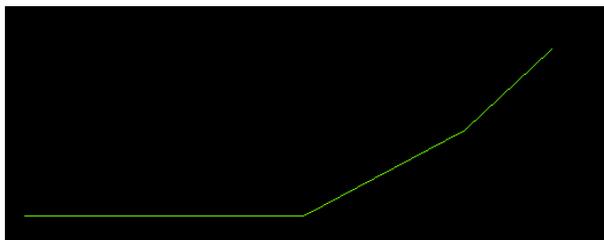
v8.75 Path Creation



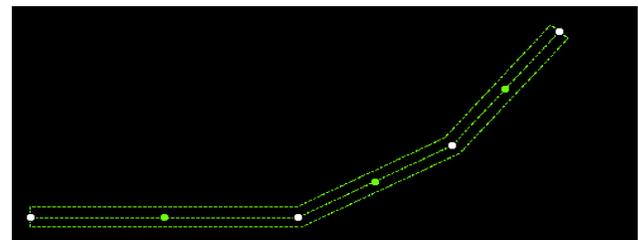
v8.90 Path Creation



v8.75 Selected Path



v8.90 Selected Path



New Text Sizing Frame

Upon selection, a frame is now shown around the Text element. Using the mouse, you can stretch any of the four sides to modify its Text size property.



The new Text size is shown next to the mouse cursor. As you move with your mouse cursor, the Text size increases or decreases by steps matching the current grid scale value.



Automatic PUT after new Circles and Ellipses

For consistency with dragging a rectangular boundary, when using the same mouse action with circles and ellipses, they are placed immediately once you release the mouse button, removing the need to press ENTER before creating another element.

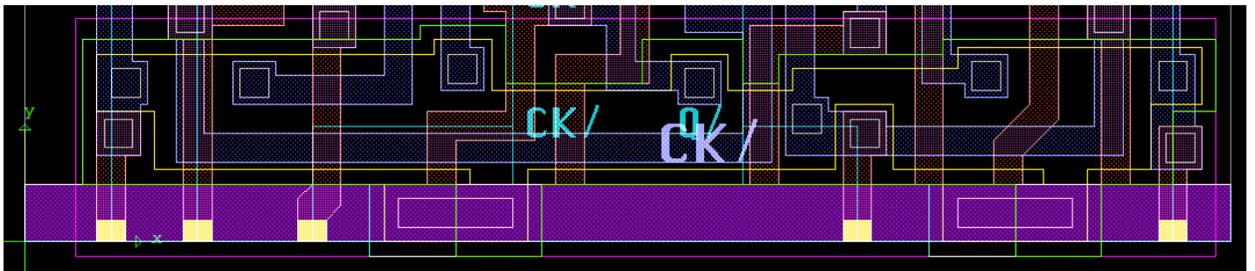
Holding the SHIFT key

In the following topics, many editing and group commands will react when the SHIFT key is pressed to limit movement direction or rotation angle.

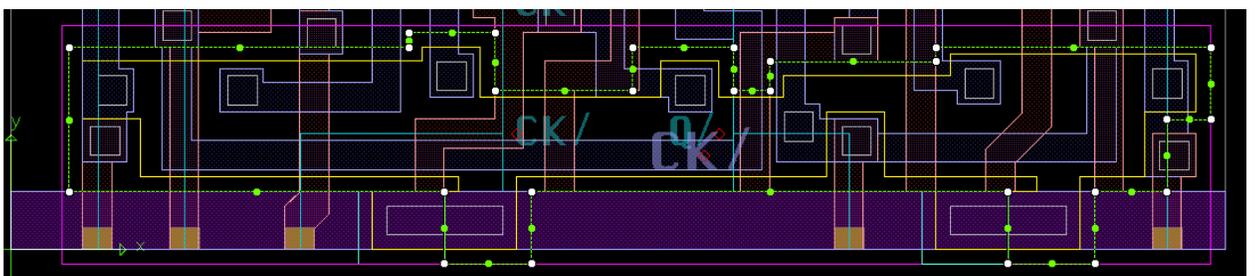
New Editor Outline and Features

The selected element is now displayed with a dashed contour line with new colored dots. The white dots are placed on top of each coordinate and the green dots at mid distance of each segment. The selected element will now always be easier to locate at any zoom level. The selected element color can be changed as usual via the dw-2000 preferences under the color tab.

(v8.75) Using a solid green line:



(v8.90) Using a dashed line with white and green dots:

