dw-2000™

Release Notes

Revision 8.75

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Document No. reln01-0875-08/2020

Printed in Canada.

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OVERVIEW

Version 8.75 of dw-2000 contains new features and updated functionalities designed to enhance our customers' productivity. In this document we highlight the changes since release version 8.70, the content of version 8.75 including planned changes that will be added to version 8.75 through the various updates and finally, give you an overview of the major changes coming up in the next releases.

dw-2000 Roadmap

It has been a long time since the dw-2000 version number has changed. But this does not mean you did not receive valuable features along the way. In the Changes since release version 8.70 section we recap the features changes since last release and in the Features you overlooked in v8.70 section we review features that many of you did not take time to explore yet.

In our experience, customers are hesitant to upgrade software while they have a well-tested and stable environment to work with. We understand that changing the environment can be frustrating as you have important work to do and deadlines to meat. Our clients sometime wait 24+ months after a release before they take time to look at the new versions. Therefore, with version 8.70, we have chosen to incrementally improve and add features to the current version, via various software updates without rattling your environment. But as you can read below in the dw-2000 Looking Forward section, there will be such important changes coming up and we would like to give a heads up before it happens.

For now, the version 8.75 is using the same library format as in v8.70 but it will reach its end of life once the next major release comes up. Functionality will be provided to upgrade your libraries to the new format as we always do. For now, the user interface remains the same with the additional features added.

dw-2000 Looking Forward

This release marks the end of some legacy features used in the last two decades. There will be other major release coming up that will introduce new technologies which will bring dw-2000 to the next level. Our development teams have been working on two important releases in parallel to the current version of dw-2000. The features are important enough that we had to redesign a lot of the dw-2000 interface, GPE command set, and library file format to accommodate the new features while maintaining as much compatibility with the current release. Find some of these features on the next page.

Multithreading

As designs become increasingly complex, layout automation and execution times to perform intensive tasks is a factor. dw-2000 will take advantage of multicore CPU in the coming releases using the multithreading capabilities to parallelize the work by dividing important tasks amongst them to reduce the processing time. This will allow us to treat a larger volume of data simultaneously and reduce processing time.

Version 8.75 introduces two new functions that utilizes the multithreading CPU capabilities, and this is only a beginning as we will provide more functionality along the various software updates. See the Multithreading in v8.75 section below to learn more.

DirectX

As designs become larger in layouts, viewing the data can take time. Another important feature will be to reduce the time to display the layout. This will be achieved using the graphics hardware acceleration capabilities of DirectX to reduce drawing times. dw-2000 will use the available APIs to improve the drawing speeds when navigating in the layout and performing layout editing.

Future library file enhancements

The next library format change will include new features that reduces its size, improves the loading and access times and enables parallel processing. Major benefits of the new library format are that it will hold more data in memory for faster access and the file size will no longer be limited to 128GB thus enabling dw-2000 to handle more data.

New Layer and Type management

In addition, the next library format will allow more than 256 Layers and Data Types. It will be changed to let users choose specific Layer/Type combinations which we call Layer / Type pairs, used to display, in selection operations and data creation. This is one of the reasons why the interface is changing. Just to name a few of these changes, the Palette, Masks, Filter, Layer editor and the Layer tool windows will be updated to allow more than 256 layers and use the new Layer / Type pairs.

We will keep you informed of the availabilities of various Beta versions with the features mentioned above as they become available. If you wish to be part of the Beta testers please send us an email to support@designw.com.

IMPORTANT NOTES

No more USB keys

Since January 2018, we stop providing USB keys to control software licenses. The key model we used is obsolete and the suppliers no longer provides updates for their drivers. If you have a USB key, please contact us (support@designw.com) and we will provide you a new license file that will be based on a different Host ID such as MAC address or Virtual Server ID if you want to host your license on a virtual server running under VMWare or Hyper-V. The required operating system running under the virtual environments must be Windows.

