



**PCB SOLUTIONS**

*An Orbotech Mentor Graphics Company*

## **GENESIS 2000**



## **RELEASE NOTES VERSION 10.0**

### ***Software Version 10.0***

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# Chapter 1 *Overview*

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## *Introduction*

This document describes the changes implemented in Genesis software version 10.0 as compared to the last major version 9.9b. This version requires the **gene100** license.

## *Identification*

The **get** process version number for all platforms is 10.0

## *Intended Readers*

All Genesis users.

## *Organization of this Manual*

**Chapter One, Overview** - introduces the subject of release notes.

**Chapter Two, Highlights** - describes in brief the changes in this version.

**Chapter Three, Major Enhancements** - Lists major changes and enhancements made to Genesis in this version.

**Chapter Four, Enhanced Analysis and DFM Actions** - Describes major enhancements and improvements introduced in this version to existing Analysis and DFM Actions.

**Chapter Five, Minor Enhancements** - Lists minor changes and enhancements made in this version of Genesis.

**Chapter Six, Parameters, Attributes, and Commands** - Lists changes and additions to configuration parameters, system attributes, and line mode commands.

**Chapter Seven, KIT List** - Lists KIT bugs and requests that have been closed.

## *Read More*

For comprehensive information about previous versions of Genesis, go to: [http://www.frontline-pcb.com/category/Genesis2000\\_Version](http://www.frontline-pcb.com/category/Genesis2000_Version)

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## Chapter 2 *Highlights*

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### *System*

#### *New Job Backup Tool*

The new Genesis Backup tool enables you to backup jobs on a network repository and restore them when you need them. Among other benefits, this enables you to keep several versions of the same job.

For more information, see [“New Backup Tool” on page 8](#).

#### *New Resize Algorithm*

A new algorithm for the Resize operation was introduced in Version 10.0 that eliminates all unexpected behaviors that may occur during Resize operations. It also improves Fill and Pattern Fill operations.

For more information, see [“New Resize Algorithm” on page 13](#).

#### *Sync Material Panels from InPlanFlex to Genesis via InLink*

You can now sync material panels defined by InPlanFlex® to Genesis. You no longer need to create panel information separately in Genesis — merely import the information, via InLink, from InPlanFlex to Genesis.

For more information, see [“Sync Material Panels from InPlanFlex to Genesis via InLink” on page 12](#).

### *I/O*

#### *Support Enabled for IPC2581A Input Format*

As of version 10, Genesis can support input in the new IPC2581A format. This is a licensed option - it requires the **inp2581** license. Data input is carried out through the standard Import Job function.

For more information, see [“Support for Input of New IPC2581A Format” on page 13](#).

## *Graphic Editor*

### *New Spacing Repair Tool*

The **Interactive Spacing Editor** enables you to define spacing requirements between two selected features at the start of the editing process, and provides the tools necessary to change one or both features in order to obtain the desired spacing.

For more information, see [“Interactive Spacing Repair Editor”](#) on page 13.

## *DFM and Analysis Actions*

### *Wrong Compensation Reported in Rout Layer Checks*

Wrong compensation for chains is now detected and reported in Rout Layer Checks. The most typical reason for wrong compensation is a hole in the chain. Such chains are now reported in the new category **Wrong Compensation**.

For more information, see [“Enhancements to Rout Layer Checks”](#) on page 18.

### *Detect Critical Traces by Board Net added to Critical Traces Detection DFM*

The Critical Trace Detection DFM was enhanced with the optional ability to detect critical traces by board net. This new capability can reduce the number of critical traces as many nets are connected on the board net level.

For more information, see [“Detect Critical Traces by Board Net added to Critical Trace Detection”](#) on page 21.

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## Chapter 3 *Major Enhancements*

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### System

#### *New Backup Tool*

The new Genesis Backup tool enables you to backup jobs on a network repository and restore them when you need them. Among other benefits, this enables you to keep several versions of the same job.

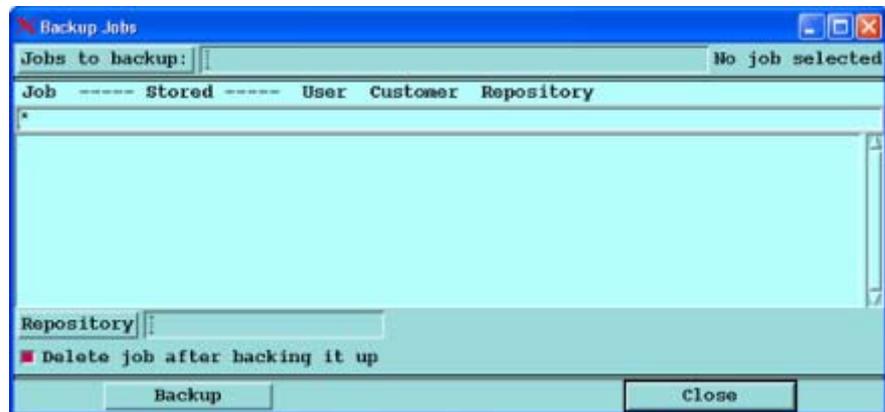
The Backup and Restore functions are part of the **File** menu in the Engineering Toolkit.



**Note** You can also use the Job Repair utility to verify job integrity before backing up the job.

## ***Backup Procedure***

In the Engineering Toolkit, click **File > Backup/Restore > Backup** to open the **Backup Jobs Popup**.



- Click **Jobs** to open the **Jobs Popup**. Select which jobs to backup.
- Click **Repository** to select the data repository where the job backup data will be sent.

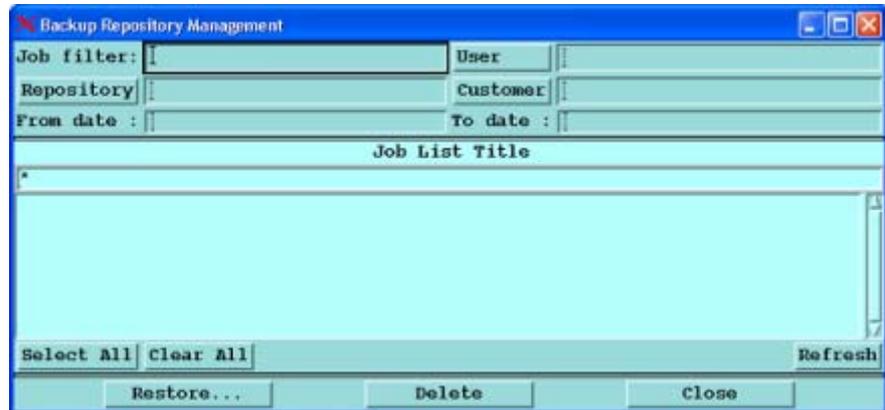
If you have not yet defined a backup data repository, an error message appears telling you to define the path to the repository.



Click **Backup** to begin the job backup process.

## Restore Process

In the Engineering Toolkit, click **File > Backup/Restore > Restore** to open the **Backup Repository Management** Popup.



Here you can select the jobs to be restored or deleted. You can filter your selection according to a number of different criteria:

- Genesis user name
- Customer name
- Data Repository name
- Date when job was last accessed, backed up, or created
- User-designed custom filter created with the same methods used to create job filters in the Genesis clipboard. (See Doc. 102, Engineering Toolkit, for more information on creating job filters.)

Once the list of jobs appears in the display area, you can select only those jobs that require further processing.

- Select the desired jobs by clicking on the job name.
- Select multiple jobs by holding down the **CTRL** key and then clicking on the job names desired.

You may **Select All** jobs that appear in the list by clicking the appropriate button. Or you may clear the list and start over by clicking **Clear All**.

## Creating a Backup Repository

**To create a backup repository:**

1. Create a folder in which you will place the configuration and setup files. Example: **C:\genesis\backup**.
2. Define a new environment variable, **FRONTLINE\_BACKUP\_DIR**, and then add the path to the **backup** folder in the variable definition.
3. Inside the **backup** folder indicated by **FRONTLINE\_BACKUP\_DIR**, insert two new text files **bakdblist** and **bakconfig**. Update them according to the instructions below.

- **bakdblist**: Repository listing

Define the repositories to be used by the system. Each repository is just a folder. For each repository, define in **bakdblist** the following settings:

---

<b>DBS {</b>	
<b>NAME=rep_1</b>	Repository Name
<b>WINPATH=c:/genesis/backup/rep_1</b>	Path - for Windows users
<b>NFSPATH=</b>	Path for Unix users
<b>READ_ONLY=no</b>	Flag whether this is read only repository
<b>}</b>	

---

- **bakconfig**: Configuration file

Add the following configuration variables:

---

<b>REPOSITORY_NAME=myrepository</b>	Define the default repository to be used
<b>DEL_AFTER_BACKUP=no</b>	Whether to delete job after backup
<b>BACKUP_BY_CHECKIN=no</b>	Currently not in use
<b>LOCK_WAIT=5</b>	How long to wait before ignoring a lock

---

4. In **FRONTLINE\_BACKUP\_DIR**, create an empty file called **bakjoblist**. In this file the system records all jobs that will be backed up.

## *File Locking Mechanism for Job Backup Repository*

This section describes the locking mechanism used by the Job Backup Repository to manage shared resources.