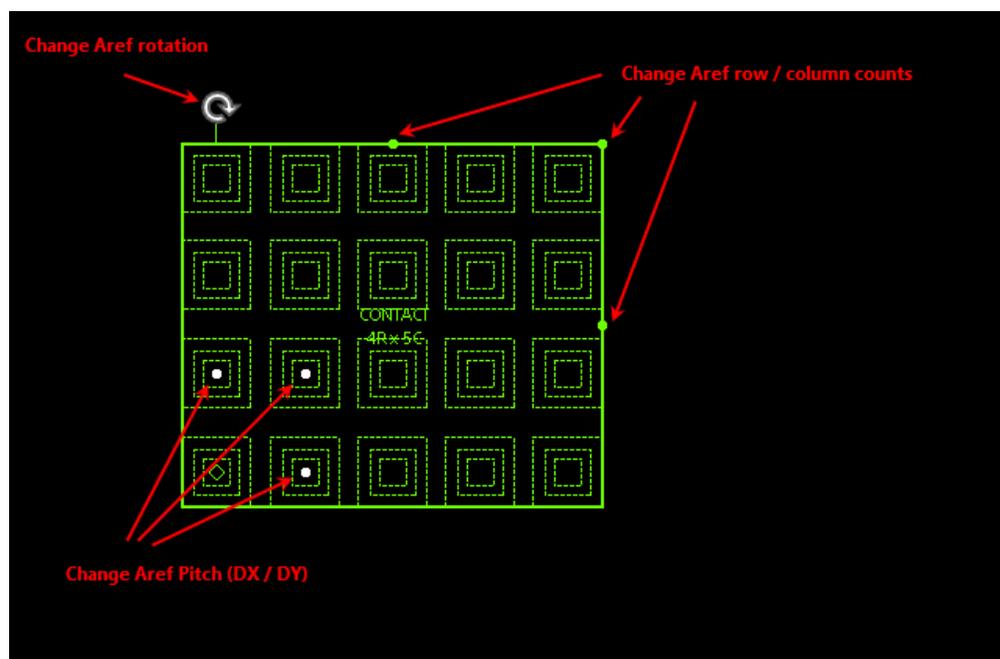




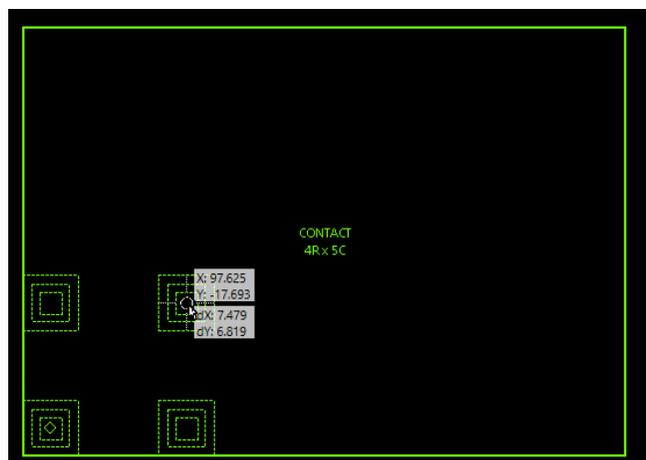
Features And Improvements

New Aref Shape Modification Features

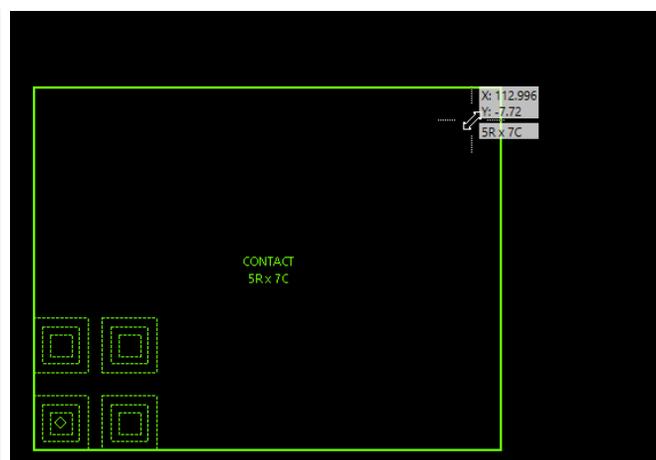
Upon selecting an Aref, notice the new white and green dots. Using the mouse, you can drag the white dots to modify the Aref Pitch in X, Y, or both at once. The green ones are located on the top and the right edges corresponding to the Aref extent. You can stretch these two edges to modify the Aref row or column counts. You may stretch to the upper corner to modify both Row and column counts at once.



White dots to change Dx & Dy



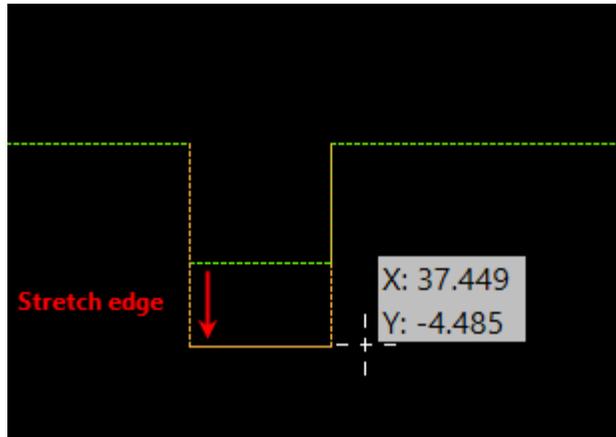
Green dots to change row & column count



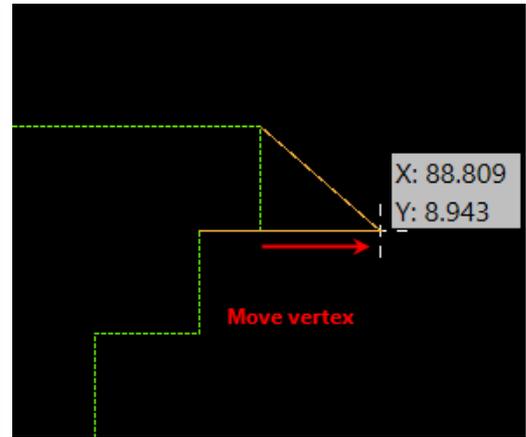
New Editing Visuals

The following images are some examples of the visual effects added to editing elements. Using the stretch edge or move vertex commands, the original and new locations are shown in figure 1 and 2.

Edit > Stretch

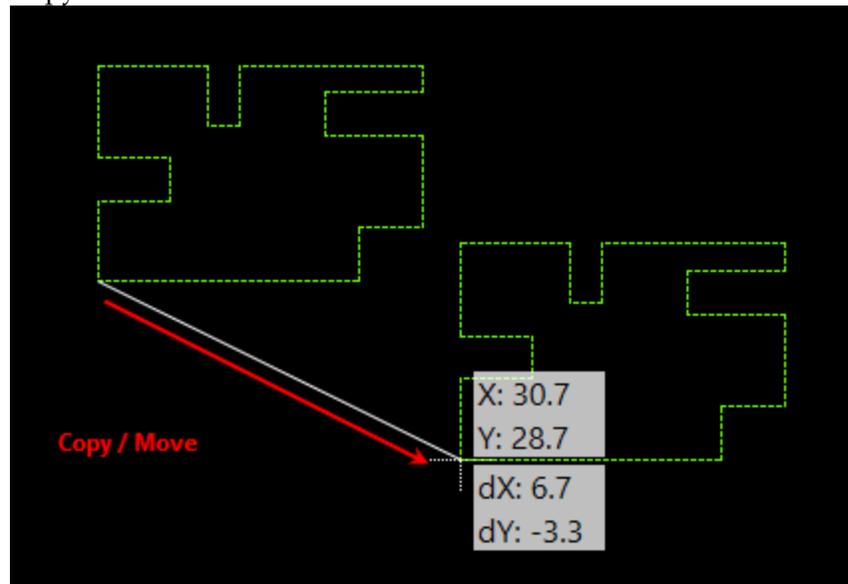


Edit > Move Vertex



Copying and moving an element, a copy of the element follows the mouse cursor and a line which displays the displacement from the chosen source location to the current cursor location. The total displacement (dX & dY) is shown next to the cursor. In addition, holding the SHIFT key will snap the operation to a vertical, horizontal or 45 degrees from the source location.

