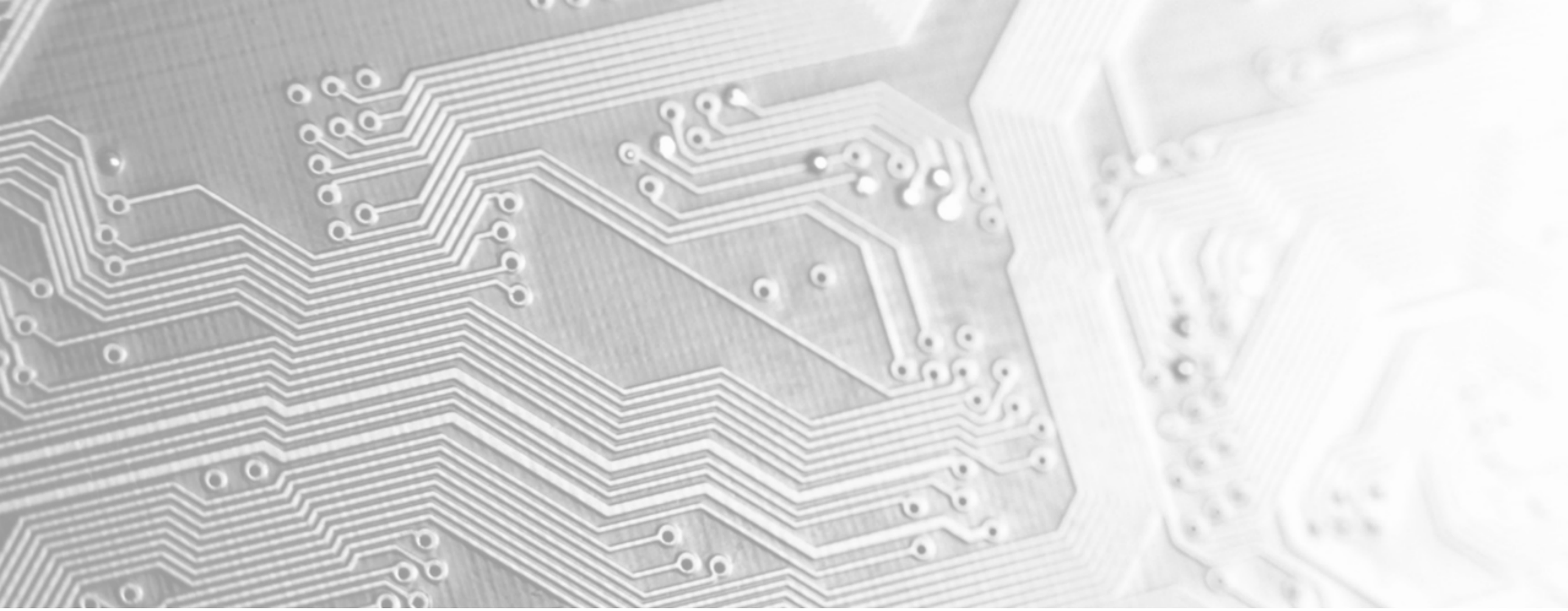


Ucam v10.1

Karel Tavernier | Ucamco

Release Notes

Ucam v10.1 Release Notes

Ucamco is proud to present Ucam version 10
This major release offers the following new or enhanced features

- New Smart Drill Tool Manager
- Netlist Compare
- IPC-D-356A Netlist Input
- Legend Optimizer
- Coverlay Optimizer
- Multi-net Visualizer
- ODB++ output v7 support and extensions
- FlashMaker Extensions
- Gerber RS-274X Optimization

New Smart Drill Tool Manager

Overview

The Smart Drill Too Manager allows customers to use their own rules for calculating drill diameter sizes.

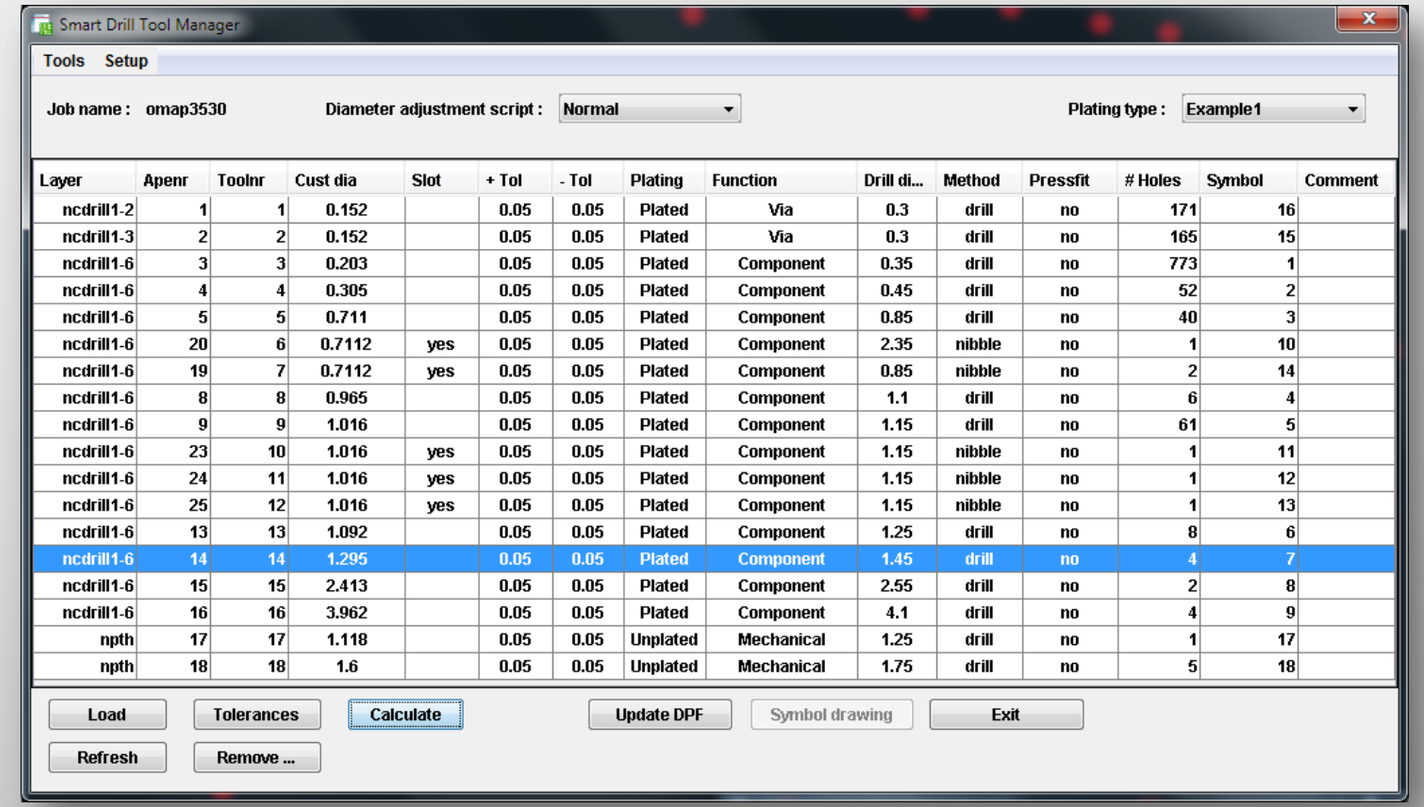
It combines an easy-to-use graphical user interface with the power of VHS scripting.

New Smart Drill Tool Manager

The new Smart Drill Tool Manager automates end diameter to drill diameter calculation

Features

- Easy-to-use and intuitive graphical user interface:
  - multiple drill files presented in a single list

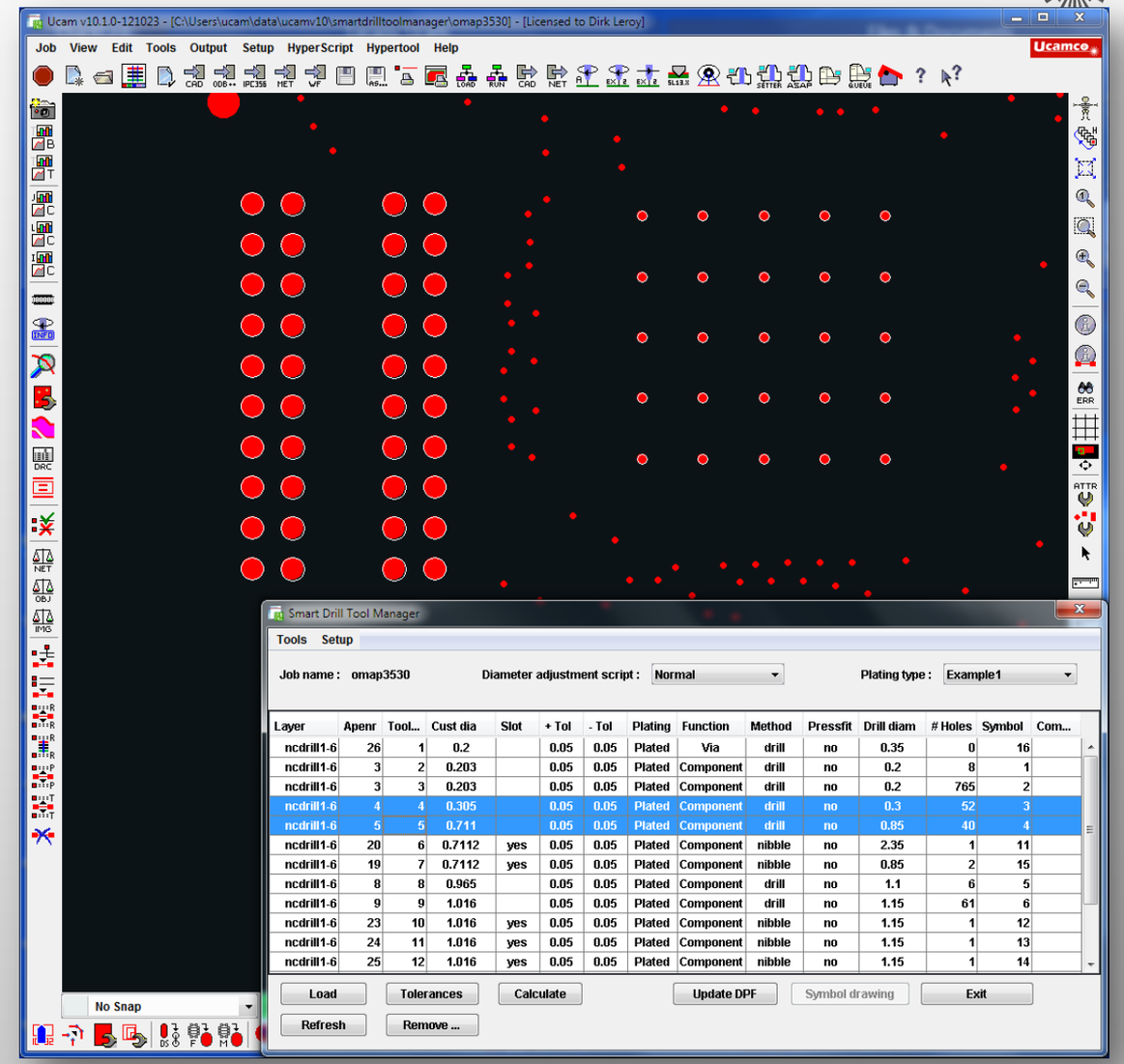


Layer	Apenr	Toolnr	Cust dia	Slot	+ Tol	- Tol	Plating	Function	Drill di...	Method	Pressfit	# Holes	Symbol	Comment
ncdrill1-2	1	1	0.152		0.05	0.05	Plated	Via	0.3	drill	no	171	16	
ncdrill1-3	2	2	0.152		0.05	0.05	Plated	Via	0.3	drill	no	165	15	
ncdrill1-6	3	3	0.203		0.05	0.05	Plated	Component	0.35	drill	no	773	1	
ncdrill1-6	4	4	0.305		0.05	0.05	Plated	Component	0.45	drill	no	52	2	
ncdrill1-6	5	5	0.711		0.05	0.05	Plated	Component	0.85	drill	no	40	3	
ncdrill1-6	20	6	0.7112	yes	0.05	0.05	Plated	Component	2.35	nibble	no	1	10	
ncdrill1-6	19	7	0.7112	yes	0.05	0.05	Plated	Component	0.85	nibble	no	2	14	
ncdrill1-6	8	8	0.965		0.05	0.05	Plated	Component	1.1	drill	no	6	4	
ncdrill1-6	9	9	1.016		0.05	0.05	Plated	Component	1.15	drill	no	61	5	
ncdrill1-6	23	10	1.016	yes	0.05	0.05	Plated	Component	1.15	nibble	no	1	11	
ncdrill1-6	24	11	1.016	yes	0.05	0.05	Plated	Component	1.15	nibble	no	1	12	
ncdrill1-6	25	12	1.016	yes	0.05	0.05	Plated	Component	1.15	nibble	no	1	13	
ncdrill1-6	13	13	1.092		0.05	0.05	Plated	Component	1.25	drill	no	8	6	
ncdrill1-6	14	14	1.295		0.05	0.05	Plated	Component	1.45	drill	no	4	7	
ncdrill1-6	15	15	2.413		0.05	0.05	Plated	Component	2.55	drill	no	2	8	
ncdrill1-6	16	16	3.962		0.05	0.05	Plated	Component	4.1	drill	no	4	9	
npth	17	17	1.118		0.05	0.05	Unplated	Mechanical	1.25	drill	no	1	17	
npth	18	18	1.6		0.05	0.05	Unplated	Mechanical	1.75	drill	no	5	18	

