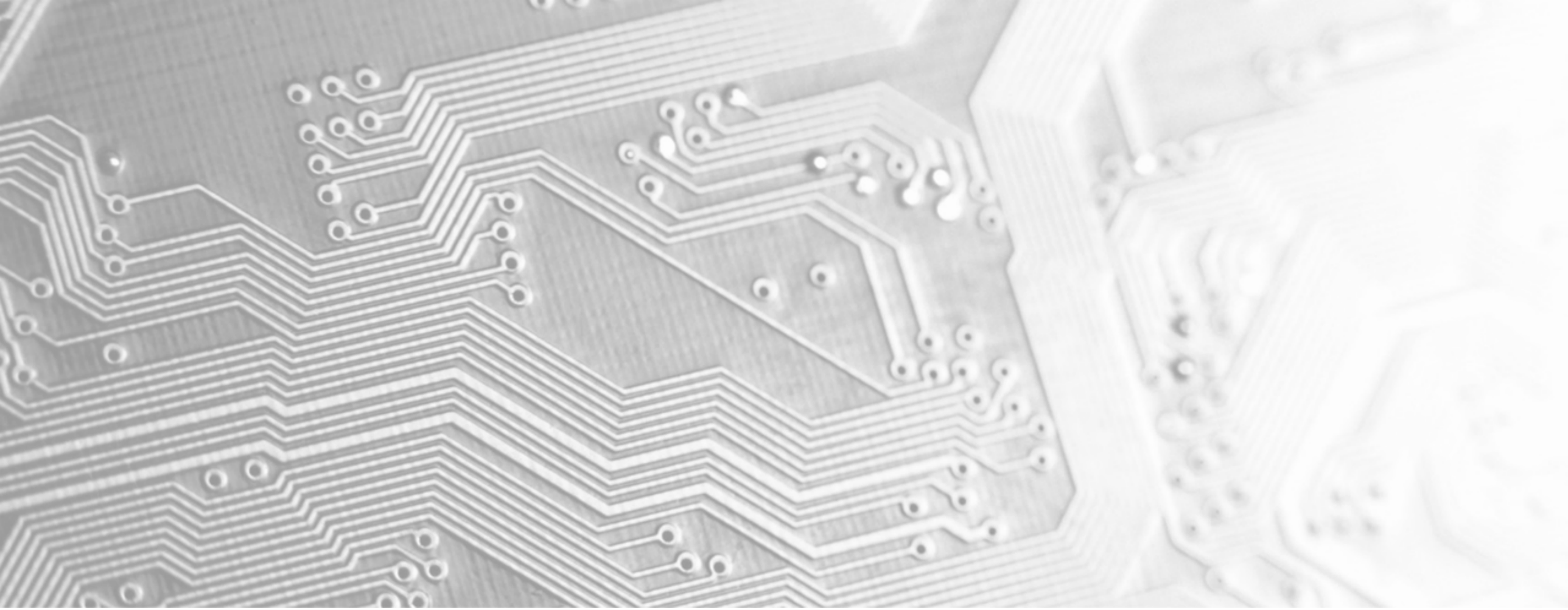
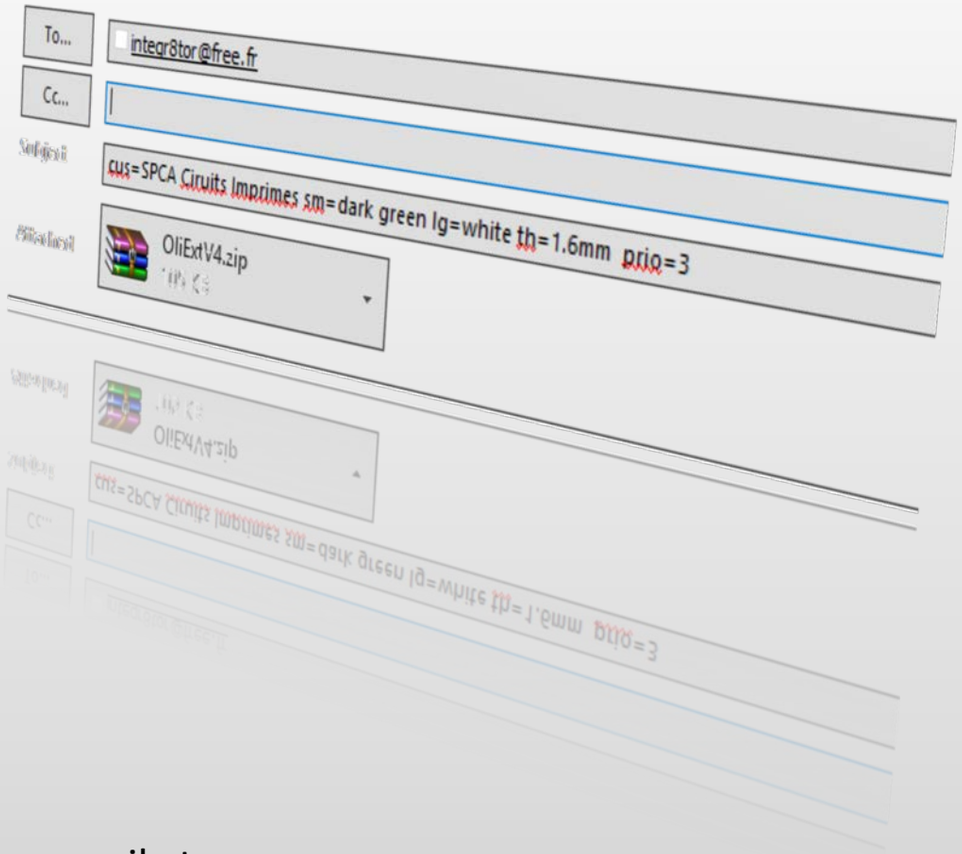


Integr8tor

Modules - Features & Benefits

Email Input Automation (9646991)

- Features
  - **Automated input** of job archives (ZIP, RAR, etc …) into Integr8tor
  - System of Emails with job archives attached, sent to a **dedicated Email account**
  - Integr8tor server is set up to poll the Email account at **regular intervals** to see if new Emails have arrived
  - If yes, it downloads the mails, strips off the attachments and process the archives **fully automatically**
  - **Custom parameters** are passed to Integr8tor using specific **codes** in the Email subject line
  - Both **SMTP** and **POP3** mail servers supported

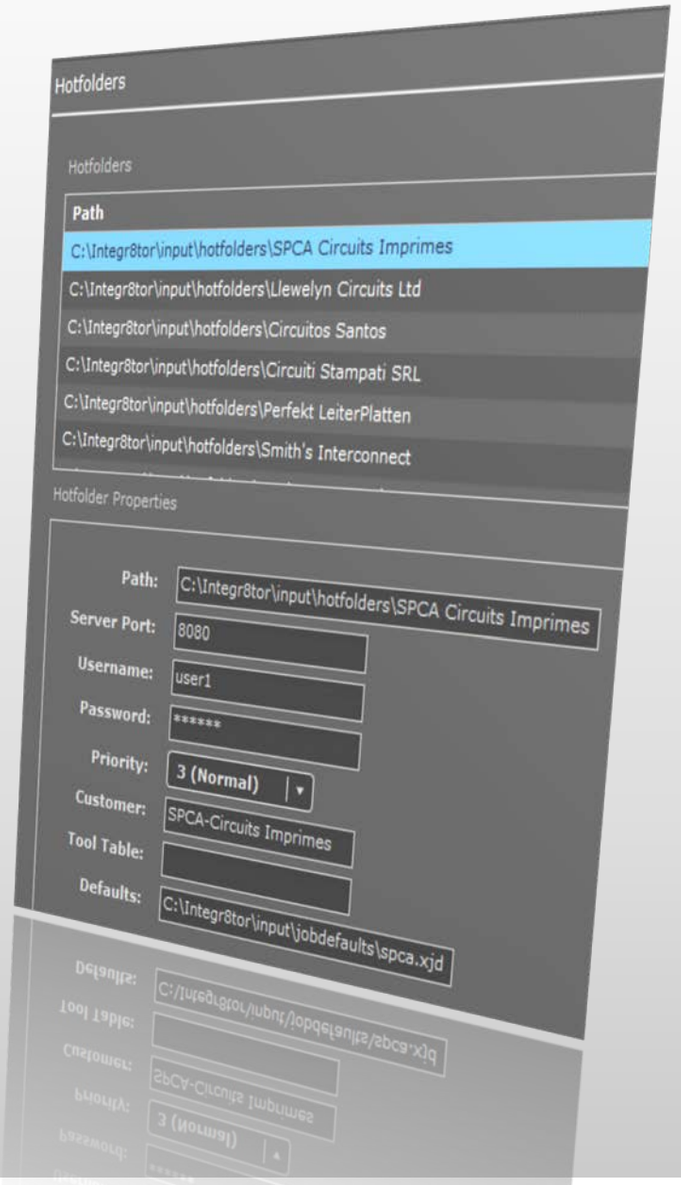


- Benefits
  - **Automation** - 24/7 unattented job submits to Integr8tor
  - **Integration** – Management Information Systems (e.g. ERP) can be set up easily to generate Emails with the required info and send them to the Integr8tor mail account
  - **Ease of Access** – No need to be on the same network. Job archives can be sent to the Integr8tor mail account from anywhere in the world…

Email Input Automation (9646991)

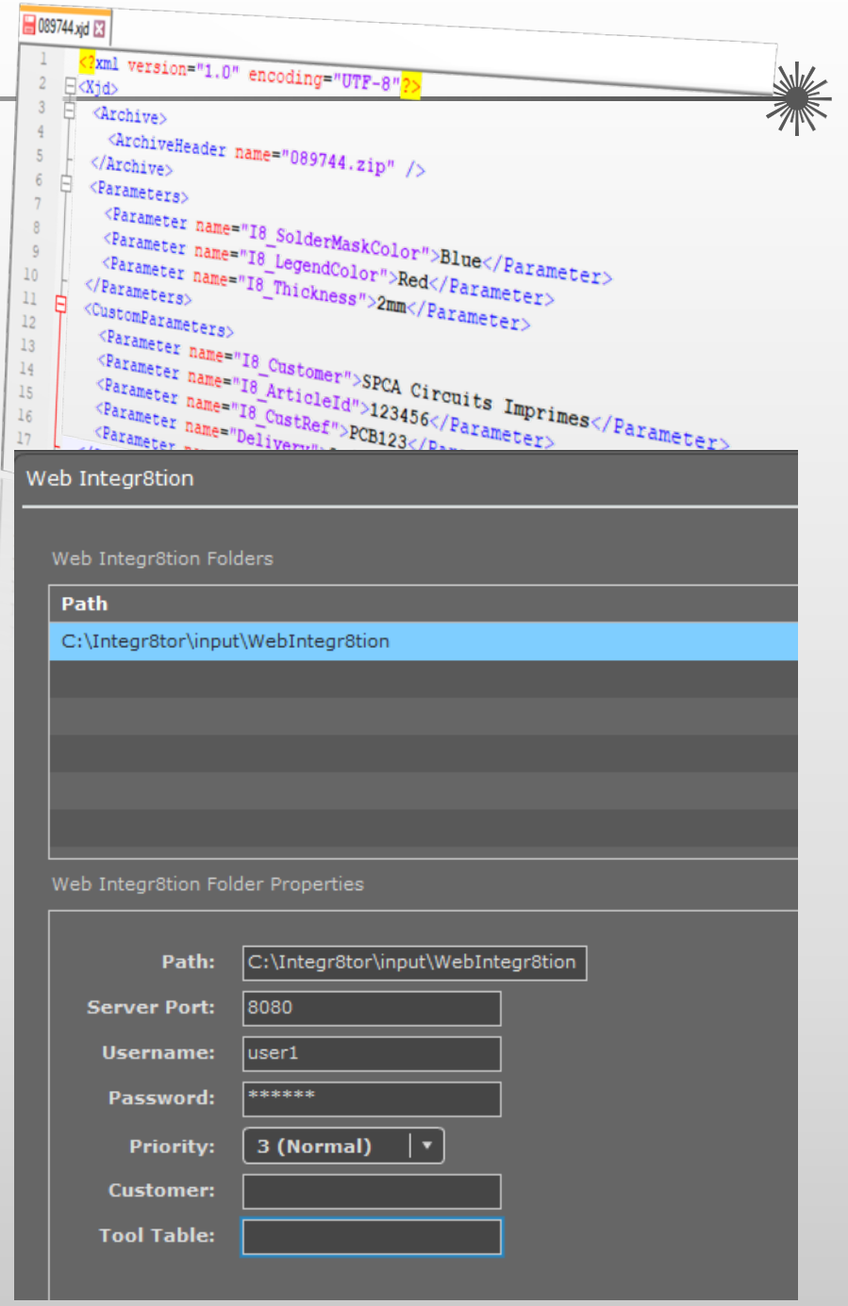
Hotfolder Input Automation (9646990)

- Features
  - **Automated input** of job archives (ZIP, RAR, etc …) into Integr8tor
  - Multiple data-entry directories set up side by side on the Integr8tor server, each associated to a specific customer and incorporating his **default custom parameters** for job processing (solder mask colour, surface finish, thickness…)
  - All hotfolders are scanned **permanently** for incoming job archives
  - Dropping a job archive in a customer's hotfolder triggers Integr8tor to pick it up, assign it to the correct customer, apply his default custom parameters and process it **fully automatically**
- Benefits
  - **Automation** - 24/7 unattented job submits to Integr8tor
  - **Integration** – Management Information Systems (e.g. ERP) can drop incoming archives into the correct customer-specific Integr8tor hotfolder
  - **Promptness** - Archives get picked up and processed by Integr8tor automatically – no delays caused by operators being tied up with something else
  - **Speed** - Timely analysis results and shorter response time to the RFQ



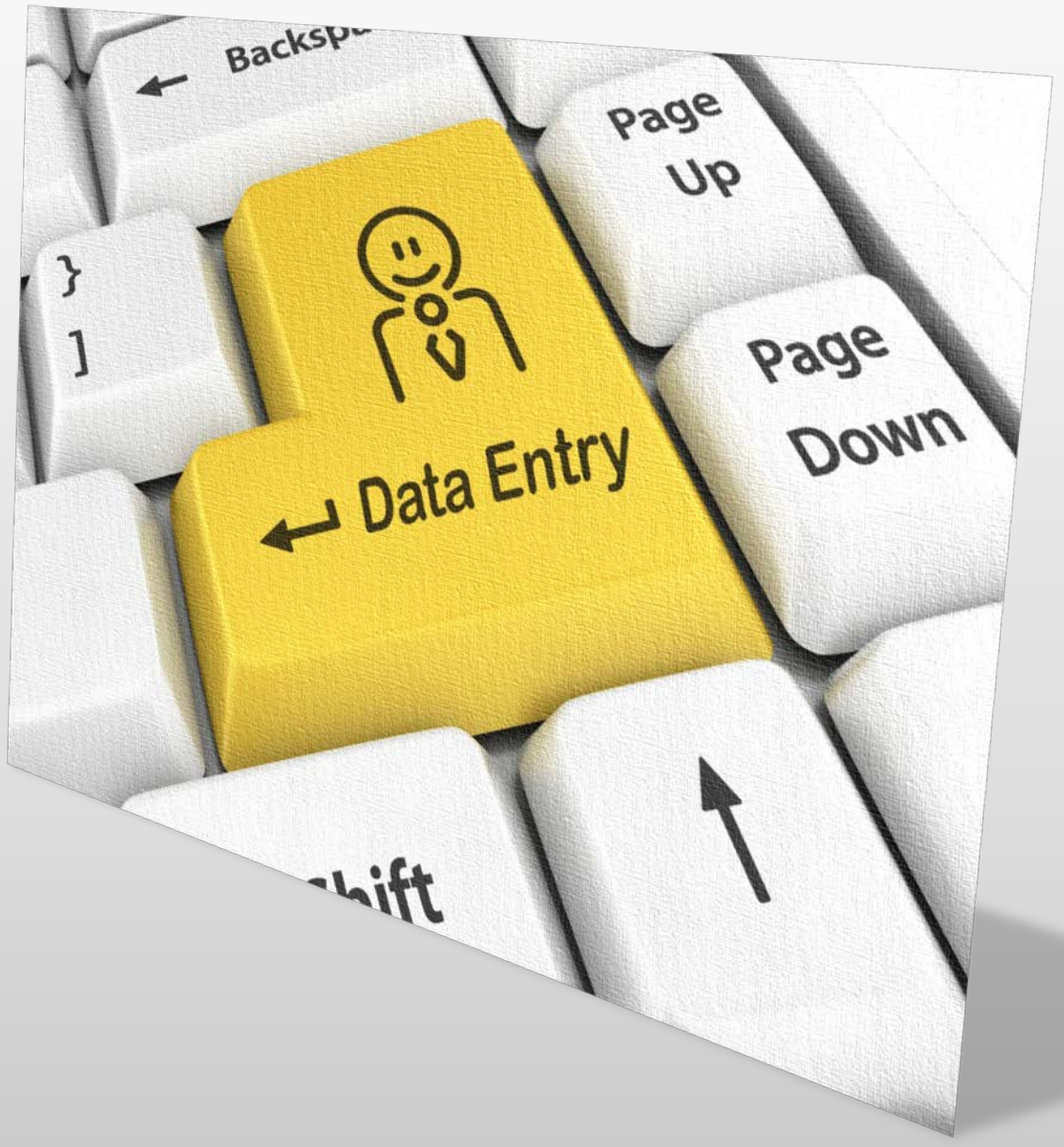
Web Input Automation (9646992)

- Features
  - **Automated input** of job archives (ZIP, RAR, etc …) into Integr8tor
  - Single data-entry directory on the Integr8tor server, configured to receive incoming job archives accompanied by a job-specific **.xjd file**
  - An .xjd is an XML file containing the customer name, job archive location and all default **custom parameters** with which the archive is to be processed (solder mask colour, surface finish, thickness…)
  - The WebIntegr8tor folder is scanned **permanently** for incoming .xjb files
  - Dropping an .xjb file in the WebIntegr8tion folder triggers Integr8tor to process the associated job archive and apply the requested custom parameters **fully automatically**
- Benefits
  - **Automation** - 24/7 unattented job submits to Integr8tor
  - **Integration** – Preeminent system for tying Integr8tor in with a company internet web portal, opening a world of new possibilities for real-time customer feedback or on-line quotation service
  - **Promptness** - Archives are passed onto Integr8tor without delay – no delays caused by operators being tied up with something else



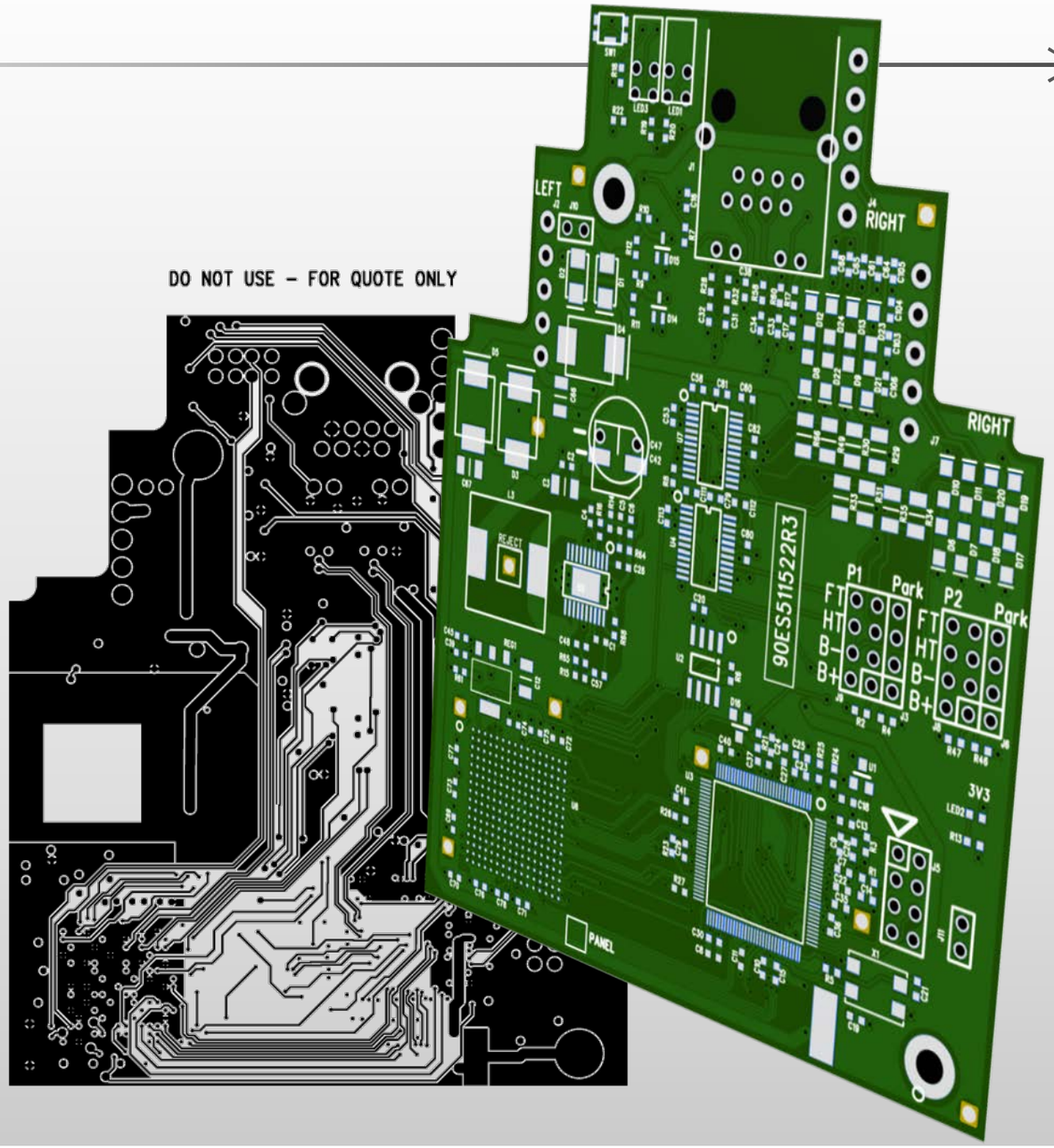
AutoInput (9646800)

- Features
  - Fully automatic data input with built-in feedback mechanism to document any anomalies detected
  - Conversion of Gerber 274X and 274D, DPF, ODB++, Excellon and Sieb und Meyer image & drill formats
  - Automatic detection of
    - Layer polarity
    - Buried & Blind drill sequences
    - Plated & non-plated drill holes
    - Outlines
  - Automatic stackup recognition with self-learning abilities
  - Automatic Layer Registration
  - Automatic Layer renaming to company's layer naming convention
  - Lightweight, Intuitive and easy-to-use interactive tools for problem-solving



AutoInput (9646800)