Copy or Move

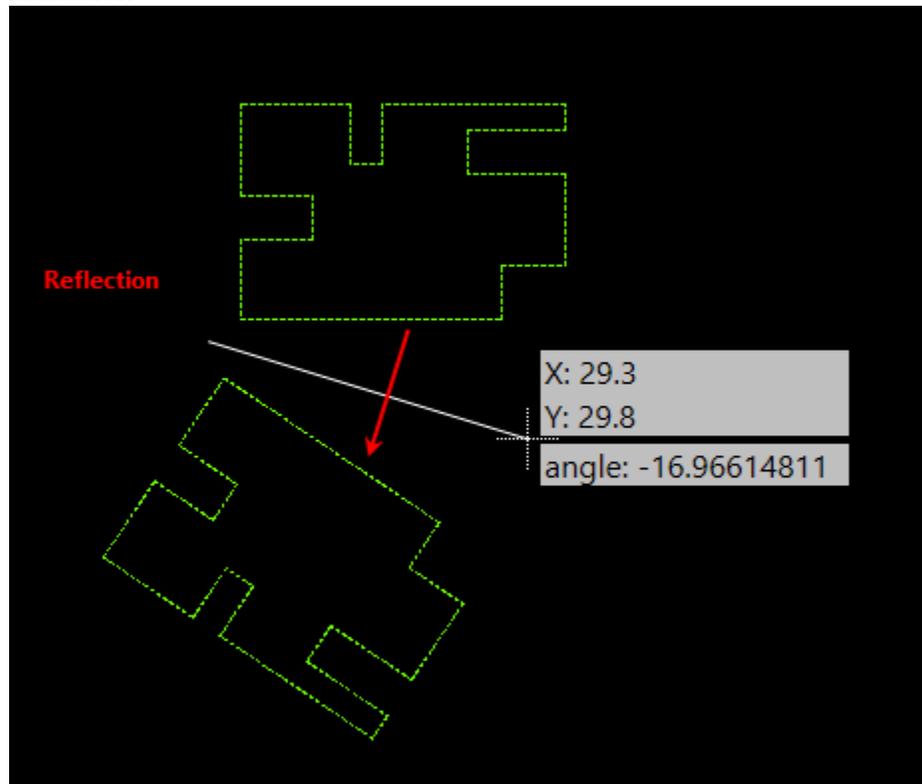




Features And Improvements

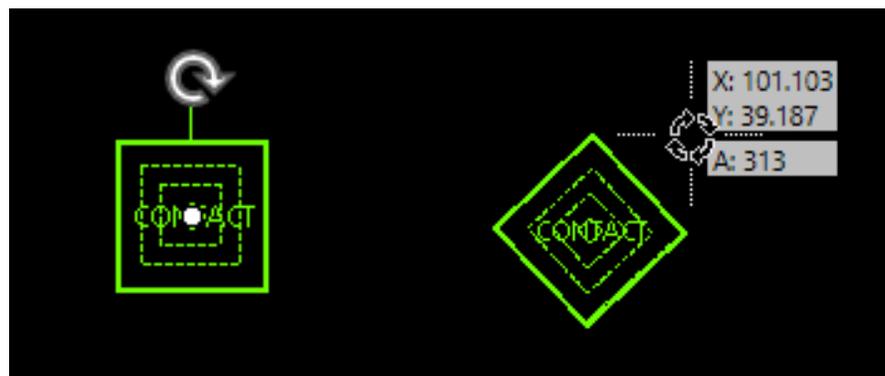
The reflection command also draws a copy of the element showing final location upon completing the reflection line entry. In addition, holding the SHIFT key will snap the operation to a vertical, horizontal or 45 degrees from the source location.

Reflection



New Rotation Icon

All Element kinds with rotation property (Ellipse, Text, Sref, Aref, PCref) now displays a rotation icon upon element selection. The Element insertion point is the pivot location. The rotation is made by 1 degree increment or 45 degrees while holding the SHIFT key.



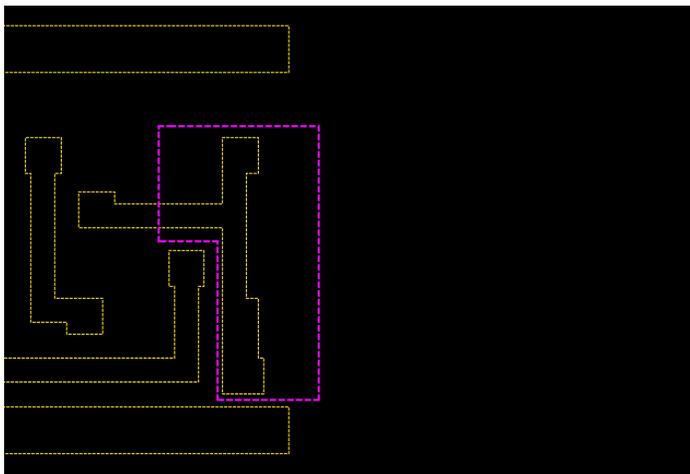
New Reference Element Content Display

The Direct2D performance increase allows us now to display the selected Sref, Aref or PCref element contents while dragging them around to facilitate their alignments with surrounding elements. If you have a computer with limited graphics capabilities to properly display the reference content, you can disable the 'Draw reference content on edit' option located under the Graphics tab in the preference window.

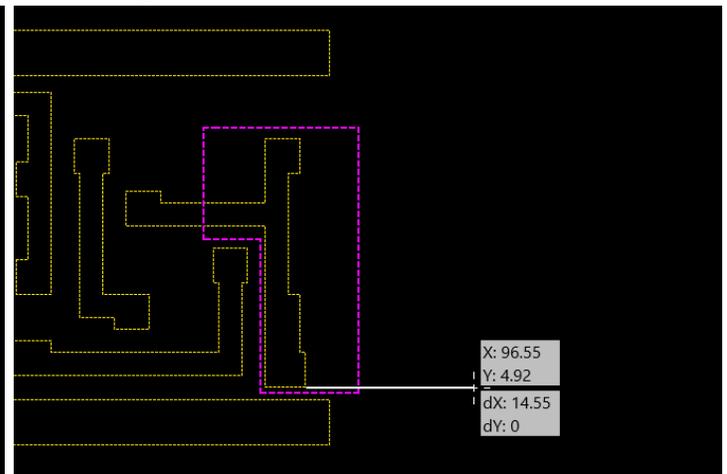
New Visual for The Group Stretch

The selection outline is now persistent until the stretch operation is completed. All vertices inside the outline are moved by the specified line displacement.