New Smart Drill Tool Manager

The new Smart Drill Tool Manager automates end diameter to drill diameter calculation

- Clicking a tool in the list highlights the corresponding drill holes on screen

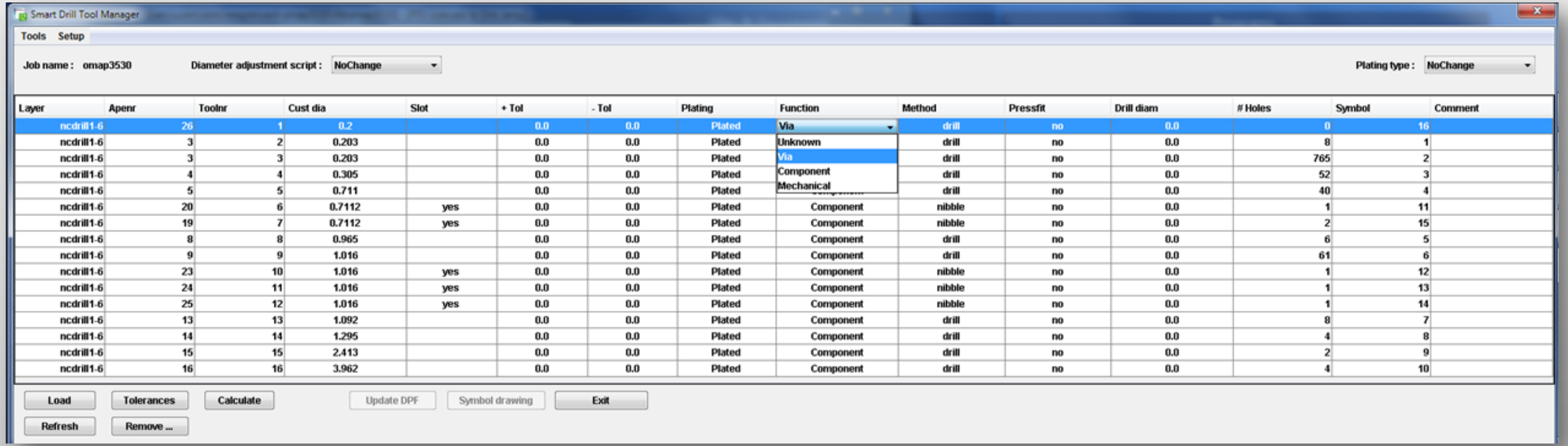


Layer	Apenr	Tool...	Cust dia	Slot	+ Tol	- Tol	Plating	Function	Method	Pressfit	Drill diam	# Holes	Symbol	Com...
ncdrill1-6	26	1	0.2		0.05	0.05	Plated	Via	drill	no	0.35	0	16	
ncdrill1-6	3	2	0.203		0.05	0.05	Plated	Component	drill	no	0.2	8	1	
ncdrill1-6	3	3	0.203		0.05	0.05	Plated	Component	drill	no	0.2	765	2	
ncdrill1-6	4	4	0.305		0.05	0.05	Plated	Component	drill	no	0.3	52	3	
ncdrill1-6	5	5	0.711		0.05	0.05	Plated	Component	drill	no	0.85	40	4	
ncdrill1-6	20	6	0.7112	yes	0.05	0.05	Plated	Component	nibble	no	2.35	1	11	
ncdrill1-6	19	7	0.7112	yes	0.05	0.05	Plated	Component	nibble	no	0.85	2	15	
ncdrill1-6	8	8	0.965		0.05	0.05	Plated	Component	drill	no	1.1	6	5	
ncdrill1-6	9	9	1.016		0.05	0.05	Plated	Component	drill	no	1.15	61	6	
ncdrill1-6	23	10	1.016	yes	0.05	0.05	Plated	Component	nibble	no	1.15	1	12	
ncdrill1-6	24	11	1.016	yes	0.05	0.05	Plated	Component	nibble	no	1.15	1	13	
ncdrill1-6	25	12	1.016	yes	0.05	0.05	Plated	Component	nibble	no	1.15	1	14	

New Smart Drill Tool Manager

The new Smart Drill Tool Manager automates end diameter to drill diameter calculation

- Customizable drop-down lists for easy and secure assignment of drill hole function

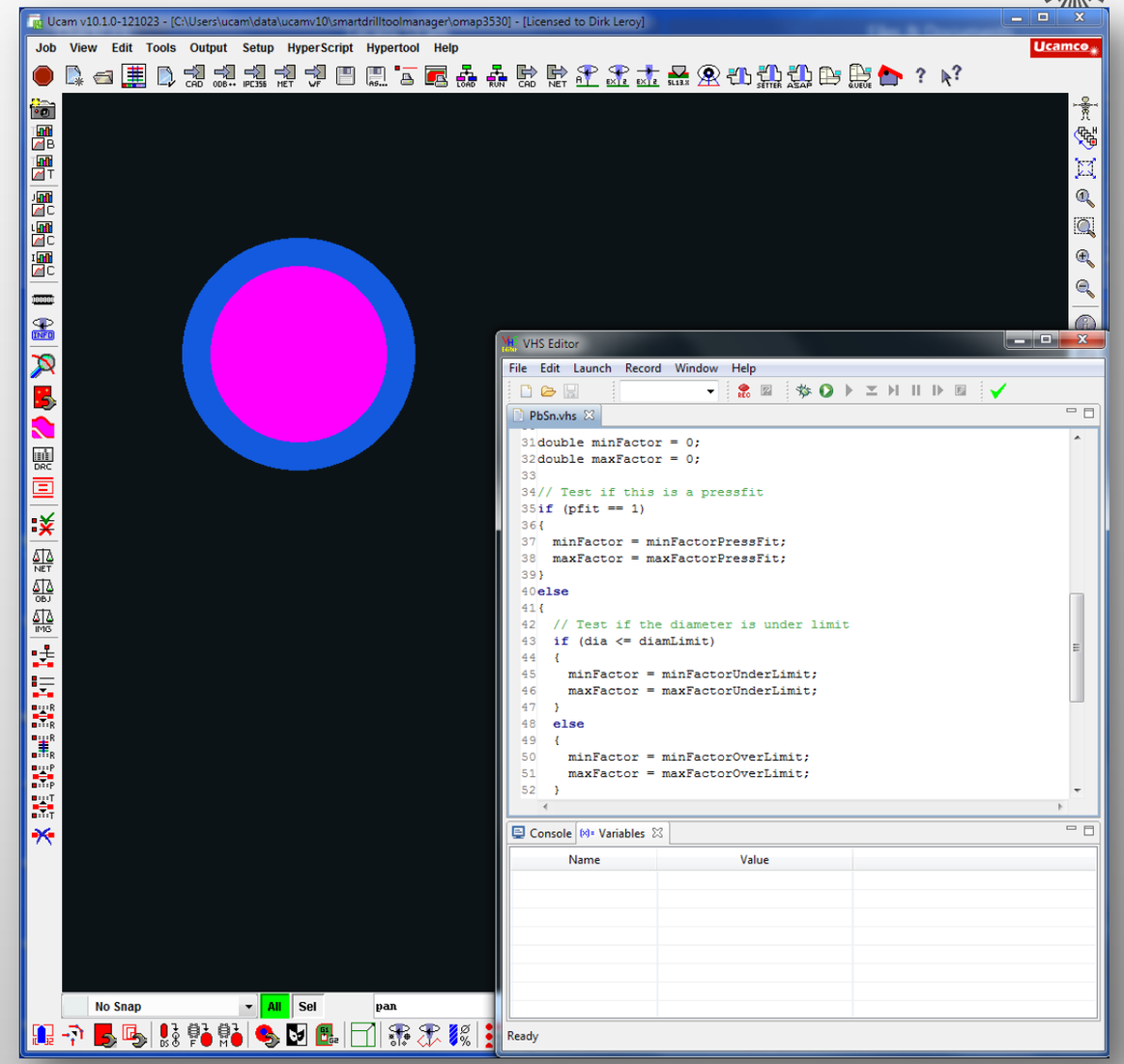


Layer	Apenr	Toolnr	Cust dia	Slot	+ Tol	- Tol	Plating	Function	Method	Pressfit	Drill diam	# Holes	Symbol	Comment
ncdrill1-6	26	1	0.2		0.0	0.0	Plated	Via	drill	no	0.0	0	16	
ncdrill1-6	3	2	0.203		0.0	0.0	Plated		drill	no	0.0	8	1	
ncdrill1-6	3	3	0.203		0.0	0.0	Plated		drill	no	0.0	765	2	
ncdrill1-6	4	4	0.305		0.0	0.0	Plated		drill	no	0.0	52	3	
ncdrill1-6	5	5	0.711		0.0	0.0	Plated		drill	no	0.0	40	4	
ncdrill1-6	20	6	0.7112	yes	0.0	0.0	Plated	Component	nibble	no	0.0	1	11	
ncdrill1-6	19	7	0.7112	yes	0.0	0.0	Plated	Component	nibble	no	0.0	2	15	
ncdrill1-6	8	8	0.965		0.0	0.0	Plated	Component	drill	no	0.0	6	5	
ncdrill1-6	9	9	1.016		0.0	0.0	Plated	Component	drill	no	0.0	61	6	
ncdrill1-6	23	10	1.016	yes	0.0	0.0	Plated	Component	nibble	no	0.0	1	12	
ncdrill1-6	24	11	1.016	yes	0.0	0.0	Plated	Component	nibble	no	0.0	1	13	
ncdrill1-6	25	12	1.016	yes	0.0	0.0	Plated	Component	nibble	no	0.0	1	14	
ncdrill1-6	13	13	1.092		0.0	0.0	Plated	Component	drill	no	0.0	8	7	
ncdrill1-6	14	14	1.295		0.0	0.0	Plated	Component	drill	no	0.0	4	8	
ncdrill1-6	15	15	2.413		0.0	0.0	Plated	Component	drill	no	0.0	2	9	
ncdrill1-6	16	16	3.962		0.0	0.0	Plated	Component	drill	no	0.0	4	10	

New Smart Drill Tool Manager

The new Smart Drill Tool Manager automates end diameter to drill diameter calculation

- Customizable rule sets for drill size calculation through Visual HyperScript (VHS).
  - Easy integration, update and maintenance of company-specific rules
  - VHS Script has access to all available information from the Smart Drill Tool Manager graphical user interface
  - VHS Script can make decisions based on this information (if-then-else constructs, operations with logical operands >, =<, <>, …)
  - Intelligent solving of rounding from imperial input data to metric output drill sizes
  - …