**Note** This information is intended primarily for system administrators.

### *Implementation*

A lock directory is created in **\$FRONTLINE\_BACKUP\_DIR**.

A lock is represented by a file named

**<resource name>.<lock type>.<hostname>.<pid>**

Example: **(bakjoblist.read.english.16282)**

The lock file contains the...

- Application name
- Application user name

### *Interaction of Read and Write Locks*

- When locking resource R for reading, the application verifies that no write locks exist for resource R.

- When locking resource R for writing, the application verifies that no read locks or write locks exist for R.

### *Waiting for a Lock*

A configuration variable in the backup database configuration file determines how many seconds the application will wait before determining that the locking/unlocking operation has failed. The configuration variable is named **LOCK\_WAIT**. It is measured in seconds and has a default value of 5.

**Note** The "lock access" file is an empty file with the name **superlock,write,<hostname>,<pid>**. This superlock file should exist only when file locking or unlocking operations are occurring.

## *Sync Material Panels from InPlanFlex to Genesis via InLink*

You can now sync material panels defined by InPlanFlex® to Genesis. You no longer need to create panel information separately in Genesis — merely import the information, via InLink, from InPlanFlex to Genesis.

To access the **InLink Popup**, select **Actions > InLink > Sync data** from the Engineering Toolkit main menu.



**Note** This requires using InPlanFlex® V3.20. If you try syncing a material panel from a schema that is related to an earlier version, you will receive an error that there is no such database object.

**Note** The **Panel** option will sync the InPlan main panel according to the methods used in previous versions.

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## *New Resize Algorithm*

A new algorithm for the Resize operation, introduced in Version 10.0, eliminates all unexpected behaviors that may occur during Resize operations. It also improves Fill and Pattern Fill operations.

## I/O

### *Support for Input of New IPC2581A Format*

As of version 10, Genesis can support input in the new IPC2581A format. This is a licensed option - it requires the **inp2581** license. Data input is carried out through the standard Import Job function.

#### **Disclaimer**

This input was tested only on the sample data provided by the IPC2581 consortium. Frontline recommends at this stage to ask customers to send reference data (ODB++ or RS274X) to validate the input.

## Graphic Editor

### *Interactive Spacing Repair Editor*

#### *Introduction*

The **Interactive Spacing Editor** enables you to define spacing requirements between two selected features at the start of the editing process, and provides the tools necessary to change one or both features in order to obtain the desired spacing.

**Note** If the two selected features touch each other, definition of spacing requirements *cannot* be performed.

There is often a need to resolve interactively spacing problems between board features. The features could be on the same layer (copper2copper, clearance2clearance) or on different layers (clearance2copper, drill2copper, rout2copper). Genesis provides a number of DFM actions to resolve spacing difficulties, but these DFM actions cannot solve ALL possible spacing problems, as it would be far too complicated to define rules that would cover every possible spacing repair problem. A better solution would be to create automatic DFM actions to solve the majority of definable spacing problems, and use an interactive tool to repair the more complex, or less obvious, problems.

Existing Genesis repair tools enable you to move and stretch different features on a board, but none of these tools enables you to define the spacing required between features as a starting point of the editing

process. The **Interactive Spacing Editor** enables you to define, at the start, spacing requirements between two selected features, and then provides the tools necessary to change one or both features in order to obtain the desired spacing.

Specific repair methods are defined for each feature. You can select which repairs to apply to either or both selected features, and define the extent of repairs required for either or both features.

### ***Repair Processes and Tools***

Interactive spacing repair can be carried out on the following features:

- Square or rectangular pad
- Any other pad
- Line (round)
- Surface

After selecting the features for which spacing problems are to be repaired, the following information is displayed:

- Actual spacing between selected features
- Feature parameters (See table below)
- Feature layer name

<b>Features Parameters</b>	<b>Example</b>
Round pad <symbol name>	Pad: r2000
Square pad <symbol name>	Square Pad: s2000
Other pad <Special symbol name>	rect2000x1000
Line <symbol name> (line length)	Line: r500 (12mm)
Surface	Surface

A number of spacing repair tools and procedures are available.

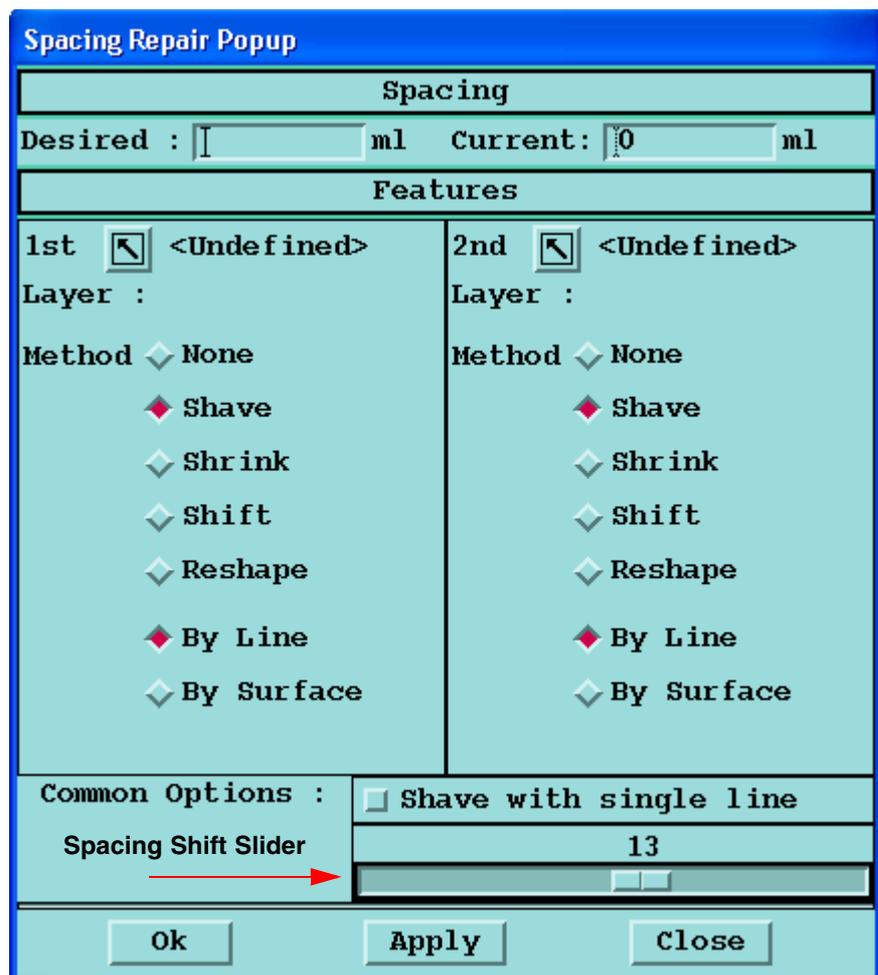
<b>Repair Action</b>	<b>Process</b>
Shave	Add a negative shave (line or surface) on the feature
Shrink	Resize the pad or the surface feature (decrease in all directions) and create a new symbol
Subtract	The line will be broken and a new thin line will be added
Shift	Move the surface or the pad
Move triplet	Move a triplet for the line
Reshape	Decrease size in one direction only (create new special symbol)
Reshape & Shift	Decrease size in one direction only (create new special symbol and shift the pad coordinate)

Repair Action	Process
Square Pad	Shave, Shrink, Shift pad, Reshape
Rectangle Pad	Reshape & Shift
Re-route	Create triplet

## Using the Interactive Spacing Editor

### To use the Interactive Spacing Editor:

- Select **Edit > Change > Spacing Repair** from the main menu.  
The Spacing Repair Popup appears.



1. Select the two features which need spacing repair.
  - a. Click the icon for the feature to be selected. In the Graphic Editor, select the feature by clicking on it. Information describing the feature and possible repair methods will appear in the popup.
  - b. Repeat the process for the second feature.
2. Define the required spacing by entering a value in the **Desired** field.

3. Select the repair method to be used on each feature.

The repair method to be used is dependent on feature type. The popup displays a list of repair methods available for each of the selected features.

Feature type	Repair method
Square Pad Rectangle Pad	Shave, Shrink, Shift pad, Reshape, Reshape & Shift
Any other pad	Shave, Shrink, Shift pad or pad-stack, Reshape
Round Line	Shave, Subtract, Move triplet, Reroute locally
Surface	Shave, Shrink, Shift, Reshape

If the repair method is defined, the actual repair is previewed on one or both features, depending on what was selected.

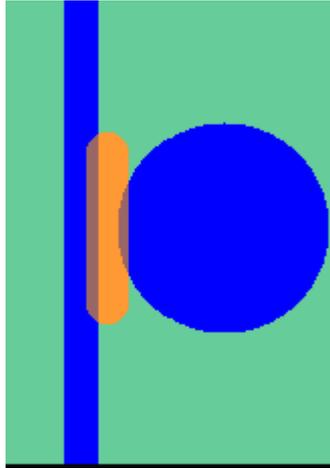
4. You can move the "Spacing Shift" slider to define which part of the additional space will be obtained from the first or the second feature. For example: 60% from the 1st feature and 40% from the 2nd one.
5. As you move the slider, the repairs are previewed online.
6. When you are satisfied with the new spacing as previewed, double-click to execute, or click **OK** or **Apply** on the Spacing Repair Popup.