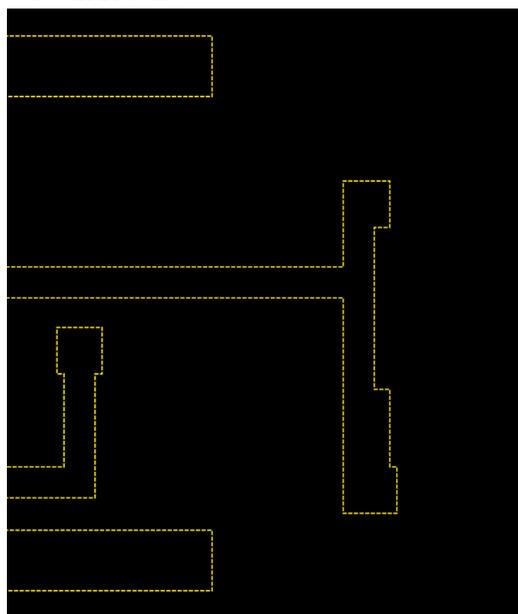
Stretch selection outline



Entering translation line



Stretch Result:

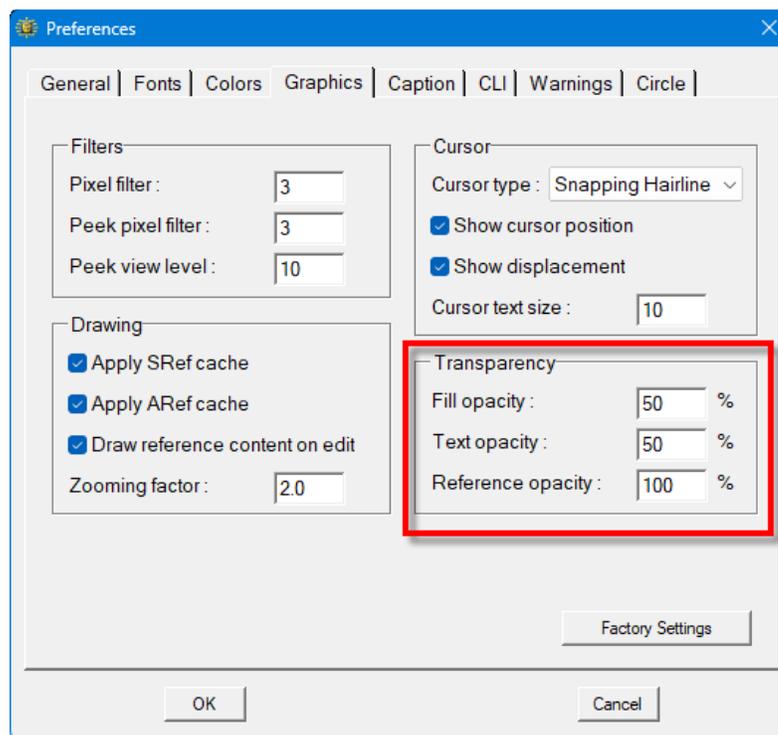




Features And Improvements

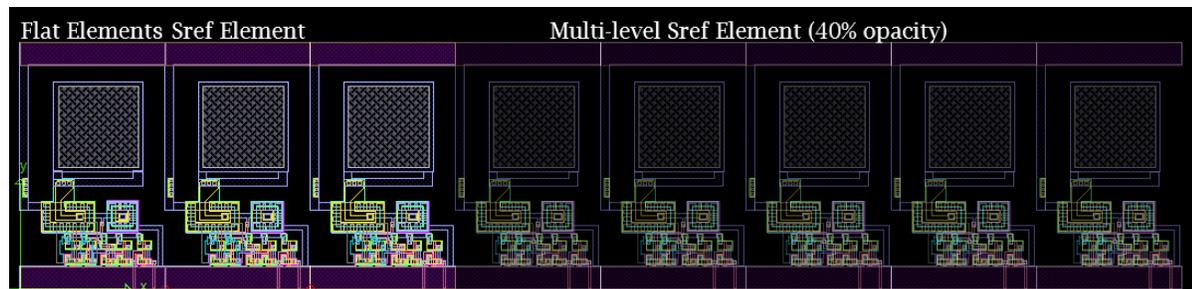
Element transparency control

With the implementation of Direct2D, we now have access to transparency feature which we now apply to the layout display. You can change the settings via the **Graphics** tab in the dw-2000 preferences. This feature significantly enhanced the layout display especially when many layers are overlapping.



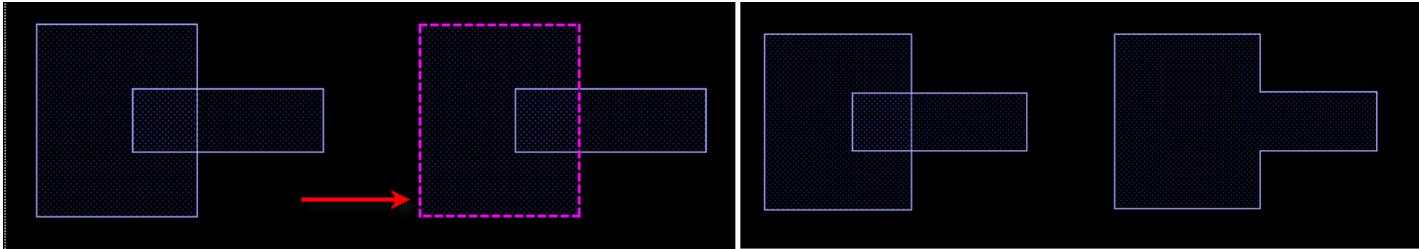
As their name suggests, the fill opacity is applied to the Boundary, Path, Circle, and Ellipse element fills whereas the text opacity applies to text elements. For example, reducing the opacity value of text element reduces its visibility whereas if set to 100%, the text element will stand out. The opacity values all range from 30 to 100%.

The reference opacity is an interesting feature which helps distinguish the element from the current hierarchical level versus the ones located in sublevels. In the following image, we can see the effect when the reference opacity is set to 40%.



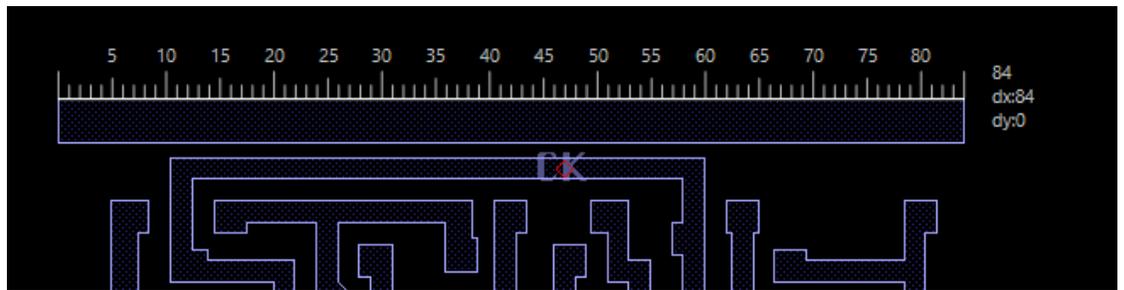
Boolean Toolbar Highlights

The element selection is now persistent until the Boolean command is cancelled with ESC. In the following example, we perform an OR operation between two shapes. The first shape selected is surrounded by a dashed contour. This contour is more visible and remains visible even if you zoom or pan the display.