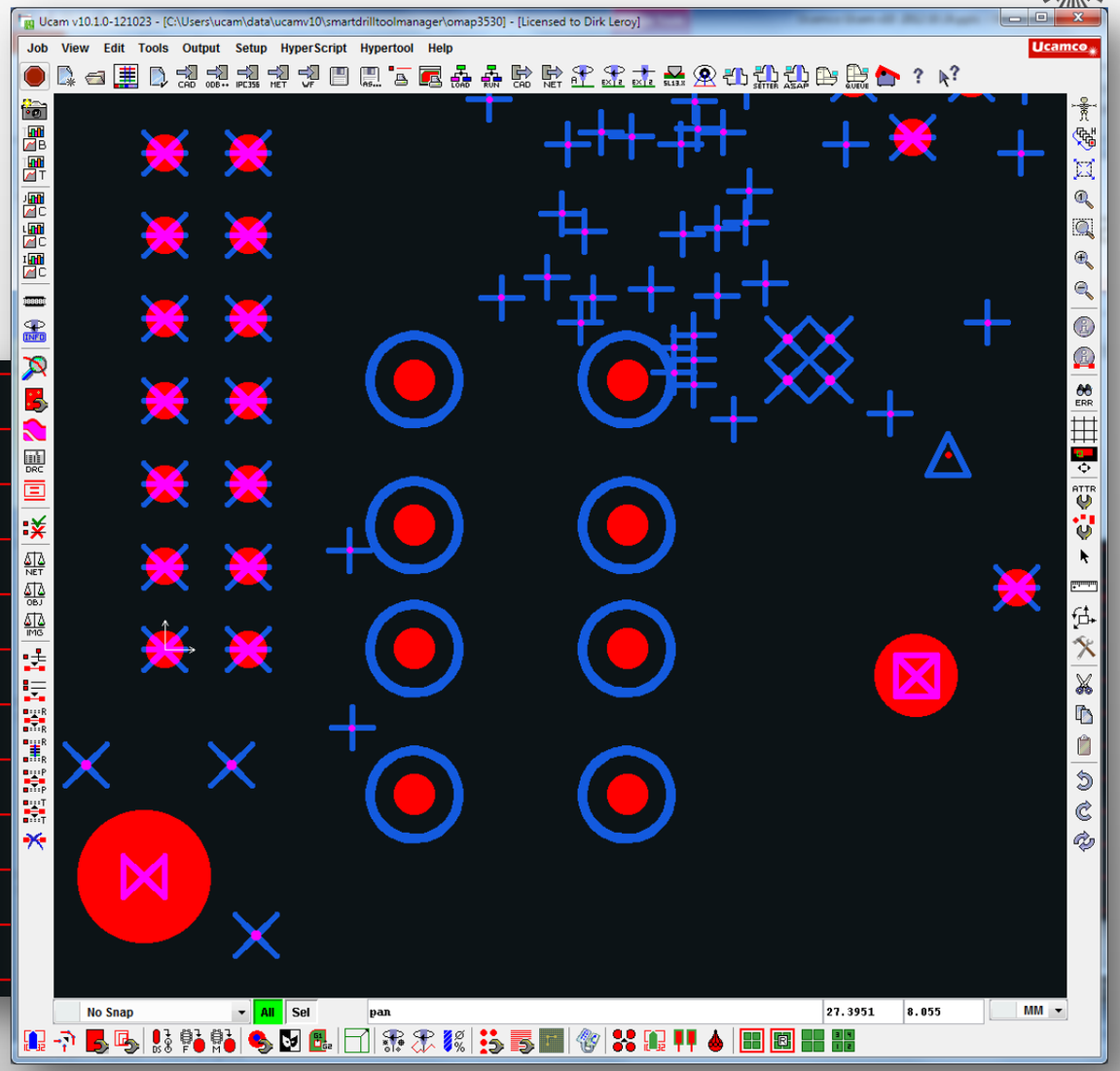


New Smart Drill Tool Manager

The new Smart Drill Tool Manager automates end diameter to drill diameter calculation

- Automatic generation of drill legend and symbol drawing for drill/rout departments and final inspection.

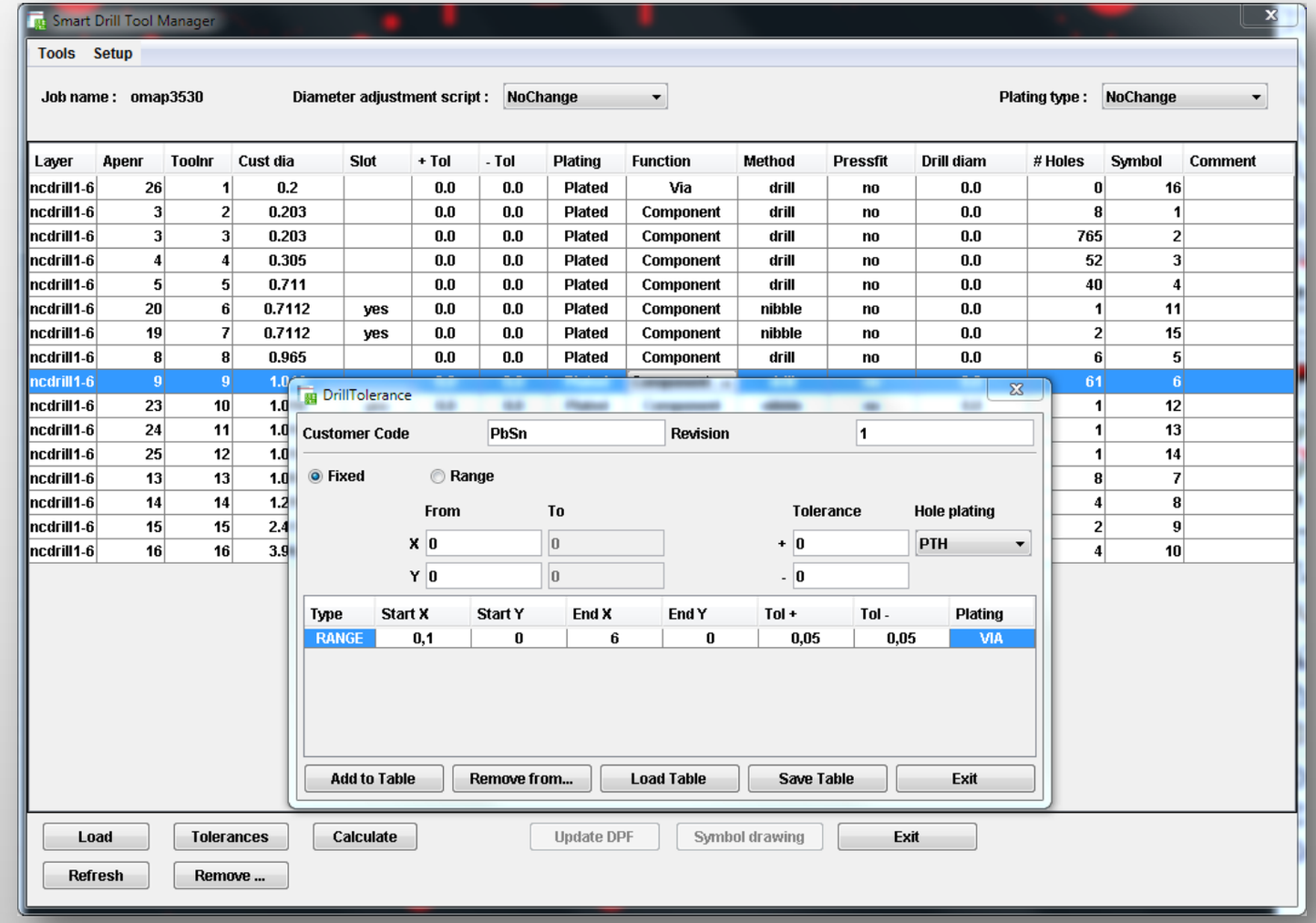
Job : omap3530				
Symbol	Tool	Drill diam.	# Holes	Comment
△	1	0.2	773	
+	2	0.3	52	
×	3	0.85	40	
◇	6	1.1	6	
□	7	1.15	61	
×	11	1.25	8	
○	12	1.45	4	
▨	13	2.55	2	
⊠	14	4.1	4	



New Smart Drill Tool Manager

The new Smart Drill Tool Manager automates end diameter to drill diameter calculation

- Create and store different hole tolerancing rules for different customers



Netlist Compare Extensions

Overview

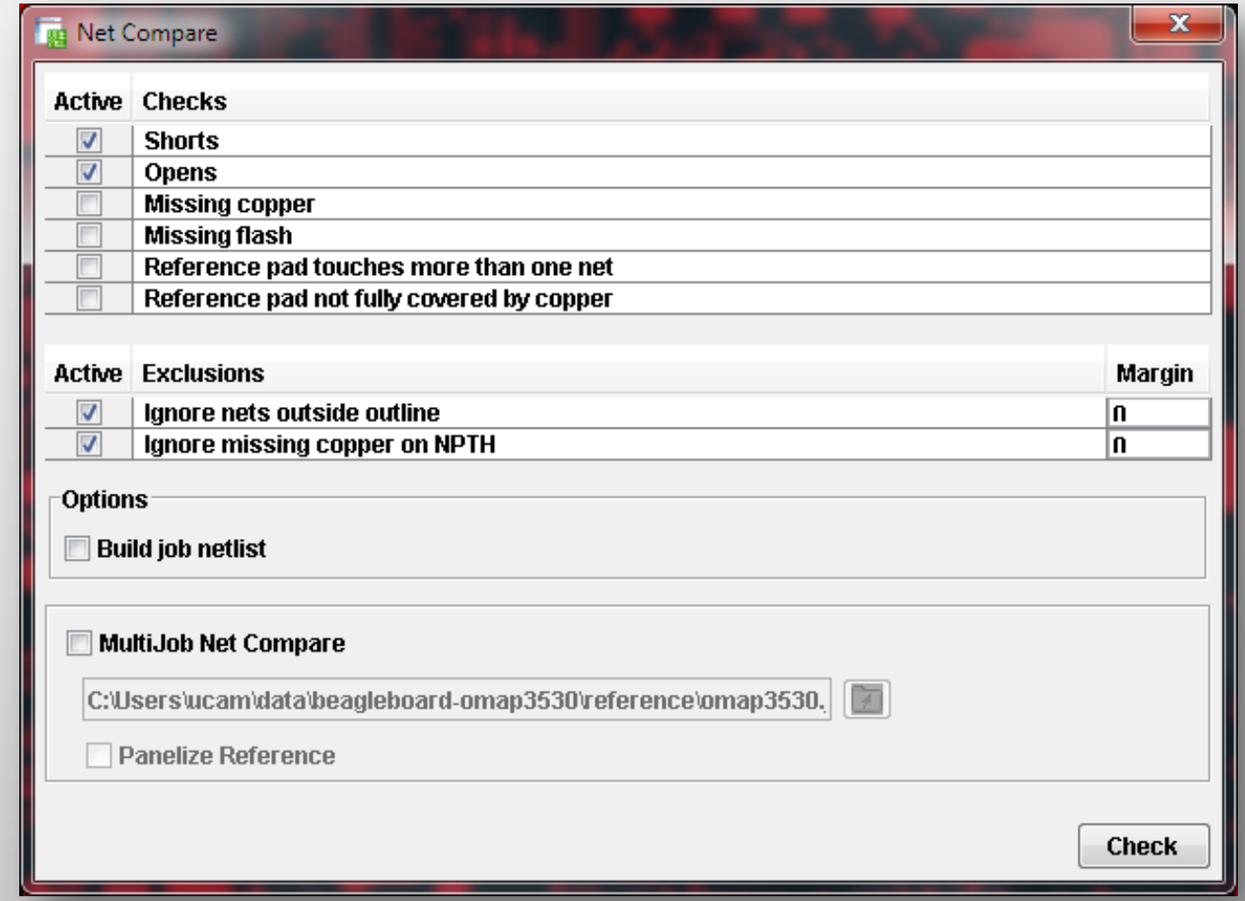
The netlist compare extensions allow the user to indicate that netlist differences on nets outside the PCB can be safely ignored, leaving only the differences on genuine PCB nets to be reviewed.

Should the program discover a netlist problem on a net which is partly inside and partly outside the PCB, it will treat it as a PCB net and advise the operator accordingly.

Netlist Compare Extensions

Filters out differences on irrelevant nets during netlist compare.