#### Remarks

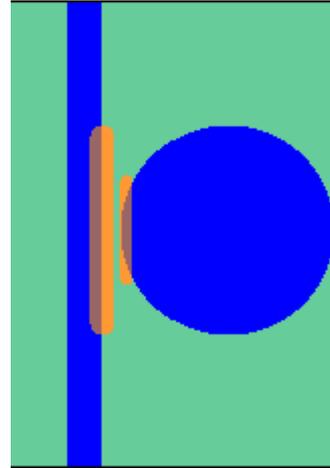
- Shaving may be executed by using a Line or Surface, depending on the options selected.
- If Shave By Line is selected and the features are on the same layer, shaving may be carried out by a single line for both features.
- Reshaping will be carried out using a subtractive shave, resulting in positive data only. (All pads become special symbol pads; surface vertices will be re-routed.)
- Reshape & Shift is implemented for rectangular pads only. For example: a pad rect60x40, reduced in size from one side by 5 mils, will be replaced by a pad rect55x40, and shifted 2.5 mils.
- Move Triplet is permitted only if the selected line is part of a triplet (actually, the center section of the triplet). Therefore, Move Triplet should be used only when this condition is true. The Move Triplet option is always "Keep Angle".

**Note** Spacing repairs are implemented by the new line mode command **space\_edit**. For more information, see ["space\\_edit" on page 44](#).

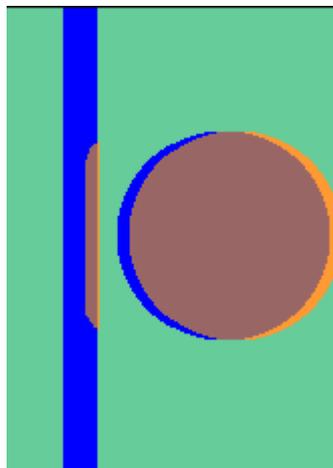
*Examples*



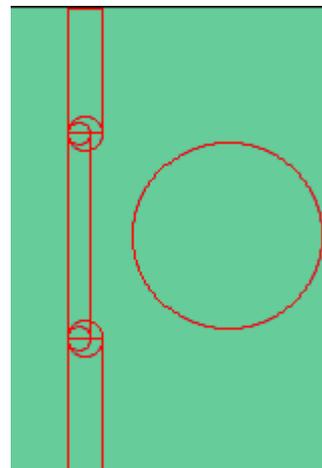
Shave by single line



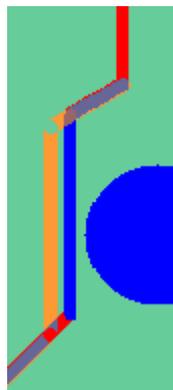
Shave by separate lines



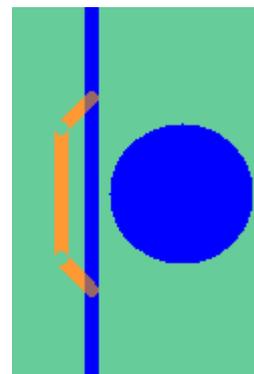
Shave by surface and shift pad



Subtract Line



Move triplet



Reroute Line

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## Chapter 4 *Enhanced Analysis/DFM Actions*

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### Doc. 0503 - Analysis Actions

#### *Enhancements to Rout Layer Checks*

##### *Detect Wrong Compensation for Chains*

Wrong compensation for chains (compensation is implemented from the wrong side of the board edge) is now detected and reported in Rout Layer Checks. The usual reason for wrong compensation to occur is a hole in the chain. Such chains are now reported in the new category **Wrong Compensation**.

##### *Wrong Compensation*

<b>Item</b>	<b>Details</b>
Full Name	Wrong Compensation
Internal ERF Name	<b>wrong_compensation</b>
Measurement Shape	Limits
Measurement ID(s)	Rout chain, surface
Layers Displayed	Rout layer

Item	Details
Purpose	Warns about chaining errors which might damage the board.
Function	Reports rout compensation which goes in the wrong direction.
Activation	Check is activated automatically when the analysis is run. No need for special settings for activation.
Known Limitations	Surface and chain with hole in it will be processed.

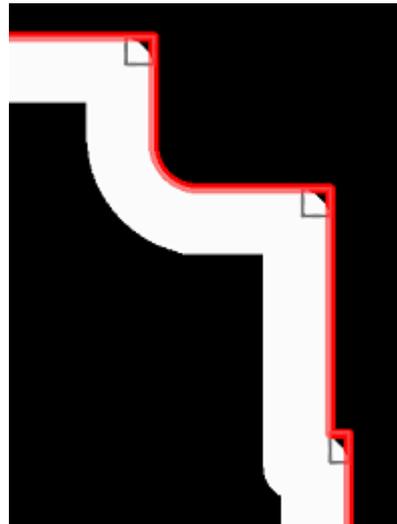
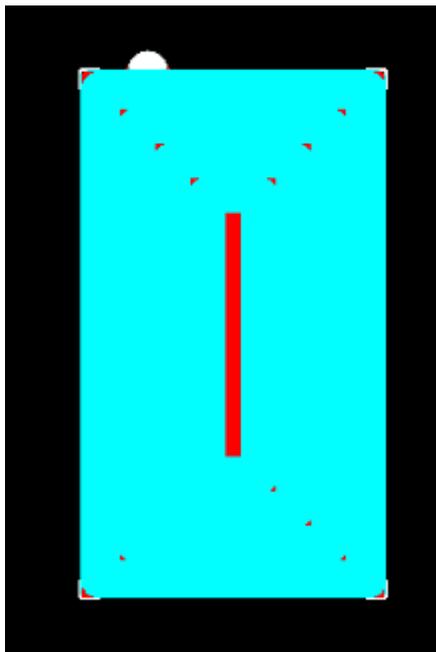
## ***Report Remaining Residue in Rout Layers Checks***

Rout Checks can now report the limits of board residue left after routing. This is residue which should have been cut from the PCB, but remains because the routing knife bends at corners and does not reach the remaining residue trapped in the corners. These residue limits are reported in the new category **Residue**.

**Note** Only chains with both holes and surfaces will be processed.

### ***Residue***

<b>Item</b>	<b>Details</b>
Full Name	Residue
Internal ERF Name	residue
Measurement Shape	Limits
Measurement ID(s)	Rout chain, surface
Layers Displayed	Rout layer



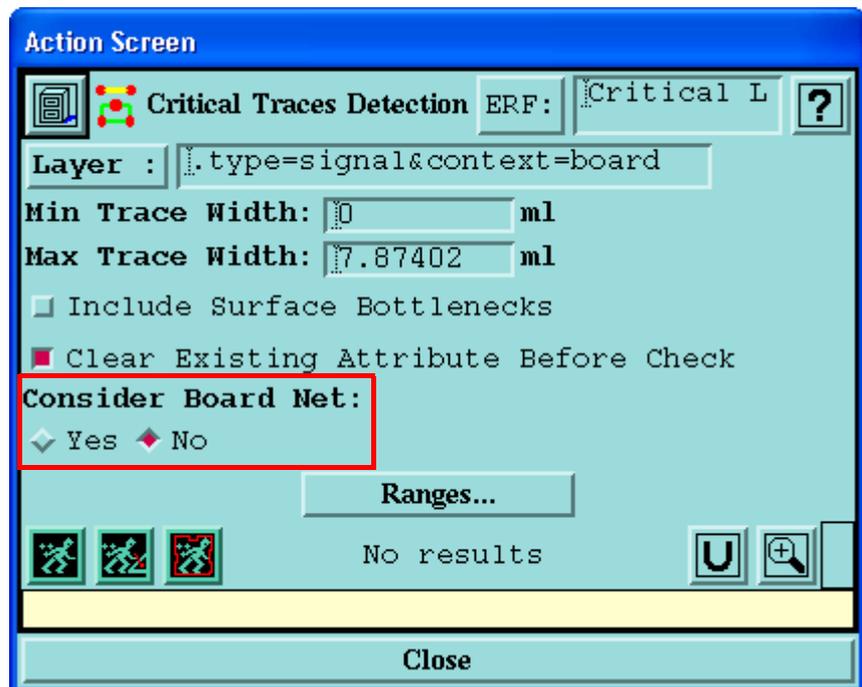
Purpose	Warns about the residue caused by the routing knife bending in corners.
Function	Reports rout residue, usually in corners.
Activation	Check is activated automatically when analysis is run. No need for special settings for activation.
Known Limitations	None

## Doc. 0602 - DFM Actions

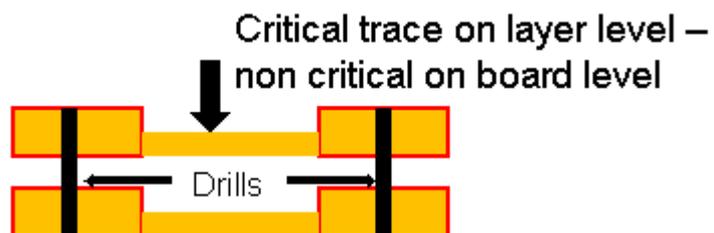
### *Detect Critical Traces by Board Net added to Critical Trace Detection*

The Critical Trace Detection DFM was enhanced with the optional ability to detect critical traces according to board net. This new capability can reduce the number of critical traces detected, as many nets are connected on the board net level.