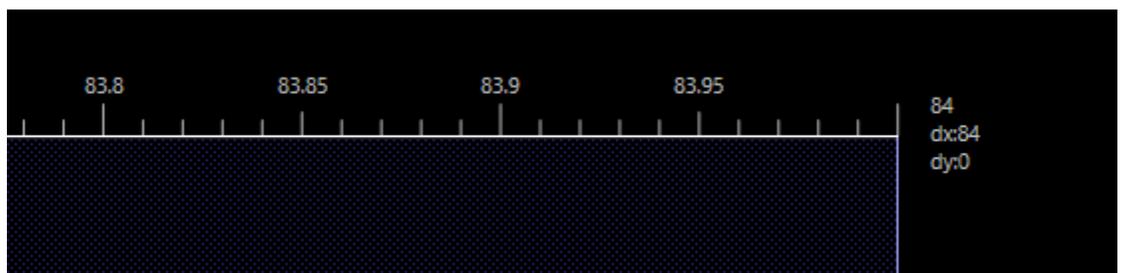
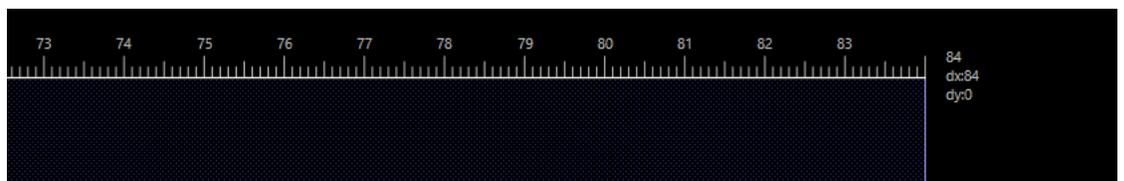


Measurement Display Along the Ruler Bars

The ruler bars will now display intermediate measures along the ruler.



As you zoom closely to the measured element, the measurement numbers will also be adapted to the current zoom level.





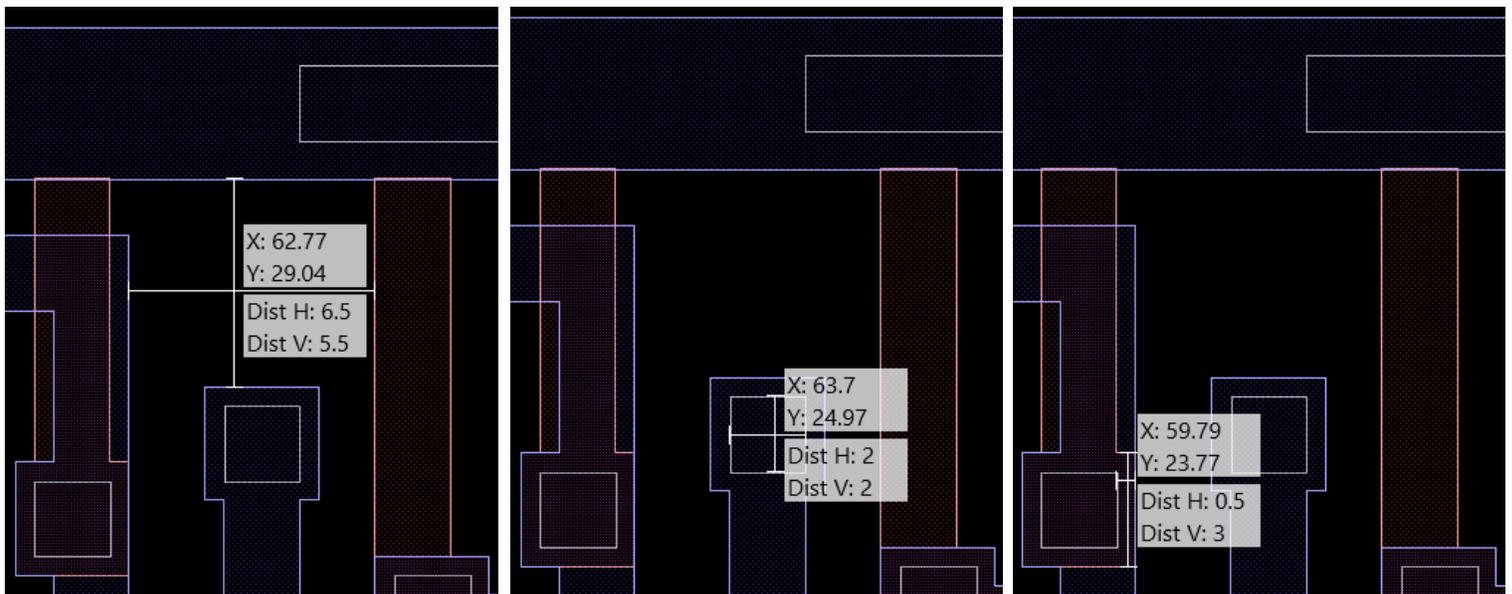
Features And Improvements

New Quick Measurements Feature



The quick measurement is a new cursor mode used to display vertical and horizontal distances at the cursor location. As shown in the images below, as you move the cursor between or inside elements, two measurement lines are shown vertically and horizontally. The lines stop at the first visible element outlines and show the distances in the lower right side of the cursor.

We enable or disable the quick measurement mode via the View menu or using the Toolbar icon shown above. The corresponding GPE command is **QMeasure** which you can use in your shortcut customization to toggle the quick measurements On or Off.