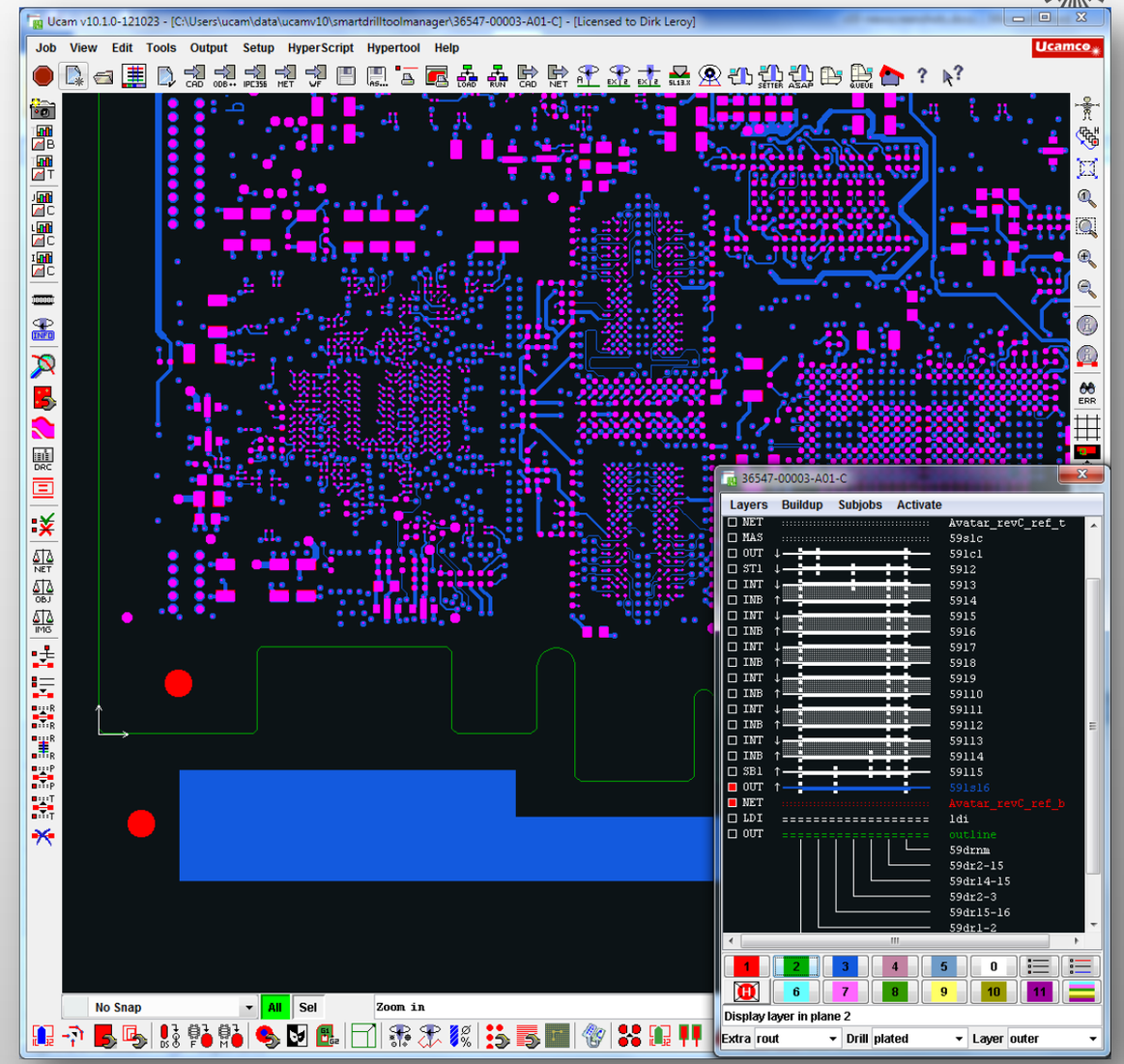
- Extended user interface options allow the definition of nets to be ignored



Netlist Compare Extensions

Filters out differences on irrelevant nets during netlist compare.

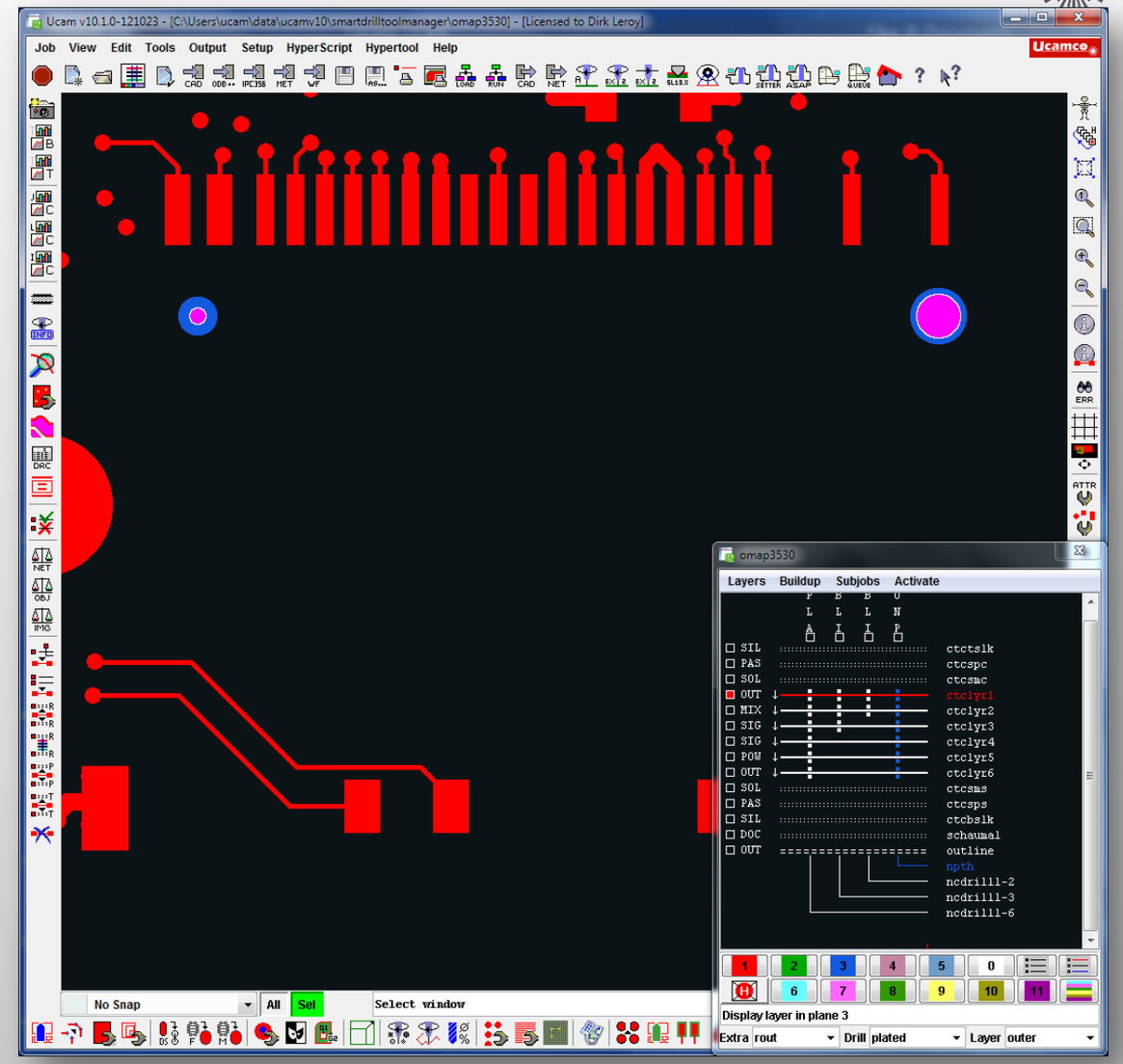
- Nets fully located outside the board outline (green box)



Netlist Compare Extensions

Filters out differences on irrelevant nets during netlist compare.

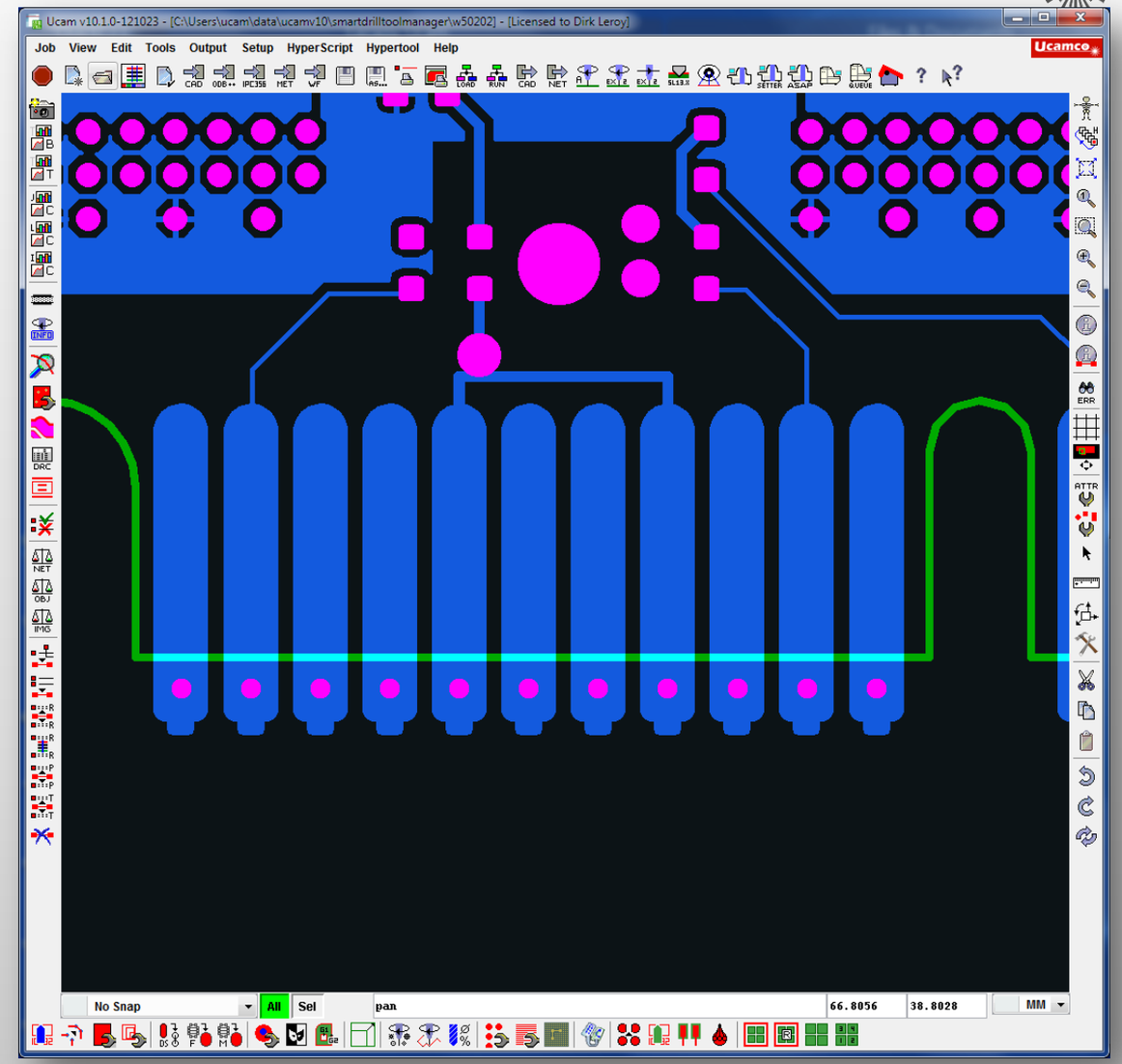
- Copper pads (red) under non-plated drill holes (blue)



Netlist Compare Extensions

Filters out differences on irrelevant nets during netlist compare.