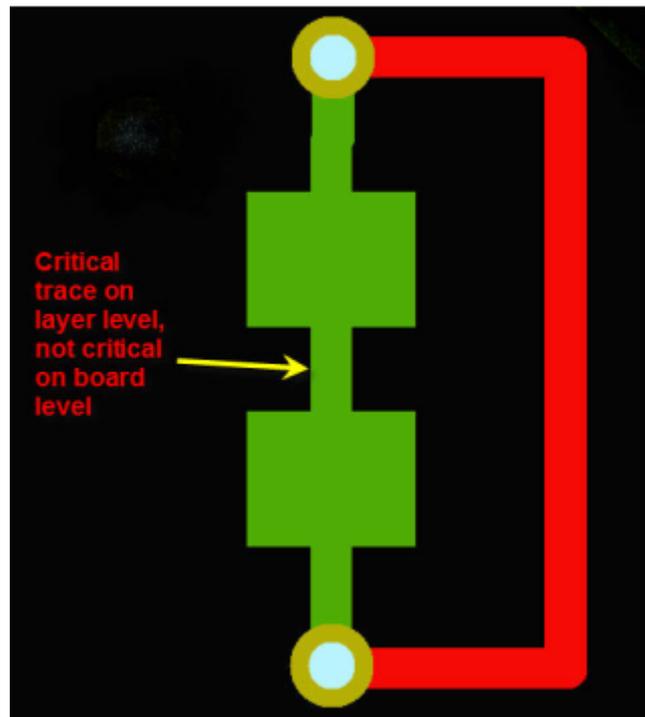
To implement this option, set **Consider Board Net = Yes**.



The connection to the board net is made when any two different layer nets connect through a drill to a single layer net on another layer.



Because there are two connectors (drills) between the layers, what would be a critical trace (i.e. creates an open) on the layer level is not a critical trace (i.e. does not create an open) on the board level.



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## Chapter 5 *Minor Enhancements*

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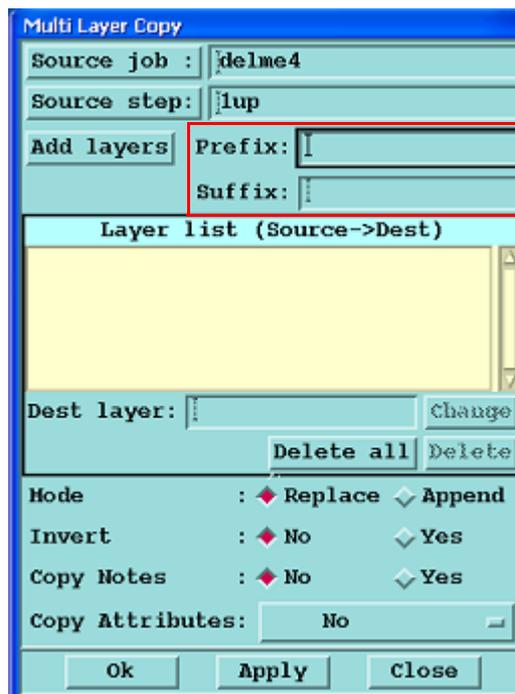
### Graphic Editor

#### *Special Symbols can be Rotated*

As of version 10.0, Genesis special symbols can be rotated. Prior to version 10.0, such symbols could not be rotated.

#### *Prefix Option Enabled for Multi Layer Copy*

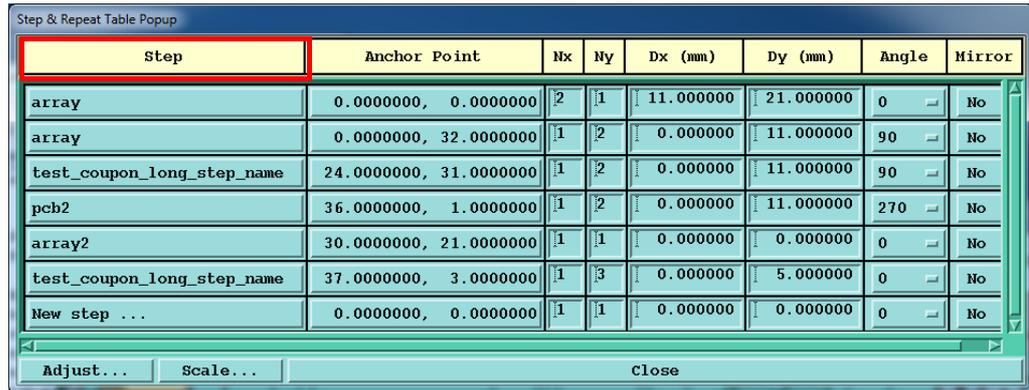
It is now possible to add a prefix, as well as a suffix, to the layer names of new layers created when copying existing layers using **Multi Layer Copy**. The new **Prefix** option operates in the same manner as the **Suffix** field, except that it adds a prefix instead of a suffix to target layer names.



## Configurable Width for Step Name Column in S&R Table

The new configuration parameter `edt_sr_name_col_width` enables you to specify the display width of the column that shows the **Step** name in the Step & Repeat Table Popup. The column display width may be defined from 12 to 64 characters wide (default=12).

If `edt_sr_name_col_width = 0`, the column width display will be equal to the number of characters used in the longest Step name found in the S&R table (but never less than 12).

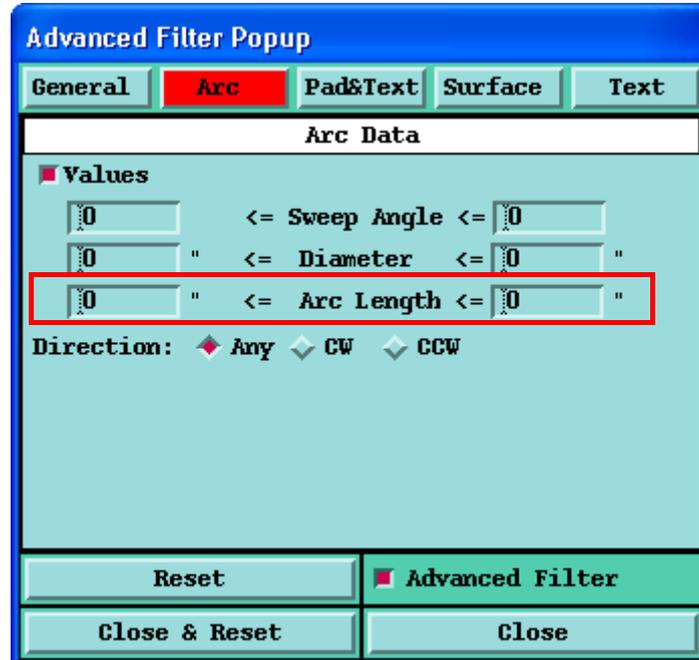


Step	Anchor Point	Nx	Ny	Dx (mm)	Dy (mm)	Angle	Mirror
array	0.000000, 0.000000	2	1	11.000000	21.000000	0	No
array	0.000000, 32.000000	1	2	0.000000	11.000000	90	No
test_coupon_long_step_name	24.000000, 31.000000	1	2	0.000000	11.000000	90	No
pcb2	36.000000, 1.000000	1	2	0.000000	11.000000	270	No
array2	30.000000, 21.000000	1	1	0.000000	0.000000	0	No
test_coupon_long_step_name	37.000000, 3.000000	1	3	0.000000	5.000000	0	No
New step ...	0.000000, 0.000000	1	1	0.000000	0.000000	0	No

For more information, see [“edt\\_sr\\_name\\_col\\_width”](#) on page 40.

## *New Arc Length Parameter for Advanced Filter Popup*

A new **Arc Length** parameter was added to the Advanced Filter Popup. This new parameter enables you to filter arcs for display according to their length. You can specify minimum and maximum arc lengths.



Two additional parameters, `min_arc_len` and `max_arc_len`, were added to the line mode command `adv_filter_set`.

### *Example*

```
adv_filter_set, filter_name=popup, update_popup=yes,
arc_values=yes, min_sweep_angle=0, max_sweep_angle=0,
min_diameter=0, max_diameter=0, min_arc_len=40,
max_arc_len=80
```

For more information, see [“adv\\_filter\\_set” on page 45](#).

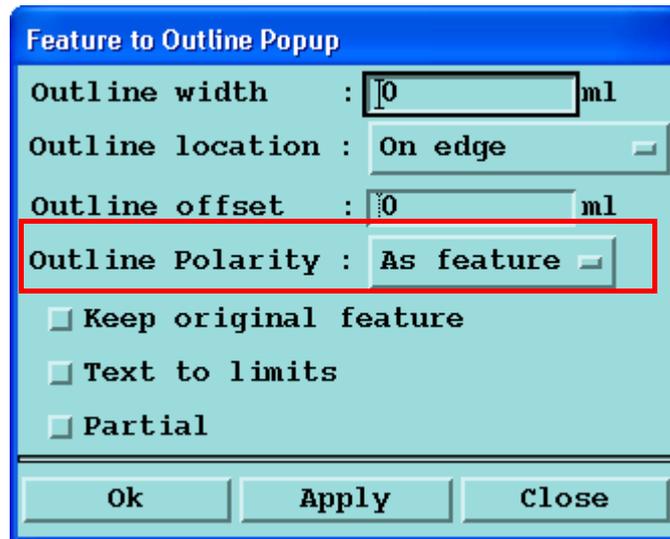
## *Outline Polarity Option Added to Feature to Outline Popup*

A new **Outline Polarity** parameter was added to the Feature to Outline Popup. This new parameter enables you to define the polarity for outlines created from features.