- Benefits
  - **Productivity** – unparalleled hit rate for fully automatic input of customer data with zero operator intervention
  - **Unattended operation** – automated workflow system – just set up the queue of job archives that need to be processed and leave the system to crunch its way through, regardless of working hours or weekends
  - **Efficiency** – intelligent scheduler makes sure that “easy” jobs are processed with priority, so the early results of those are readily available and quotation can start promptly
  - **Traceability** – incomplete or corrupted job archives or jobs with other problems are set aside for later review with a clear documentation of the problem, as Integr8tor moves on to the next job in line
  - **Documentation** – realistic and scaleable images of both the full PCB and the individual layers after input make a valued addition for the sales engineer preparing the quotation



Optional AutoInput formats

- Eagle XML Import (9680033)

  Direct input support for the CAD database of the highly popular and widespread Eagle design product

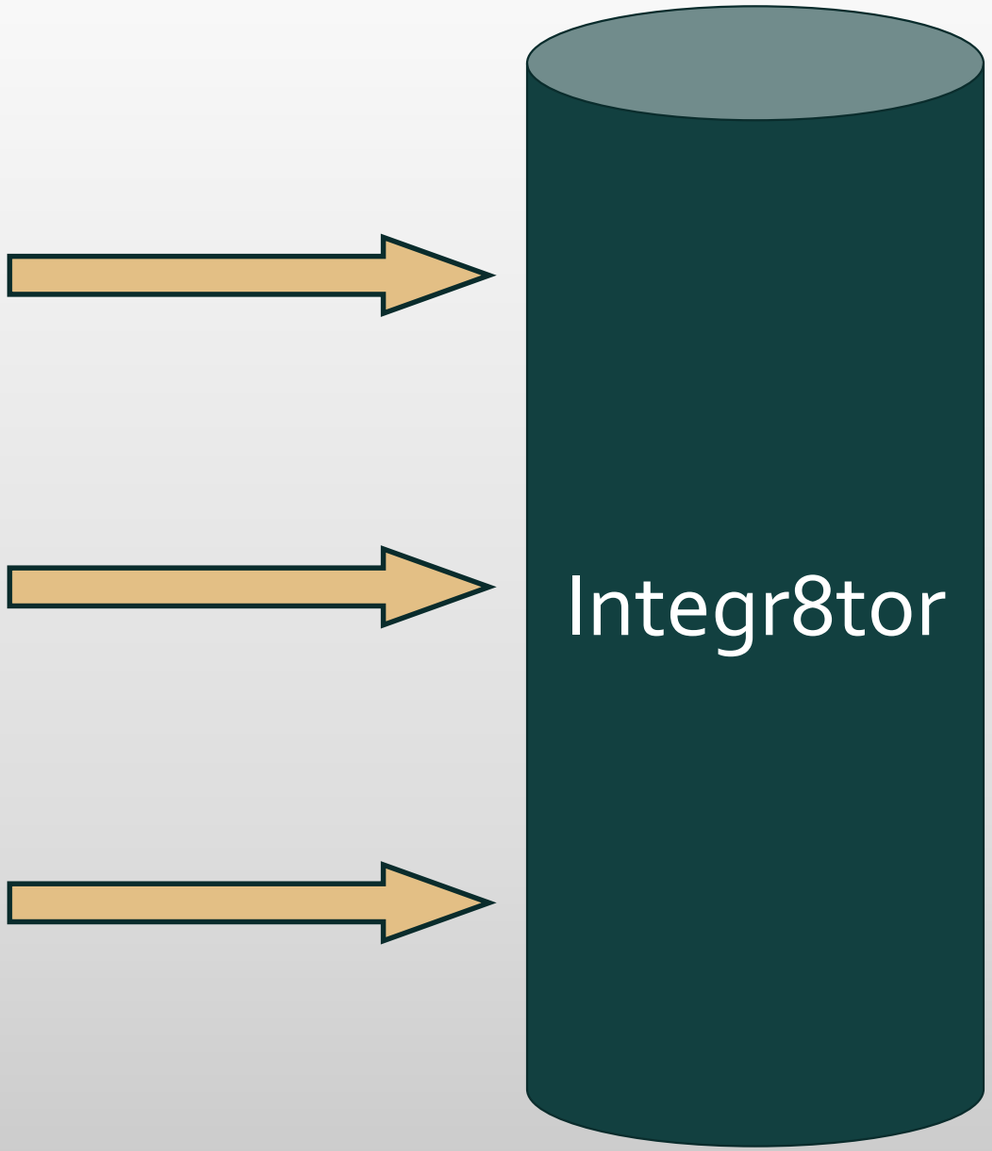
  Supports version 6 or higher

- GWK Format Import (9680080)

  Graphicode's GC-PowerStation and GC-Prevue native databases read directly into Integr8tor without having to convert to Gerber first

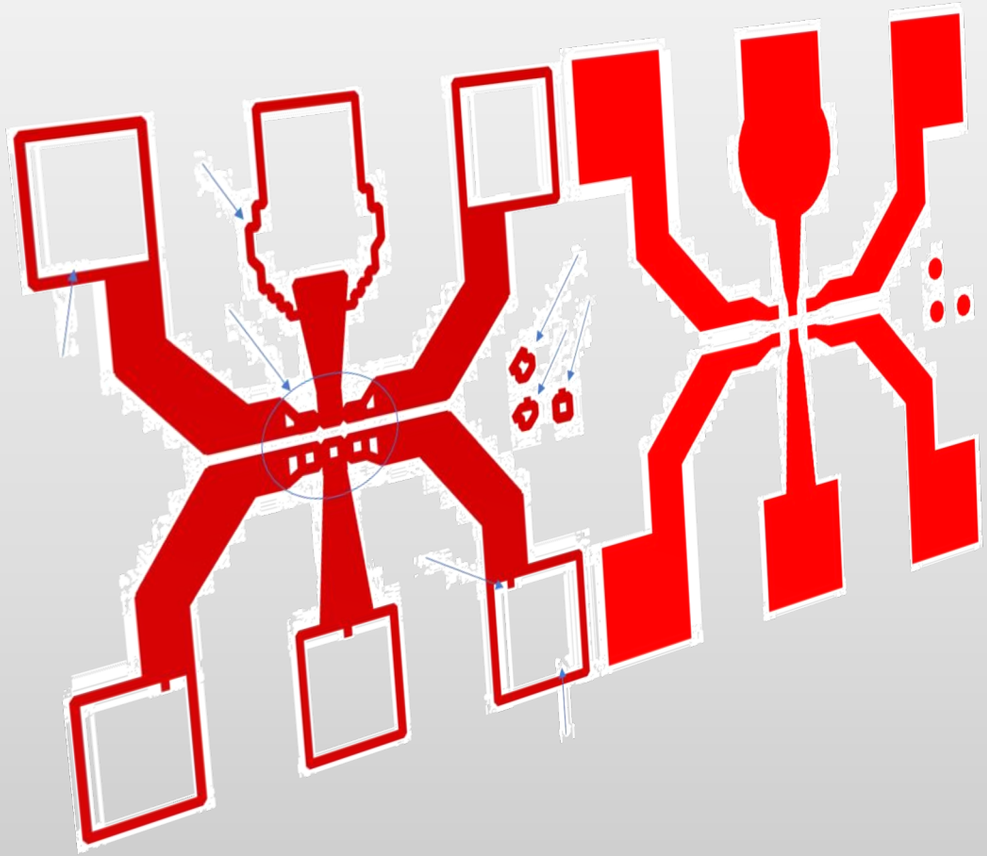
- Bosch Format Import (9646946)

  Proprietary format of the German-based electronics manufacturer Robert Bosch GmbH reads into Integr8tor fully automatically



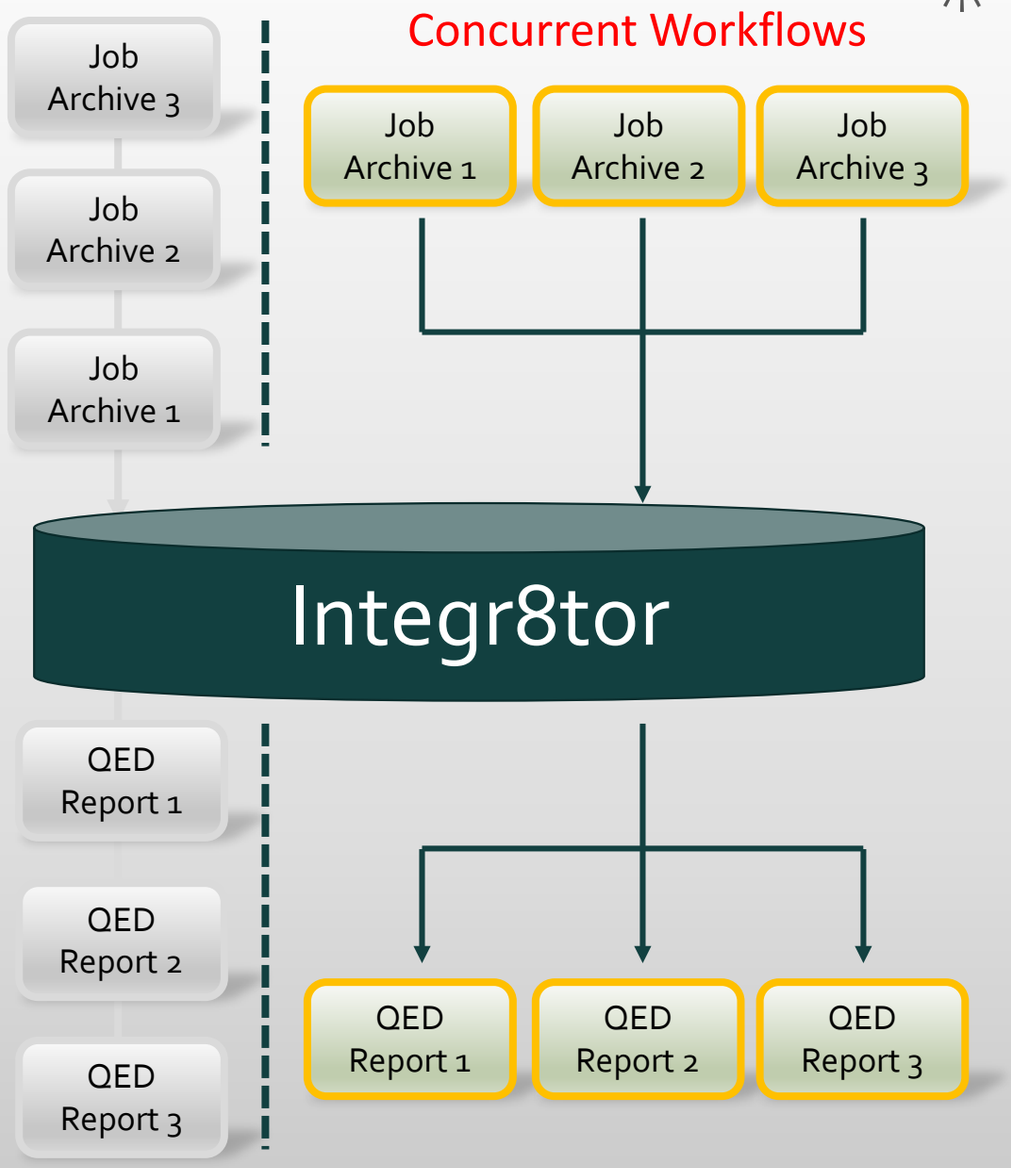
Optional AutoInput formats

- DXF Import (9680132)
  - Reads, analyses and quotes customer archives with fabrication layout data in DXF, just like regular Gerber archives
  - Collects QED data
  - High-accuracy DPF files can be exported for further processing in CAM



Concurrent Workflows (9650032)

- Features
  - Enables Integr8tor to process several job archives simultaneously
  - Unleashes full number-crunching power by addressing multiple Integr8tor server cores
  - Customer-configurable: add 1, 2, 3, … concurrent workflows depending on your server hardware and the number of requests for quotation coming in
  - Fully transparent: submit jobs like on a single workflow system and let the intelligent Integr8tor scheduler take care of how to best organize the work for optimum results
- Benefits
  - Throughput – doubles/triples/… the amount of jobs processed in the same period of time
  - Scaleability – add additional Integr8tor concurrent workflows as your business is expanding and the need arises
  - Responsiveness – stay on top of the incoming RFQ's – no matter how many - and be the first to respond to your customer's inquiry



Ucamco CAM Integr8tion (9646868)

- Features
  - Output of DPF format (Ucam).
  - includes original job (= original objects) output.
  - Includes custom renaming. Includes CAM Input Report.

Genesis CAM Integr8tion (9646830)

- Features
  - Output of ODB++ format (Genesis).
  - includes original job (= original objects) output.
  - Includes custom renaming.
  - Includes CAM Input Report.

RS274X Gerber CAM Integr8tion (9646829)

- Features
  - Output of RS274-X format (Gerber)
  - includes original job (= original objects) output
  - Includes custom renaming
  - Includes CAM Input Report

Polar Integr8tion (9646794)

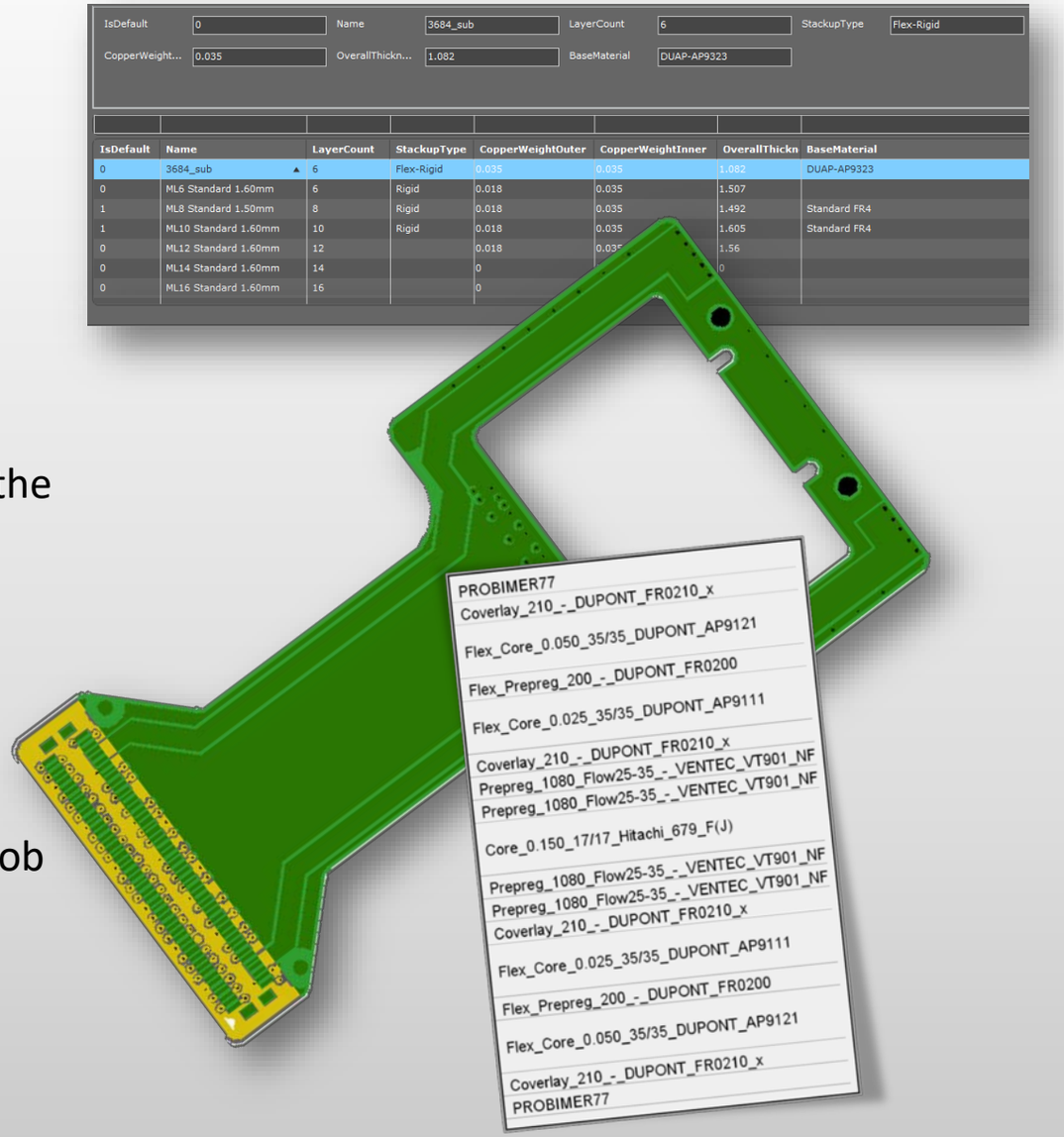
- Features
  - integration (bidirectional) with Polar stackup software

Stackup Template Library (9680071)

- Features
  - Integr8tor storage for all previously created stackups
  - Automatic search for a matching stackup for newly submitted jobs
  - Maintains all stackups in one central location
  - Stores key stackup characteristics in searchable database fields
  - Allows the definition of default stackups for standard products
  - Suggests a “closest-match” alternative in case no fully matching template was found
  - Allows to pick up the best matching stackup, edit it to make it suitable for the current job and store it as a new template
  - Updated dynamically with every new job processed, either fully automatically or upon demand

Stackup Template Library (9680071)

- Benefits
  - Automatic stackup selection for incoming jobs
  - No interruption of the automatic Integr8tor workflow for standard PCBs, thanks to the system of default templates
  - Fast search and easy filtering of existing stackups to find potentially good stackup candidates in case of manual stackup assignment
  - Suggestion of best-matching alternative gives a head-start for the creation of a new stackup
  - All stackup information stored centrally – No valuable work scattered around on individual PCs
  - All available stackups can be consulted from any PC in the company running an Integr8tor Cockpit or Dashboard
  - Stackup template library extends dynamically with every new job processed, either fully automatically or upon demand
  - Over time, fewer new stackups must be created as more and more can simply be picked from the ever-growing library

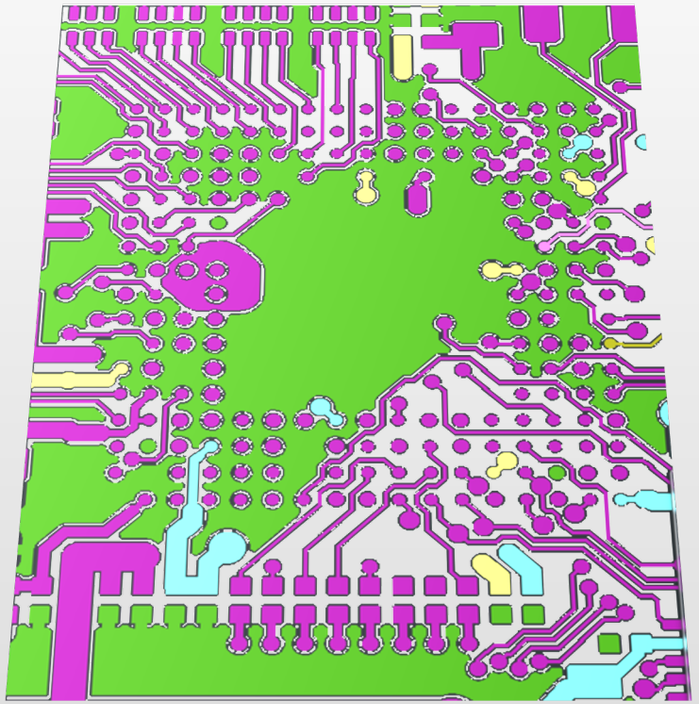


Stackup template Input (SSX) (9680061)

- Features
  - manual input (via cockpit) of a material stackup into stackup library
  - note: API commande are/will be available via advanced scripting to input an SSX into our stackup library template (if available)

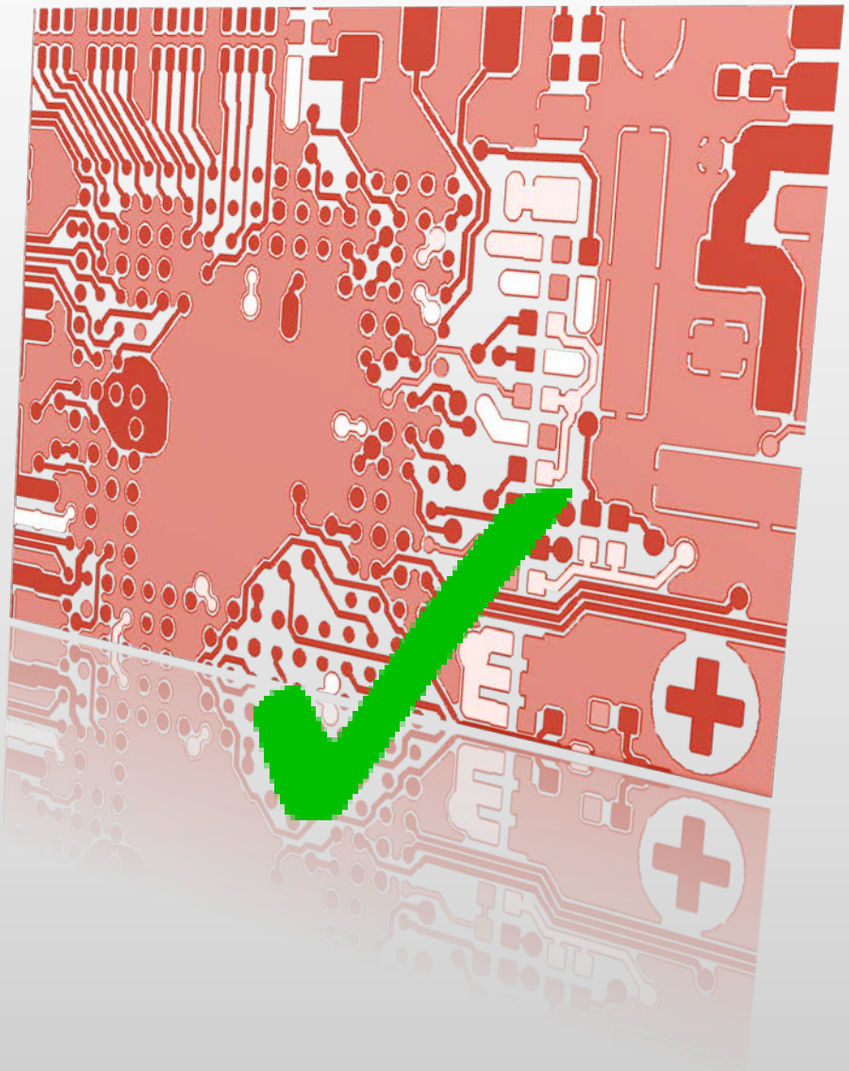
Auto Reference (9646601)

- Features
  - AutoReference reads in one of the following netlist formats
    - IPC-D-356A (9646601A)
    - IPC-D-356B (9646601C)
    - Mentor Neutral Format (9646601B)
    - DPF (9646601E)
    - ODB++ (9646601D)
  - It sets aside this information as the "golden" netlist for the PCB
  - In the absence of an external netlist, AutoReference extracts one itself, based on the PCB image data and again sets it aside as the golden netlist
  - At various points during the AutoCAM process, AutoReference builds the netlist of the job in progress and compares it to the golden netlist information
  - Any deviation in the electrical connectivity of the board is reported as part of the AutoCAM report