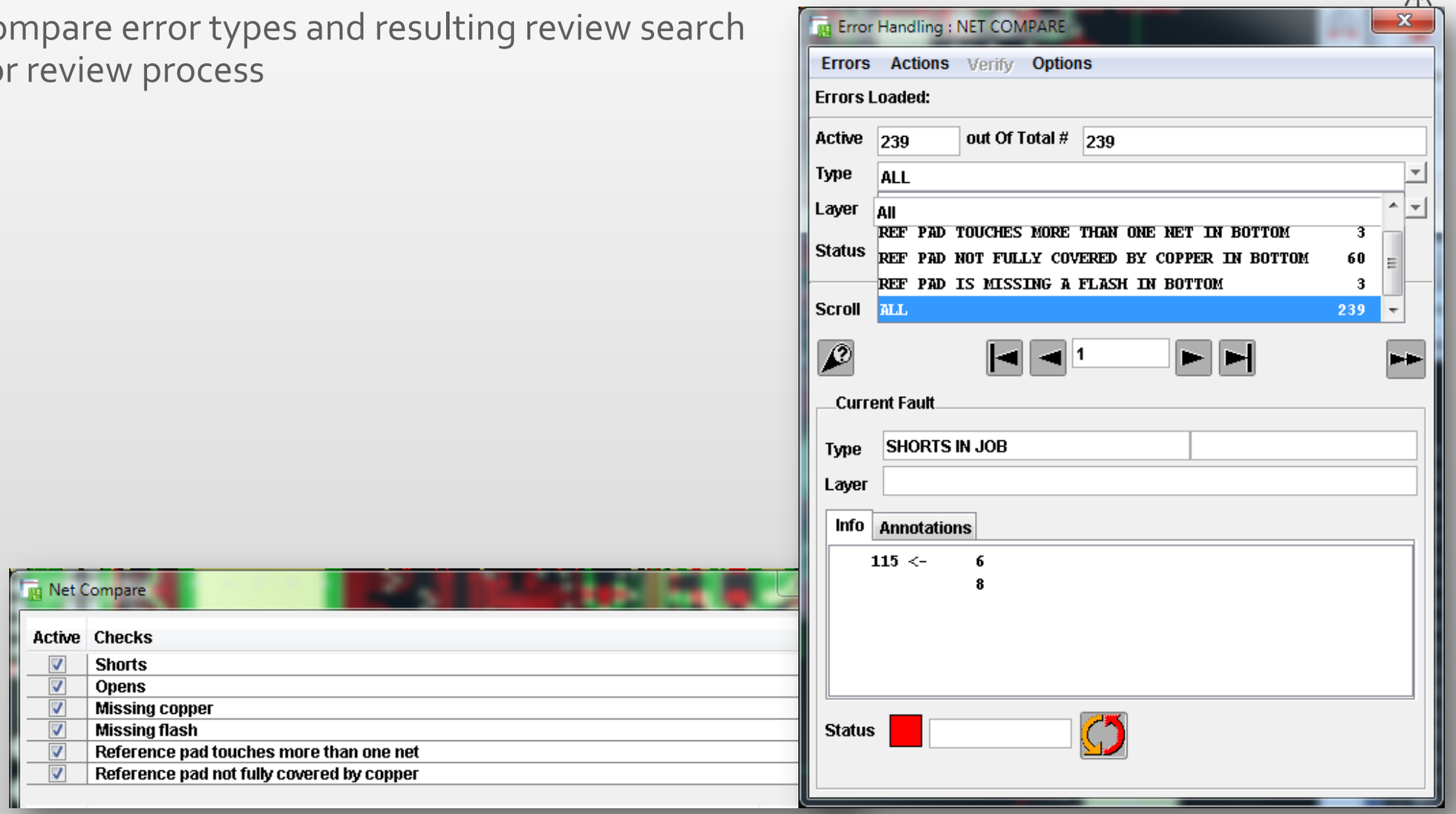
- Emphasis on Security
  - Nets partly inside partly outside the board outline (edge connectors) always verified.



Netlist Compare Extensions

Filters out differences on irrelevant nets during netlist compare.

- Extended list of netlist compare error types and resulting review search criteria speed up the error review process



IPC-D-356A Netlist Input enhancements

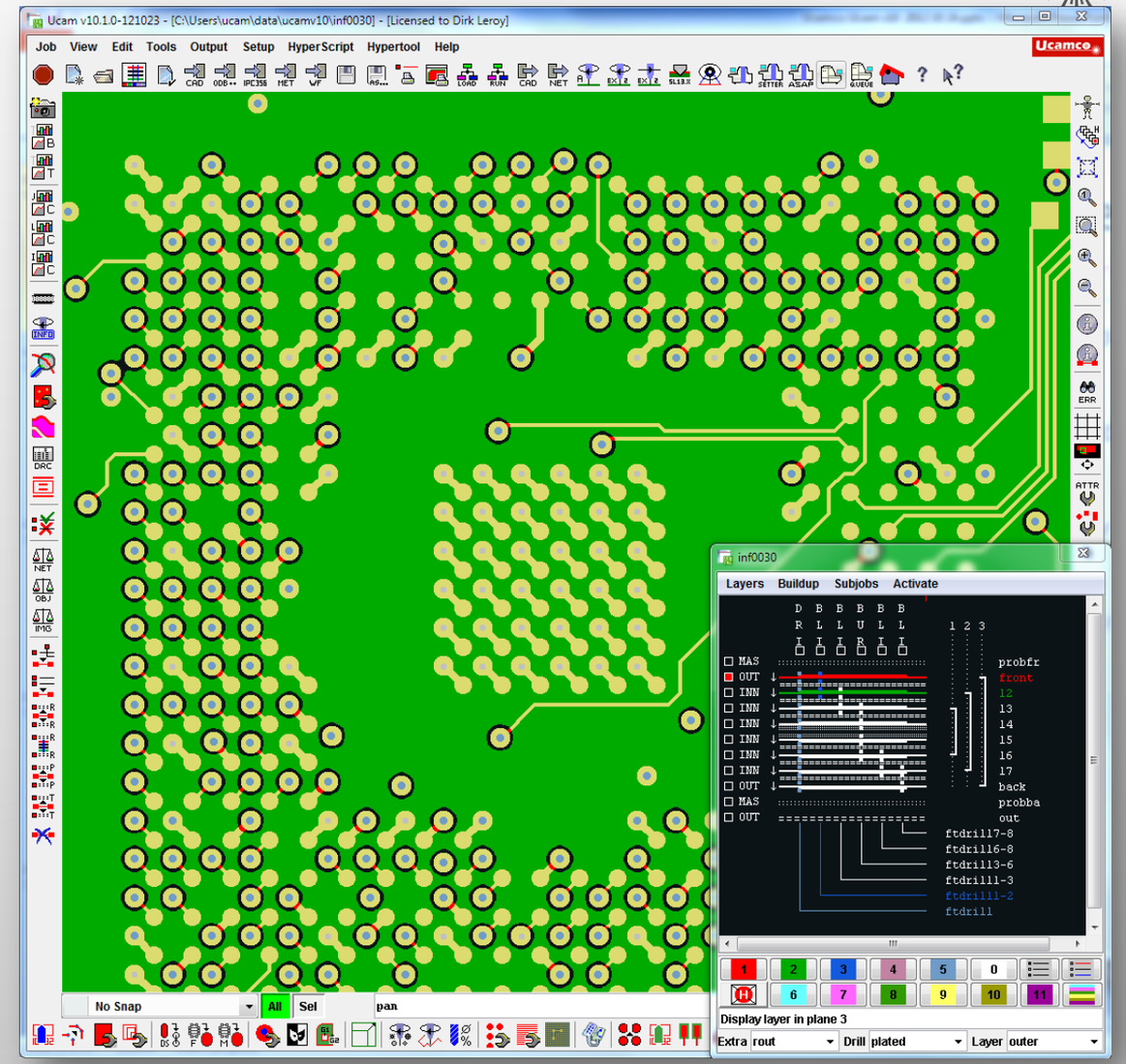
Overview

Version 10 features a new IPC-D-356 input processor to deal with all subtleties of this popular netlist format. Not connected (N/C) networks, copper features on NPTH drill holes and stepped data are now passed on to the netlist compare function in a much more intelligent and robust way to exclude false errors and minimize error review times.

IPC-D-356A Netlist Input enhancements

Filters out differences on irrelevant nets during netlist compare.

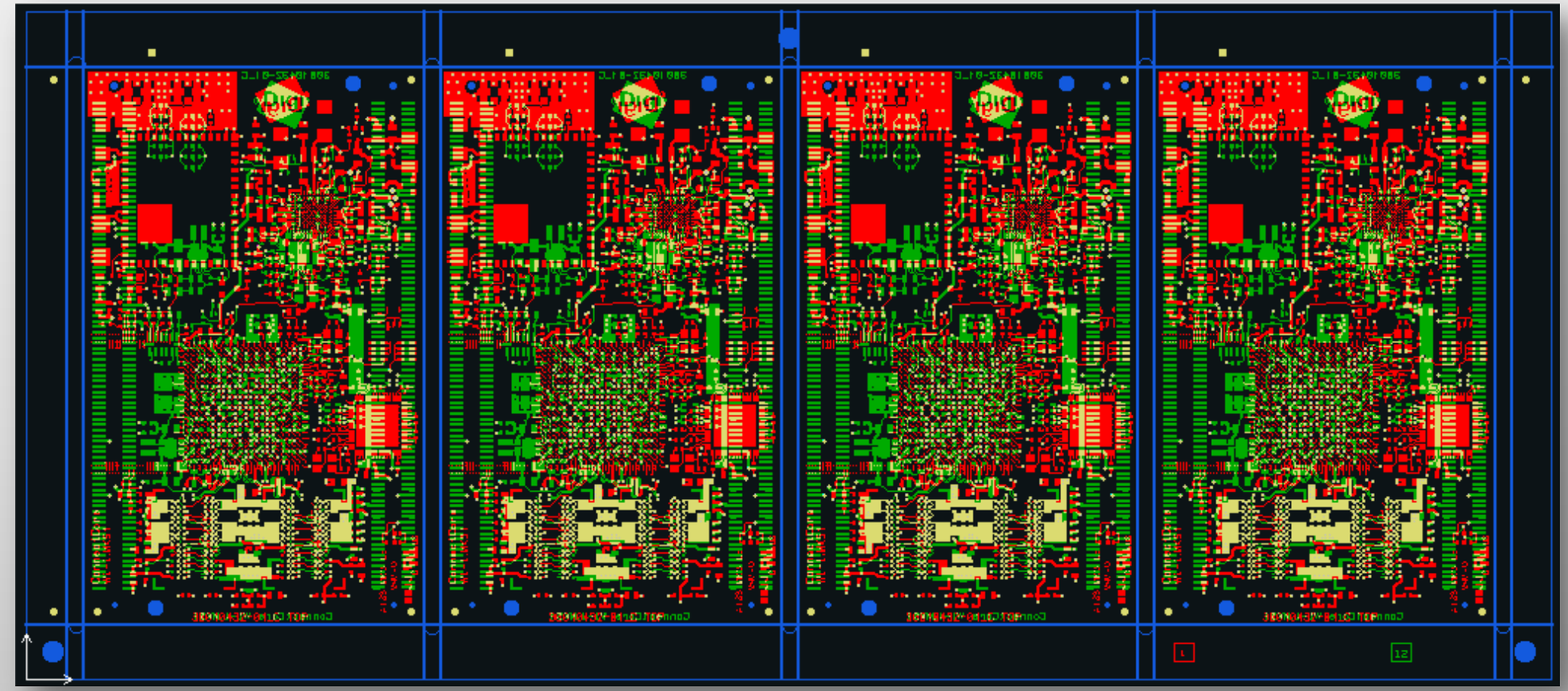
- Increasing board complexity causes growing number of CAD vendors to supply CAD Netlist data
- US board manufacturers report around 70% of new orders include CAD Netlist data
- IPC-D-356A is standardized and by far the most widely used netlist format
- Version10 IPC-D-356A input processor has been reviewed and upgraded to provide enhanced support for:
  - HDI products (multiple blind vias)



IPC-D-356A Netlist Input enhancements

Filters out differences on irrelevant nets during netlist compare.