Available options include:

- **As feature:** Outline will have the same polarity as the original feature.
- **Positive:** Positive outline will be created.

- **Negative:** Negative outline will be created.



The new parameter **polarity** was added to the line mode commands **sel\_feat2outline** and **sel\_feat2outline\_partial**.

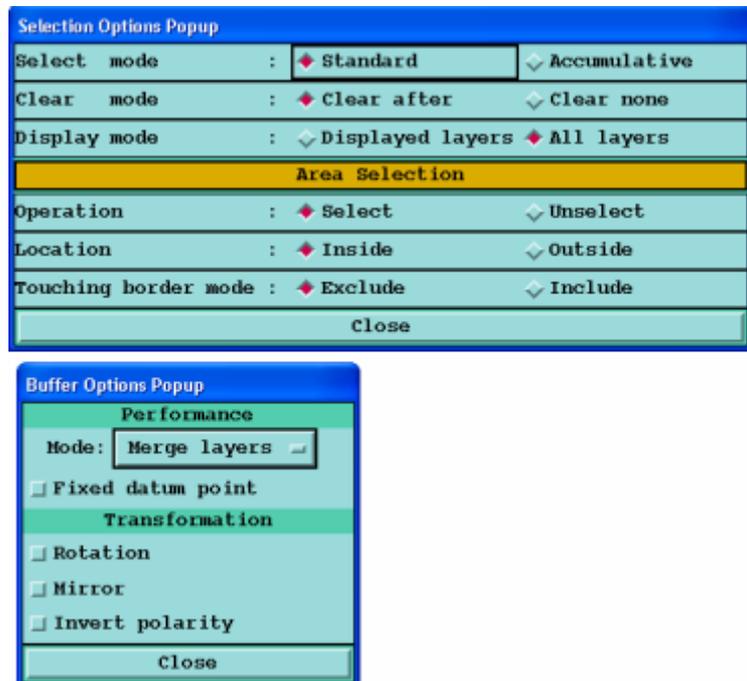
Options for polarity:[as\_feature; positive; negative].

For more information, see [“sel\\_feat2outline”](#) on page 46.

## ***Selection or Buffer Options: Access Default Settings Without Opening Control Popup***

As of version 10, Genesis will access saved default selection or buffering options *without* the need for you to first open the appropriate popup (Selection Options Popup or Buffer Options Popup). This is accomplished by setting the new configuration parameter **edt\_consider\_saved\_defaults** to **Yes**.

If `edt_consider_saved_defaults = No`, Genesis will maintain its earlier behavior, and not access the saved default values until the appropriate popup has been opened. See “[edt\\_consider\\_saved\\_defaults](#)” on page 40.



### *Explanation*

Genesis enables you to save user-defined default feature selection options or buffering options made in the Selection Options Popup or Buffer Options Popup by pressing <CTRL+ALT+S> on the keyboard. (There is no equivalent GUI command.) With this new configuration parameter, Genesis can use those default selection or buffering options without first opening the appropriate popup.

## **I/O**

### ***Enhancements to Sieb & Meyer Output***

#### ***M97/M98 Command Supported for Canned Text Output***

Genesis Sieb & Meyer output now supports the M97/M98 command for canned text: the text will not be broken during output. This enables the user to change text inside the file without the need to output data again.

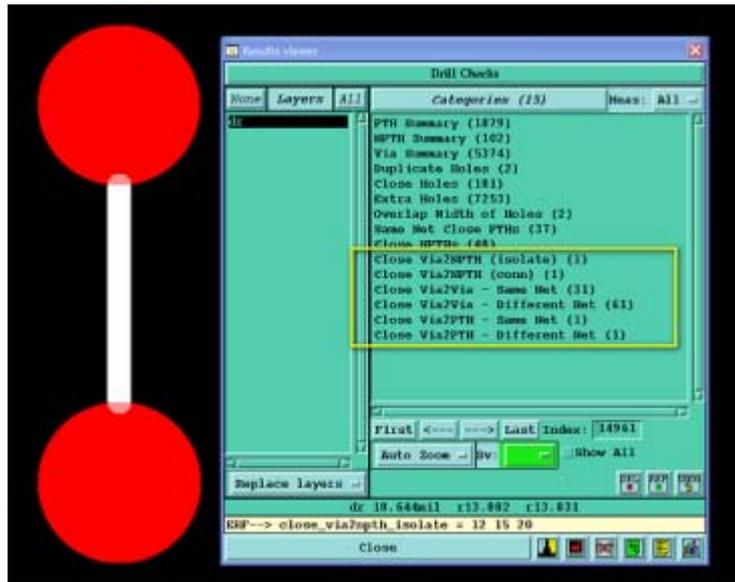
#### ***T0 Command Added After Last Coordinate of Each G45/G46 Command***

Genesis Sieb & Meyer output now adds a T0 command after the last coordinate of each G45/G46 command.

The ability to add the T0 command is controlled by the new Boolean configuration parameter **iol\_sm\_t0\_after\_full\_circle**. It has the following values:

- **Yes** (default) - add T0 command after last G45/G46 command (routing full circle).
- **No** - does not add T0 command (maintain old behavior).





### *Close Via2NPTH (isolate)*

Item	Details
Full Name	Close Via2NPTH (isolate)
Internal ERF Name	<b>close_via2npth_isolate</b>
Measurement Shape	Segment
Measurement ID(s)	Pad
Layers Displayed	Drill layer
Purpose	
Function	Report the spacing of Via hole to NPTH which are in different nets.
Activation	
Known Limitations	

---

### *Close Via2NPTH (conn)*

<b>Item</b>	<b>Details</b>
Full Name	Close Via2NPTH (conn)
Internal ERF Name	<b>close_via2npth_conn</b>
Measurement Shape	Segment
Measurement ID(s)	Pad
Layers Displayed	Drill layer
Purpose	
Function	Report the spacing of Via hole to NPTH which are in the same net.
Activation	
Known Limitations	

### *Close Via2Via - Same Net*

<b>Item</b>	<b>Details</b>
Full Name	Close Via2Via - Same Net
Internal ERF Name	<b>close_via_same_net</b>
Measurement Shape	Segment
Measurement ID(s)	Pad
Layers Displayed	Drill layer
Purpose	
Function	Report the spacing of Via holes which are in the same net.
Activation	
Known Limitations	

### *Close Via2Via - Different Net*

<b>Item</b>	<b>Details</b>
Full Name	Close Via2Via - Different Net
Internal ERF Name	<b>close_via_diff_net</b>
Measurement Shape	Segment
Measurement ID(s)	Pad
Layers Displayed	Drill layer
Purpose	
Function	Report the spacing of Via holes which are in different nets.
Activation	
Known Limitations	

---

---

### *Close Via2PTH - Same Net*

<b>Item</b>	<b>Details</b>
Full Name	Close Via2PTH - Same Net
Internal ERF Name	<b>close_pth_same_net</b>
Measurement Shape	Segment
Measurement ID(s)	Pad
Layers Displayed	Drill layer
Purpose	
Function	Report the spacing of Via hole to PTH which are in the same net.
Activation	
Known Limitations	

### *Close Via2PTH - Different Net*

<b>Item</b>	<b>Details</b>
Full Name	Close Via2PTH - Different Net
Internal ERF Name	<b>close_pth_diff_net</b>
Measurement Shape	Segment
Measurement ID(s)	Pad
Layers Displayed	Drill layer
Purpose	
Function	Report the spacing of Via hole to PTH which are in different nets.
Activation	
Known Limitations	

---

## *Enhancement to Signal Layer Checks*

### *Report Features Built with Zero-width Special Symbols*

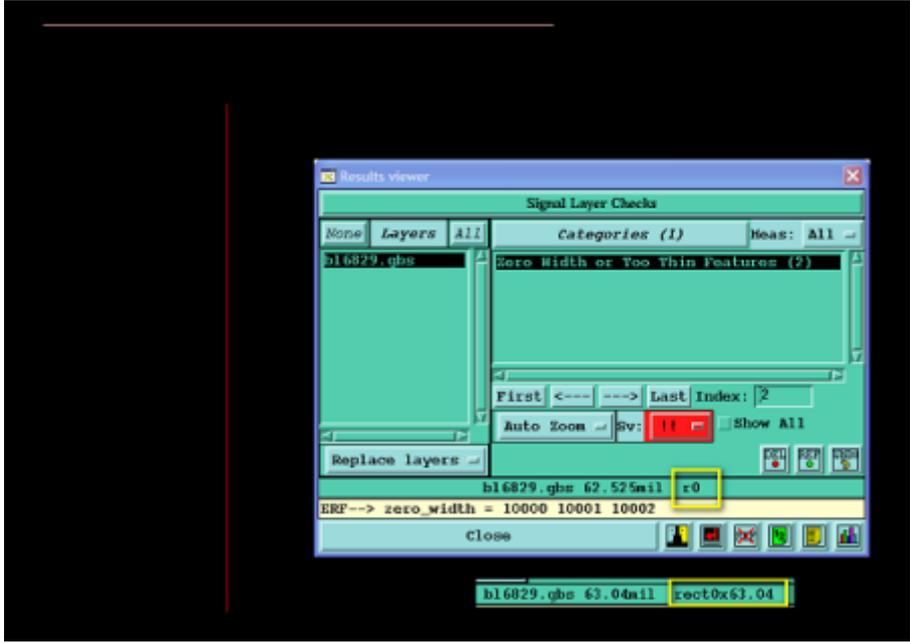
An enhancement was made to the category **Zero Width or Too Thin Features** in the Signal Layer Checks Analysis Action. Prior to version 10, this category reported only Pads that were drawn using zero-width R0 or S0 symbols. As of version 10, this category also reports Pads drawn with zero-width special symbols. These features will not appear on the final plot.