64-bit Operating System

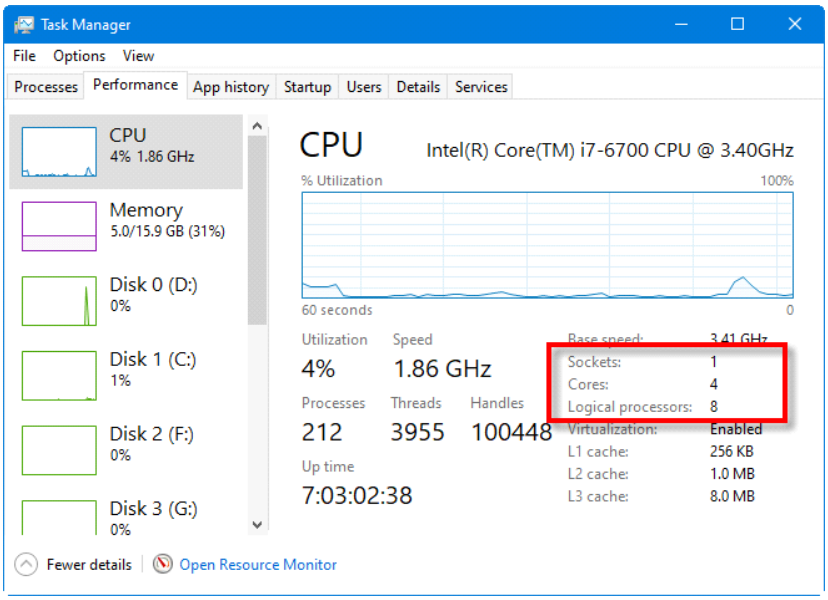
Starting with version 8.75 of dw-2000, only 64-bit environments are supported.

Consulting services

Design Workshop technical services department is remarkably successful, and we get more and more demands for customized solutions. Please contact us if you would like to outsource the development of your design rule decks (DRC), layout extract (HLVS), PCell library, special layout generator, interfacing with other software's or any other automated task you would like to add to your dw-2000 framework. We can sign your non-disclosure agreements (NDA) before we look at the details of your project.

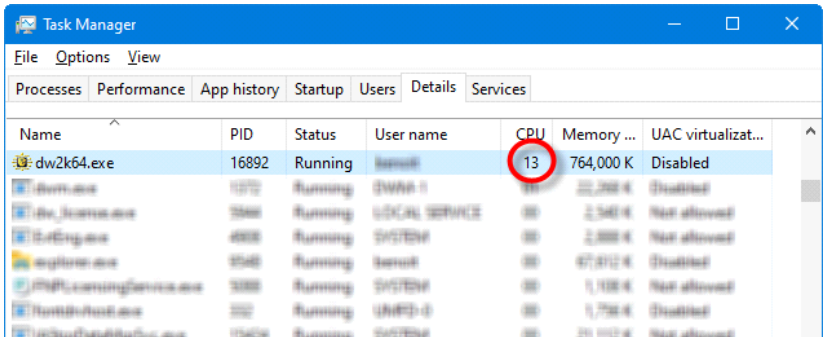
Multithreading in v8.75

In the last decades, CPU manufacturer have been providing processors made with several cores. Some of them can logically perform two tasks at once, known as threads. If you look at your Task Manager window, under the Performance tab, you can find how many processors using the socket count, total core count, and how many logical processors it represents. Here we have an i7 processor with 4 cores, each core can run two threads at once, for a total of 8 logical processors.



When executing an intense operation in dw-2000, such as running a DRC or during a Boolean operation, with the processor configuration shown above, the % Utilization associated to dw-2000 will be 12.5%, displayed as 13% as shown below. Which means we use 100% of one of the logical pro-

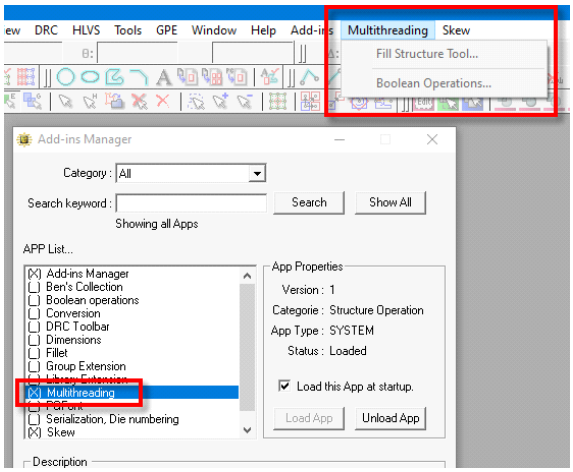
cessors assigned to that operation running within the dw-2000 framework. The image below shows that the operation we are running is using only one of the logical processors.