- Single point Networks (IPC-D-356A N/C features)
- Copper features associated with NPTH holes
- Step and Repeat net list data (customer panels)



Legend Optimizer

Overview

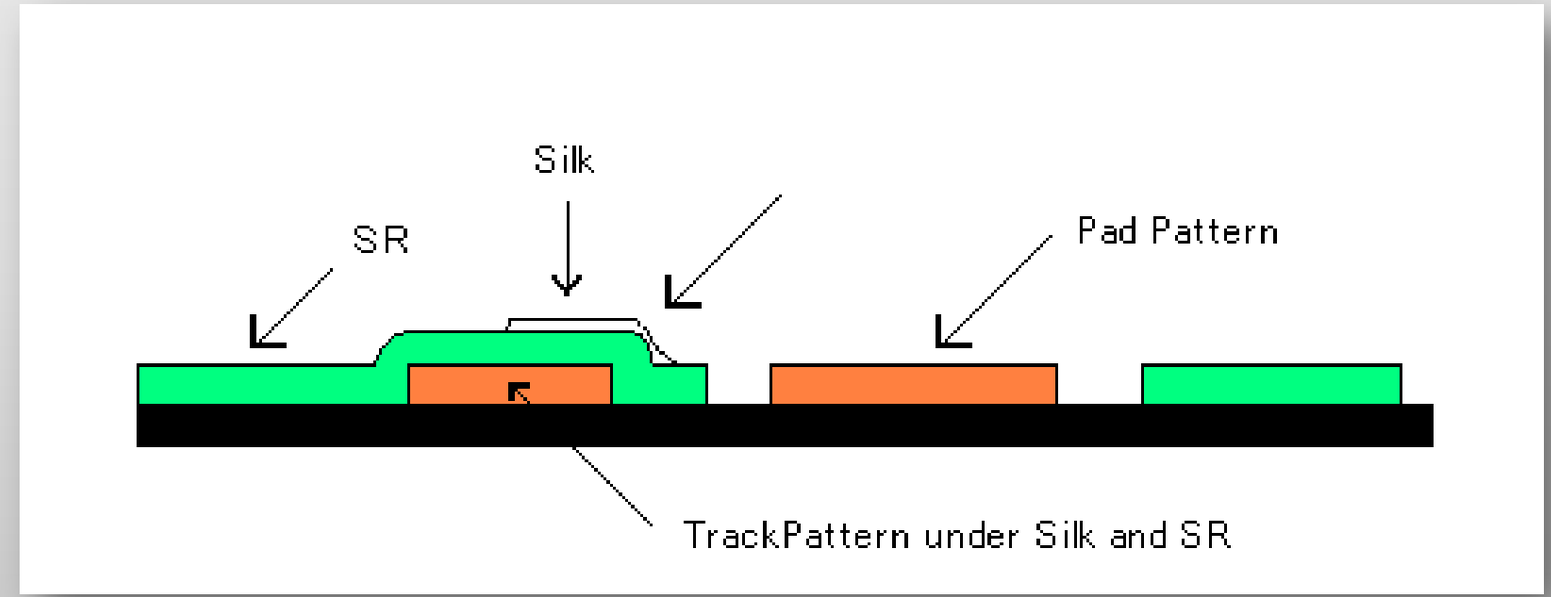
Legend Optimizer provides enhanced control over the silk clipping process. It allows to separate between texts and non-texts in a legend layer and to treat them differently during the optimization process.

The legend optimizer new user interface packs convenience functions for marking and scaling texts next to advanced clipping functionality with on-line checking of the remaining length and width.

Legend Optimizer

Improved flexibility for removing legend depending on PCB requirements

- Enhanced control over the silk clipping process needed
  - Uneven PCB surface and direction and pressure of squeegee can cause silk screen ink to bleed into nearby solder mask openings and further onto copper pads
  - Once cured, the silk screen ink is hard to remove without damaging the underlying copper.
  - Quite often the bleeding problem is repetitive and all boards on the same location in the panel are affected.

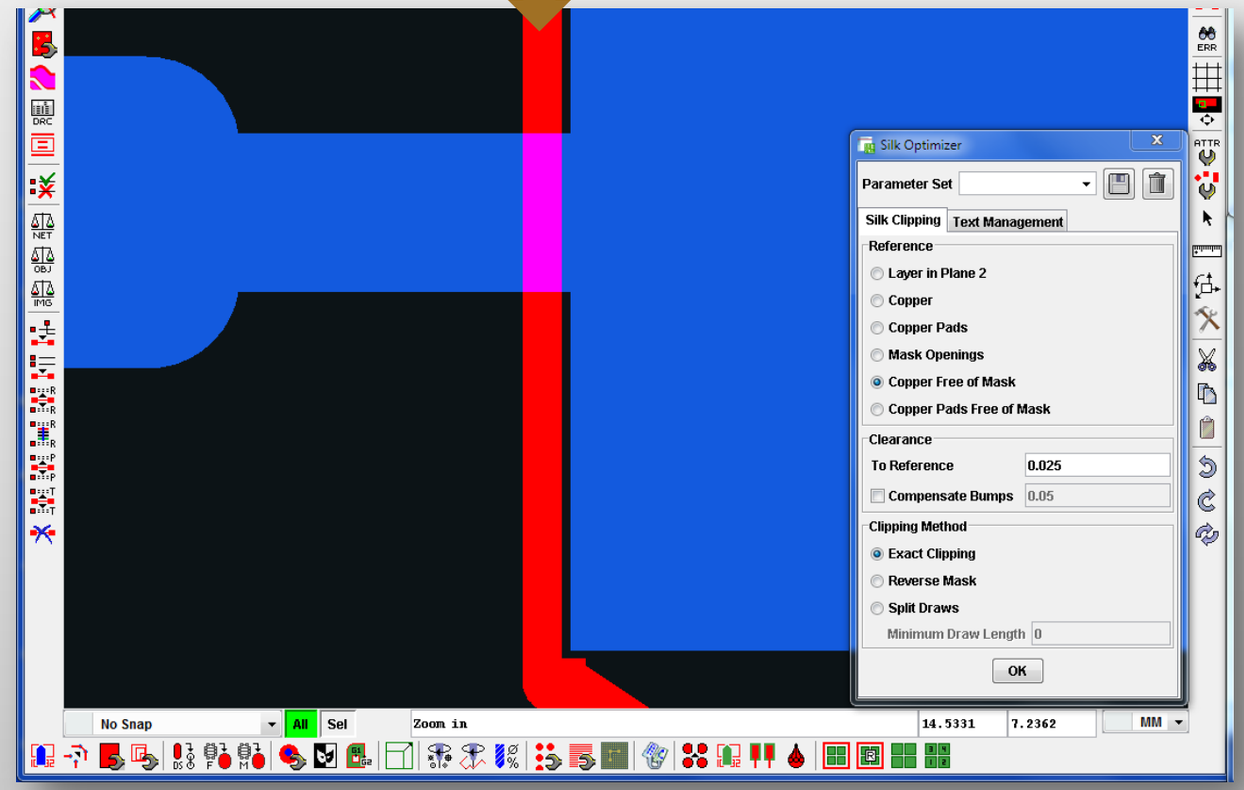


Legend Optimizer

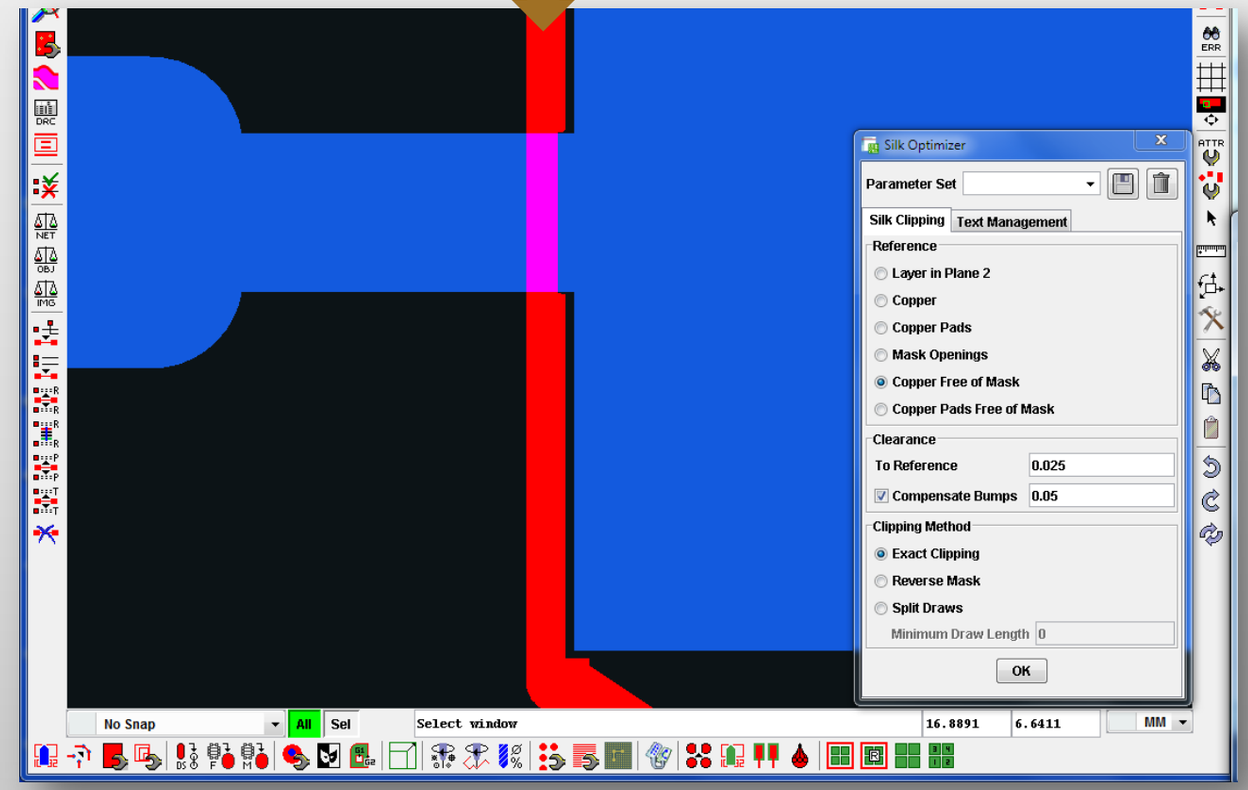
Improved flexibility for removing legend depending on PCB requirements

- Legend Optimizer's bump compensation anticipates this problem
  - Depending on surrounding copper geometries, Legend Optimizer locally cuts back the silk screen over an additional distance to avoid bleeding problem

Without bump compensation



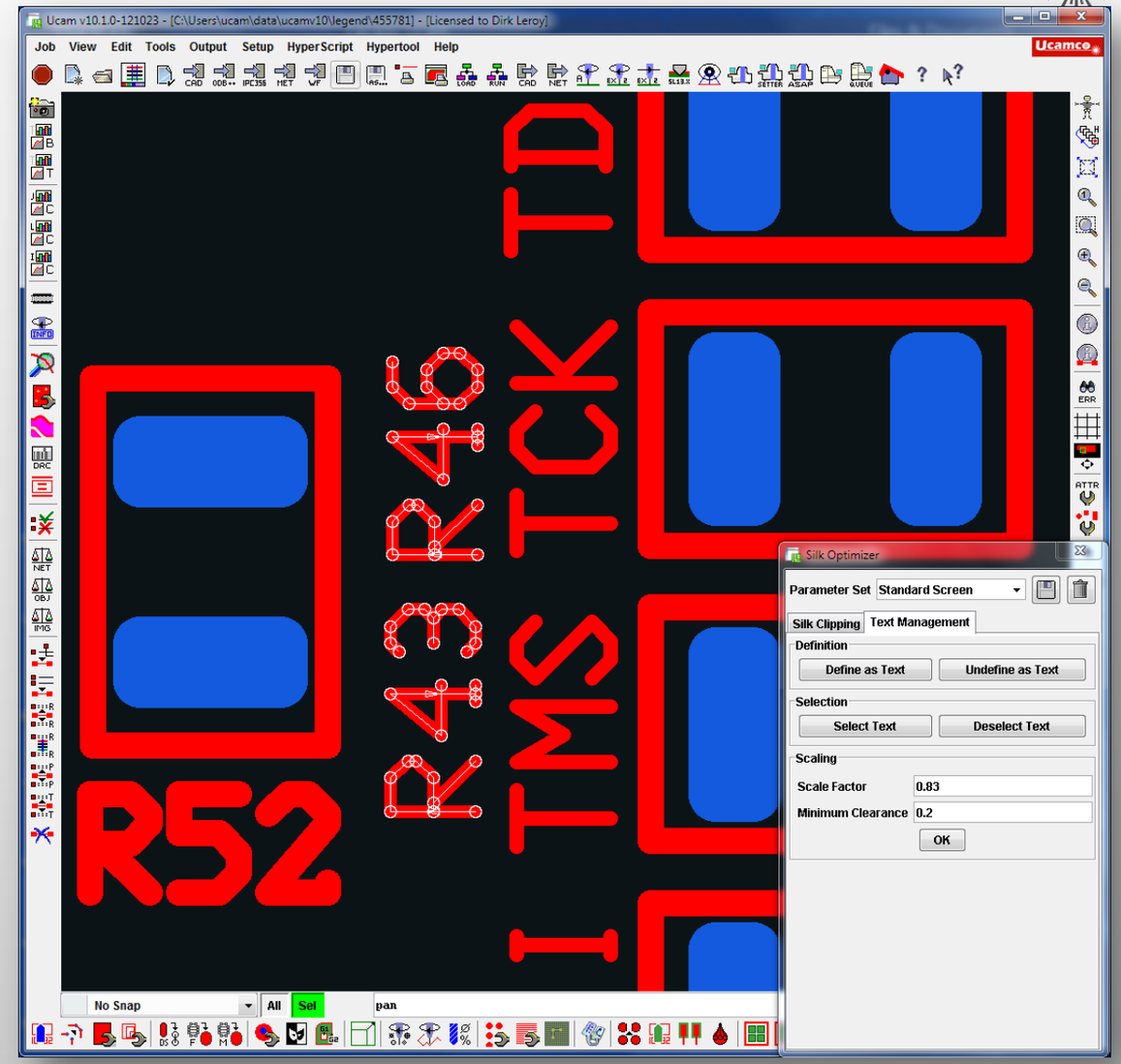
With bump compensation



Legend Optimizer

Improved flexibility for removing legend depending on PCB requirements

- Legend Optimizer handles maskless PCBs with ease:
  - Clips against outer layer copper or copper pads
  - Ability to clip against non-copper layers
- Different Clipping methods:
  - Local contourization to achieve highest accuracy
  - Negative on top of customer original for easier traceability
  - Split draws – always cut silk screen lines over their complete width
- Text Management functionality to scale down silk screen texts, thereby improving legibility
- All settings and values can be saved in one or more configuration files for easy retrieval and consistent use



Coverlay Optimizer

Overview

Using the module's workflow-based user interface, the operator annotates the different coverlay openings and specifies the parameters for later optimization.