If **v\_report\_zero\_width\_features = Yes**, all features whose width is zero (drawn with zero-width R0 or S0 symbols, or zero-width special symbols), or features that are not larger than the value of ERF variable **v\_max\_width\_for\_too\_thin\_features**, are reported in the category Zero Width or Too Thin Features.

If **v\_report\_zero\_width\_features = No**, Signal Layer Checks does not report these features.

### *Enhanced Category: Zero Width or Too Thin Features*

<b>Item</b>	<b>Details</b>
Full Name	Zero Width or Too Thin Features
Internal ERF Name	<b>zero_width</b>
Measurement Shape	Shape of features or special symbols whose width is 0 or not larger than ERF variable v_max_width_for_too_thin_features
Measurement ID(s)	None
Layers Displayed	Work layer

Item	Details
	
Purpose	<p>Reports all features whose width is zero (drawn with zero-width R0 or S0 symbols, or zero-width special symbols) or features that are not larger than the value of ERF variable <b>v_max_width_for_too_thin_features</b>. These features will not appear on the final plot.</p>
Function	<p>Reports all features and special symbols whose width is zero (drawn with symbols R0 or S0, or with zero-width special symbols) or features not larger than <b>v_max_width_for_too_thin_features</b>.</p>
Activation	<p>Set <b>v_report_zero_width_features</b> to yes.</p>
Known Limitations	<p><b>v_max_width_for_too_thin_features</b> should not be less than 0 and not larger than 1 mil.</p>

## Enhancement to Solder Mask Checks

### Report Features Built with Zero-width Special Symbols

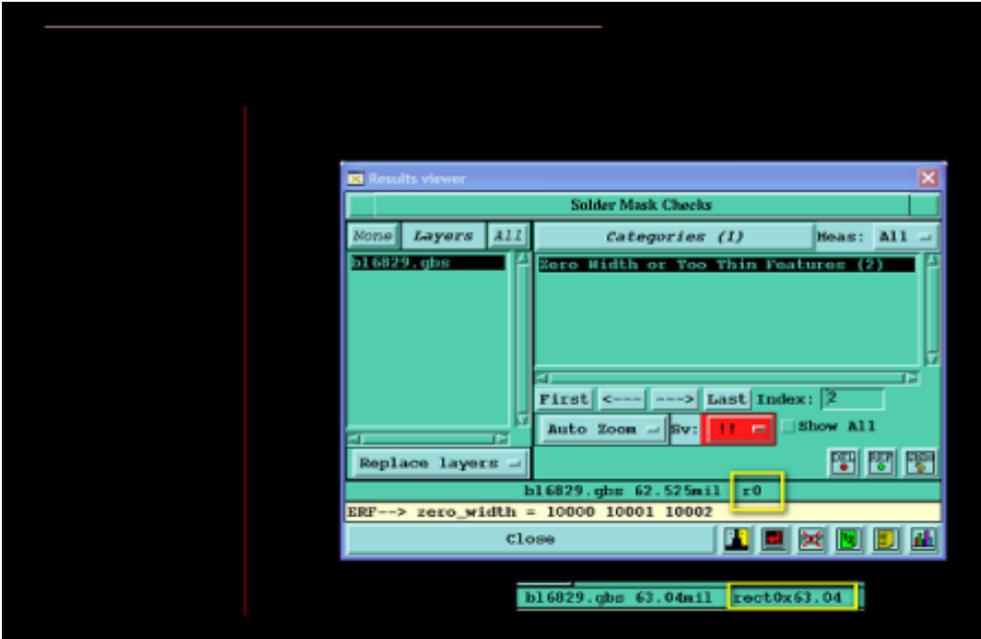
An enhancement was made to the category **Zero Width or Too Thin Features** in the Solder Mask Checks Analysis Action. Prior to version 10, this category reported only Pads that were drawn using zero-width R0 or S0 symbols. As of version 10, this category also reports Pads drawn with zero-width special symbols. These features will not appear on the final plot.

If **v\_report\_zero\_width\_features** = Yes, all features whose width is zero (drawn with zero-width R0 or S0 symbols, or zero-width special symbols), or features that are not larger than the value of ERF variable

**v\_max\_width\_for\_too\_thin\_features**, are reported in the category Zero Width or Too Thin Features.

If **v\_report\_zero\_width\_features** = No, Solder Mask Checks does not report these features.

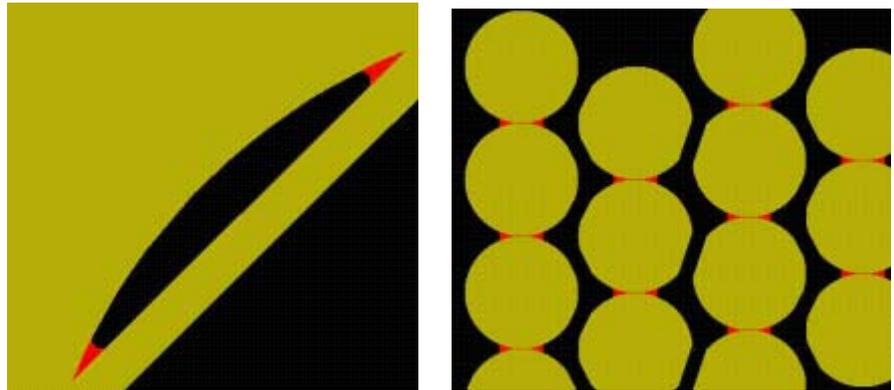
### *Enhanced Category: Zero Width or Too Thin Features*

Item	Details
Full Name	Zero Width or Too Thin Features
Internal ERF Name	<b>zero_width</b>
Measurement Shape	Shape of features or special symbols whose width is 0 or not larger than ERF variable <b>v_max_width_for_too_thin_features</b>
Measurement ID(s)	None
Layers Displayed	Work layer
	
Purpose	Reports all features whose width is zero (drawn with zero-width R0 or S0 symbols, or zero-width special symbols) or features that are not larger than the value of ERF variable <b>v_max_width_for_too_thin_features</b> . These features will not appear on the final plot.
Function	Reports all features and special symbols whose width is zero (drawn with symbols R0 or S0, or with zero-width special symbols) or features not larger than <b>v_max_width_for_too_thin_features</b> .
Activation	Set <b>v_report_zero_width_features</b> to yes.
Known Limitations	<b>v_max_width_for_too_thin_features</b> should not be less than 0 and not larger than 1 mil.

## *Enhancement to Sliver Repair*

The Sliver Repair algorithm was enhanced to enable repairs of all slivers in negative power & ground layers.

The Sliver Repair action can now repair slivers or peelables in negative power & ground layers which are not larger than **max sliver value** or **max peelable value**. Prior to this enhancement, the action could repair slivers or peelables to the size of **2 \* max sliver value** or **2 \* max peelable value**.



## *Enhancement to Drill Touching Copper Count*

In DTCC, category titles can be created dynamically by using the drill size as part of the category name. As of version 10.0, dynamically-created category names that use the drill size will display the correct and complete drill size, including the numbers appearing to the right of the decimal point (if they exist in the actual data). Prior to version 10.0, the drill size in the category name was rounded, with the digits after the decimal point not appearing.

```
Drills Touching Copper - Summary
r127.00drill11.50to3.00oz (12966)
r220.00drillabove4.50oz (1092)
r203.00drillabove4.50oz (152)
r3683.00drillabove4.50oz (2)
r4064.00drillabove4.50oz (4)
```

Category titles before version 10.0

```

Drills Touching Copper - Summary (14224)
Drill(r127.00) piercing Cu between 1.50 and 3.00
Drill(r220.98) piercing Cu above 4.50 oz (1092)
Drill(r203.20) piercing Cu above 4.50 oz (152)
Drill(r3683.00) piercing Cu above 4.50 oz (2)
Drill(r4064.00) piercing Cu above 4.50 oz (4)

```

Category titles as of version 10.0.