The challenge, to exploit the full CPU potential, is to be able to divide an operation amongst the logical processors. Some operations can be divided and not all operations are worth using this mechanics either. Whenever it will adequate to unleash this powerful feature, we will take the time to implement for targeted operations.

As a demonstration, we have created two programs that divides their operation amongst the processors. The first one is the multithreaded Boolean Operations. This operation dispatches the tiles to be treated amongst the processors until all tiles are processed and the result combined in the same destination structure. The second program, multithreaded Fill Structure Tool, is used to fill empty areas with tiny shapes. It can add millions of elements in a Structure and avoids overlapping with areas occupied by the layout.

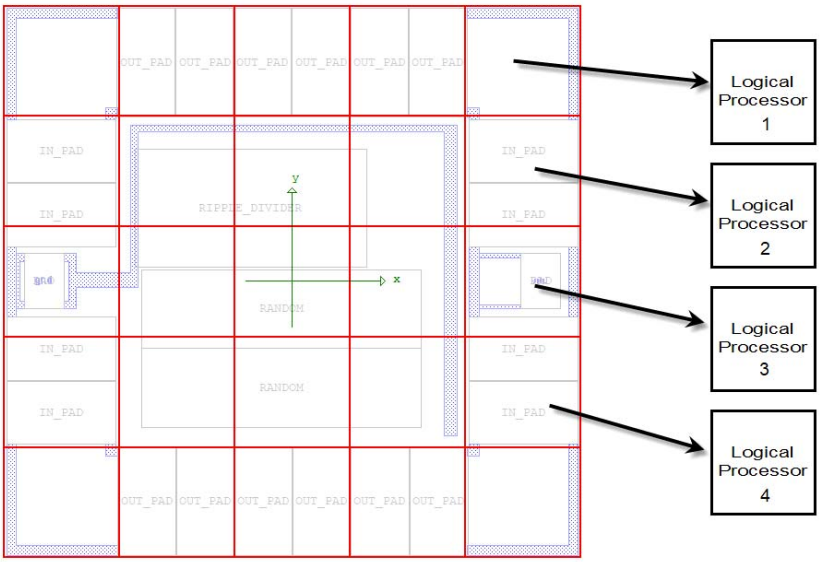
These two programs are loaded in the dw-2000 interface via the Add-ins manager located under the Add-ins menu. By default, the Multithreading add-ins is already enabled, and you will see the Multithreading menu in the main menu bar.



More programs like this will become available in the software updates that will follow this release.

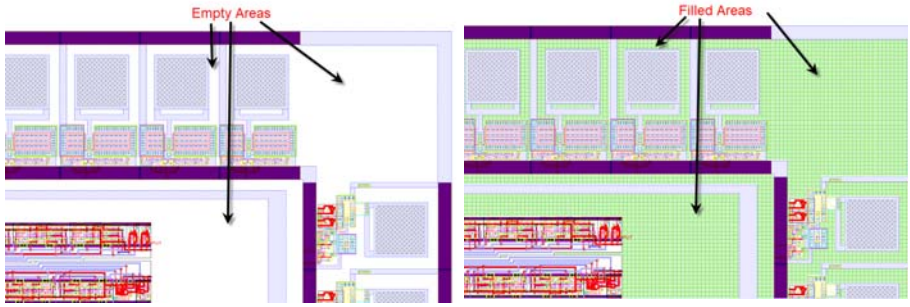
Multithreaded Boolean Operations

This program divides the layout into tiles where each tile will be processed by one of the logical processors available in your system. Each processor will perform the selected Boolean operation using the input layers, save the result, then process the next tile in the queue.



Fill Structure Tool

The same strategy is used for the Fill Area operation. This program fills the non-occupied area with a selected shape drawn in its own structure.



OASIS interchange file format update

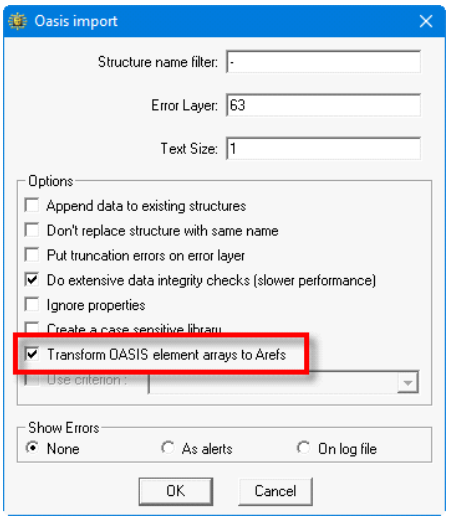
Unlike the GDSII, this format preserves layer names and allows additional element kinds such as native circle elements. The most interesting feature is how small this file can be compared to GDSII. This makes it a good choice when we need to exchange files through the internet or when there is a limited disk or virtual space.