AutoReference (9646601)

- Benefits
  - Security: golden netlist data is a premium tool in safeguarding against unwanted modifications to the layout.
  - Security: using an external golden netlist even adds an extra level: it captures problems introduced during data output on CAD and data input on CAM
  - Automation: every job coming out of AutoReference is netlist-certified automatically – No need to do anything extra
  - Consistency: AutoReference is integrated in the workflow – the process is always carried out in the same consistent manner – No risk of forgetting
  - Clarity: netlist inconsistency warnings can be configured to appear on any report for fast retrieval and easy consultation

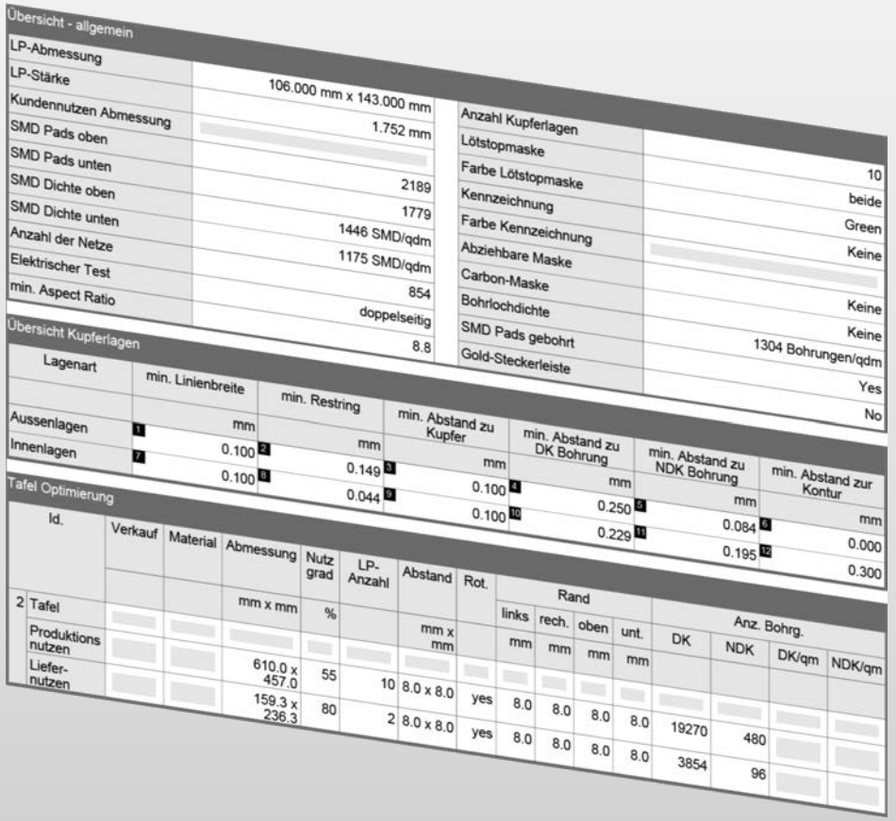


AutoAnalyzer (9646803)

- Features
  - Generates one or more configurable QED (Quotation & Engineering Data) PDF report(s), multi-language support, based on
    - QED Copper Layer Analysis (9646950)
    - QED Exposed Copper Analysis (9646951)
    - QED Solder Mask Analysis (9646952)
    - QED Drills Analysis (9646953)
    - QED Bare Board Test Analysis (9646955)
    - QED Production Panel Analysis (9646956)

AutoAnalyzer (9646803)

- Benefits
  - Automatic design analysis
  - Immediate DRC/capability check on the job
  - More accurate/comprehensive product engineering data
  - Integration with Quotation and/or Engineering systems
  - Return accurate quotes parameters within minutes
  - Less risk of error or missing critical parameters
  - Information about faulty or non conforming formats



Übersicht - allgemein

LP-Abmessung	106.000 mm x 143.000 mm	Anzahl Kupferlagen	10
LP-Stärke	1.752 mm	Lötstopmaske	beide
Kundennutzen Abmessung		Farbe Lötstopmaske	Green
SMD Pads oben	2189	Kennzeichnung	Keine
SMD Pads unten	1779	Farbe Kennzeichnung	
SMD Dichte oben	1446 SMD/qdm	Abziehbare Maske	Keine
SMD Dichte unten	1175 SMD/qdm	Carbon-Maske	Keine
Anzahl der Netze	854	Bohrlochdichte	1304 Bohrungen/qdm
Elektrischer Test	doppelseitig	SMD Pads gebohrt	Yes
min. Aspect Ratio	8.8	Gold-Steckerleiste	No

Übersicht Kupferlagen

Lagenart	min. Linienbreite	min. Restring	min. Abstand zu Kupfer	min. Abstand zu DK Bohrung	min. Abstand zu NDK Bohrung	min. Abstand zur Kontur
	mm	mm	mm	mm	mm	mm
Aussenlagen	1 0.100	2 0.149	3 0.100	4 0.250	5 0.084	6 0.000
Innenlagen	7 0.100	8 0.044	9 0.100	10 0.229	11 0.195	12 0.300

Tafel Optimierung

Id.		Verkauf	Material	Abmessung	Nutzgrad	LP-Anzahl	Abstand	Rot.	Rand				Anz. Bohrg.			
									links	rech.	oben	unt.	DK	NDK	DK/qm	NDK/qm
				mm x mm	%		mm x mm		mm	mm	mm	mm				
2	Tafel															
	Produktionsnutzen			610.0 x 457.0	55	10	8.0 x 8.0	yes	8.0	8.0	8.0	8.0	19270	480		
	Liefer-nutzen			159.3 x 236.3	80	2	8.0 x 8.0	yes	8.0	8.0	8.0	8.0	3854	96		

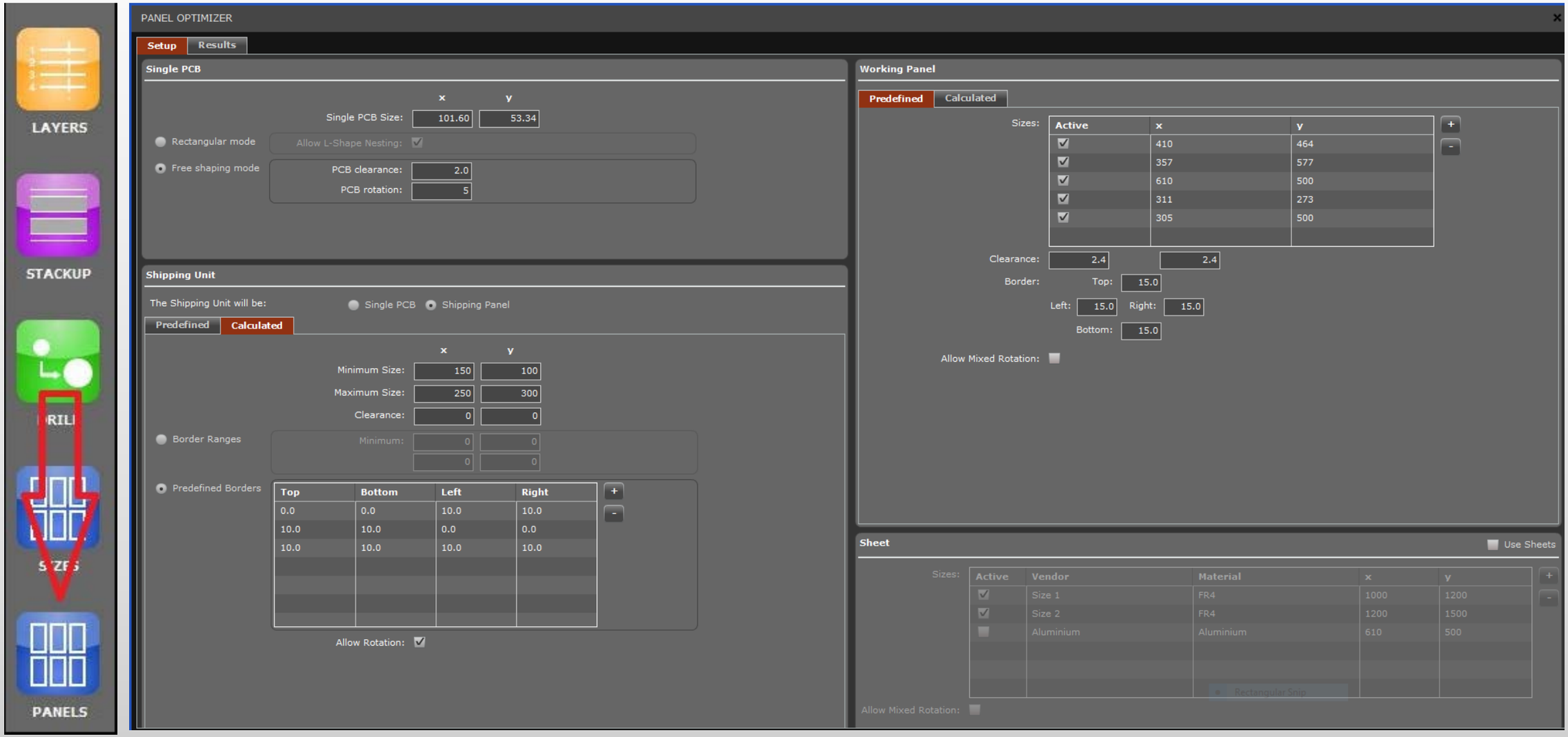
Quotation&Engineering Data Integration (9646866)

- Features
  - Generation and output of QED v2 in XML format; incl. integration support
  - v2 = extension containing production data output (PPD), only available after defining the production stages (new module in UcamX)

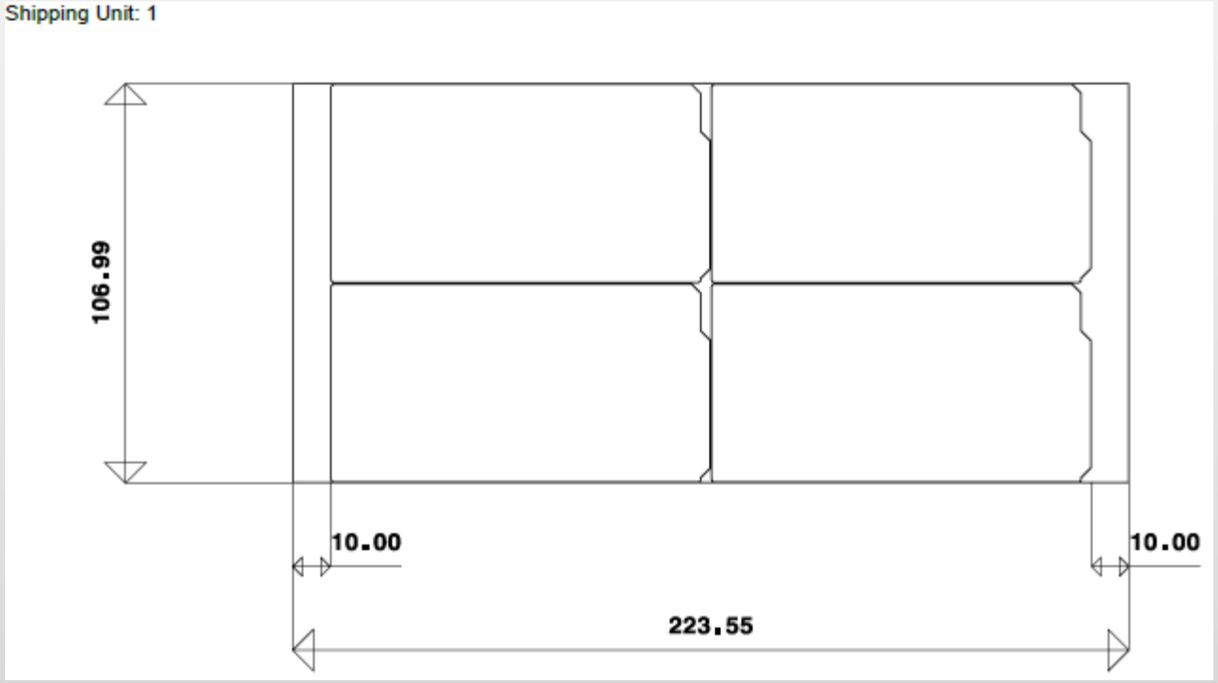
Dynamic customer panel optimizer (9650044)

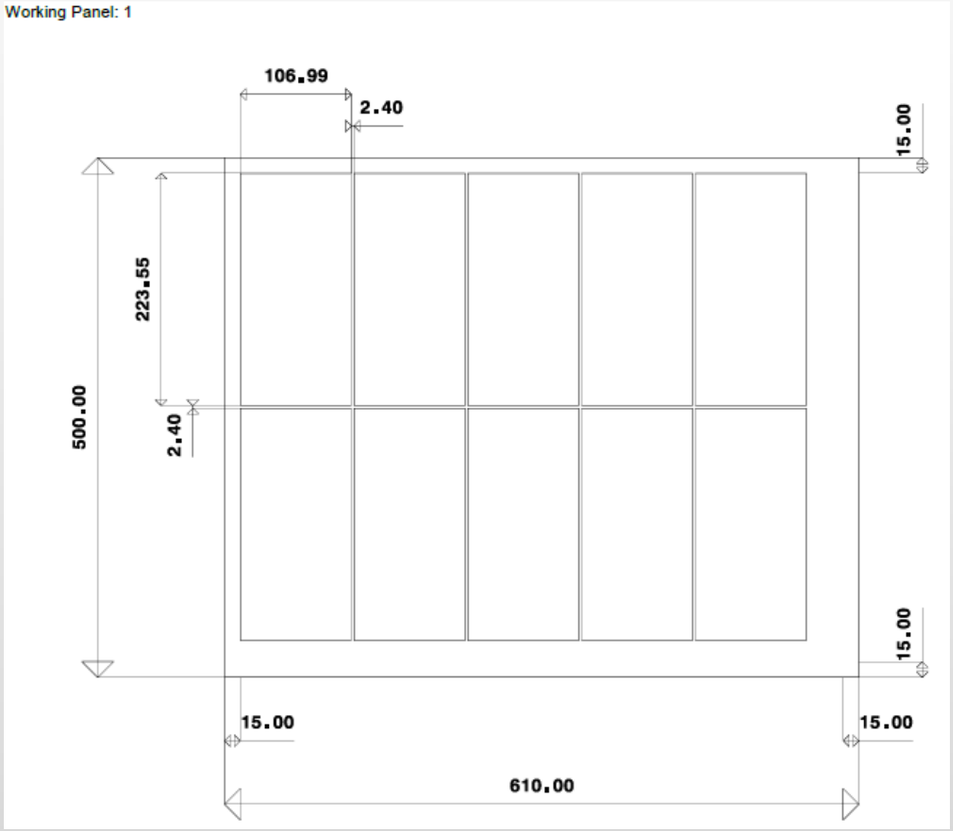
- Features
  - Calculates optimal variable customer panel / standard (fixed) production panel combinations
  - Extends QED with customer panel & production panel information including drawings
  - Definition of panel sizes for customer and production panels can be predefined or dynamically build while processing the job in Integr8tor

Dynamic customer panel optimizer (9650044)



Dynamic customer panel optimizer (9650044)



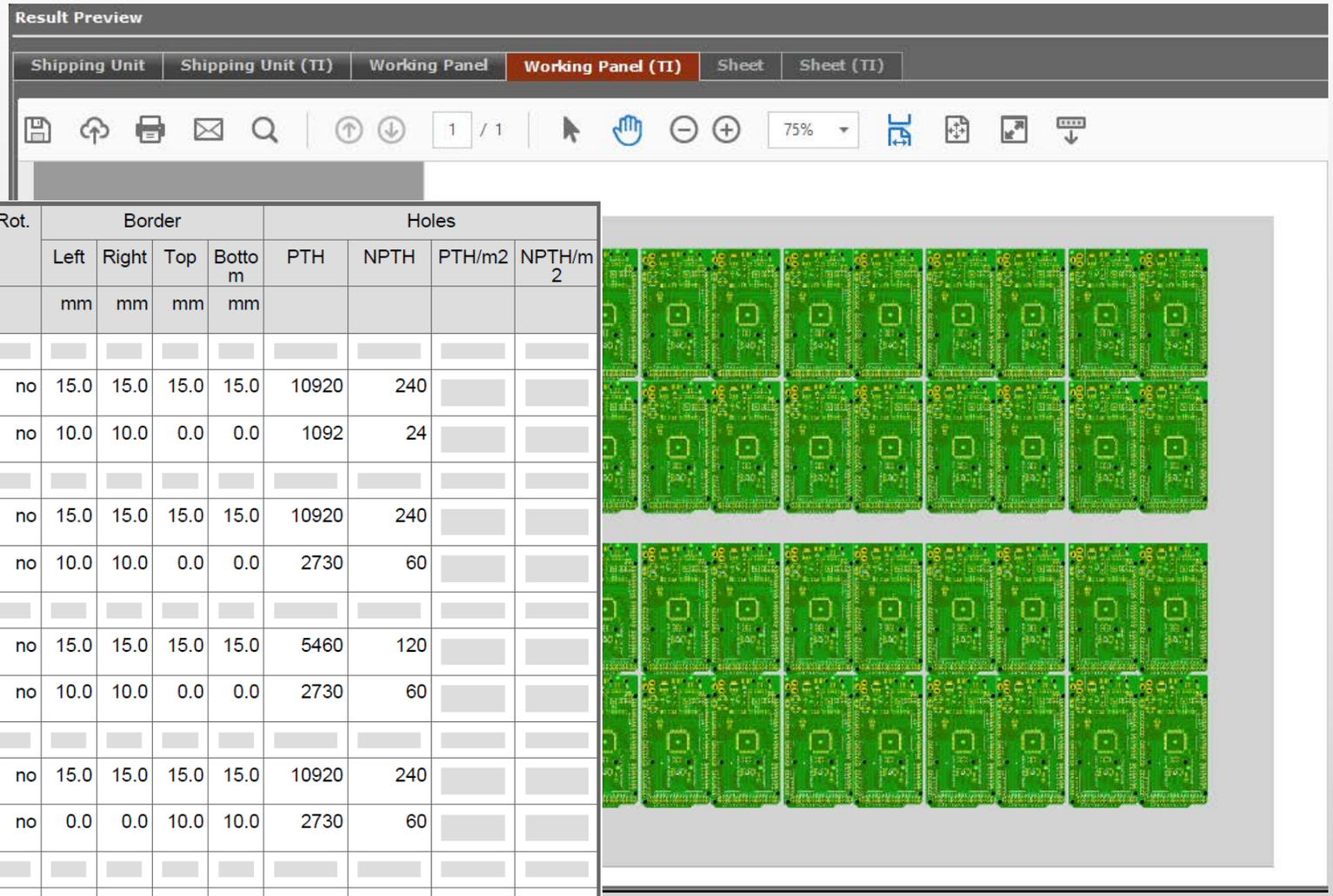


Drawings and overview chart can be added in the QED PDF reports

Dynamic customer panel optimizer (9650044)

DPO overview chart

Id.		Vendor	Material	Size	Usage	PCB Count	Clearance	Rot.	Border				Holes			
									Left	Right	Top	Bottom	PTH	NPTH	PTH/m2	NPTH/m2
				mm x mm	%		mm x mm		mm	mm	mm	mm				
1	Sheet															
	Working Panel			610.0 x 500.0	70	40	2.4 x 2.4	no	15.0	15.0	15.0	15.0	10920	240		
	Shipping Unit			223.6 x 107.0	90	4	0.0 x 0.0	no	10.0	10.0	0.0	0.0	1092	24		
2	Sheet															
	Working Panel			610.0 x 500.0	70	40	2.4 x 2.4	no	15.0	15.0	15.0	15.0	10920	240		
	Shipping Unit			223.6 x 267.2	90	10	0.0 x 0.0	no	10.0	10.0	0.0	0.0	2730	60		
3	Sheet															
	Working Panel			305.0 x 500.0	70	20	2.4 x 2.4	no	15.0	15.0	15.0	15.0	5460	120		
	Shipping Unit			223.6 x 267.2	90	10	0.0 x 0.0	no	10.0	10.0	0.0	0.0	2730	60		
4	Sheet															
	Working Panel			610.0 x 500.0	70	40	2.4 x 2.4	no	15.0	15.0	15.0	15.0	10920	240		
	Shipping Unit			203.6 x 287.2	92	10	0.0 x 0.0	no	0.0	0.0	10.0	10.0	2730	60		
5	Sheet															
	Working Panel			610.0 x 500.0	70	40	2.4 x 2.4	no	15.0	15.0	15.0	15.0	10920	240		
	Shipping Unit			223.6 x 287.2	84	10	0.0 x 0.0	no	10.0	10.0	10.0	10.0	2730	60		



Real image in the Layer Structure Editor

Sheet optimizer (9645001A)

- Features
  - Calculates optimal variable customer panel / variable production panel / fixed sheet combinations
  - Extends QED with customer panel, production panel and sheet information, including drawings

QED Scoring Analysis (9646954)

- Features
  - Extends QED with Scoring information.