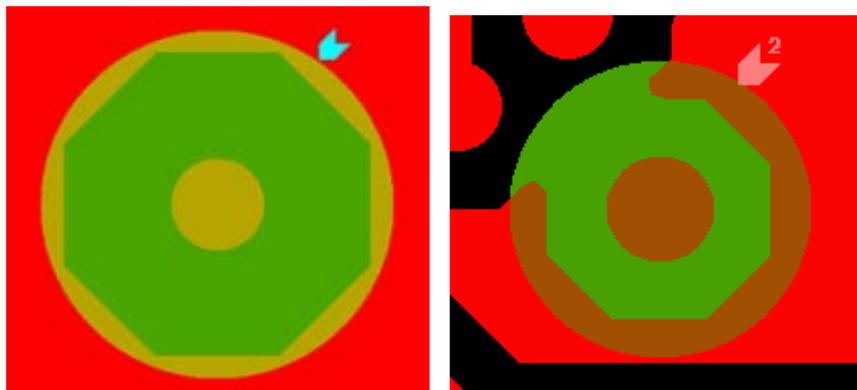
Note the numbers (.98,.20) appearing after the decimal point.

**Note** This enhancement is relevant only when working in Metric units. It is not relevant when working with Imperial units.

## *Enhancement to Solder Mask Repair*

### *Rules for Treatment of Coverage Problems*

A new ERF variable, `v_max_edge_overlap_for_coverage`, was added to the Solder Mask Repair DFM Action. This new ERF variable is designed to help decide when to fix certain coverage problems.



#### **General Rules for Repair**

- If the pad is a fiducial pad, then the coverage problem shown above should not be repaired.
- If the pad is an SMD or drilled pad, then the coverage problem described above should be repaired.
- If the pad is not a fiducial pad, not an SMD pad, and not a drilled pad, then the decision whether or not to repair such coverage problems is decided by the value of the new ERF variable `v_max_edge_overlap_for_coverage`.

Defines the maximum permitted percentage of edge overlap for oversized clearances for which the Solder Mask Repair action will repair the coverage problem. If the copper overlap clearance

edge is larger than this value, the Solder Mask Repair action will not repair the coverage problem, but merely report it.

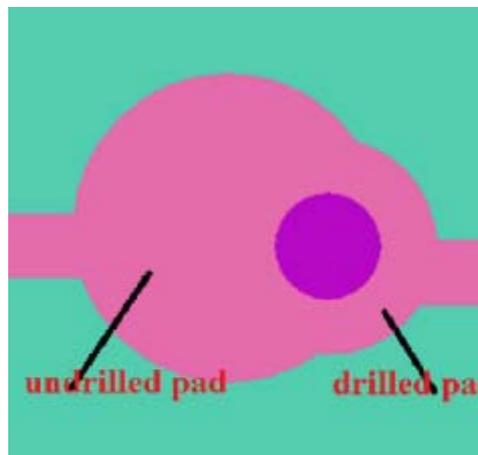
The default value is -1. This value tells the system not to consider the overlap percentage, and to always try to fix such coverage problems.

## *Enhancement to Advanced Teardrops Creation*

As of version 10.0, you can specify whether to add teardrops to drilled pads, undrilled pads, or to both types of pad.

**Drilled pad:** If the distance between a pad center and a drill center is *less* than 0.1 mils, the pad is counted as a drilled pad.

**Undrilled pad:** If the distance between a pad center and a drill center is *more* than 0.1 mils, or if a pad does not touch a drill at all, then the pad is considered an undrilled pad.



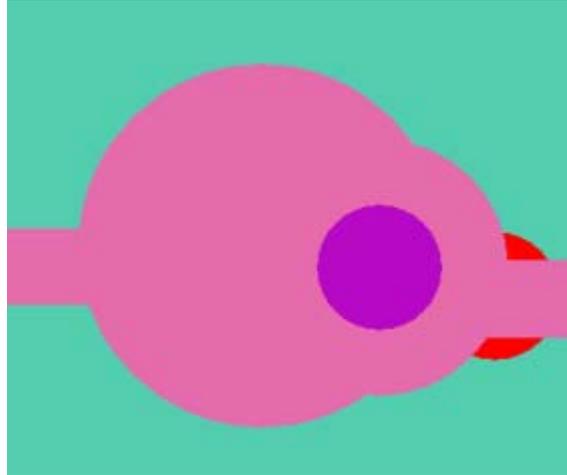
The pad on the left-hand side touches the drill, but does not share the drill center (their centers are separated by more than 0.1 mil). This pad is considered an **undrilled pad**.

The pad and drill on the right-hand side not only touch, they have the same center (their centers are separated by less than 0.1 mil). This pad is considered a **drilled pad**.

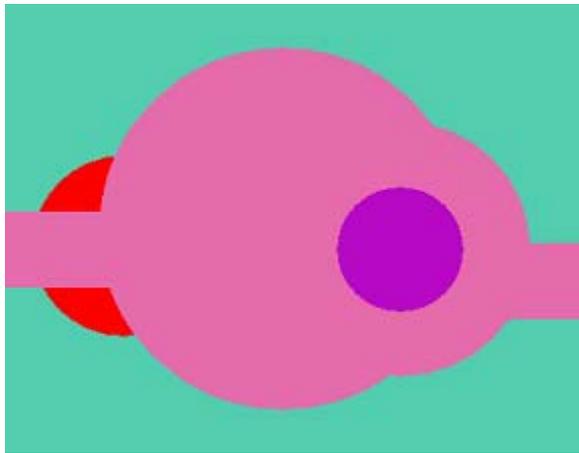
---

*Examples*

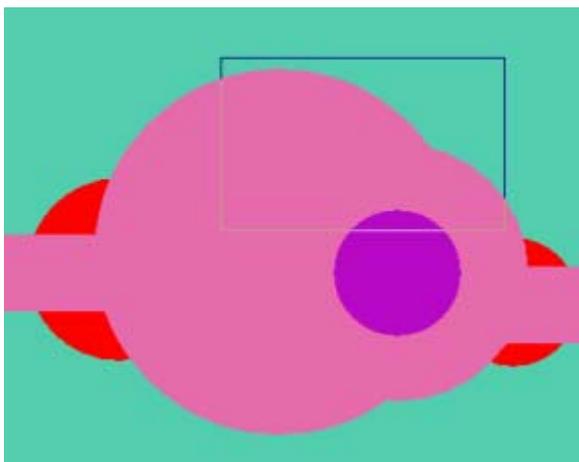
- Create teardrop for drilled pads only.



- Create teardrop for undrilled pads only.



- Both types of pad (drilled and undrilled pads) get a teardrop.



---

## Chapter 6 *Parameters, Attributes, and Commands*

---

### *New Configuration Parameters*

---

#### *edt\_consider\_saved\_defaults*

Type	Boolean
Default	No
Description	Consider saved Selection & Buffer default values Enables use of saved default values for Selection options and Buffer options without needing to reopen the Selection Options Popup or the Buffer Options Popup.
See Also	The Graphic Editor (Doc. 0601)

---

#### *edt\_sr\_name\_col\_width*

Type	Integer
Default	12
Description	Sets the column width for the Step column in the Step & Repeat Table. Range is 12 to 64. If <b>edt_sr_name_col_width</b> = 0, the column width display will be equal to the number of characters used in the longest step name found in the S&R table (but never less than 12).
See Also	The Graphic Editor (Doc. 0601)

---

#### *iol\_sm\_t0\_after\_full\_circle*

Type	Boolean
Default	Yes
Description	Enables adding a T0 command after the last G45/G46 command. <b>Yes</b> (default) - add T0 command after last G45/G46 command (routing full circle). <b>No</b> - does not add T0 command (maintain old behavior).
See Also	Output Formats (Doc. 0702)

---

---

## *New Line Mode Commands*

### *Backup/Restore Job Line Mode Commands*

#### *backup\_job\_list*

<b>Command</b>	<b>backup_job_list</b>
<b>Group</b>	Engineering Toolkit
<b>Description</b>	Builds a backup repository job list in a file containing lines of <job_name> <job_ver>
<b>Response</b>	None
<b>Parameter</b>	<b>Value</b>
<b>path</b>	Path to report

#### *backup\_job\_properties*

<b>Command</b>	<b>backup_job_properties</b>
<b>Group</b>	Engineering Toolkit
<b>Description</b>	Builds a backup repository job list in a file containing lines of <job_name> <job_ver>
<b>Response</b>	Job properties in the following order: <job_name> <ver> <repository_name> <date> <time> <format> <application> <oper> <customer>
<b>Parameter</b>	<b>Value</b>
<b>job</b>	Job name
<b>ver</b>	Job version number (or 0 for last job version)

#### *backup\_job\_delete*

<b>Command</b>	<b>backup_job_delete</b>
<b>Group</b>	Engineering Toolkit
<b>Description</b>	Deletes a job from a backup repository
<b>Response</b>	None
<b>Parameter</b>	<b>Value</b>
<b>job</b>	Job name

---

<b>ver</b>	Job version number (or 0 for last job version)
<b>date_time</b>	(Optional) Date and Time when job was backed up. Parameter has the following format: dd- <b>MMM</b> -yy HH:mm:ss (Leading zeroes required). Example: 02-Jul-12 09:35:03 <b>Note:</b> <b>date_time</b> overrides <b>ver</b>

---

### *backup\_job\_backup*

---

<b>Command</b>	<b>backup_job_backup</b>
<b>Group</b>	Engineering Toolkit
<b>Description</b>	Backup a job from the application database to a backup repository
<b>Response</b>	None

---

<b>Parameter</b>	<b>Value</b>
<b>repo</b>	Name of target job repository
<b>job</b>	Name of job to back up
<b>mode</b>	Method of storing job in repository: directory, tar, tar_gzip

---

### *backup\_job\_restore*

---

<b>Command</b>	<b>backup_job_restore</b>
<b>Group</b>	Engineering Toolkit
<b>Description</b>	Restores a job from backup repository to the application database
<b>Response</b>	None

---

<b>Parameter</b>	<b>Value</b>
<b>job</b>	Job name
<b>ver</b>	Job version number (or 0 for last job version)
<b>date_time</b>	(Optional) Date and Time when job was backed up. Parameter has the following format: dd- <b>MMM</b> -yy HH:mm:ss (Leading zeroes required). Example: 02-Jul-12 09:35:03 <b>Note:</b> <b>date_time</b> overrides <b>ver</b>
<b>dest_job</b>	New name for restored job
<b>dest_db</b>	Name of destination job database

---

### *backup\_job\_tool\_open*

---

<b>Command</b>	<b>backup_job_tool_open</b>
<b>Group</b>	Engineering Toolkit

---

---

<b>Description</b>	Opens the job backup window
<b>Response</b>	None
<b>Parameter</b>	<b>Value</b>
<b>jobs</b>	List of job names. Names separated by semicolons (;).