Reading files of 4GB or more

This version of dw-2000 can now read OASIS files larger than 4GB. The dw-2000 library file uses the same file format as v8.70 which is limited to 128GB. The next revision of the library file will bump up this limitation significantly.

New options to reduce Library size and increase conversion speed

The OASIS format contains complex methods to save repetitive elements called Element arrays which is a key feature to its small footprint. To allow more data to be stored in a Library, while importing an OASIS file, the new OASIS conversion option called "Transform OASIS element arrays to Arefs" converts some of the OASIS compacted data to Aref elements.



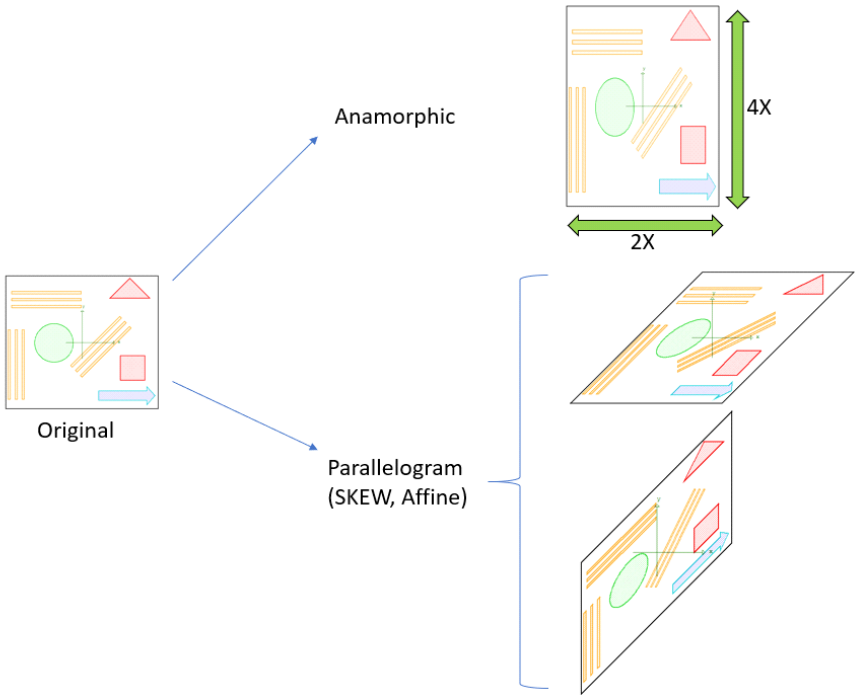
This new option creates a new Structure, places the repeated data in it and then reference this new Structure using Aref elements. This reduces the library file size and speeds up the conversion time significantly.

For example, we have a Structure with a large number of rectangles. Under some conditions, these flat elements are grouped together and stored as an OASIS Element Array. Upon importing this array, dw-200 creates a new Structure with a single rectangle, then uses the Aref element to step and re-

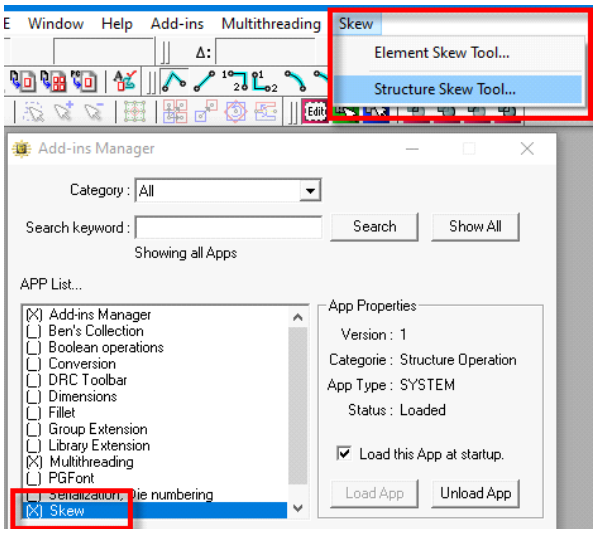
peat the rectangle to corresponding original locations. In other words, it buries one element of the array into a new Structure and uses Aref element to reference it rather than placing multiple copies of the flat data which in most cases would take more disk space. The array is evaluated beforehand, then it buries the element only when it is practical to do so.