QED Viaplug Analysis (9646957)

- Features
  - Extends QED with viaplug and stacked via information

QED Layer Images Output (9646944)

- Features
  - Extends QED PDF report with high resolution PDF images of all layers

DFM Classes (9650036P)

- Features
  - Translates the Integr8tor design analysis results to the production capabilities and combines them into a Design For Manufacturability (DFM) assessment
  - Produces an easy-to-understand colour-coded table: orange cells indicate a value out of range – green cells indicate the design analysis value is within range of the given DFM Class
  - Places a DFM assessment table on the QED PDF report
  - Adds the DFM assessment information to the Integr8tor QED XML output
  - DFM classes are customer-defined and unlimited in number

    E.g. *Easy – Standard – Difficult – Demanding*
  - All Integr8tor design analysis properties(1) as well as customer-defined properties(2) are available for use in the DFM assessment

    E.g.(1) *Number of layers – Minimal track – Minimal gap – Smallest drill hole – …*

    E.g.(2) *If the product is IPC-A-610 Class3 then DFM class always "Demanding"*

			Standard	Extra 1	Extra 2	Advanced 1	Advanced 2
			class 1	class 2	class 3	class 4	class 5
Check area 1	Material thickness rigid		0.5-2.4	0.2-3.2	0.05-6.35	0.05-6.35	-
	Material thickness flexible		-	0.05-0.1	0.025-0.049	0.025-0.049	-
	Flex-Rigid		-	-	-	-	-
Check area 2	Layercount	4	1-6	1-8	1-10	1-10	1-32
	Aspect Ratio	3.0					
	Blind Vias		-	-	>= 0.10mm (max. depth 0.10mm)	>= 0.075 (max. depth 0.065mm)	>= 0.075 (max. depth 0.065mm)
Check area 3	Min. Track	0.21	>= 0.2000	>= 0.1500	>= 0.1000	>= 0.0750	>= 0.0500
	Min. Track outer	0.21	>= 0.2000	>= 0.1500	>= 0.1000	>= 0.0750	>= 0.0500
	Min. Track inner	0.25	>= 0.1500	>= 0.1500	>= 0.1000	>= 0.1500	>= 0.1500
	Min. Clearance	0.054	>= 0.1524	>= 0.1270	>= 0.1500	>= 0.1500	>= 0.0500
Check area 4	Min. Annular Ring outer	0.199	>= 0.2200	>= 0.1700	>= 0.1016	>= 0.0762	>= 0.0500
	Min. Annular Ring inner	0.15	>= 0.2500	>= 0.2200	>= 0.1300	>= 0.1000	>= 0.0750
	Min. Clearance PTH to inner	0.3	>= 0.2540	>= 0.2286	>= 0.1900	>= 0.1500	>= 0.1250
	Min. Diameter PTH	0.5	>= 0.2000	>= 0.1500	>= 0.2159	>= 0.2032	>= 0.1905
	Min. Diameter NPTH	0.85	>= 0.3000	>= 0.2000	>= 0.1500	>= 0.1000	>= 0.0500
	Min. Clearance outer	0.054	>= 0.1524	>= 0.1270	>= 0.1016	>= 0.0762	>= 0.0500
Check area 5	Min. Clearance inner	0.3	>= 0.1524	>= 0.1270	>= 0.1016	>= 0.0762	>= 0.0500
	Bondgold		-	-	Yes	Yes	-
	Gold Edge Connector		-	Yes	Yes	Yes	-
	Vcut		-	-	Yes	Yes	-
	Depth routing		-	Yes	Yes	Yes	-
	Impedance-Check		-	-	Yes	Yes	-
	Special materials (TMM, Teflon)		-	-	Yes	Yes	Yes

DFM Classes (9650036P)

- Benefits
  - Saves time: no need to go through all values of a design analysis to find out whether a board is difficult or easy to make
  - Easy reading: color-coding mechanism shows at a glance where the bottlenecks are
  - Customer feedback: DFM Classes provides a solid basis for recommendations to your customer, who may rework the design to obtain higher production yields and a more competitive price offer
  - Excellent aid for CAM: provides a head start in CAM for DRC and repair later when the quotation has become an order
  - Easy setup and maintenance: just specify your DFM rule set and an experienced Ucamco professional can set up, install and maintain the module remotely for you.
  - Tailor-made for your environment: DFM Classes simulate your capabilities to the full, with your choice of DFM criteria and granularity for defining the DFM classes

min Outer Layer Annular Ring	0.149	200	175	150	120	100	100	75	75	60
min Inner Layer Annular Ring	0.15	225	200	175	145	125	125	100	100	85
min Plated Layer Pad Diameter	0.598	900	800	700	590	500	450	400	350	270
min Inner Layer Pad Diameter	0.6	950	850	750	640	550	500	450	400	320
max aspect ratio for Plated hole	5.3	3.2	3.6	4.0	4.6	5.3	6.4	6.4	-	-
min Plated hole	0.3	500	450	400	350	300	250	250	200	150
distance Plated hole to Plated hole	0.3	750	600	500	410	350	350	285	275	230
distance Non-plated hole to Cu on inner layers		IAR + 25	IAR + 25	IAR + 25	IAR + 25	IAR + 25	IAR + 25	IAR + 25	IAR + 25	IAR + 25
distance Non-plated hole to Cu on outer layers		350	300	250	200	200	200	150	100	75

XED Export for UCAM (UFD format) (9650029)

- Features
  - Output of XED for UcamX (UFD)

PDF Report Customizer (9646867)

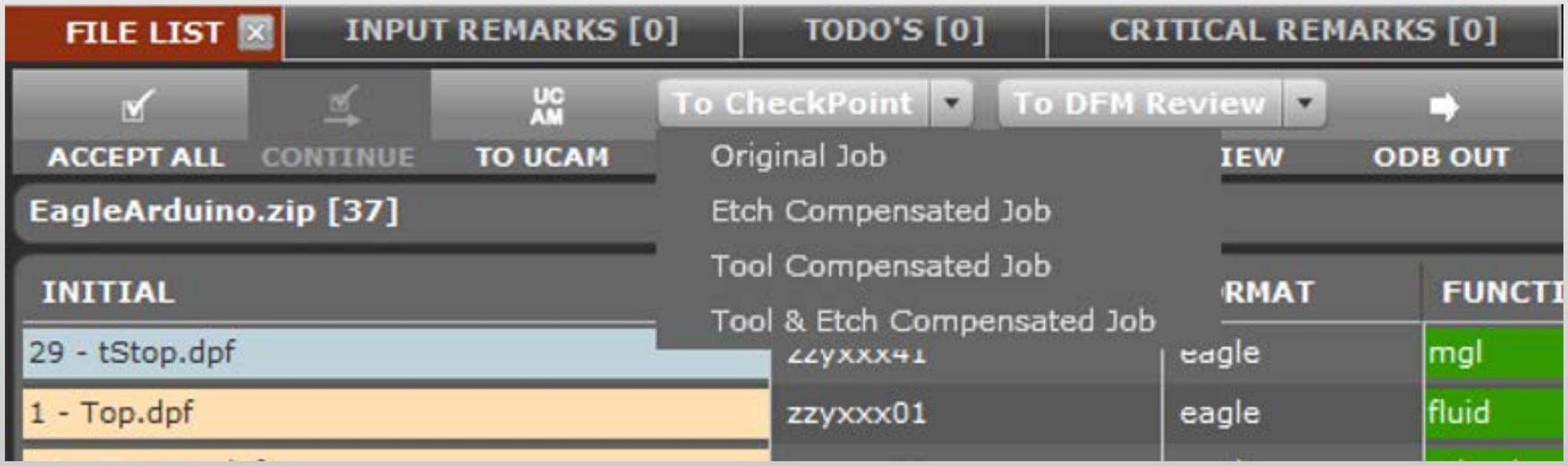
- Features
  - Software toolbox to generate custom PDF reports
  - Customization work not included
    - offered by Ucamco following specifications provided
    - done by customer after a two day training provided by Ucamco

Perspectives

- Features
  - Perspectives let you run multiple design analyses on a job to provide QED data geared towards ***production*** in addition to the QED info for quoting
  - Currently 4 Perspectives are available:
    - Original job perspective – contains data and analysis results from the unmodified job data as received from the customer
    - Drill tool compensated perspective – perspective in which data and analysis results are based on drill tool diameters rather than on end diameters
    - Etch compensated perspective – perspective which contains the data and analysis results starting from copper layers to which an etch compensation factor has been applied
    - Combined Drill tool and etch-compensated perspective – combining the results of the previous two

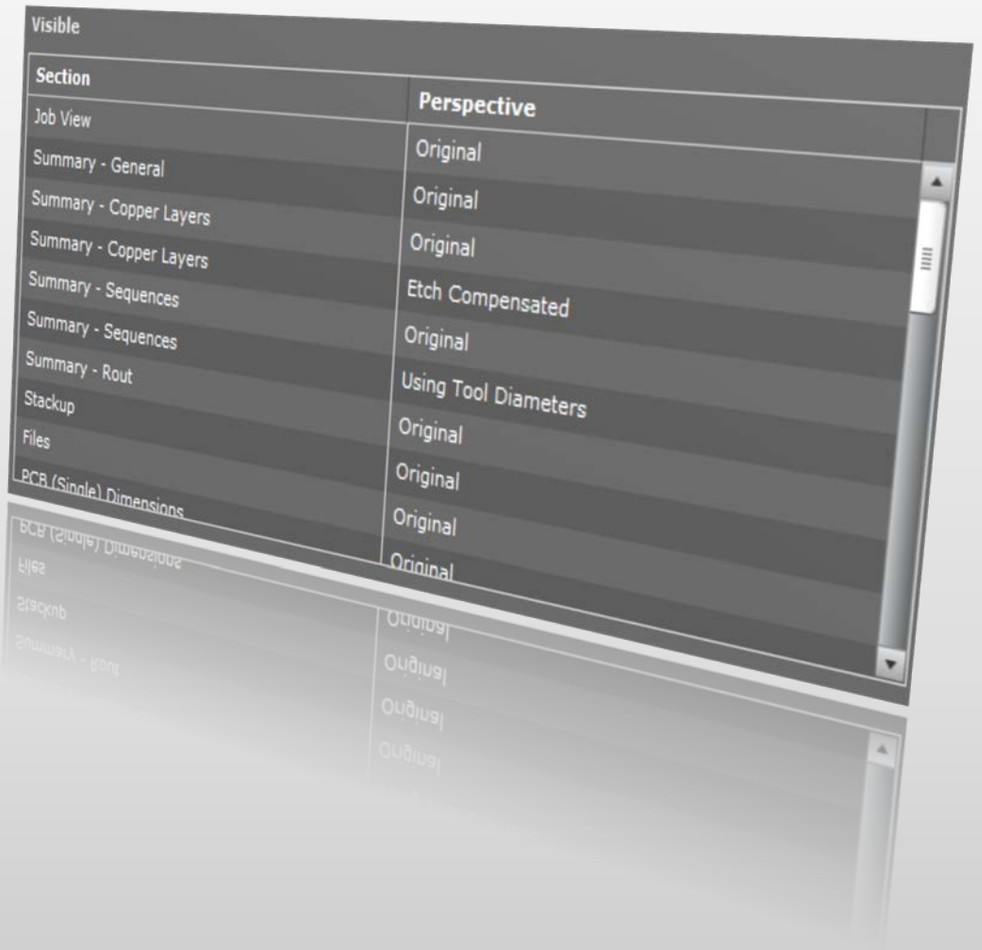
Perspectives

- Features
  - The analysis results from the different perspectives can be combined into a single QED PDF report or split into separate reports
  - Perspectives manages the data from the different analyses side by side in a consistent and easy-to-access way
  - ***Checkpoint*** and ***DFM Review*** have easy access to the analysis results from every perspective
  - ***DFM Classes*** has access to the analysis data from any perspective and build the manufacturability table from it



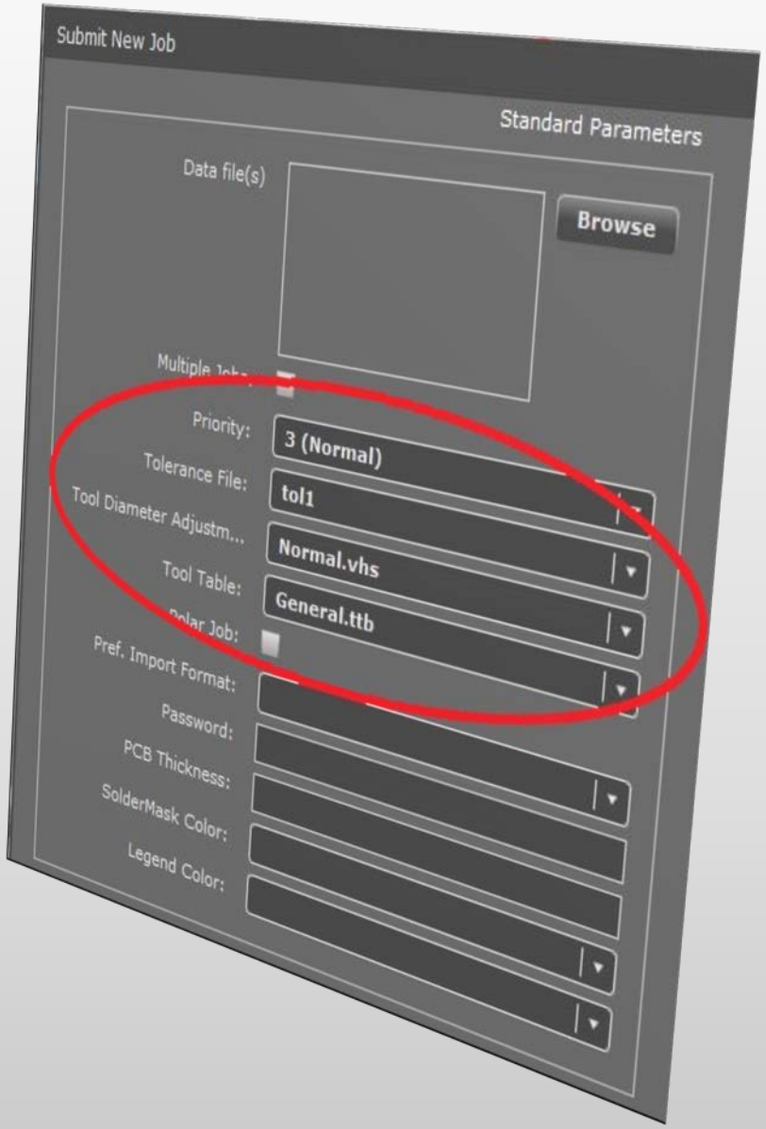
Perspectives

- Benefits
  - Versatility: use the original design analysis data to communicate with your customer and data from one of the additional perspectives to feed to your Engineering, Pre-CAM or CAM departments for internal use
  - Ease-of-use: all analysis data in the different perspectives is calculated in one go; no need to rerun jobs a second or a third time
  - Versatility: dedicated PDF reports with data from different perspectives can be easily configured by drag-and-drop
  - Easy access: ***Checkpoint*** – ***DFM Classes*** – ***DFM Review*** can all display and report on the data from the different perspectives
  - Consistency: if an operator intervention has an impact on the design analysis results, the relevant data in the various perspectives is updated automatically and selectively
  - Compatibility: original, drill tool compensated or etch-compensated PCB layout data can be exported to DPF, ODB++ or Gerber for further use in CAM



Drill Tool Compensated Perspective (9680090)

- Features
  - The Drill Tool Compensated perspective automates the calculation of drill tool sizes based on your own rules, practices and sophistication
  - Perspective in which the job analysis is done using drill tool diameters rather than customer finished hole sizes in order to establish the available tolerances in production
  - It allows for additional input parameters at Job submit time, necessary to convert finished sizes to drill tool sizes automatically
    - Tool Diameter Adjustment (vhs) – incorporate your own ***UcamX VHS scripts*** to calculate the required drill tool diameter based on the size, function and characteristics of the hole diameter
    - Tolerance File – set up a generic or customer-specific hole tolerance file and take into account the requested plus and minus tolerances to exactly calculate the correct drill tool diameter
    - Tool Table – post-adjust the calculated tool diameter to cater for certain types of surface finish like hot-air solder leveling



Drill Tool Compensated Perspective (9680090)

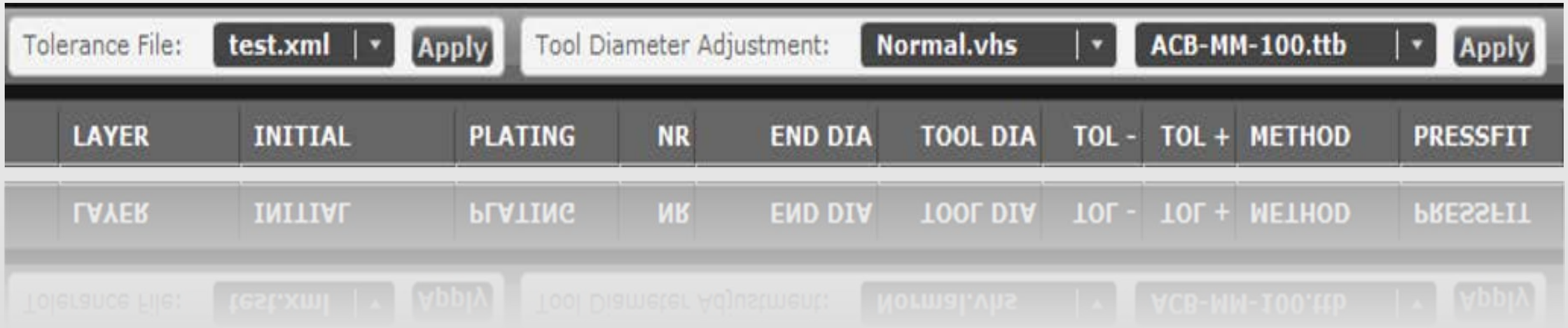
- Features
  - In combination with the Drill Tool Compensated perspective, ***Drill Editor*** features an additional section where the results of Integr8tor's automatic drill tool analysis can be completed or corrected:
    - (Re)define via holes
    - Define via hole filling
    - Define pressfit holes
    - Set up or adjust unsymmetrical drill hole tolerances
    - .....

  Any of these characteristics can then be queried to calculate the correct drill tool diameter

	LAYER	INITIAL	NR	PLATING	FILLED VIA	END DIA	TOOL DIA	TOL -	TOL +	METHOD	FUNCTION	PRESSFIT
	zzyxxx60	NC_DRL.dpf	1	plated		0.3	0.4	0.1	0.1	drill	Via	
	zzyxxx60	NC_DRL.dpf	2	plated		0.5	0.6	0.1	0.1	drill	Via	
	zzyxxx60	NC_DRL.dpf	3	plated		0.8	0.95	0.1	0.1	drill	Component	☑
	zzyxxx60	NC_DRL.dpf	4	plated		2.2	2.25	0.1	0.1	drill	Mechanical	
	zzyxxx60	NC_DRL.dpf	5	plated		3	3.05	0.1	0.1	drill	Mechanical	
	zzyxxx60	NC_DRL.dpf	6	non-plated		3.3	3.35	0.1	0.1	drill	Mechanical	

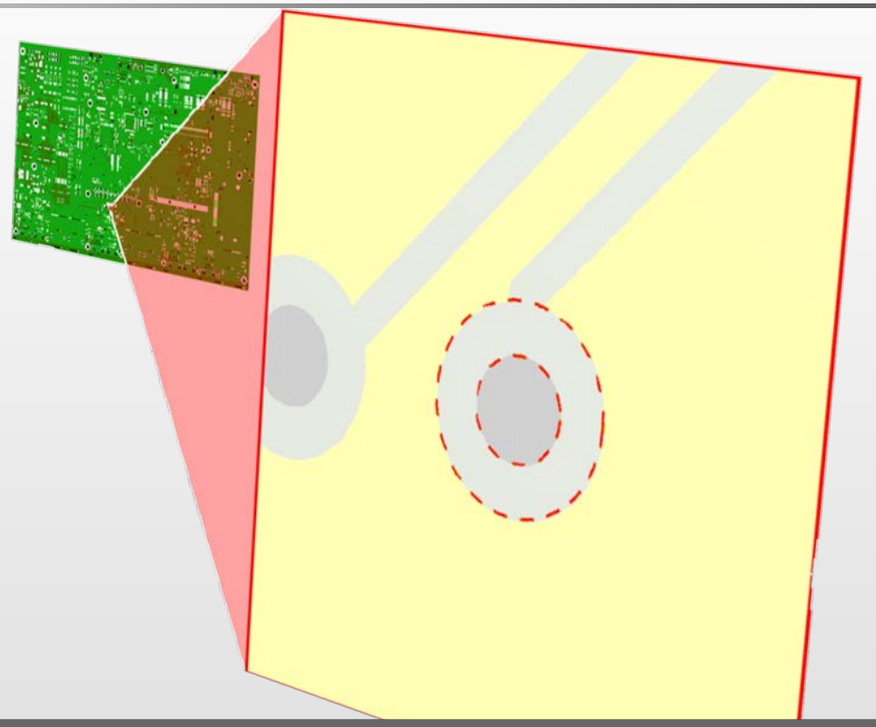
Drill Tool Compensated Perspective (9680090)

- Features
  - Additional ***Drill Editor*** toolbar allows to change the initial choice of Tool Diameter Adjustment script, Tolerance Table or Tool Table and to recalculate the new tool diameter in real time.



Drill Tool Compensated Perspective (9680090)

- Benefits
  - Manufacturability: view the job and the analysis results with the modified drill tool diameters in ***DFM Classes***, ***DFM Review*** or ***Checkpoint*** and find out with ease how tight your manufacturing tolerances really are
  - Versatility: the Drill Tool Compensated Perspective produces a valuable, drill-oriented view on the job, offering Engineering or CAM departments a timely alert to anticipate to potential restring or critical registration issues
  - Automation: for every job submitted, the Drill Tool Compensated Perspective automatically calculates the correct drill tool sizes – No need to do anything extra



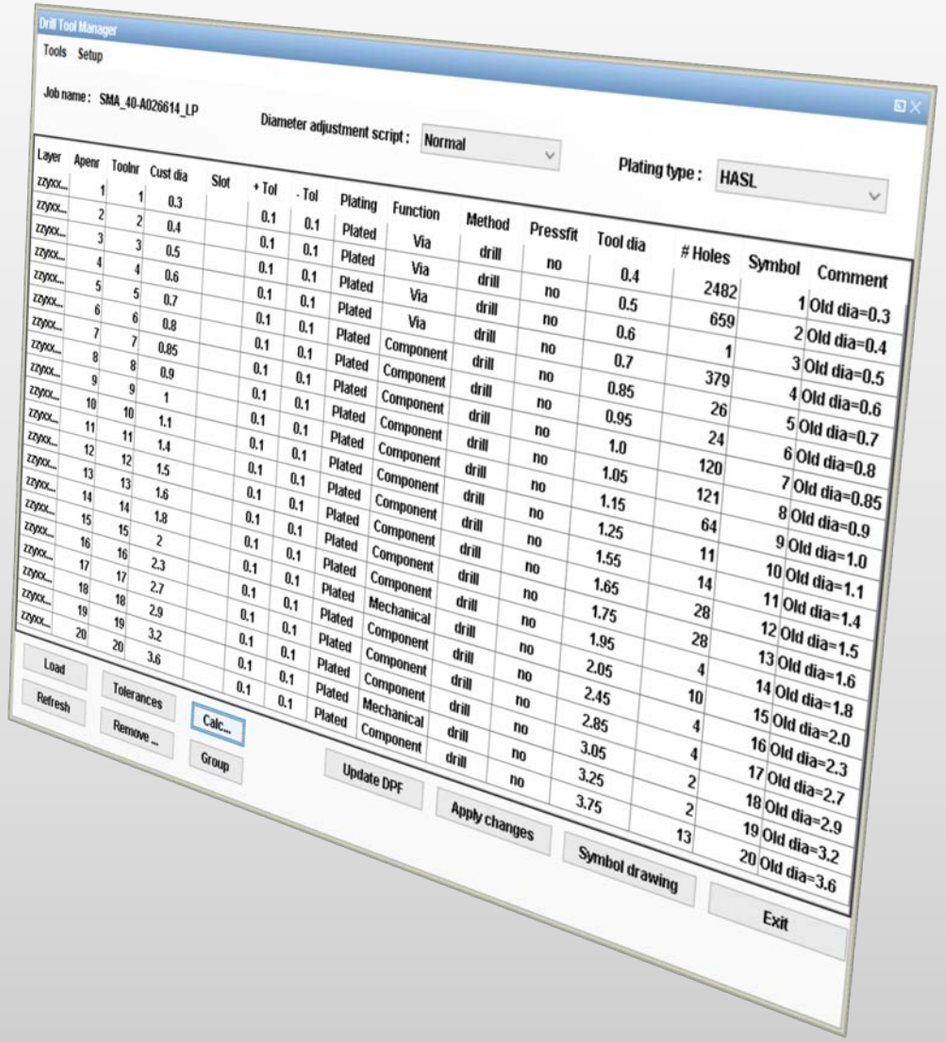
Summary - Sequences - After Tool Compensation

Type	Sequences	Tools	Min. End Dia.	Max. End Dia.	Holes	Min. Ring on Outer
			mm	mm		mm
Blind	0					
Buried	0					
PTH	1	6	0.400	3.350	1949	0.099
Plated (Total)	1	6	0.400	3.350	1949	0.099
NPTH	0					
Total	1	6	0.400	3.350	1949	0.099

!!!