---

### *restore\_job\_tool\_open*

---

<b>Command</b>	<b>restore_job_tool_open</b>
<b>Group</b>	Engineering Toolkit
<b>Description</b>	Opens the job restore window
<b>Response</b>	None

---

### *backup\_job\_tool\_close*

---

<b>Command</b>	<b>backup_job_tool_close</b>
<b>Group</b>	Engineering Toolkit
<b>Description</b>	Closes the job backup window
<b>Response</b>	None

---

### *restore\_job\_tool\_close*

---

<b>Command</b>	<b>restore_job_tool_close</b>
<b>Group</b>	Engineering Toolkit
<b>Description</b>	Closes the job restore window
<b>Response</b>	None

---

---

## *Other Commands*

### *space\_edit*

<b>Command</b>	<b>space_edit</b>
<b>Group</b>	Graphic Editor
<b>Description</b>	Change or create space between two features Features may be on the same or different layers
<b>Parameter</b>	<b>Value</b>
<b>fidx1</b>	First feature index. Use existing feature index
<b>fidx2</b>	Second feature index. Use existing feature index
<b>layer1</b>	First feature layer name. Use existing layer name
<b>layer2</b>	Second feature layer name. Use existing layer name
<b>mode1</b>	First feature repair mode
<b>mode2</b>	Second feature repair mode
<b>common_shave</b>	In cases that use the shave mode for both features on the same layer: - yes - use a single line to shave both feature - no - use two line to shave each feature
<b>space</b>	Desired spacing between first and second features. Range: [>0 .. 100] mil (in current units)
<b>shift</b>	Shift space from the middle of the space from the first to the second feature. Used if mode1 & mode2 != none. Range: [-50 .. +50] mil (in current units).

---

## Revised Line Mode Commands

### *adv\_filter\_set*

The new parameters **min\_arc\_len** and **max\_arc\_len** were added to the existing LMC **adv\_filter\_set**.

<b>Command</b>	<b>adv_filter_set</b>
<b>Group</b>	Graphic Editor
<b>Description</b>	The command is used for setting the advanced Features filter parameters. The filter is used for various functions, such as 'features selection'.
<b>New Parameter</b>	<b>Description</b>
<b>min_arc_len</b>	Minimum and maximum arc length
<b>max_arc_len</b>	Value: [ $\geq 0$ ] (inch/mm)

### *copy\_layer*

The value **new\_layers\_only** was added to the parameter **copy\_attrs** in the existing LMC **copy\_layer**.

<b>Command</b>	<b>copy_layer</b>
<b>Group</b>	Graphic Editor
<b>Description</b>	The command copies a layer to another layer. If the destination layer does not exist, it will be created and added to end of the matrix.
<b>Parameter</b>	<b>Description</b>
<b>copy_attrs</b>	Defines whether to copy layer attributes when layer features are copied. Values: - No (default) - Do not copy layer attributes - Yes - Copy layer attributes - <b>New layer only</b> - Copy new layers only

***print***

A new parameter was added to the existing LMC **print**.

<b>Command</b>	<b>print</b>
<b>Group</b>	Graphic Editor
<b>Description</b>	The command is used for printing graphic layers in PDF or Postscript format.
<b>New Parameter</b>	<b>Description</b>
<b>paper_units</b>	Enables custom paper sizes to be defined in either inches or millimeters. Permitted values: <b>inch</b> , <b>mm</b> . Default = <b>inch</b> .

***sel\_feat2outline***

The value parameter **polarity** was added to the existing LMC **sel\_feat2outline**.

<b>Command</b>	<b>sel_feat2outline</b>
<b>Group</b>	Graphic Editor
<b>Description</b>	Replace all selected features by line and arc features of the selected features outlines.
<b>Parameter</b>	<b>Description</b>
<b>polarity</b>	Outline polarity: as_feature, positive, negative

***sel\_feat2outline\_partial***

The value parameter **polarity** was added to the existing LMC **sel\_feat2outline\_partial**.

<b>Command</b>	<b>sel_feat2outline_partial</b>
<b>Group</b>	Graphic Editor
<b>Description</b>	Create a feature outline (line and arc features) and save only part of the features outline.
<b>Parameter</b>	<b>Description</b>
<b>polarity</b>	Outline polarity: as_feature, positive, negative

## Chapter 7 *KIT List*

The following KITs have been resolved for Genesis version 10.

**Note** KITs marked with '\*\*' are partially fixed.

KIT No.	Priority	Description
<b><i>DFM Actions</i></b>		
17752	C	SMR removes large clearance
17580	H	Solder Mask Repair erf v_max_oversized_clearance
17624	H	Signal layer optimization occurred spacing violation
17786	H	Sliver removal in pg layer
17828	H	Embedded SM opening missing in SMR
17902	H	Sliver repair problem
17964	H	Advanced Teardrop Creation: can not add teardrop in v99
17999	H	SLO: checklist stop running problem
<b><i>Analysis Actions</i></b>		
16287	C	v_consider_board_net setting problem in SLC
17863	C	SLC fail
16276	H	Separate stack via missing hole from "Missing hole" category
17130	H	SLC - get wrong AR when v_use_line_width_as_tool_size = no
17713	H	False alarm in 'short arc' of 'Rout Analysis'
17714	H	Rout analysis should report a corner when tool size = arc diameter
17973	H	cannot run SLC
17683	M	Drill check---wish add item for same net close vias
16908	M	Rout analysis - alert corners
<b><i>Input</i></b>		
17247	C	ODB & Gerber Discrepancy Analysis
17837	C	Gerber274x input problem--SIP is fixed wrong with v9.9b
17881	C	Input RS274X problem (Surface)
<b>Priority Codes: C →Critical, H →High, M →Medium, L →Low</b>		

<b>KIT No.</b>	<b>Priority</b>	<b>Description</b>
17913	C	Input: Wrong image in Gerber 274x input
17945	C	Gerber274x input missing hole
15391	H	A little piece of copper is disappearing during DPF input
17925	H	SIP input fail and genesis crash at v99b1
<b><i>Output</i></b>		
17810	C	Surface not filled properly during output
17822	C	Missing surface features on OPFX output
17961	C	Drill output does not work
17859	H	Rs274x output - should not decompose surface
17651	M	Print: features are transparency printed with parameter "Print layers=Separately"
<b><i>Dynamic Etch Compensation</i></b>		
17985	C	DETC time too long
17540	H	Request that attributes remain the same after DEC
<b><i>Panelization</i></b>		
17781	M	Full step name display in S&R table
<b><i>Graphic Editor</i></b>		
14144	C	Resize surface 1.42 - 1.53mils - bad results
14675	C	After resizes, surface disappears. Copper removed.
15327	C	Some clearances have been disappeared during Resize
17556	C	Hole disappears during resize
17639	C	2 clearances disappear after resize
17647	C	Bad surface after resize
17711	C	Resize surface cause data loss
17724	C	Global resize closes isolations in surface
17729	C	Fill Surface problem
17745	C	Resize surface will disappear
17750	C	After resizing, some clearance was filled.
17759	C	A difference of a resizing result
17803	C	Surface fill problem
17804	C	Resize surface cause hole missing
17832	C	Surface disappeared
17915	C	Contourize: Internal error occurred
17127	H	The Selection Options are not saved
17485	H	Rotate non-standard symbol name problem
<b>Priority Codes: C →Critical, H →High, M →Medium, L →Low</b>		

<b>KIT No.</b>	<b>Priority</b>	<b>Description</b>
17710	H	Step Compare issue
17748	H	Duplicated donuts changed into a round pad during contourization
17801	H	Add rotated dynamic text problem
15410	M	Corners of clearances become round during resize
16110	M	Layer Name in the 'S&R Fill Pattern'
16774	M	Problem of Resize
17574	M	Prefix for multilayer copy
17827	M	Length of Arc in Advanced Filter of Feature Filter
<b><i>System</i></b>		
17883	C	Surface is missing after import
17877	H	Failure to import a job
<b><i>Auto Rout Manager</i></b>		
17972	H	Auto Rout Manager: scale output arc problem in arm
<b>Priority Codes: C →Critical, H →High, M →Medium, L →Low</b>		