Minor Change to Rotate and Reflect



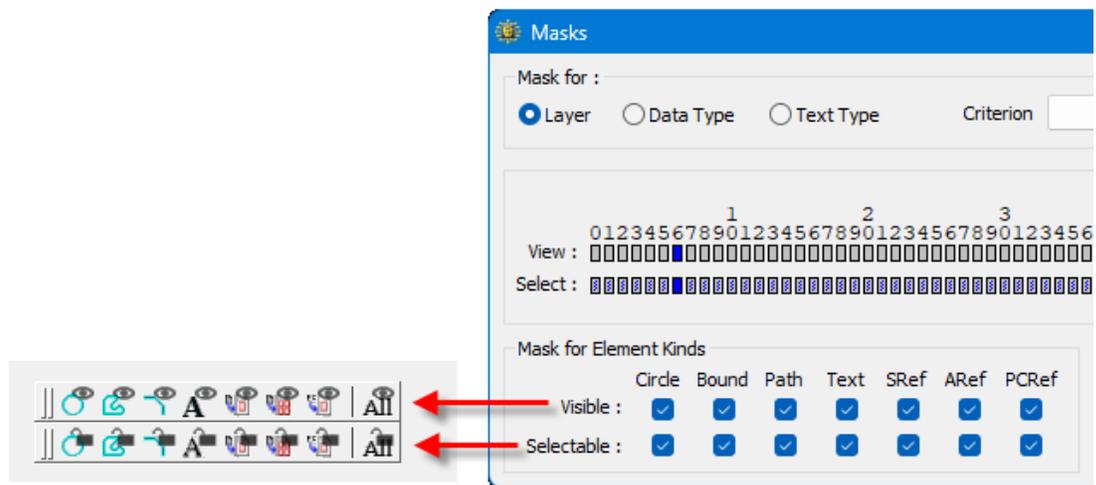
The rotation and reflection commands are no longer sticky and will now perform the operation only once. As a result, you won't need to cancel using the ESC key once the operation is completed.

Automatic GPE Task Cleanup

The sticky commands, such as copy and move, are now removed automatically from the GPE command stack if there are no more selected elements targeted by the pending command. As a result, you are no longer required to manually clear the commands using the ESC key hence reducing the confusion when there are several pending commands and no more candidate elements to apply it to.

New Element Masking Toolbars

We can now quickly toggle visibility and selection by element kinds using these two new toolbars. They are the equivalent of the 'Mask for Element Kind' found in the Masks window.



New and Removed Preferences

A few obsolete preferences were removed, and some new ones added. Here is a short list of the changes.

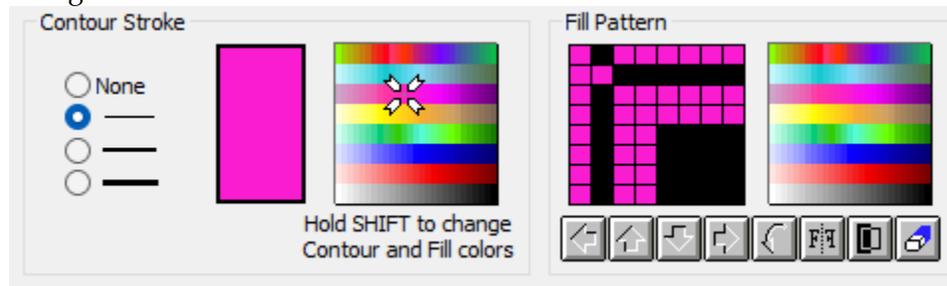
- General: Remove obsolete preference related to boxes Layers and Types.
- Colors: A new color swatch is available for the ruler bars.
- Colors: Two different sets of colors are now stored, one for the white and one for the black background.
- Graphics: With the new cursor position display, the text color is no longer required and was removed.
- Graphics: A new preference is available to turn off reference content display while editing reference elements. This option will help when you have a computer with limited graphic capabilities.
- Graphics: New transparency options to control opacity for polygons fills, Text elements and sublevel reference elements.
- Circles: The circle approximation options no longer apply to the GDSII file conversion. The GDSII export now has its own option presented in the conversion option window.



Features And Improvements

Fill and Contour Color Synchronization

In the palette window, you can now hold the SHIFT key while picking a color to change both contour and fill colors at once.



Aref Properties

The Aref properties window now provides a button to automatically set the Aref delta X and Y to match the selected reference structure dimensions.

TPK Search Paths

Added in one of the v8.75 updates, the dw-2000 technology files (.TPK files) are no longer required to be stored under the Technology folder where dw-2000 is installed. You can now add a GPE load path via the GPE browser window to let dw-2000 know where to find them.

Retired C Developer's Kit Module

The C Developer's kit, which was part of the Advanced GPE Extensions, has been retired. There were too many limitations or not enough functionality in its current implementation. Users now use inter process communication (IPC) to interface with dw-2000 which makes the C Developer's kit obsolete.

Selection / Movement Options

The selection and movement restrictions options, located under the **Group > Options** menu or typing **WinOptions** command, no longer required closing to apply the changes. You can now leave the window open and change any options which will have immediate effect in the Structure window.

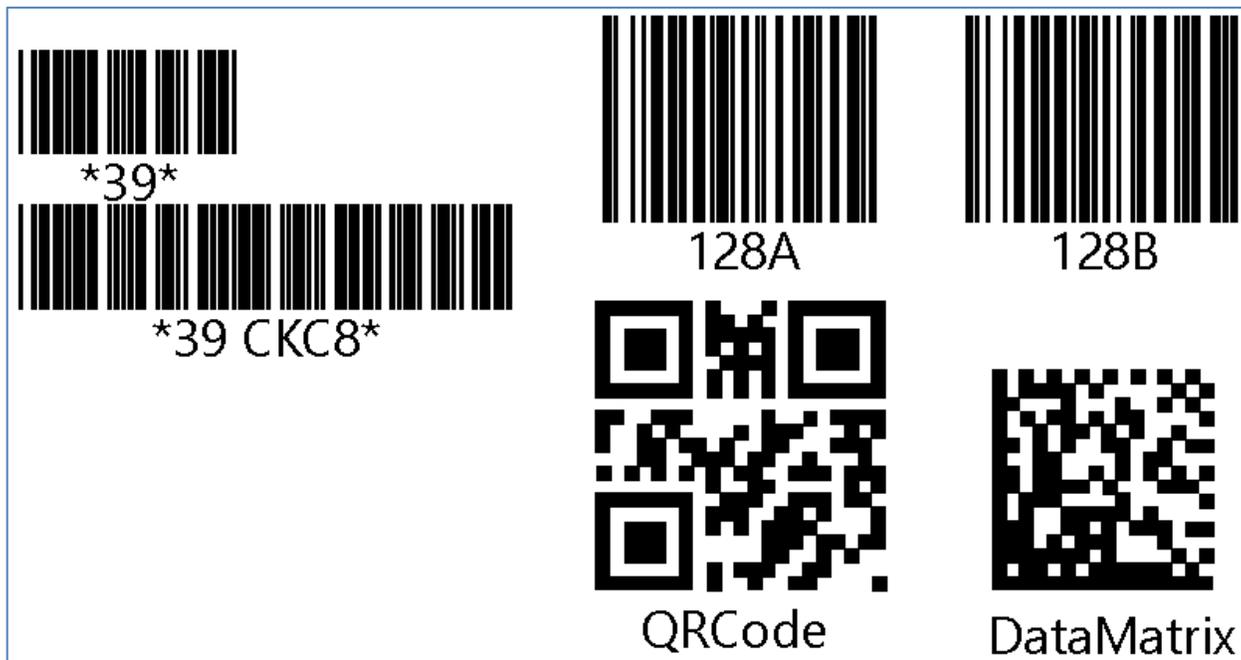
International OS & File System (Unicode)

Version 8.90 better supports international operating and file systems (Unicode).