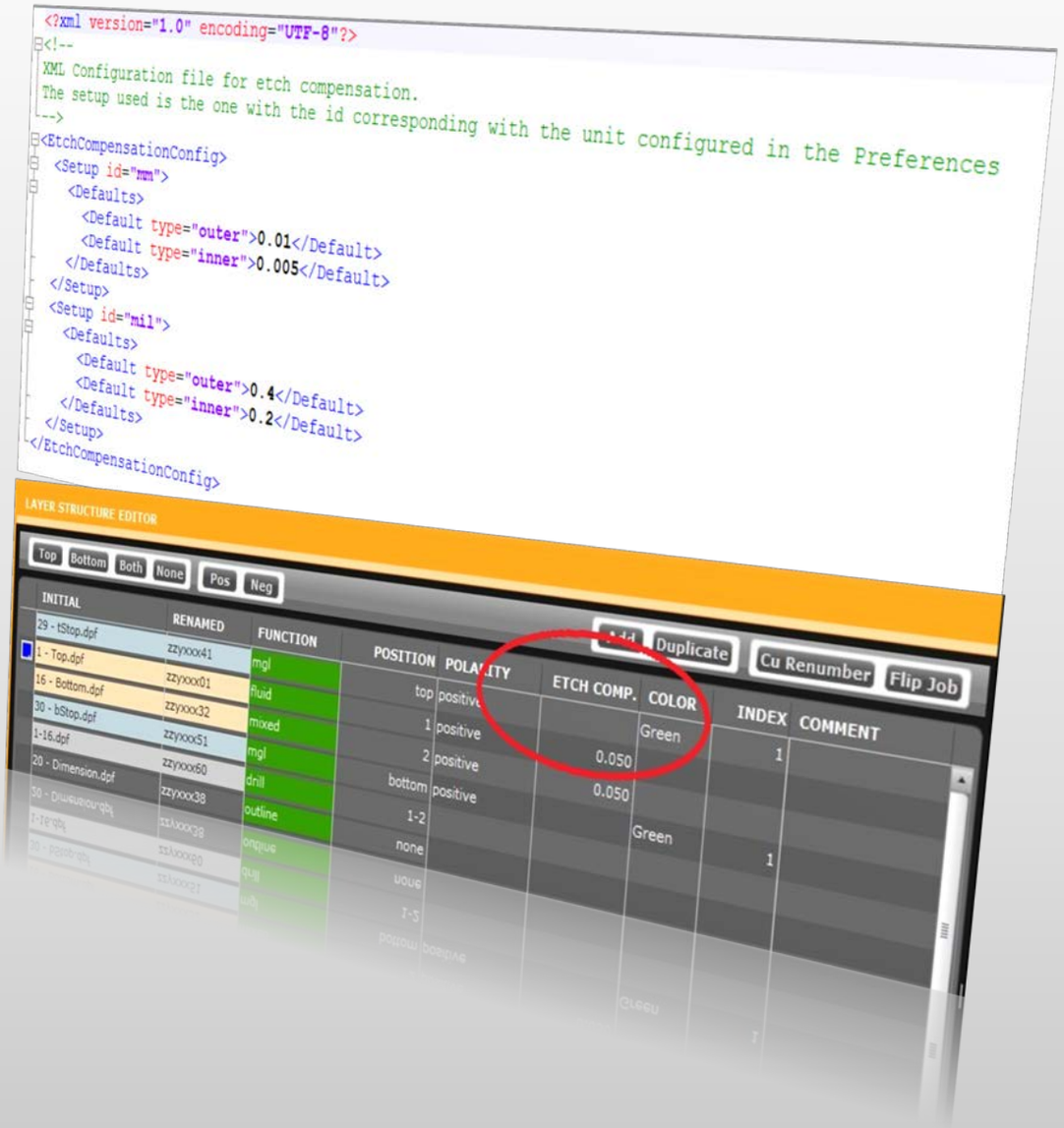
Drill Tool Compensated Perspective (9680090)

- Benefits
  - Consistency: customer rules for drill tool calculation are embedded within Integr8tor, ensuring consistent results time after time, regardless of the skills level of an operator
  - Customization: use ***VHS scripting*** within the Drill Tool Compensated Perspective to fully mold the drill tool calculation rules to your own practices and specific production requirements
  - Sophistication: combine all three – VHS Script, Tolerance tables and Tool Tables – to reach the highest levels of sophistication in your calculation rules
  - Compatibility: all tool-related data from the Drill Tool Compensated Perspective is transferrable to ***UcamX*** for further use in ***Drill Tool Manager***. Any changes made there will flow back to Integr8tor transparently
  - Compatibility: Drill Tool Compensated PCB layout data can be exported to DPF, ODB++ or Gerber for further use on any CAM system



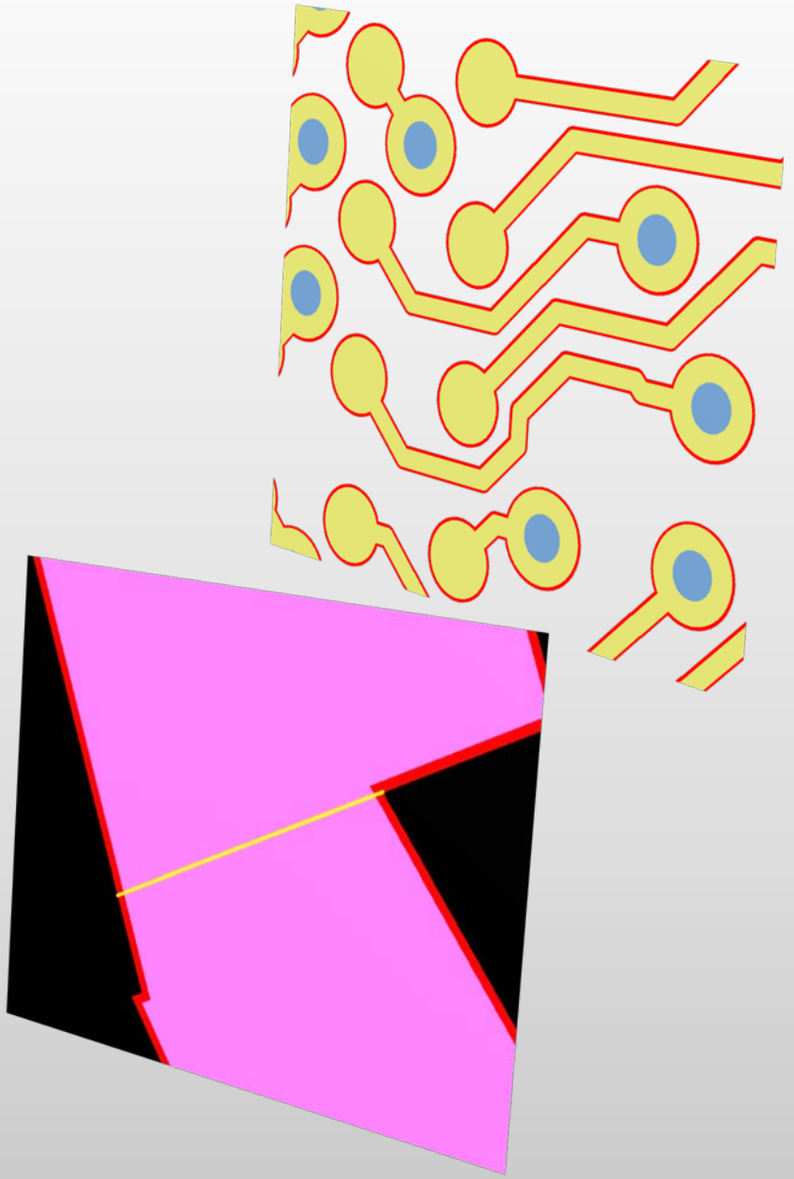
Etch-Compensated Perspective (9690091)

- Features
  - The Etch-Compensated perspective adds an etch compensation value to all features on the designated copper layers
  - All analysis data in this perspective is based on the increased copper sizes
  - Default etch compensation values for outer and inner layers can be embedded in the Integr8tor workflow
  - An extra section in Layer Structure Editor allows to change the default values in case of more complex buildups with multiple plating cycles for the same copper layer
  - Etch compensation values can be entered in MM or MIL, depending on preference



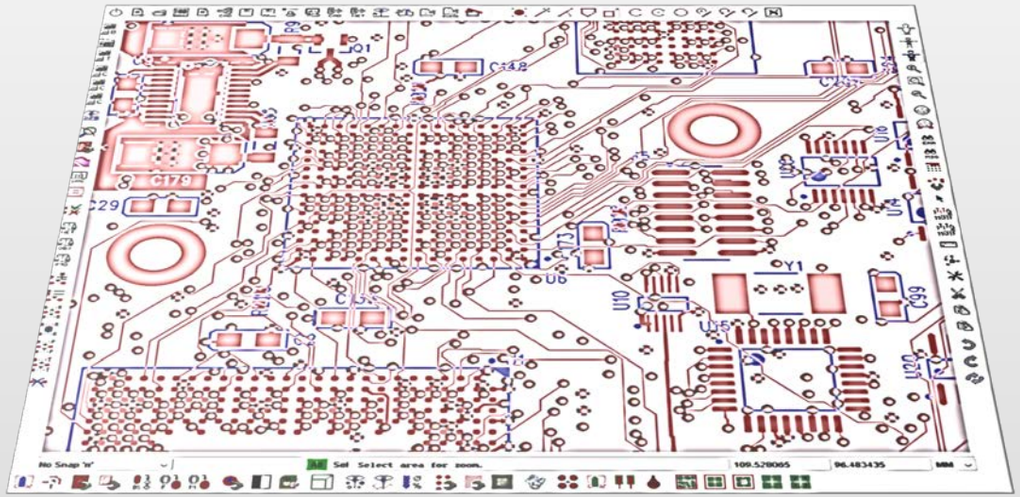
Etch-Compensated Perspective (9690091)

- Benefits
  - Manufacturability: view the job and the analysis results based on the compensated copper features in ***DFM Classes***, ***DFM Review*** or ***Checkpoint*** and find out with ease what the impact of the applied compensation will be on the etching process
  - Manufacturability: reveals potential issues involved in compensating non-parallel copper edges
  - Automation: for every job submitted, the Etch-compensated Perspective automatically applies the desired compensation values to the copper layers – No need to do anything extra
  - Consistency: if a manual operator intervention has an impact on the design analysis results, the relevant data in the Etch-compensated Perspective is updated automatically and selectively
  - Compatibility: the PCB layout data with the Etch-compensated features can be exported to DPF, ODB++ or Gerber for further processing on any CAM system



AutoCAM (9650016 – 9646604 - 9646603)

- Features
  - AutoCAM is an entire suite of configurable software modules to automate the tedious and routine CAM tasks that need to be repeated on every job.
  - AutoCAM produces an optimized version of the job data to provide CAM with a head start
  - An integrated and automatic netlist integrity checker serves as a watchdog and monitors the validity of the changes applied to the PCB layout
  - AutoCAM consists of three building blocks
    - AutoRecover: Repairs invalid gerber constructions such as self intersecting contours, invalid arc definitions, etc…
    - AutoRebuild: reconstructs the intelligence that was lost in translation from CAD to CAM.
    - AutoClean: performs a host of data clean-up and adjustment functions to bring the job in optimum shape for further processing in the CAM department



AutoCAM – AutoRecover (9650016)

- Features
  - Repairs invalid gerber constructions such as
    - self intersecting contours
    - invalid arc definitions
    - etc…
  - Reported on CAM report
  - Output formats based on integration format (see 9646868 / 9646830 / 9646829)

AutoCAM – AutoRebuild (9646604)

- Features
  - AutoRebuild restores the intelligence lost in translation from CAD to CAM
    - PadMaker

      PadMaker replaces the painted pads from the incoming data with flashed pads
    - RegionMaker

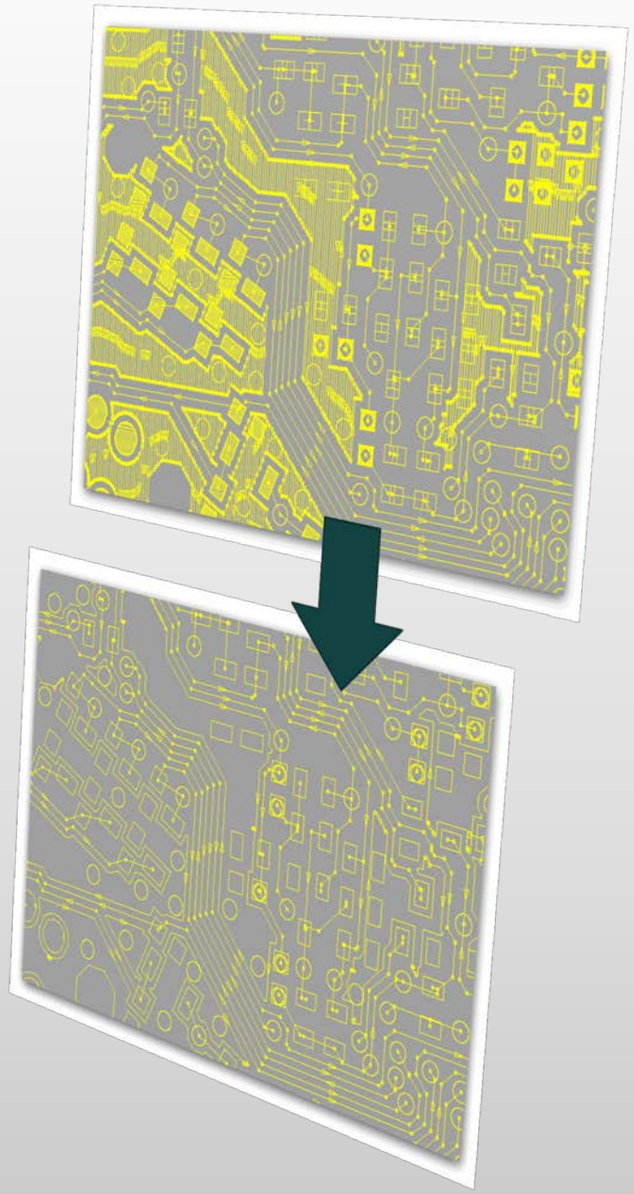
      RegionMaker converts painted areas to contour areas
    - AutoReverse

      AutoReverse switches the polarity of copper layers in which the data describes clearances in the copper rather than the copper itself
    - AutoMarkup

      Copper pads and drill tools are marked with designated attributes so that their further processing later on in CAM can be done more intelligently

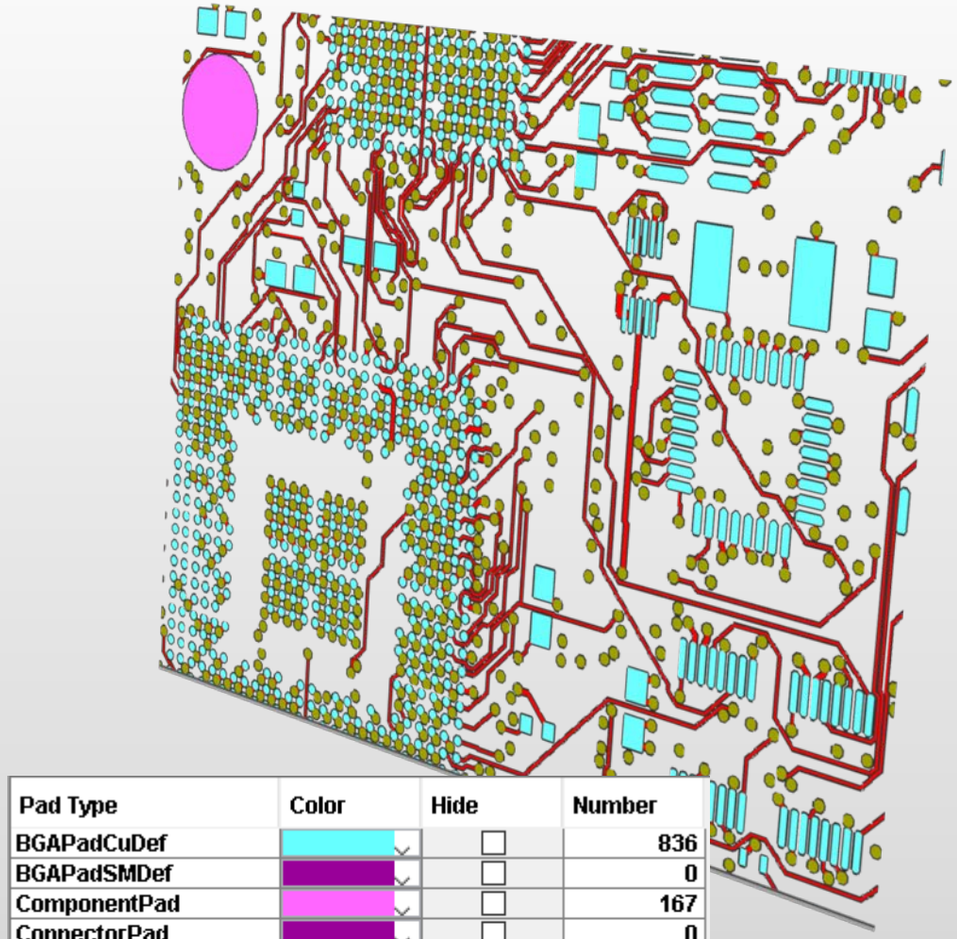
      Copper pads: SMD pads, BGA pads, Component pads, Via Pads, Fiducial pads …

      Drill tools: Component hole, Non-plated hole, Via hole,…
  - AutoRebuild exports an enhanced version of the input data to DPF, Gerber or ODB++ for further processing on CAM



AutoCAM – AutoRebuild (9646604)

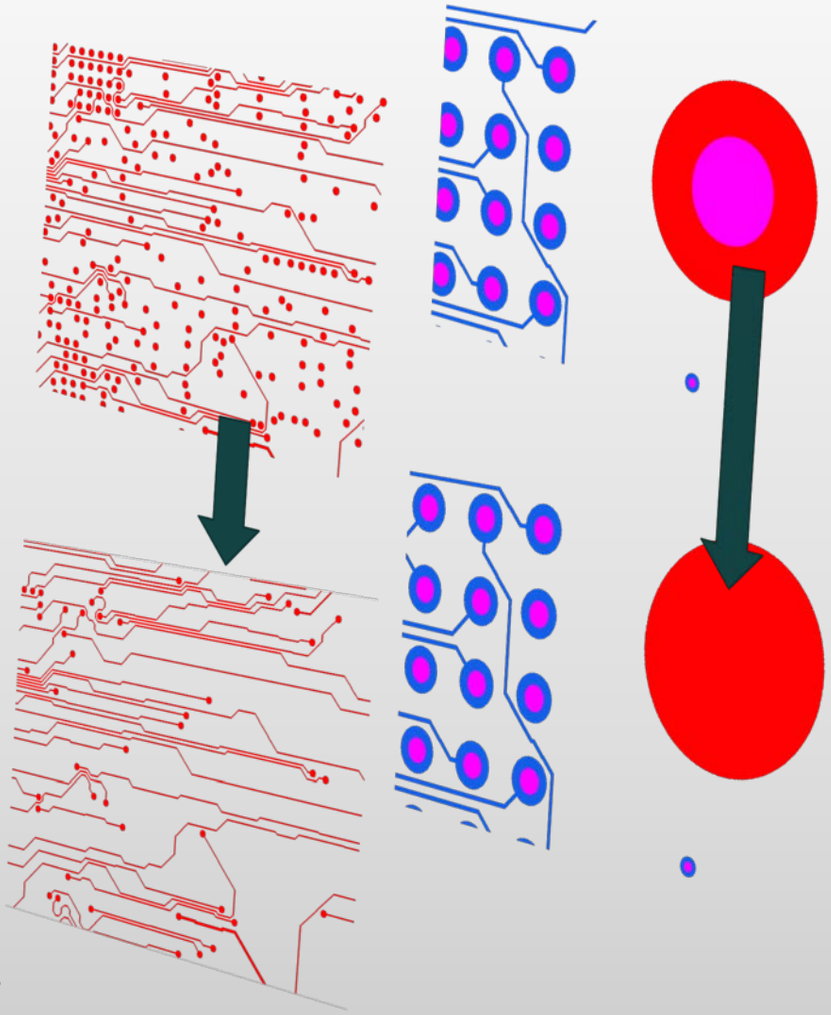
- Benefits
  - Reduced CAM time: starting from the optimized data from AutoRebuild, CAM processing times may drop by up to 30% and more
  - Data optimization: RegionMaker and PadMaker substantially reduce the amount of data. Less data means faster software response times
  - Improved User Experience: faster software response times causes less CAM operator idle time and vastly contributes to a more pleasant user experience
  - Automation: the intelligence introduced by AutoMarkup allows for smarter and much more sophisticated automation on CAM. A wide range of CAM functionality like DRC, Repair, drill tool compensation, etch compensation, solder mask optimization… stands to benefit from the additional AutoMarkup information in an AutoRebuilt data set
  - Security: AutoRebuilt is backed up by powerful netlist and image comparison tools to guarantee absolute data integrity



Pad Type	Color	Hide	Number
BGAPadCuDef			836
BGAPadSMDef			0
ComponentPad			167
ConnectorPad			0
NoPad			2
SMDPadCuDef			639
SMDPadSMDef			0
TestPad			0
UnknownPad			0
ViaPad			1782
WasherPad			0