Advanced Transformation for Affine (Skew) and Anamorphic Layouts

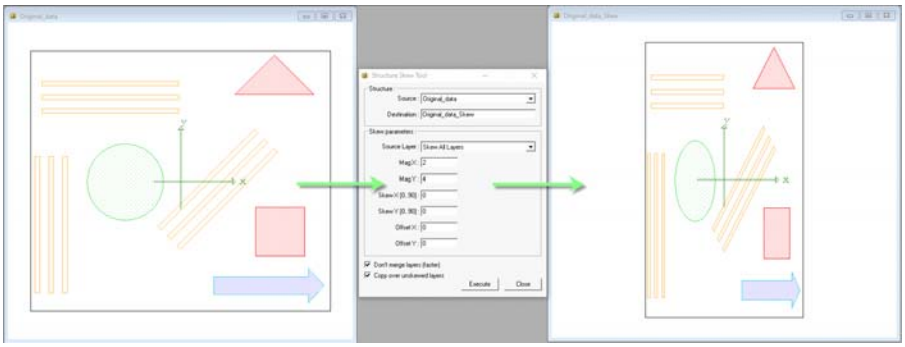
In this release we introduce a new transformation tool to create Affine and Anamorphic layouts.



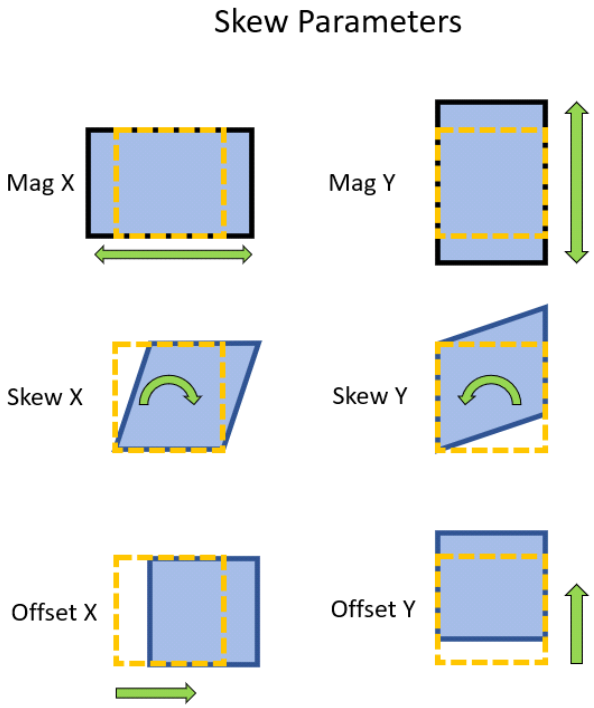
To do so we introduced two new GPE commands, **Skew** and **DlaSkew.** To learn more about the commands look at their syntax under Help > Help. To demonstrate what they can do, you can load the Skew add-ins via the Add-ins Manager Window and then use the commands under the Skew menu.



Using the Structure Skew Tool, simply input the source/destination Structures, select the layers, enter the transformation parameters, and click Execute. The tool creates a new layout in the destination Structure with the applied transformation.



Here is an overview of the Skew parameters you can use to transform the layout:



Additions to version 8.75

There will be more features that will be added to dw-2000 during version 8.75's life cycle. These will be added, as features become available, as software updates where only the build number is changing.

The description of these new features will be in the Revisions Notes published with each new build. Simply use the **Help > Check for Updates…** menu command occasionally to look for these new updates.

User request for changes and suggestions

We have thousands of custom solutions available that, most of the time, need custom tuning to meet your requirements. We gladly share these solutions, even though they may be partial, as part of our normal activities in the support department under certain conditions.