More Barcode Styles

To complement our 2D barcodes (see QRCode and DataMatrix GPE commands), we have enhanced our sample Barcode PCell kit which is located under the dw-2000 samples folder. The PCell kit now offers the following linear barcode styles:

- Code 39
- Code 39 with checksum
- 128A
- 128B



PCref Coordinates

The coordinate entry for PCref elements that requires more than one coordinates, such as Linear, Arc, S-Bends waveguide, is different in version 8.90 and if you have a GPE script that places such PCref elements, the script might not be compatible with v8.90 and will require minor modifications.

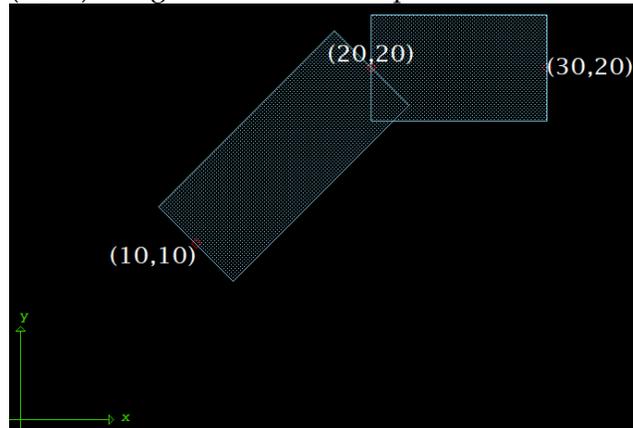
The reason for this change was required since there were issues when PCref were used with rotations and would not be created correctly.

If your GPE script uses the **CE** command to create the PCref element, no changes are required. When using the **PutEL** command, the coordinate parameter entry now uses offsets from origin instead of local Structure coordinates. Let's see the following example to describe the differences between v8.90 and earlier versions of dw-2000.



Features And Improvements

Placing a 3 coordinates Linear Waveguide using the positions (10,10) (20,20) (30,20) using the CE command produces the following artwork.



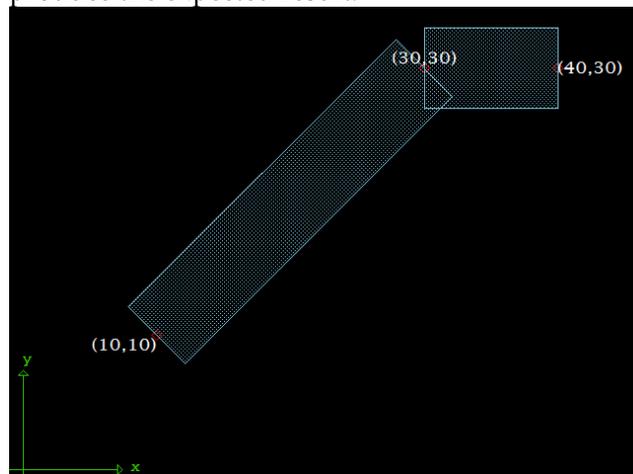
Using the PutEL command in previous dw-2000 versions, the same local Structure coordinates was used:

```
PutEl pcref,0,-2;;; "PL_LinearWG"; (10,10,20,20,30,20); ;;;; "6;0;.025;254 0"
```

For version 8.90 the coordinate entry with CE remains the same but for the PutEL command, starting with the second coordinate (in red), all entries are represented by an offset from the PCRef origin (in orange).

```
PutEl pcref,0,-2;;; "PL_LinearWG"; (10,10,10,10,20,10); ;;;; "6;0;.025;254 0"
```

Now using PutEL with the original coordinates (10,10,20,20,30,20) will not produce the expected result:



During the transition between v8.75 and 8.90, the GPE program can be modified and use the correct syntax based on the current running version. We can use the GPE command 'version' to determine which dw-2000 is running and use the corresponding syntax. For example:

```
if (nformat (version){1}) < 8.90 then
  \ Use old syntax
  PutEl pcref,0,-2;;; "PL_LinearWG"; (10,10,20,20,30,20); ;;;; "6;0;.025;254 0"
else
  \ Use new syntax
  PutEl pcref,0,-2;;; "PL_LinearWG"; (10,10,10,10,20,10); ;;;; "6;0;.025;254 0"
endif
```

Data Conversion (GDSII / OASIS / MEBES / AutoCAD)

Many changes were made to the dw-2000 file conversion formats which you will discover below. If the file extension .GDS and .OAS are mapped to the dw-2000 program, double clicking any of those files will start dw-2000 and open it corresponding conversion window. You may as well drag and drop the files over the dw-2000 program to start the conversion process if no structure is currently open.

For complete details, the PDF manuals are found under the dw-2000 Help menu under **Data Conversion, OASIS Conversion and AutoCAD conversion.**

AutoCAD Conversion

This conversion module now supports AutoCAD file formats (DXF & DWG) used by AutoCAD software from the year 2000 to 2024. Note that Autodesk has been using the same file format since year 2018.

GDSII Conversion

There are many new features and improvements in the GDSII file conversion which include a new conversion option interface which displays all the options in one single prompt window. Starting with the common changes in both the import and export operations, the log file now includes all the selected conversion options, more detailed warnings and errors, and a detailed report when used with a layer mapping file. The Text Scaling option is now a magnification factor for both import and export. A new option lets you hand pick the Structure and layer names to import or export.

GDSII Import

Here is a list of the new import options:

- You can now associate an installed Technology Package with the imported GDSII data.
- New option to automatically "**Create missing layer names**".
- A new option to "**Output detailed information in the log file**". Use this option append additional information such as the data locations to the various errors or warnings in the log file.
- New GPE commands: **GDSImportOptions, GDSImport**

The following option list were removed or changed:

- Removed: "**Put truncation error on error layer**".
- Removed: "**Rebuild Hierarchy**".
- Changed: "**Don't replace structure with later creation/modification dates.**"
- Changed: "**Use Criterion**" replaced by the new layer selection option.
- Obsolete GPE command: **Streamin**



Features And Improvements

GDSII Export

Here is a list of the new export options:

- The circle approximation option (which includes ellipses) is now defined in the conversion option rather than using the one defined under the dw-2000 preferences.
- New GPE commands: **GDSExportOptions**, **GDSExport**

The following option list were removed or changed:

- Obsolete GPE command: **Streamout**

The GDSII conversion manual is found under the **dw-2000 Help > Data Conversion** menu.