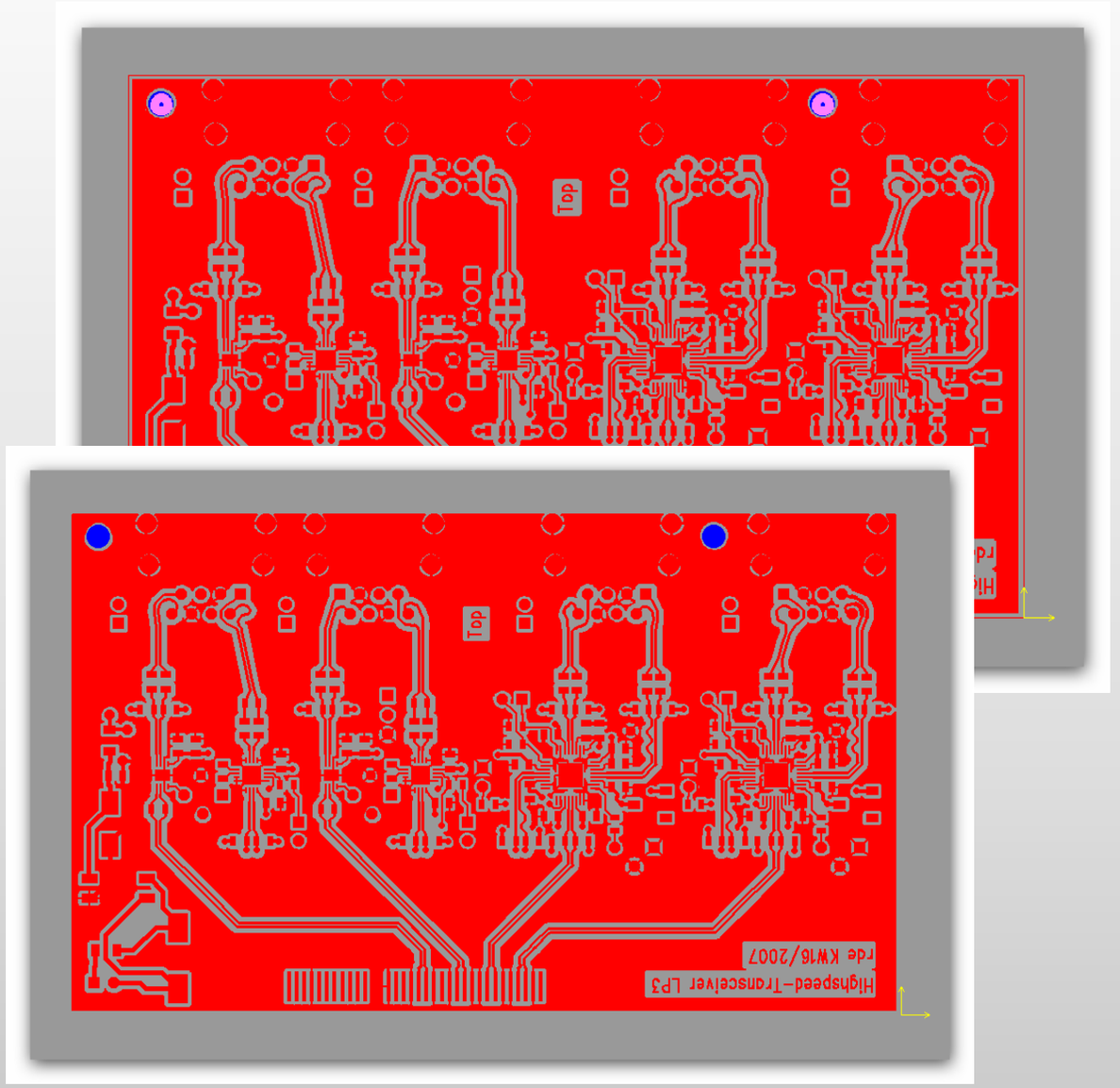
AutoCAM – AutoClean (9646603)

- Features
  - AutoClean automatically performs a host of data clean-up and adjustment functions, which would otherwise be part of the job preparation in CAM
    - Double drill hole removal
    - Pre-drill hole removal
    - Removal of non-functional pads on inner layers
    - Removal of Copper pads on non-plated drill hole locations
    - Aligning drill holes to copper pads
    - Split mixed drill layers into separate plated and non-plated drill layers
    - Intelligent removal of data outside of the board outline, including clipping of data elements that are partly inside partly outside
    - Removal of the board outline, drawn in the copper layers
  - All AutoClean options are individually setable and most of them have additional parameters to influence their behavior
  - AutoClean exports an enhanced version of the input data to DPF, Gerber or ODB++ for further processing on CAM



AutoCAM – AutoClean (9646603)

- Benefits
  - Reduced CAM time: starting from the optimized data from AutoClean, CAM processing times may drop by up to 30% and more
  - Improved User Experience: CAM operators receive a data set that is already in optimum shape for starting the real CAM work. The tedious work of cleaning up has already been done for them
  - Less automation required: the sophisticated algorithms from AutoClean do away with the need for writing one's own data clean-up scripts
  - Consistency: data is always cleaned using the same, secure methodology. The quality of the result is constant and unrelated to any human knowledge or skill level
  - Security: AutoClean's embedded checking and verification tools ensure full data integrity of the exported layout data



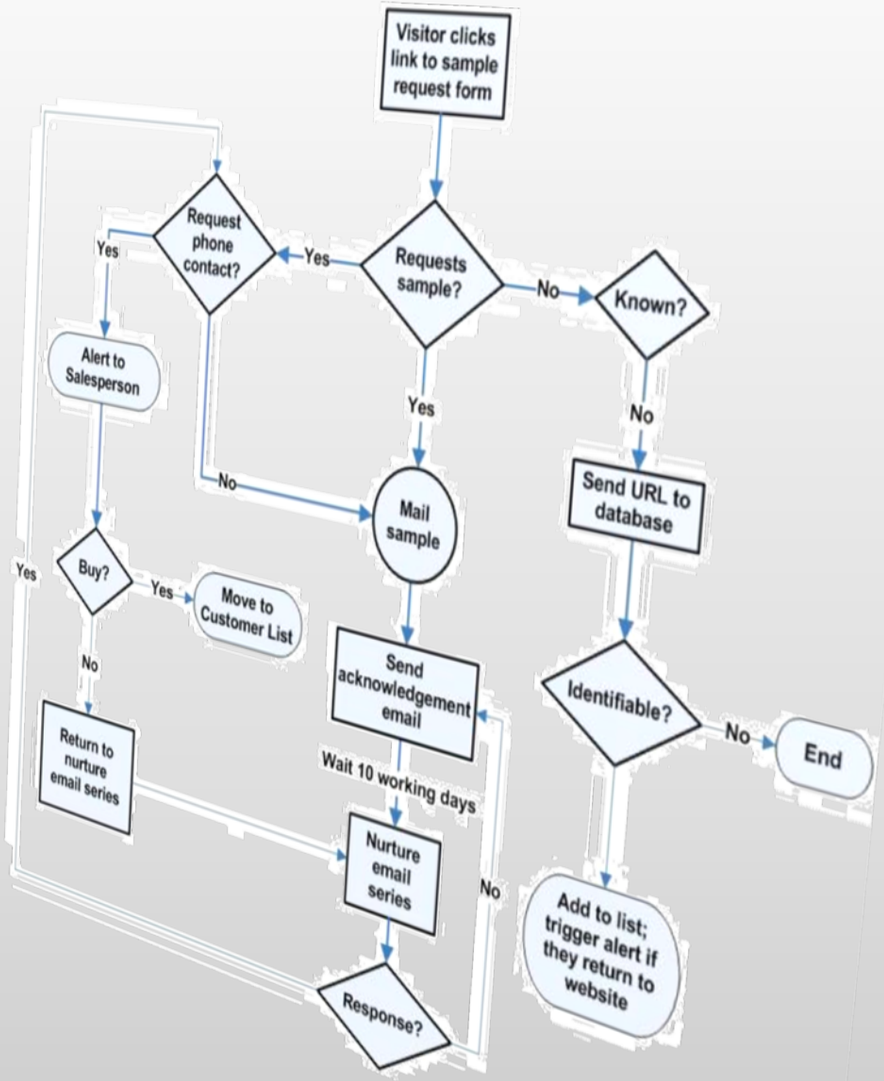
External Scripting

- Features
  - External scripting offers a set of programming tools to influence the way a data set is processed within the Integr8tor workflow
  - The complete module is built up of 3 levels, each addressing a different aspect of the Integr8tor workflow control
    - Level 1 - Systems Integration & Communication (9646949)
    - Level 2 - Job Flow Control (9680089)
    - Level 3 - Hypertool for Integr8tor

    The functionality of the levels is incremental: level 2 includes the functionality from level 1; level 3 includes the functionality from level 1 and level 2

External Scripting

- Benefits
  - Full Automation: external scripting minimizes the need for operator decisions on special cases in the Integr8tor workflow. More jobs run through fully automatically without human intervention and as a result quotation information and CAM data arrive in the relevant departments in a timely manner
  - Systems Integration: external scripting allows other information systems in the company to tie in with Integr8tor. The knowledge about orders, jobs, delivery,… is shared between several business-critical applications, ranging from ***Web Portal*** over ***ERP*** to ***Production and Planning systems***. The entire business flow becomes more integrated and therefore smoother
  - Scalability: the incremental levels of scripting respond to every need, from basic to highly sophisticated. They allow the automation to grow along with the business

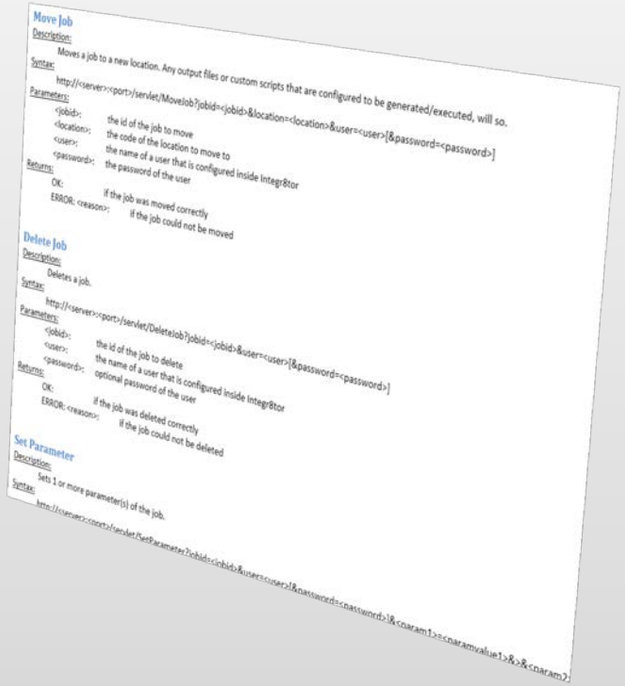


External Scripting - Level 1

Systems Integration & Communication (9646949)

- Features
  - an external system (ERP, PPS, Customer Web Application,…) to move an Integr8tor job to a new tray
  - an external system to delete an Integr8tor job from the job queue
  - an external system to change a job queue characteristics for an existing job (prio, tray,…)
  - an external system to abort a running job
  - an external system to inquire about the status of an Integr8tor job (available, running, completed, stopped)
  - to execute a customer script that has been attached to a tray when an integr8tor job enters this tray
  - to perform some logistic actions like sending Emails from out of Integr8tor, do data management (FTP, directly in the file system…)

External systems are granted access to the Integr8tor environment via an http command set

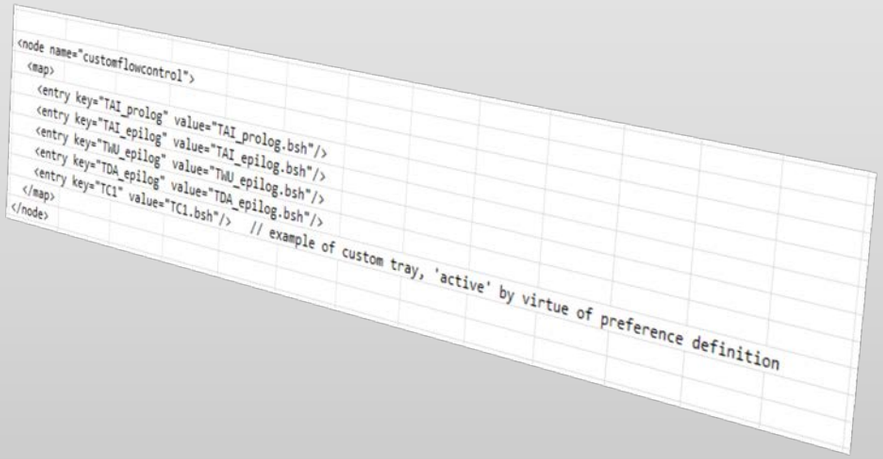


External Scripting - Level 2

Job Flow Control (9680089)

- Features
  - a full blown Application Programming Interface (API) to interrogate all characteristics of an Integr8tor job (who is the customer, how many copper layers, has an outline been detected, what surface finish has been defined,…)
  - a system of Custom Flow Control (CFC) with which an Integr8tor job can be made to follow a different route than the standard and static Input – Workup – Design Analysis.

    E.g. using the API, a Customer Flow Control script could detect an archive from customer XYZ has come in and force Integr8tor to bypass design analysis, moving the data from input straight to the tray for exporting the job to DPF



External Scripting - Level 3

Hypertool for Integr8tor

- Features
  - This level adds CAM functionality to the Integr8tor workflow. With scripting level 3 it is possible to integrate your existing UcamX hypertools into the Integr8tor environment

Cockpit User (9646799)

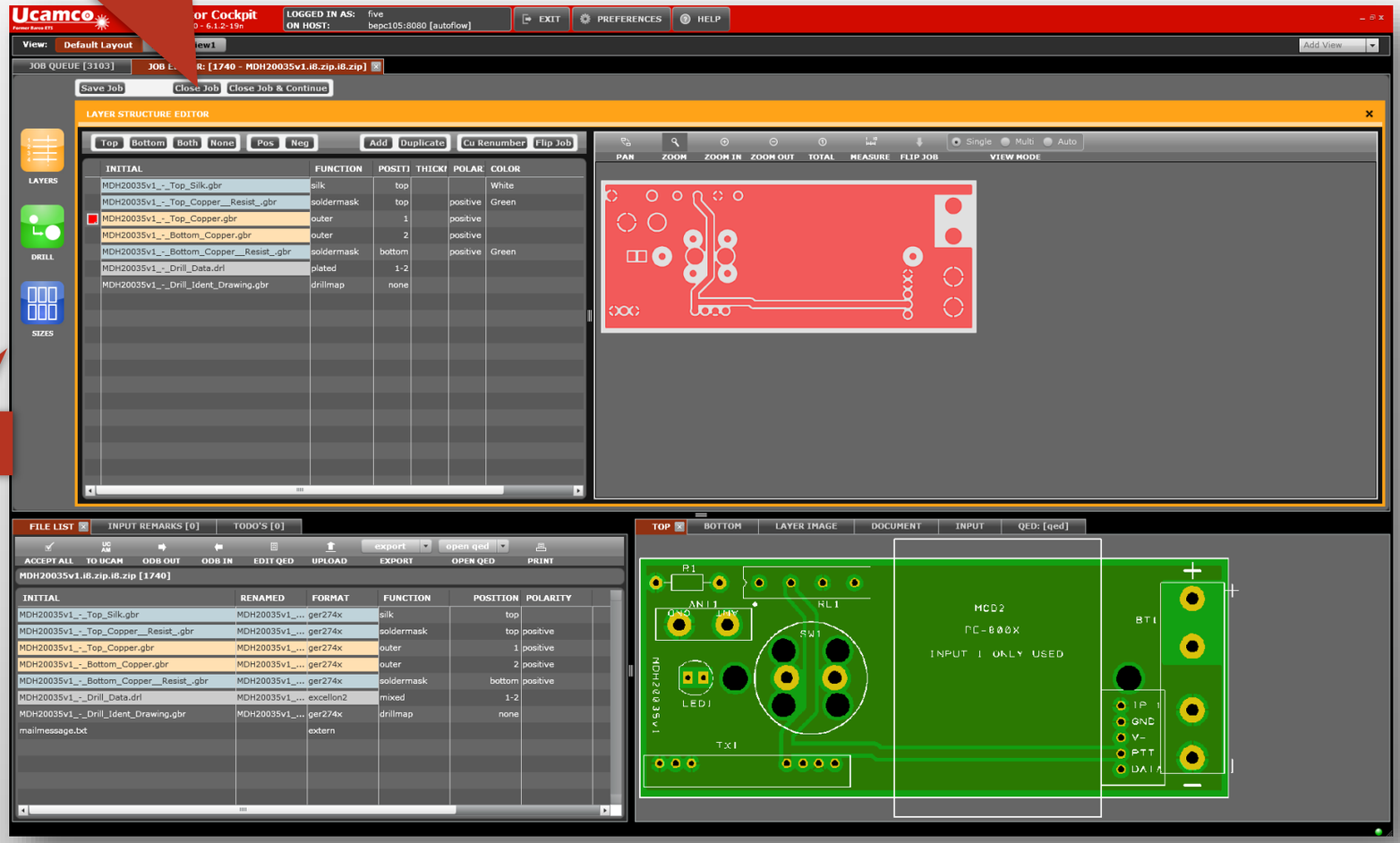
- Features
  - Concurrent User
  - Easy switching between opened job and job queue
  - Wizards
  - Interface is completely customizable.
  - Different views can be stored and loaded
  - Drill Editor also supports Rout tools
  - QED Editor allows you to fill in process Parameters and overrule computed Parameters

Cockpit User (9646799)

Cockpit User (9646799)

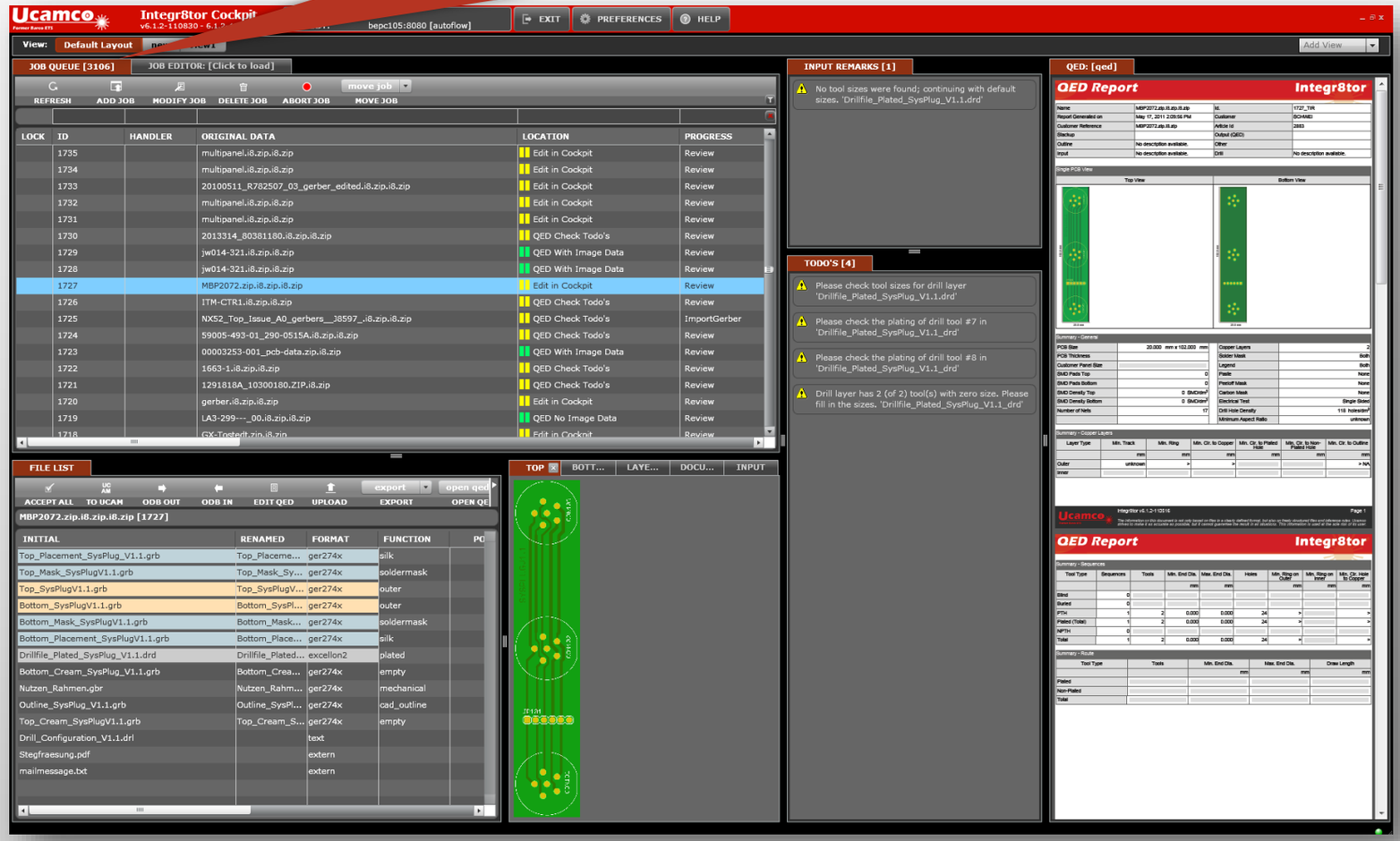
Easy switching between opened job and jobqueue

Wizards



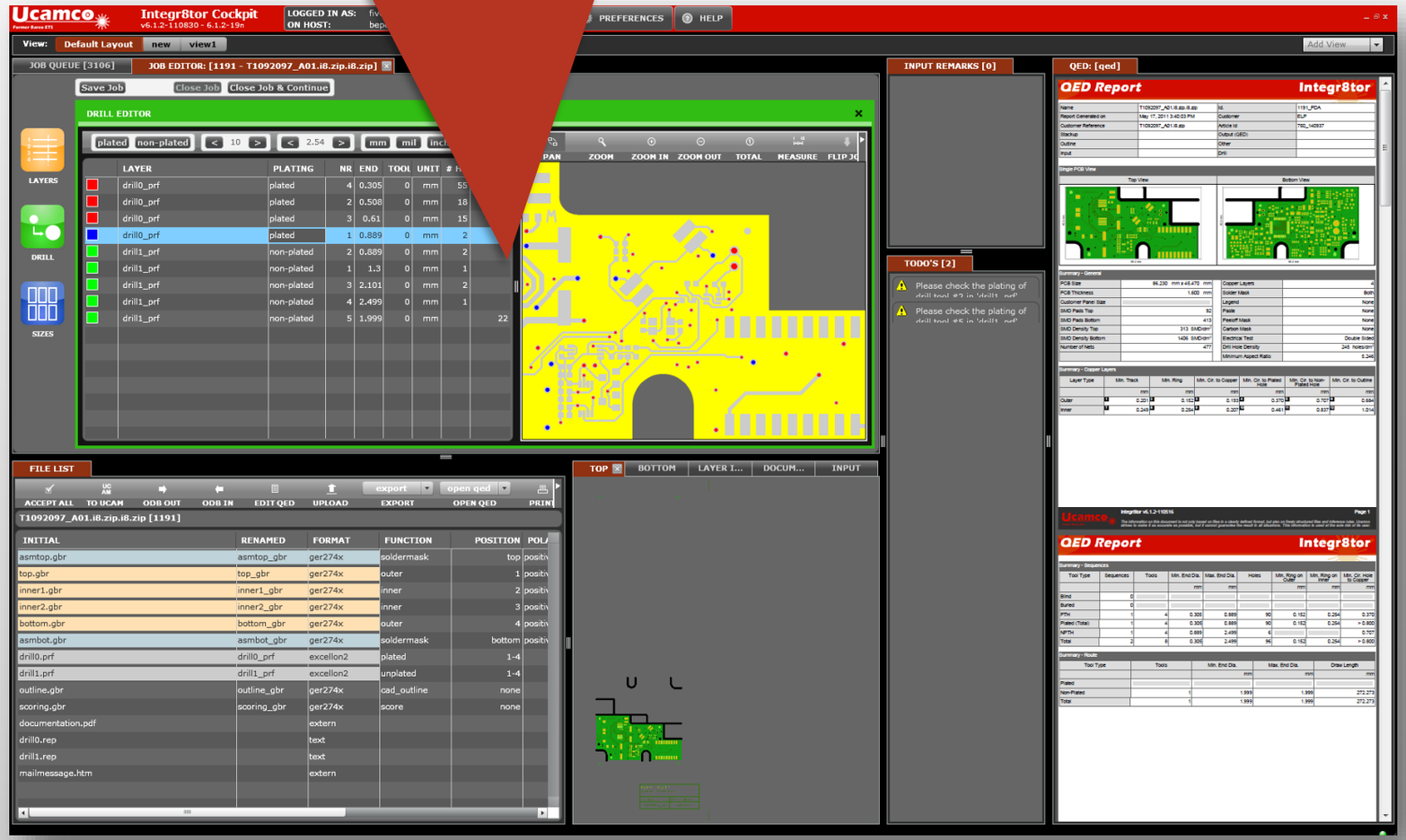
Cockpit User (9646799)

Interface is completely customizable.
Different views can be stored and loaded.