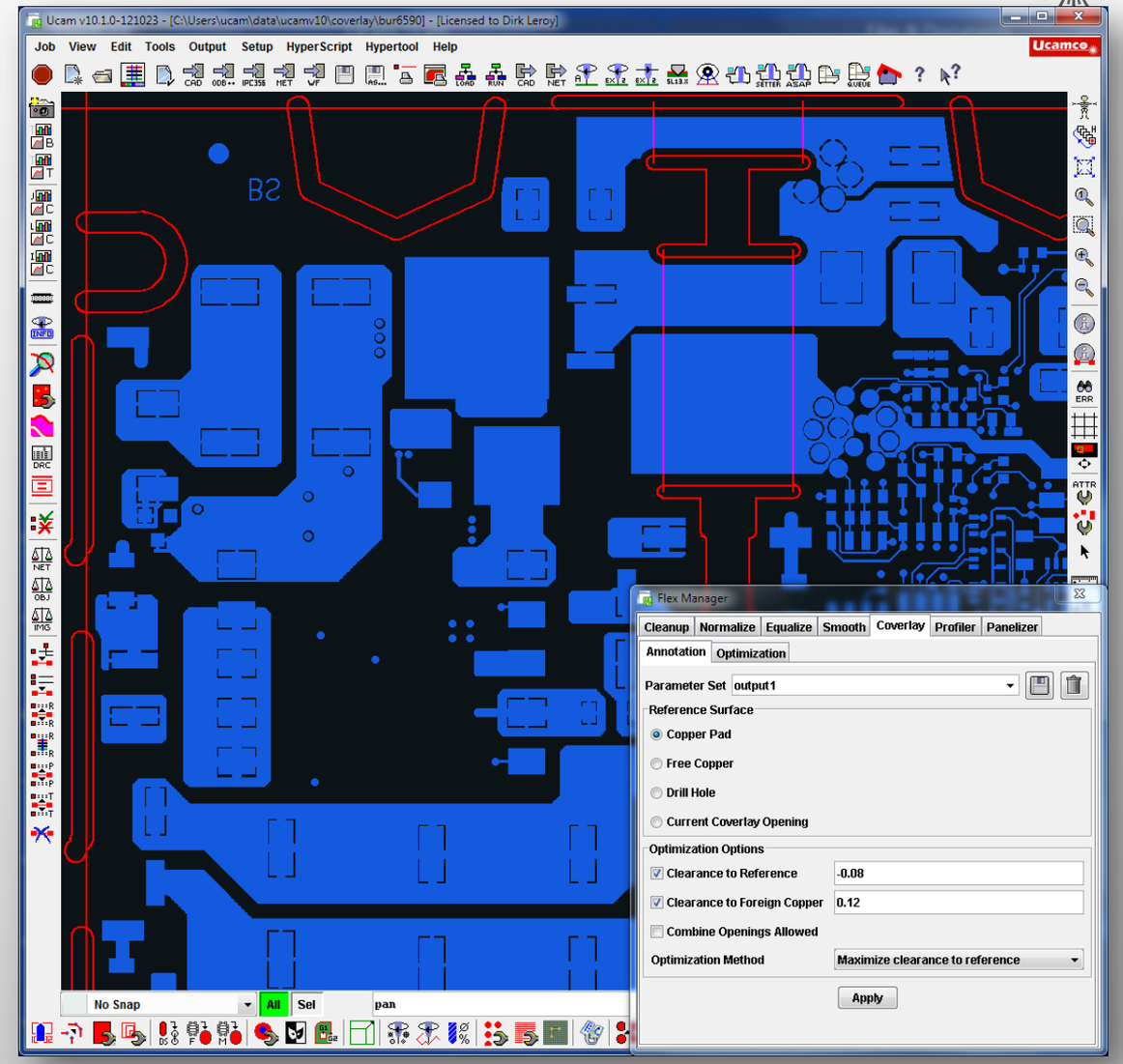
The optimization step in combines the original reference coverlay with the annotated openings and the various aspects of the chosen production method to produce the final coverlay production data.

To make it absolutely secure, any anomalies or incompatibilities before, during or after optimization are on-line checked and reported in Ucam's error handling tool.

Coverlay Optimizer

Enhanced Coverlay Optimizer for Flex-Rigid

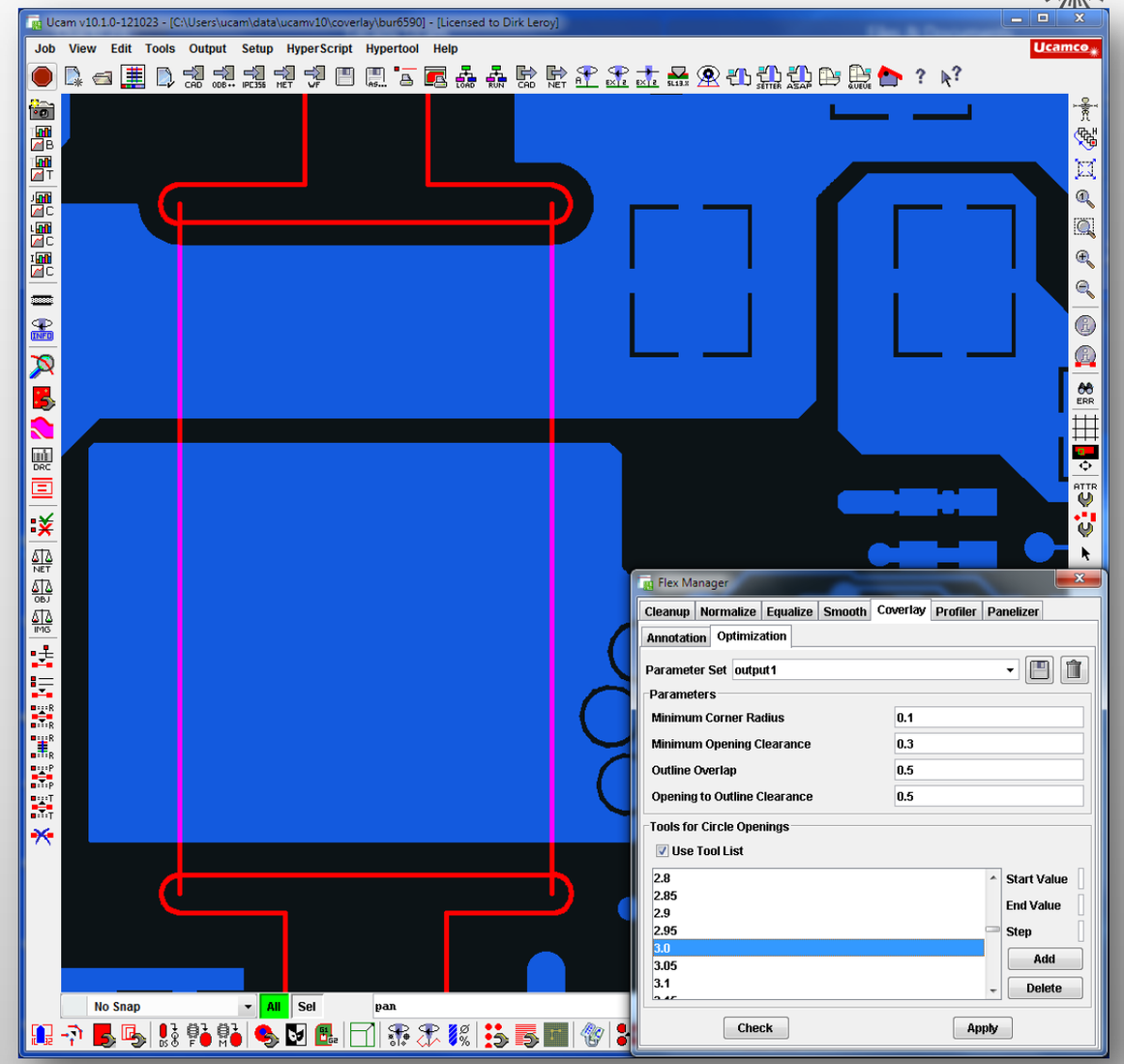
- Optimizing a flex or flex-rigid's coverlay for manufacturing is a very specific and demanding task
- Customer original data often absent or unusable
- Major rework required
- Coverlay Optimizer offers a workflow-based graphical user interface to deal with this challenge
  - First annotate the coverlayer openings:
    - specify their reference in the corresponding copper layer
    - define how much coverlay openings should become bigger or smaller than their reference
    - enter a minimum stay-clear distance towards adjacent copper
    - choose an optimization method and indicate if single coverlay openings can be merged with nearby other openings to achieve the desired result



Coverlay Optimizer

Enhanced Coverlay Optimizer for Flex-Rigid

- Specify the production-specific optimization parameters
  - Choice of material ?
  - Customer tolerances ?
  - Coverlay to be punched, drilled / routed or lasered ?
  - Different production methods – different tolerances
  - Circular coverlay openings may have to be mapped onto the available drill bit sizes
- Run feasibility check to find out about any anomalies or incompatibilities
- After operator review, Coverlay Optimizer adapts the coverlay openings in accordance with the values and rules specified
- Store frequently used annotation and production setup parameters under a specific setup name