OASIS Conversion

There are many new features and improvements in the OASIS file conversion which include a new conversion option interface which displays all the options in one single prompt window. Starting with the common changes in both the import and export operations, the log file now includes all the selected conversion options, more detailed warnings and errors, and a detailed report when used with a layer mapping file. A new option lets you hand pick the Structure and layer names to import or export. The Layer mapping was added to the conversion options.

OASIS Import

Here is a list of the new import options:

- You can now associate an installed Technology Package with the imported OASIS data.
- New option to automatically "**Create missing layer names**".
- New GPE commands: **OASISImportOptions**, **OASISImport**

The following option list were removed or changed:

- Removed: "**Put truncation error on error layer**".
- Changed: "**Use Criterion**" replaced by the new layer selection option.
- Obsolete GPE command: **OASISin**

OASIS Export

Here is a list of the new export options:

- You can now choose to export or not the layer names defined in the current Library.
- New GPE commands: **GDSExportOptions**, **GDSExport**

The following option list were removed or changed:

- Obsolete GPE command: **OASISout**

The OASIS conversion manual is found under the **dw-2000 Help > OASIS Conversion** menu.

MEBES Conversion

The MEBES export has a revised conversion option interface which removes the confusion with the extent option. You can now choose to use the entire data extent which includes the Structure extent and additional extent if a positive size option is used, or you can manually enter the desired extent which will be used to clip any data the lies outside of it. The second change is for MEBES mode V conversion where the minimum resolution changed from 0.005 to 0.001.

The OASIS conversion manual is found under the **dw-2000 Help > Data Conversion** menu.



New and Enhanced GPE Commands

We make our best efforts to maintain compatibility with the GPE program written for previous versions of dw-2000 and to avoid any disruption. Nevertheless, we recommend having a look at the following list of commands. Especially, the new and modified commands will enhance your current GPE program implementation and give you access to new functionality. We suggest replacing or removing any of the obsolete commands.

The GPE command syntax, description and examples are available under the dw-2000 **Help > Help** menu, under the GPE command list.

New GPE Commands

Command	Description
ContourWidth	Sets the contour line thickness for the specified layers to the specified width value.
CreateLayerMatrix	Takes a layer name list and returns the corresponding Layer/Type numerical matrix.
CtrlKey	This command has the same behavior as ' OptionKey ' which verifies the CTRL key state during a mouse operation.
DrawingOn / DrawingOff	Use these commands to enable/disable element drawing in the opened Structures. The context in which these commands are used is in a GPE program which performs layout operations that displays layout changes or navigate through the layout. Temporarily turning off the drawing during the operations will allow your GPE program to run faster.
FStruct	This command finds the opened Structure index, ranging from 1 to 20, where the Element key resides.
GDSExport / GDSExportOptions	These commands replace ' Streamout '.
GDSImport / GDSImportOptions	These commands replace ' Streamin '.
GetScreenInfo	This function returns the screen information which includes the width, height, minimum X and Y positions, maximum X and Y positions, minimum and maximum window sizes, all in pixel units. When multiple displays are used, the values include the desktop extension.
GetTPKFileNames	This function returns the list of all Technology Package (.TPK) file names currently available in the dw-2000 framework.
IDSelectAll	Adds all selectable Elements to the group.
IndicesOfList	Use this command to locate a list element from a list.



New and Enhanced GPE Commands

Command	Description
IsDirectoryValid	This new command is used to verify if a specified directory exists on your file system.
MatchWildcards	Use this command to perform a string search using dw-2000 wildcards.
MTBoolean	Use this command to run a Multithreaded Boolean operation.
OASISExport / OASISExportOptions	These commands replace 'OASISout'.
OASISImport / OASISImportOptions	These commands replace 'OASISin'.
Opacity	Sets the transparency level for polygon fills, Text Elements, and sublevel Sref and Aref elements.
PCellsUsed	This function returns a list of PCell names of all PCref instances placed in any of the Structures in the current Library.
PCRename	Use this command to rename a PCell definition.
QMeasure	Use this command to enable or disable the Quick measurement cursor mode.

Enhanced GPE Commands

Command	Description
CoordInput	This command has a new parameter that let you choose what to do when the user presses the ESC key.
Dataxxx	GPE commands starting with 'Data' which modifies layout (DataCopy, DataMove, DataOversize, etc) now works with closed Structures.
DlaCirclesToLayer	Added a parameter to setup the segment count per 360 degrees.
DlaEllipsesToLayer	Added a parameter to setup the segment count per 360 degrees.
DlaLayerToCoords	New parameter MaxCoordPerPoly.
Dlgxxx	The Dialog module commands, starting with 'Dlg', have been updated in the Help and PDF manual. Their syntax is now clear, and many examples were added.
IDCircleExplode	Added a parameter to setup the segment count per 360 degrees.
PathInput	This command has a new parameter that let you choose what to do when the user presses the ESC key.
PolyInput	This command has a new parameter that let you choose what to do when the user presses the ESC key.
PutEL	For PCref elements, when used with a multi-coordinate PCell, the coordinates number 2 and beyond are specified as an offset from coordinate number 1. See the PCref coordinates section for more details.

Command	Description
SavePict	The command now supports TIFF file format. As a result, the options are BMP, GIF, JPG, PNG, and TIFF. The file format parameter has been removed from its syntax.
WindowInput	This command has a new parameter that let you choose what to do when the user presses the ESC key.

Obsolete GPE commands

Command	Description
Dashed, Dotted, Broken, Solid	These commands were used to control the layer contour pattern which is now always solid for many years already. The only command that changes the contour is ' ContourWidth '. Using these commands will simply have no effect. No errors will be reported upon compiling your GPE scripts.
Devkxxx	All commands starting with ' DEVK ' for the C Developer's kit are now disabled since the module is officially retired. Using these commands will simply have no effect. No errors will be reported upon compiling your GPE scripts.
OASISin / OASISout	These commands will continue to work for a while, but we suggest using the new commands (OASISImport, OASISImportOptions) to get access to the new converter options.
Prefix	This unused command was removed. If the command was used in your GPE script, an error is shown at compile time.
StreamIn / StreamOut	These commands will continue to work for a while, but we suggest using the new commands (GDSImport, GDSImportOptions) to get access to the new converter options.