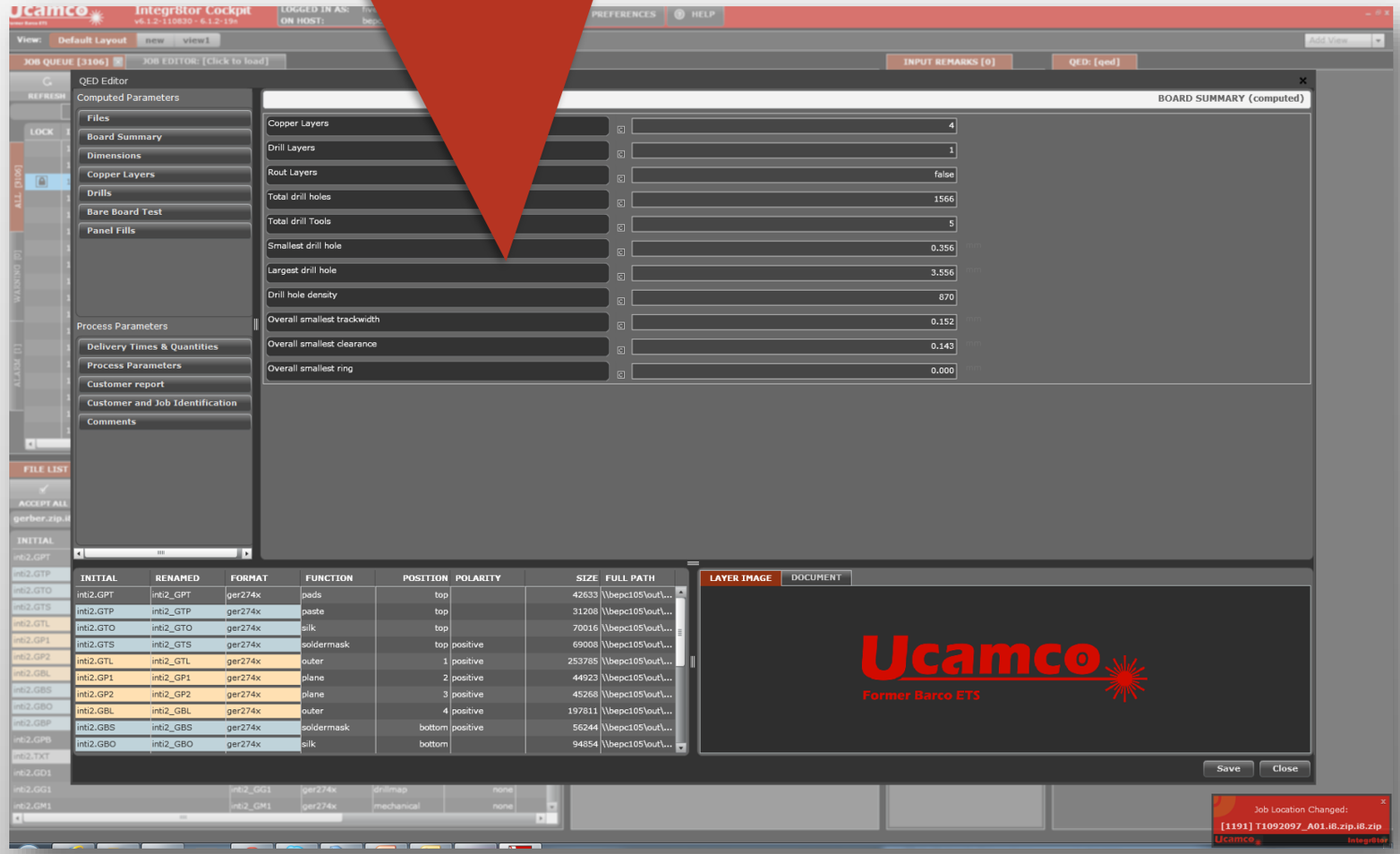
Cockpit User (9646799)

Drill Editor also supports Rout tools.
Selected tool is highlighted in blue.

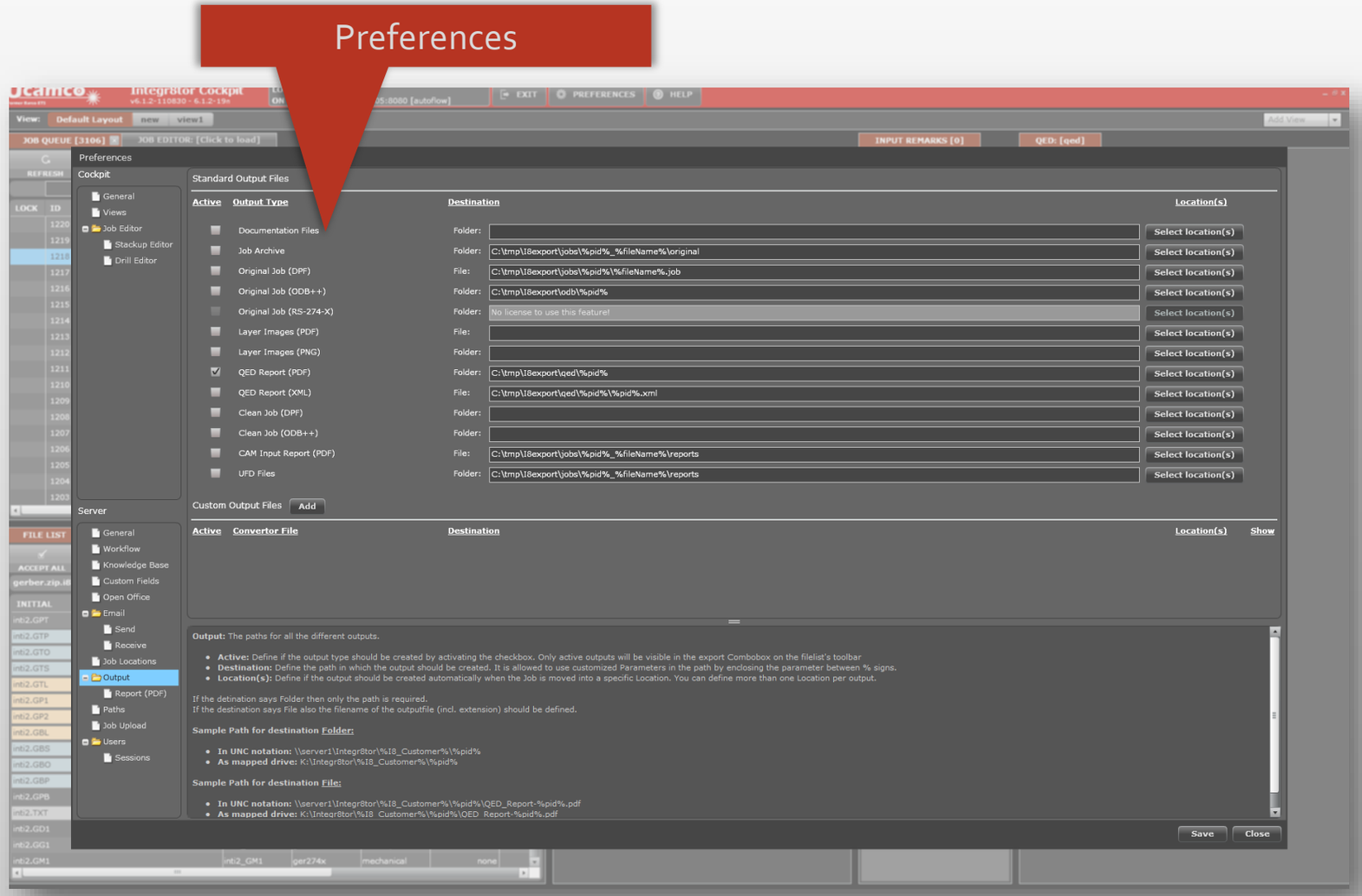


Cockpit User (9646799)

QED Editor allows you to fill in process Parameters and overrule computed Parameters



Cockpit User (9646799)



Dashboard User (9646808)

- Features
  - Concurrent User

Checkpoint (9646993)

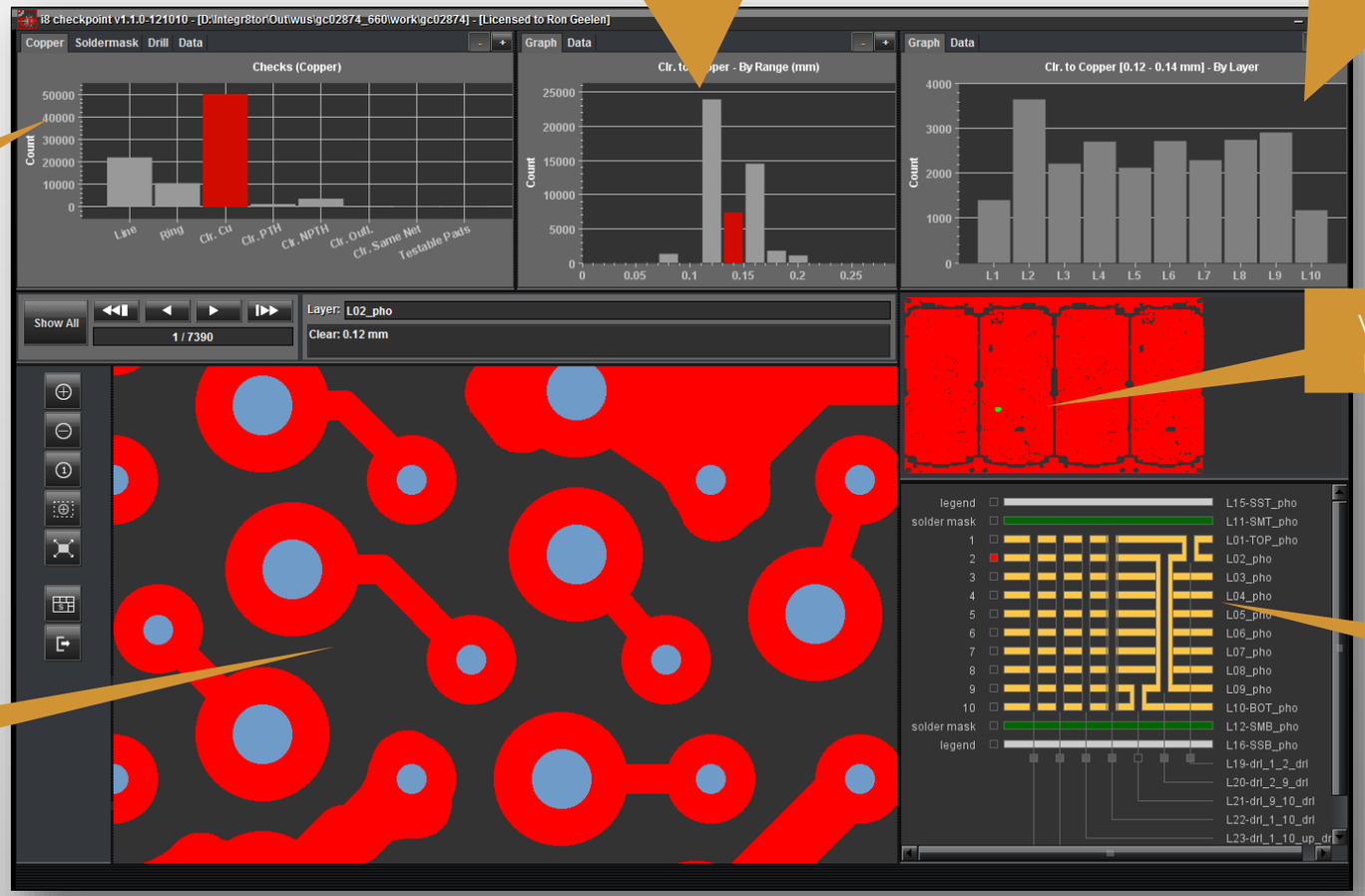
- Features
  - Extends Cockpit functionality with Graphical review application of all QED summary locations
  - Visualizes for all checked design parameters all the found locations in the design.
  - Shows the parameters in different graphs. Going from an overall graph to a detailed graph per layer.
  - Available parameters are based on the functionality available in Integr8tor.
  - Runs on every windows-based client without any setup.
  - Requires only a license to run.
  - Is customizable.

Checkpoint (9646993) - Interface

Detailed graph of selected DA parameter and the amount of locations

Detailed graph of selected DA parameter and the amount of locations per layer

Overall graph of all DA parameters and the amount of locations



View guide showing position on the pcb

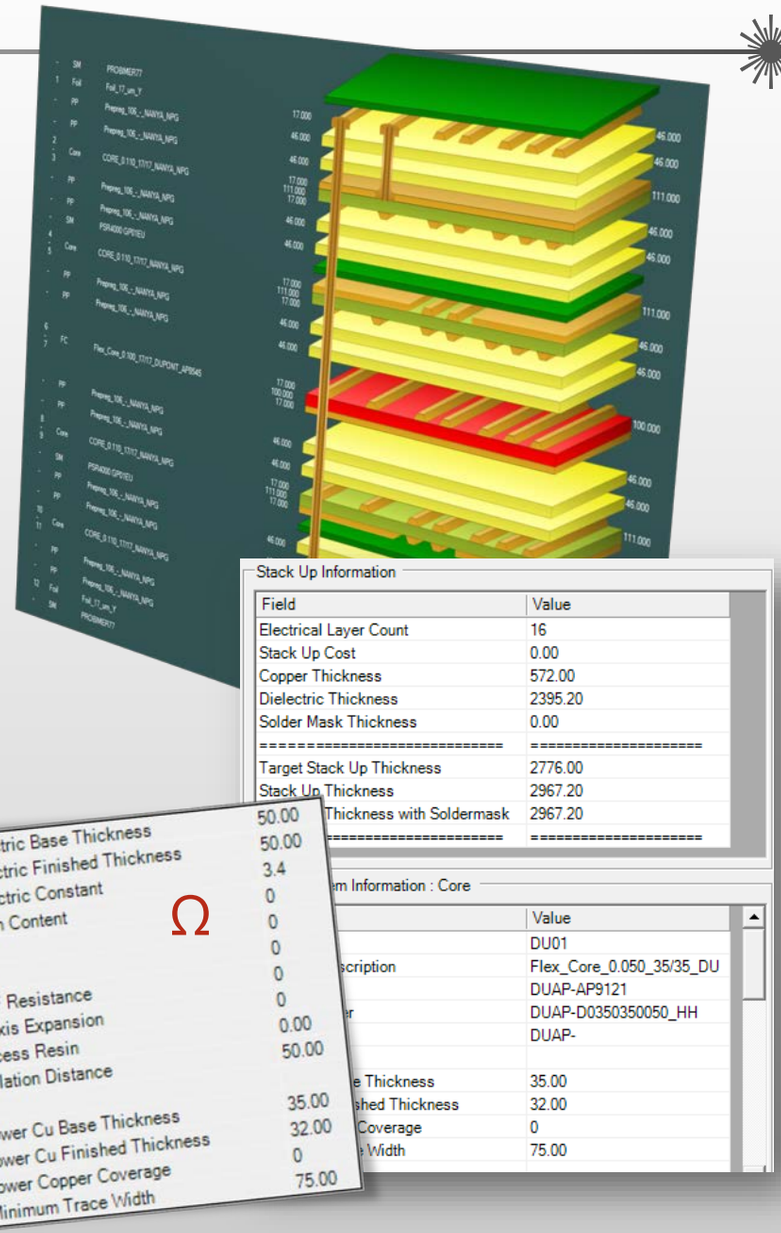
Detailed view per location

Stackup showing affected layer(s)

Ustack (9680063)

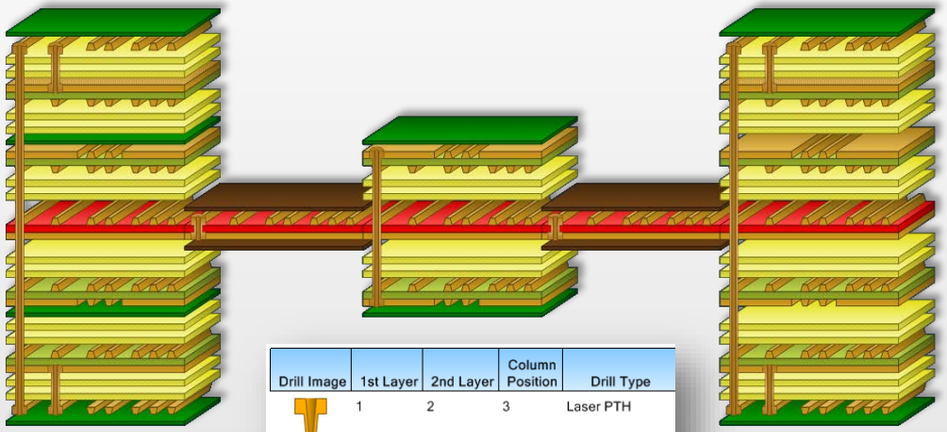
- Features
  - Advanced and versatile module for adding material information to the layer stackup
  - Support for all common material families to build rigid, flex, HDI and flex-rigid boards:

    Cores – Prepregs – Flex Cores – BondPly – Coverlays Adhesives – Stiffeners – Phantom material…
  - Custom-definable material library – linkable to your current material management system
  - Embedded stackup documentation and print module
  - Support for multiple stackups per job to model complex flex-rigid stackups
  - Symmetrical and non-symmetrical stackups supported
  - Post-lamination board thickness calculation based on the true copper percentage of the various layers in the board
  - Calculates and verifies aspect ratio
  - On-the-fly stackup DRC checks to safeguard against sub-optimal stackup designs

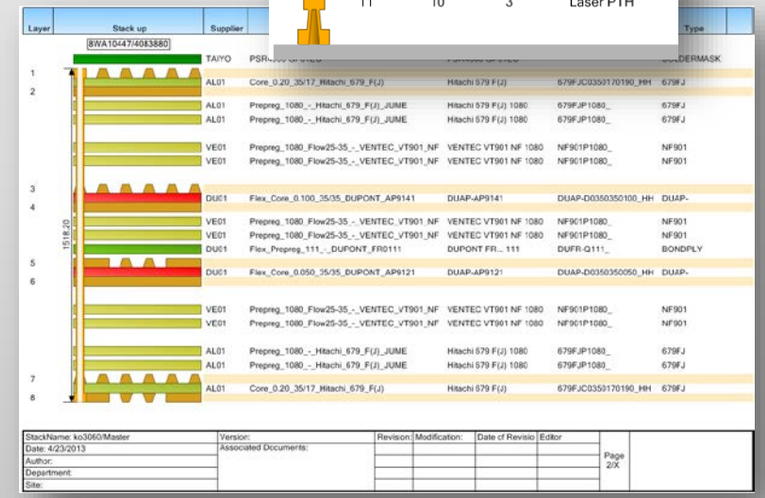


Ustack (9680063)

- Benefits
  - Easy-to-use and intuitive tool for creating even the most complex of stackups
  - Very short learning curve
  - Material and stackup information available in Integr8tor QED data for a more accurate price estimation
  - Professionally-looking stackup documentation – printed or in PDF – is a valued add-on to the customer's quotation bundle
  - Very accurate prediction of the final board thickness
  - Resin starvation DRCs and alarms for non-symmetrical material usage prevent improperly designed stackups from arriving on the shop floor and help reduce scrap rates
  - Material and stackup information is transferred seamlessly to the UcamX CAM job output from Integr8tor – No repeated or duplicated stackup work during CAM
  - Bi-directional, 100% compatible link with Polar Instruments' software modules for adding and calculating impedance structures



Drill Image	1st Layer	2nd Layer	Column Position	Drill Type
	1	2	3	Laser PTH
	1	11	1	Mechanical PTH
	2	10	2	Mechanical PTH
	11	10	3	Laser PTH

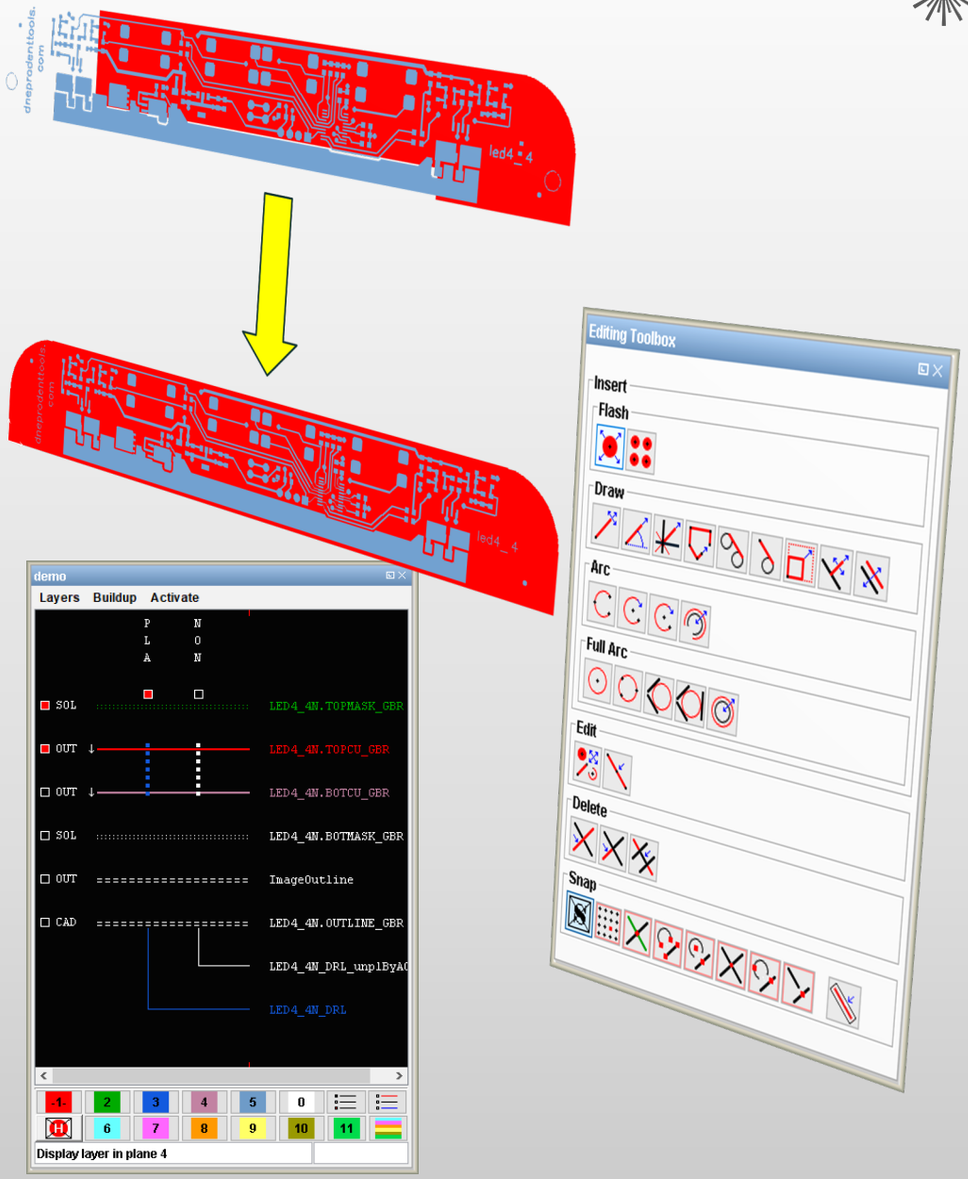


Cockpit Job Editing (9646807)