Multinet Visualizer

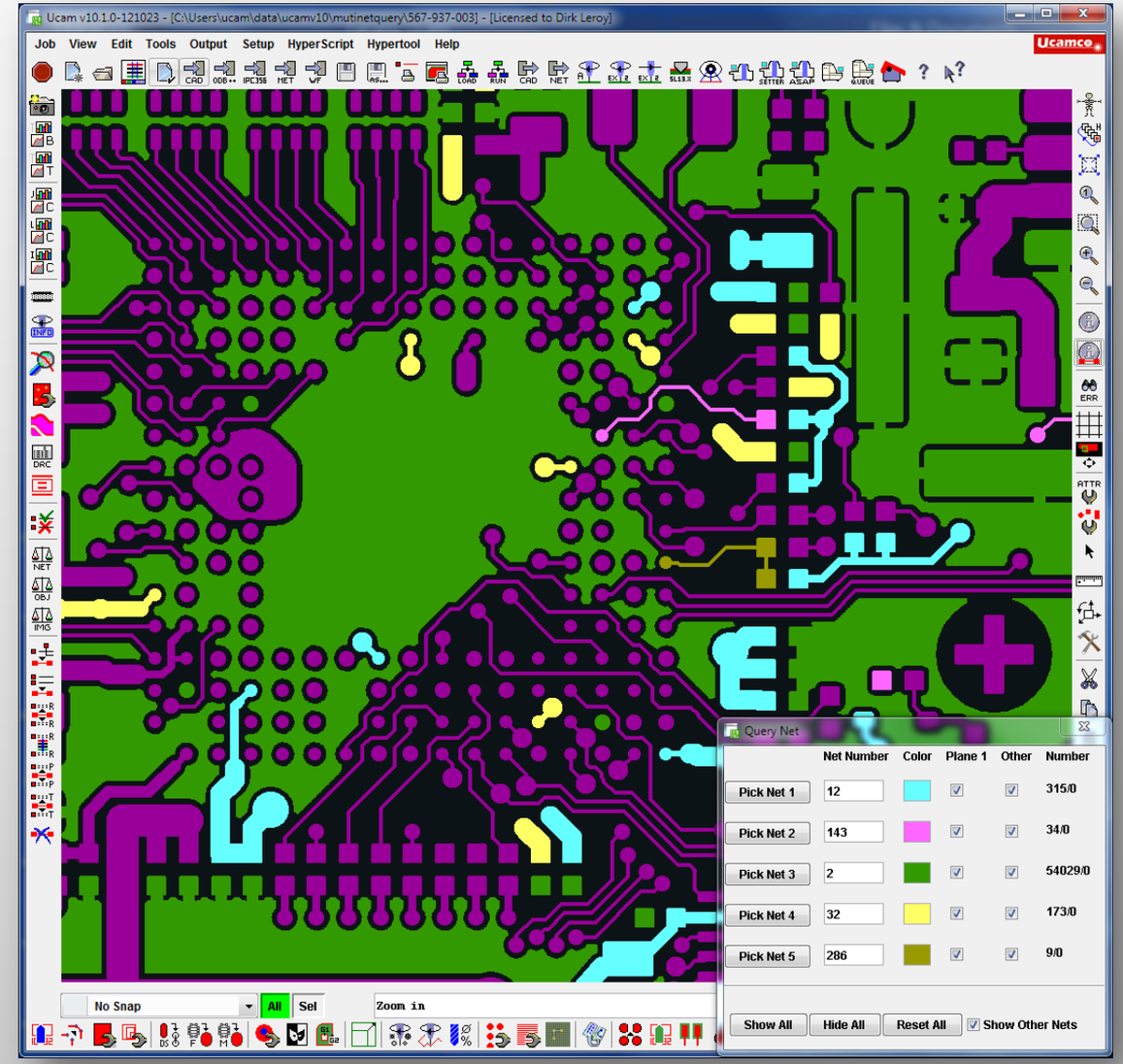
Overview

Ucam v10's Multinet Visualizer is a convenient tool to highlight multiple electrical nets within a single job. Up to 5 nets can be presented on screen, in solid or hatching pattern colors to quickly identify which layer they are on.

It has the ability to temporarily hide all nets which are not under examination, so the operator can concentrate on what is relevant, without being mislead by unimportant nearby nets.

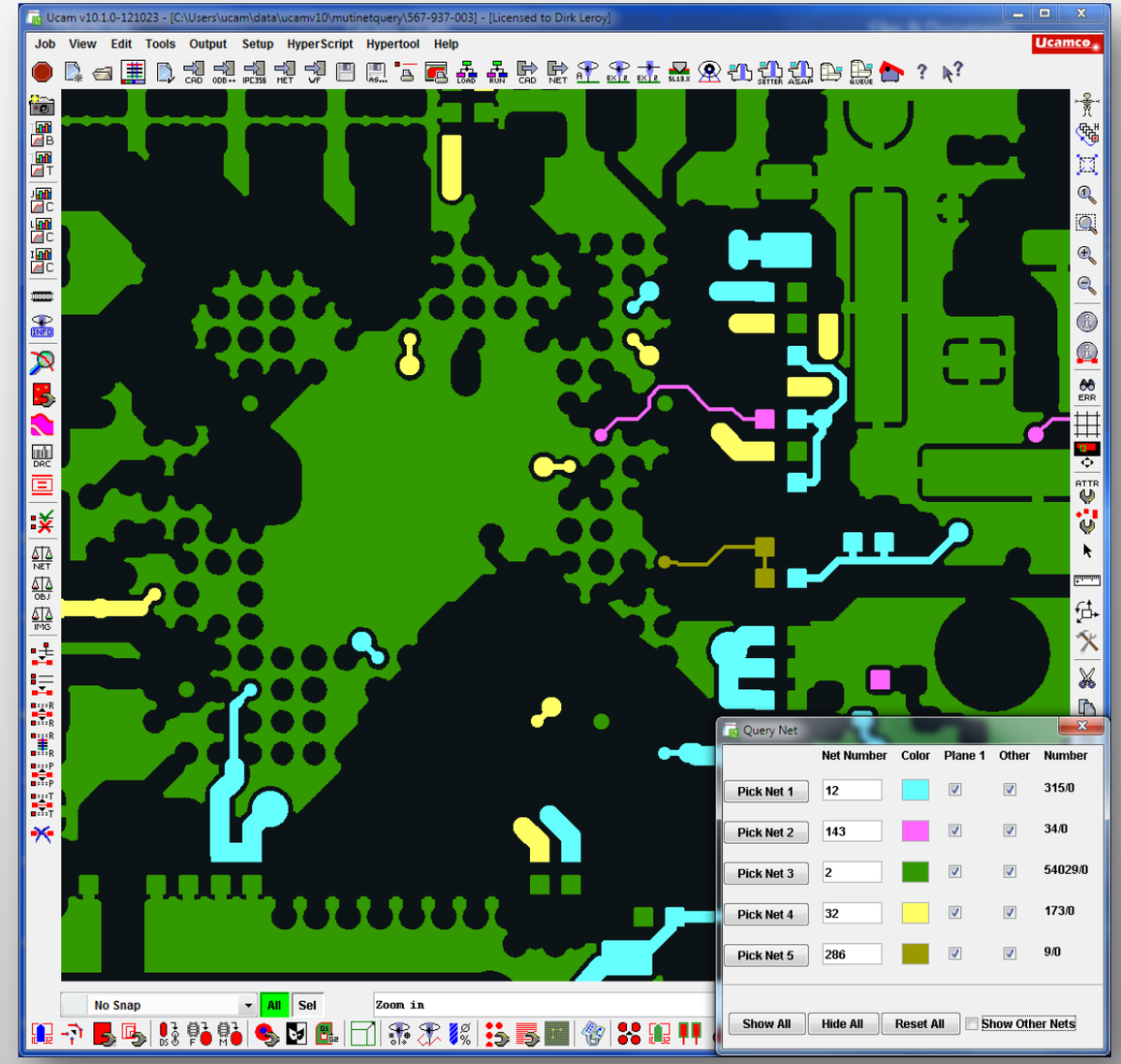
Multinet Visualizer

- Display of up to 5 different nets in individual colors



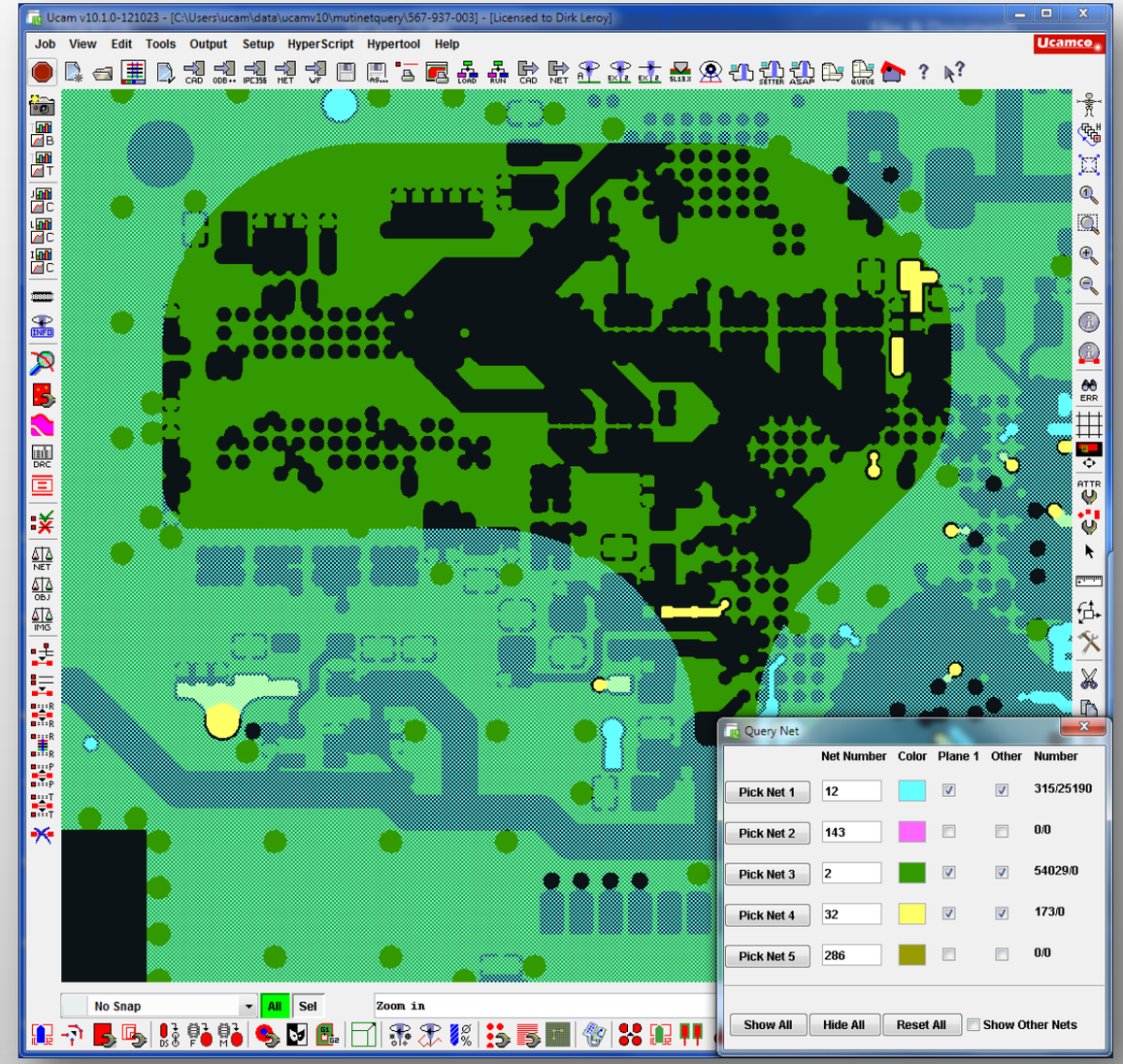
Multinet Visualizer

- Hide all nets apart from the ones under examination



Multinet Visualizer

- Facilitates defect location in case of netlist compare or electrical test errors
- Solid vs. hatched net display depending on visual and active status of a layer



ODB++ output v7 support en extensions

Overview

Customers linking to third-party CAM stations or direct imaging equipment will highly appreciate support for rotated single images with rotation angles other than multiples of 90 degrees.

Other highlights include the use of a much larger set of so-called ODB++ native aperture shapes and the transfer of extended Gerber macro names into the OBD++ data structure.

ODB++ output v7 support en extensions

- Ucam output to ODB++ Version 7
- Support for rotated PCBs in panel
- Uncompressed output can be generated.
- Standard ODB shapes will be used in output.
- Native shapes are exported in ODB, like a diamond shape.
- The required exported version can be defined in the preferences.
- The macro name used in Gerber-X macros will also be used in ODB.

Flashmaker extensions

Overview

Allows the operator to redefine incoming extended Gerber macros into standard rectangle aperture shapes.

The resulting job is lighter to handle and quicker to process through the rest of the CAM flow.

Flashmaker extensions

- Conversion DPF complex aperture shapes or contour areas into standard DPF rectangle or box shapes
- Standard shapes offer a host of advantages over complex shapes
  - Soldermask Optimization
  - testpoint generation
  - Output to IPC-D-356A and other electrical test formats
  - Output to ODB++
  - …

Gerber RS-274X Optimization

Overview

While the vast majority of Gerber files transferred every day are of impeccable quality and perfectly comply with the standard, there is always the odd exception to prove the rule. We at Ucamco have always kept our ear to the ground to find out about these cases and you – our customers – have been very helpful in passing them on to us. Over time, this has allowed us to set up our own "rogues gallery" of poor quality or plainly invalid Gerber files.

For our Ucam V10 release, we have meticulously reviewed your valued input and undertook to find out what the intended result was for all of these cases. As we did, we discovered that a frequent shortcoming in many of these files was sloppy rounding and subsequent loss of precision on behalf of the author of the file.

Gerber RS-274X Optimization

Overview

This may seem trivial, but inadequate precision in combination with very small arcs has the potential of turning these small arcs into full 360 degree arcs and change the appearance of a layout. Ucam V10 has an increased alertness to these situations and flags suspicious arcs accordingly.

It is findings like these that have been used to raise Ucam V10 Gerber input to an unprecedented level of robustness. We have equipped it with a completely revised messaging system to make the operator aware of any ambiguities found during or after input. And should there be the occasional false alarm, we are confident it will be largely outnumbered by the many times you are rightly advised about a genuine pitfall in one of your customers' Gerber data.

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