When your request is more complex or needs new functionality to be added to dw-2000, we will take the time to analyze your project and, in some cases, we will add it as new functionality during an update. If your project

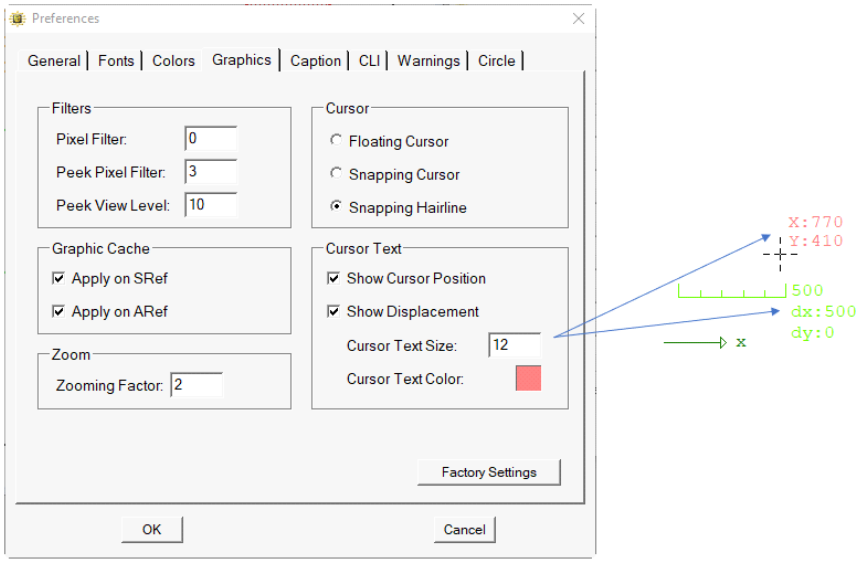
is more complex or proprietary, we offer engineering services. For example, development of layout atomization solutions, PCell libraries, DRC and HLVS scripts, etc.

Changes since release version 8.70

Since the release v8.70, we have made many software updates which includes new functionalities which were documented in the Revision Notes. Here is a quick summary of these changes.

Cursor and ruler Text are now resizable

In v8.70 we added position next to the cursor in the Structure window. We can control its display, color, and Text size via the **Tools > Preferences...** window. The size also changes the text dimension displayed with Ruler bars.

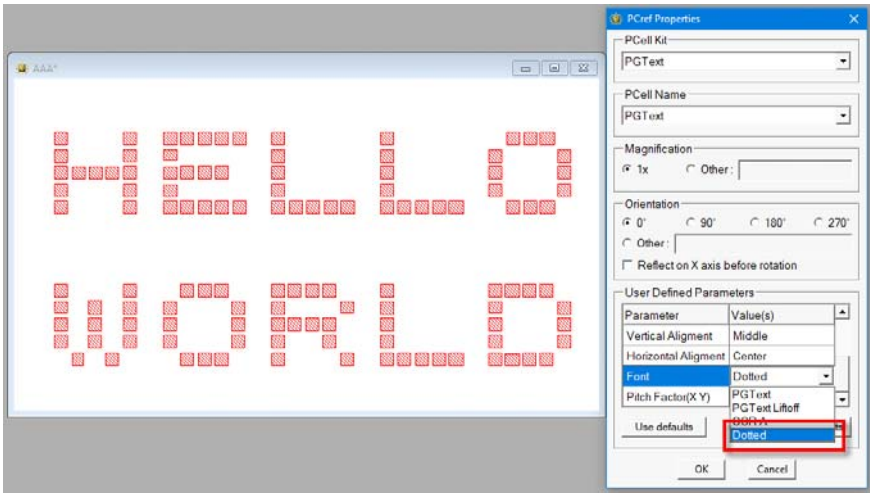


Support for Unicode file systems

We have added support for Unicode file systems. dw-2000 now opens files located in file path containing Unicode characters.

Pixelated style text in the PGText PCell kit

We have updated the PGText_Kit.pck PCell kit and to include a Pixelated style text. You can find the PGText PCell kit under the "<dw-2000>\samples\PCells" folder where dw-2000 is installed. To load the PCell kit, copy the PGText_Kit.pck file under the dw-2000 PCell_kits folder to load it automatically each time you start dw-2000.



Barcode PCell kit

The Barcode Code 39 sample PCell is now part of the sample PCell kits. You can find the Barcode PCell kit under the "<dw-2000>\samples\PCells" folder where dw-2000 is installed. To load the PCell kit, copy the Barcode.pck file under the dw-2000 PCell_kits folder to load it automatically each time you start dw-2000.

Features you overlooked in v8.70

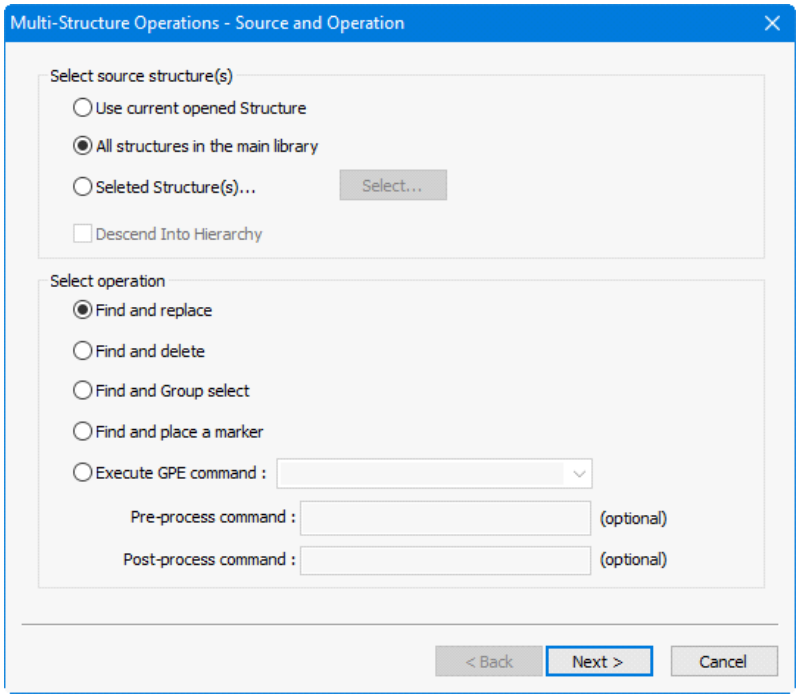
Multi-Structure Operations (MSO)

The Multi-Structure Operations (MSO) is a new, easy to use utility which facilitate a large variety of batch operations you can do on single or multiple structures in your main library.

The MSO uses a wizard interface that lets you choose the source structures and operation to perform on a collection of Elements chosen according to specific property criteria. Just to name a few (and not limited to), you can use the MSO to:

- Find and change any properties of Elements such as layers or path width
- Find and delete Elements such as deleting references by name
- Find and group select References by name
- Locate and place a marker on Elements
- Locate and print location such as PADs or device ports

The MSO utility is located under the Tools menu. This first wizard page shows the source and operation options:



For more details and complete examples please refer to "*Using dw-2000*" manual located under the dw-2000 Help menu on chapter 20.

NEW AND ENHANCED GPE COMMANDS

This section contains an inventory of the new and modified GPE commands. Please take time to review the lists as you may find helpful commands to simplify your GPE programs or help writing new solutions.

For more details on the GPE commands, refer to *dw-2000™ Online Help*.

Command	Description
ClearCLI	Clears the whole content of the CLI window.
DDEExecute	If the time out parameter isn't provided, the command will use the default value set using the new DDETimeOut command.
DDETimout	Sets the delays to provide more time for remote applications to respond to a DDE command.
DeleteDirectory	Deletes the folder and subfolders.
DlaFindDubious	Verifies if there are any irregularities or intersecting points in a derived layer.
DlaGrow	Resize a derived layer in one or more directions.
DlaSelEdge	New operators AVOID, BUTTOROVER, INSIDE, INSIDEONLY, OUTSIDE, OVERLAP.
DlaSelShape	New shape selection operation "CIRCLE" added.
DlaSkew	Applies affine, anamorphic transformation and translation to a derived layer.
ExplodeKeys	Explodes elements whose keys are in the given set.
GetProcessID	Returns a numerical vector of process IDs of each process matching the specified name.
OasisIn	Added new options to specify the destination library file name, and option to transform OASIS element arrays to Arefs.
OasisStrList	Retrieves a list of Structure names and their size froman OASIS file.
PolyIsDubious	Verifies if there are any irregularities or intersecting points in a polygon.
Reset	Erases the content of all global and static variables of all loaded GPE programs.
Skew	Applies affine, anamorphic transformation and translation to a polygon.

Command	Description
StreamStrList	Retrieves a list of Structure names and their size froma GDSII file.
UnIDkeys	Removes (Deselect) from the group all element matching the element keys.
WEB	Now opens URL using the default web browser. It used to always open Internet Explorer.