- Features
  - Job input and editing (stackup editor, drill tool editor, sizes editor, …)

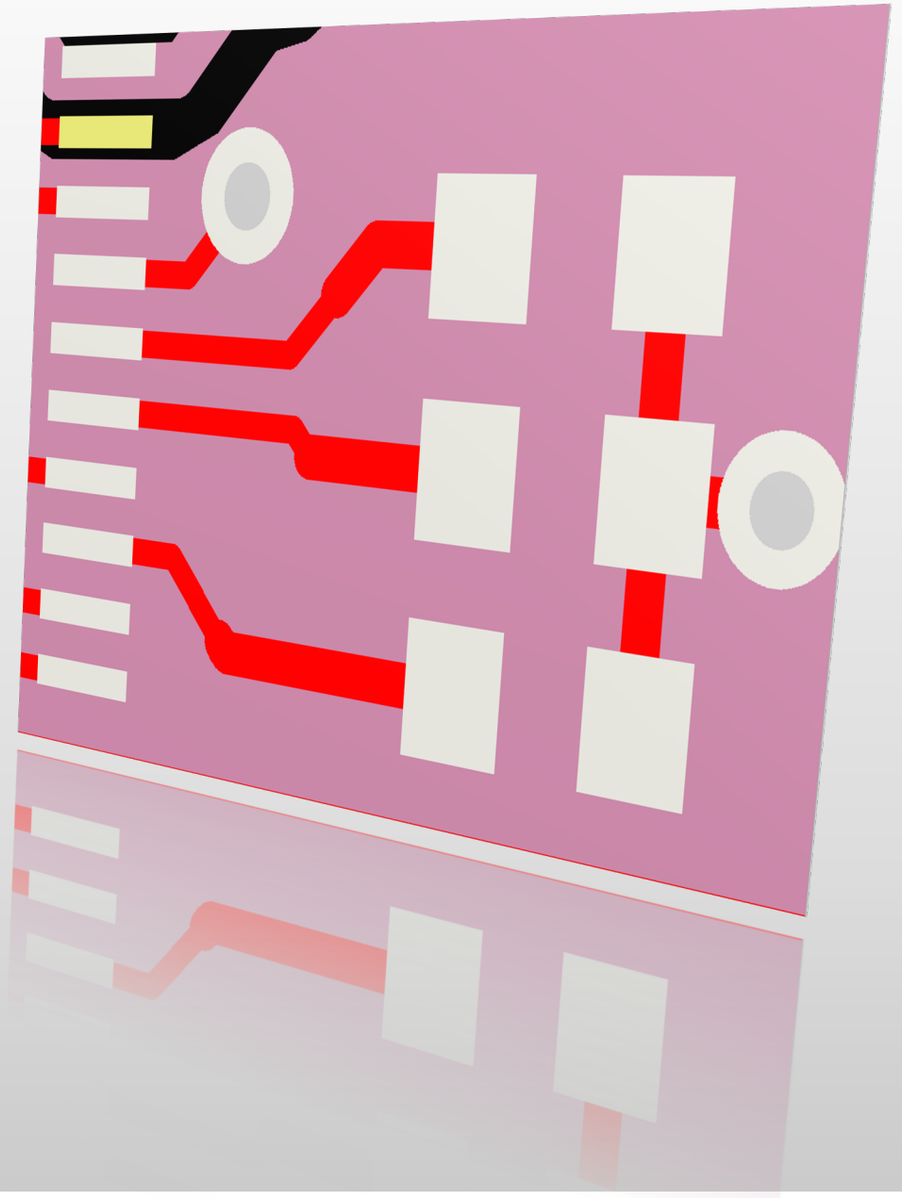
UcamX WE (Workflow Edition) (9680177)

- Features
  - Full-blown graphical editor for addressing any issues in the incoming data
  - Directly accessible from within Cockpit
  - Provides high-end editing tools to
    - Add a **missing outline** to a job or **correct** a faulty one
    - **Register** low-info or highly symmetrical layers manually in case the automatic layer registration was inaccurate
    - Set the correct layer **polarity**
    - **Eliminate duplicate** layers from the job stackup
    - Add **gold mask** or **peel-off layers** to the job that are not available in the customer archive
    - **Merge** split layers together (e.g. 1 layer with pads – 1 layer with traces to make for 1 physical copper layer)
    - Read in the odd **legacy** Gerber data set that still comes with old-school aperture lists
    - Examine netcompare **errors** reported by the AutoReference option
    - …



UcamX WE (Workflow Edition) (9680177)

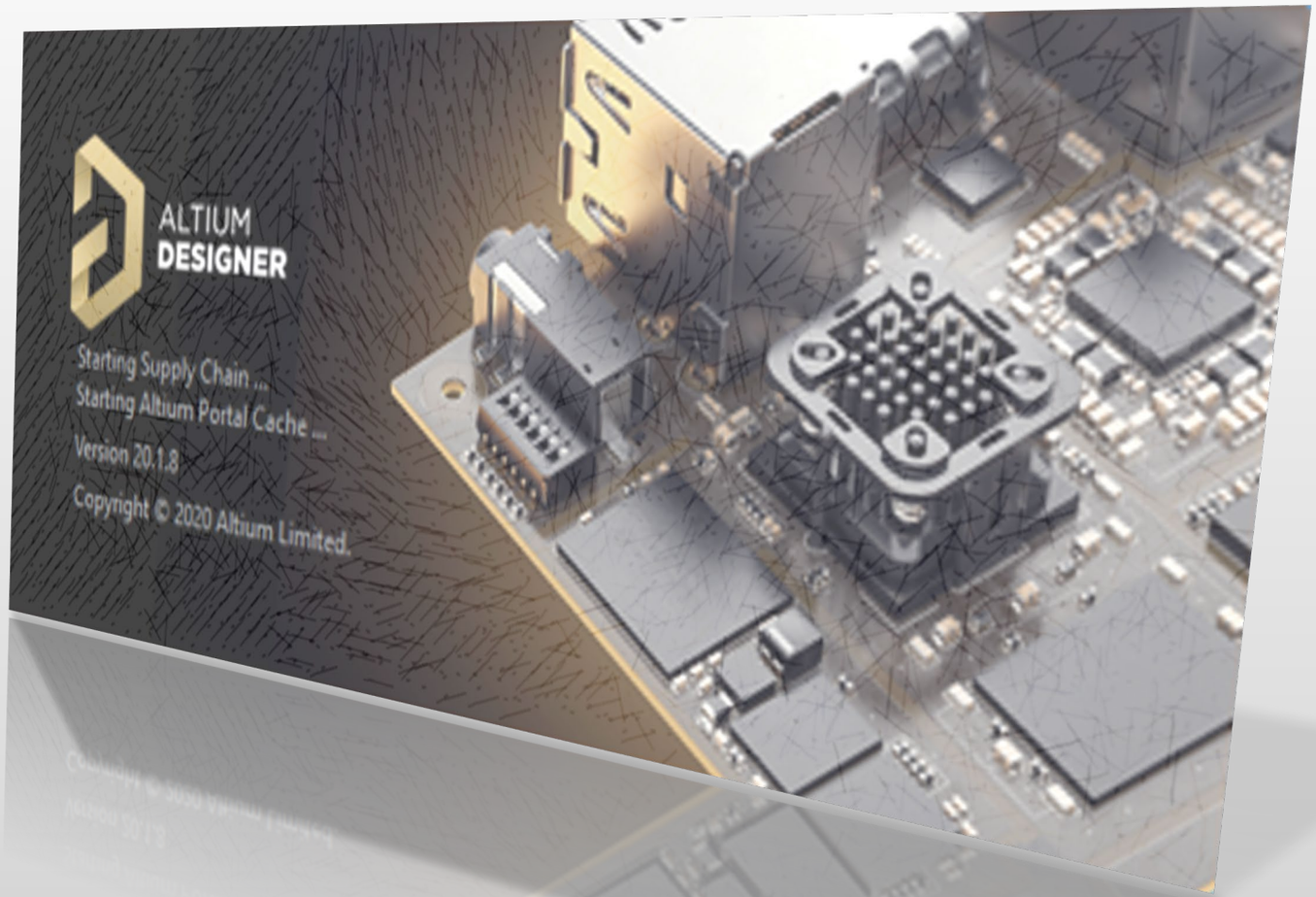
- Benefits
  - Accuracy: adding missing vital information to the Integr8tor job (outline, gold-plated areas, …) provides for the most accurate analysis and quotation data
  - Efficiency:
    - Resolve data inconsistencies "on-line" in Integr8tor, without having to take the job off-line to a CAM engineer. A job with an issue continues its flow within minutes
    - UcamX WE is floating. Use it from any Cockpit on the network
    - UcamX WE uses a private set of licenses - no interference with the pool of licenses for your CAM department
  - Cost-effictiveness:UcamX WE comes free of charge as part of and for the duration of your maintenance contract
  - Ease-of-use: UcamX WE comes with a very intuitive and customizable user interface and requires a very short learning curve



Altium PCB Input Connector (9680181)

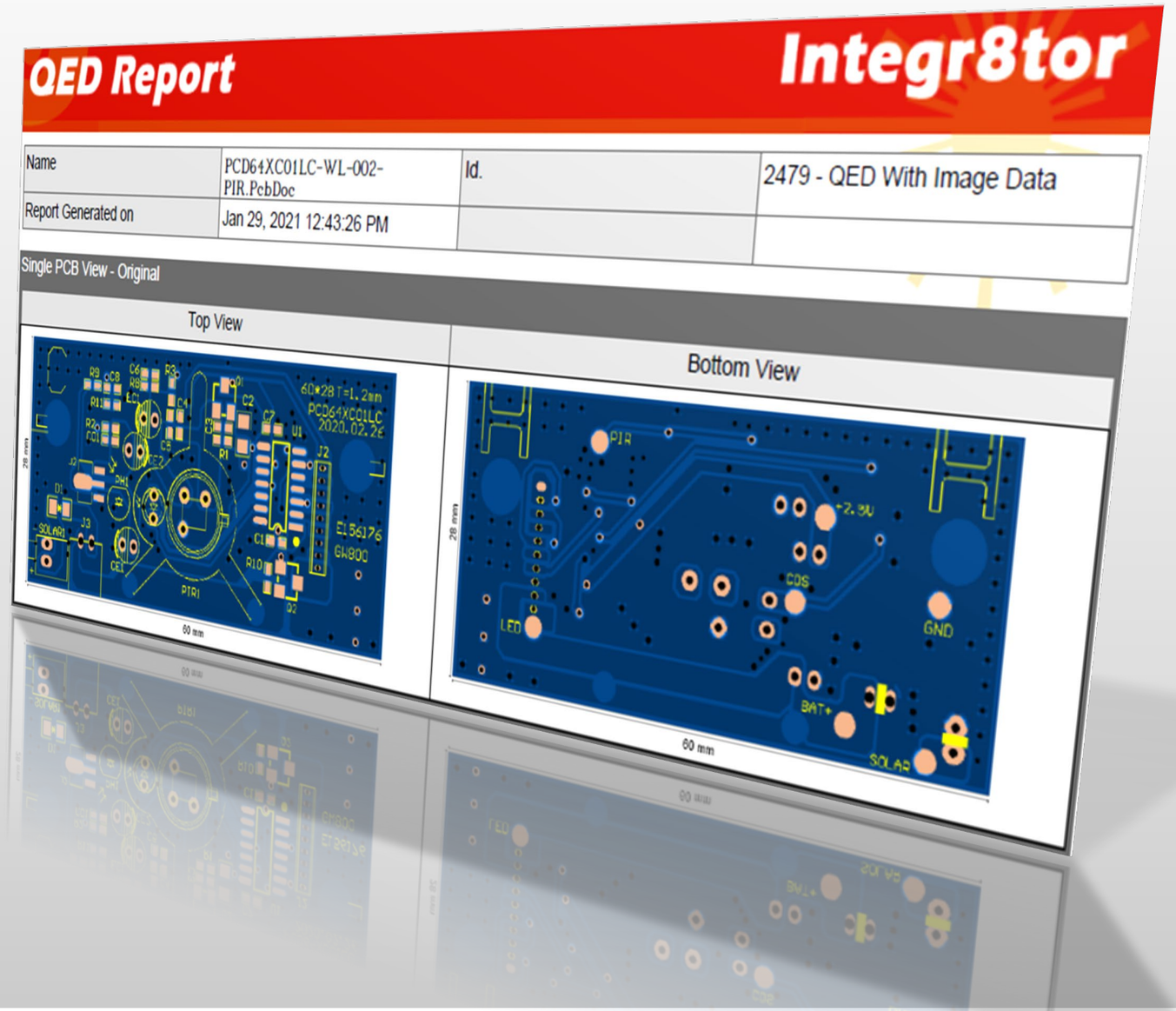
- Features

  - Input of Altium Designer CAD database files (.pcbdoc files)
  - Incoming pcbdoc files are forwarded transparently to an Altium Designer software package (not included) and converted on the fly
  - The resulting Ucamco-certified Gerber X2 files return to Integr8tor for QED analysis - no questions asked – all information is in X2
  - Different cockpit clients can submit pcbdoc archives at the same time Integr8tor takes care of the queue management towards Altium



Altium PCB Input Connector (9680181)

- Benefits
  - Customer loyalty: grow market share by accepting your customers' preferred data input format
  - Cost-effictiveness: take the Altium Designer software you may already have in house anyway, and let Integr8tor make use of it
  - Security: Altium PCB Input Connector instructs Altium Designer which conversion options to use for the optimum result
  - Ease-of-use: completely transparent to the end-user/sales person. No special skills or knowledge required
  - Automation: fully automated solution for processing pcbdoc files into Integr8tor



DPMX (IPC-2581) data input (9680185)

- Features

  - Input of IPC-2581 database files
  - Full PCB production data import including
    - Copper layers
    - Drill layers
    - Layer stackup
    - Board outline
    - Soldermask
    - Legend
    - Paste
    - Netlist
    - Assembly&fabrication drawings
    - …

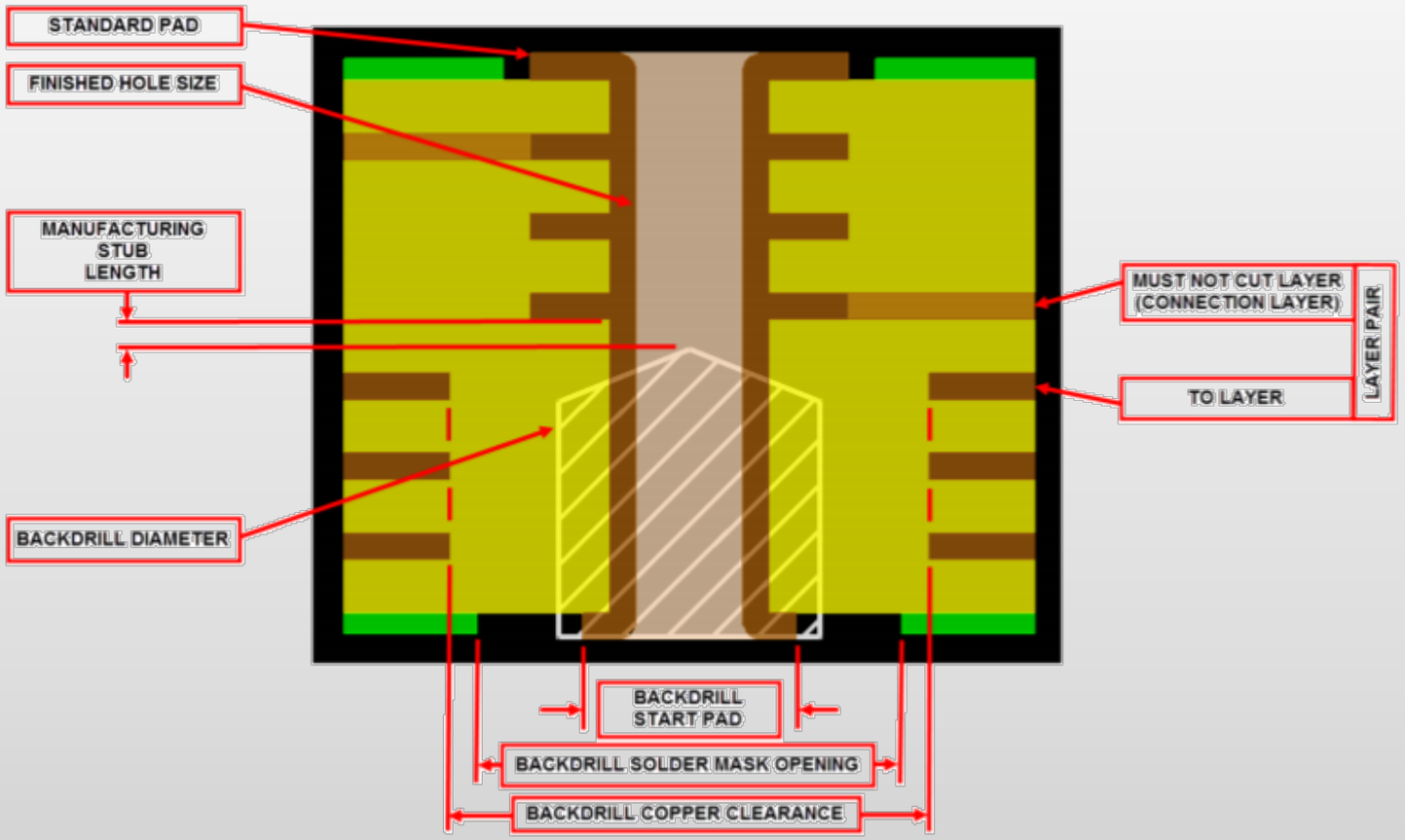
DPMX (IPC-2581) data input (9680185)

- Benefits
  - Automation: read in manufacturing data fully automatically in the emerging standard DPMX format
  - Customer loyalty: grow market share by accepting your customers' preferred data input format
  - Ease-of-use: single-file database for the entire PCB

Backdrill support (9680154)

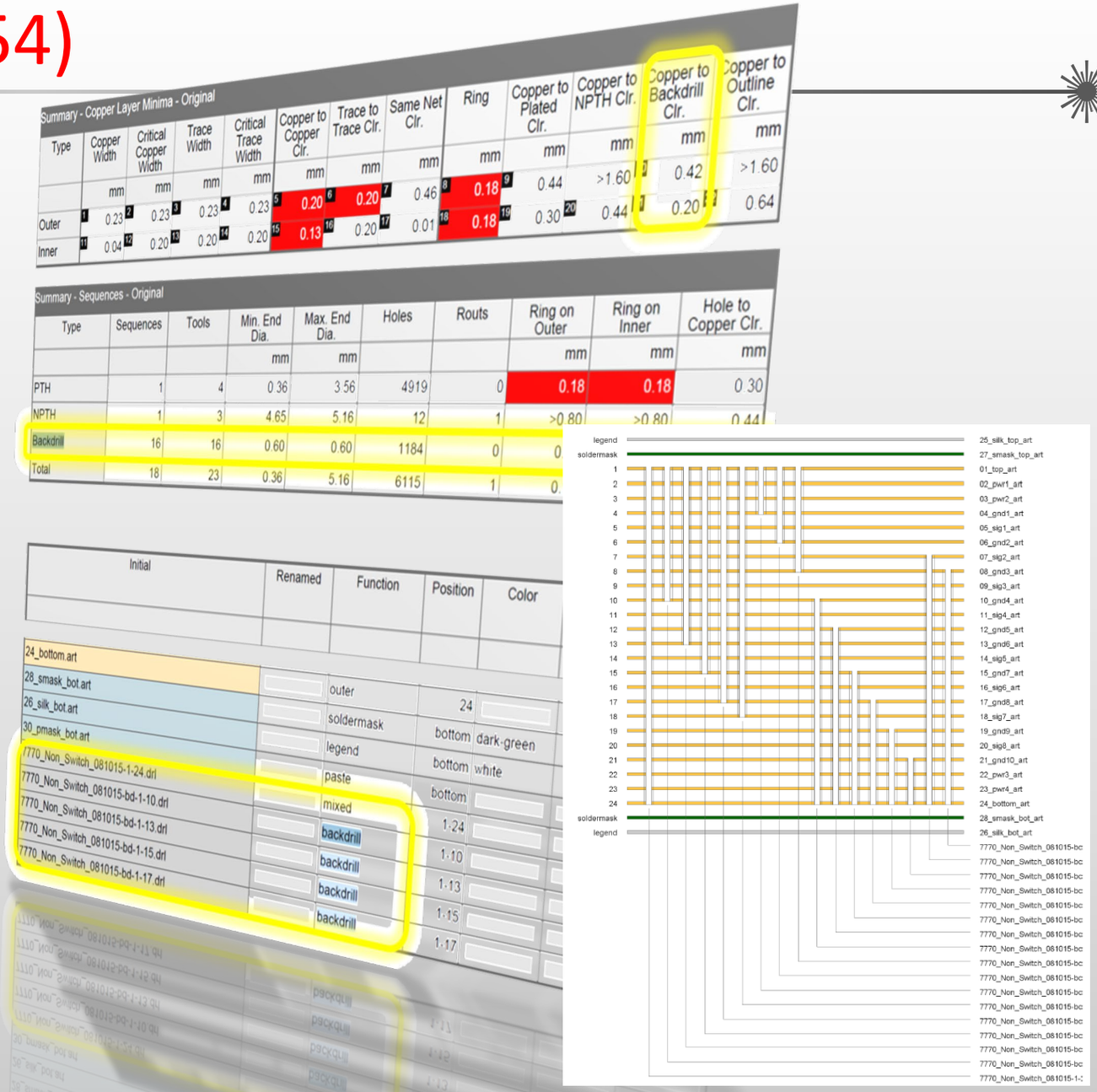
- Features

- Automatic recognition of PCBs requiring backdrilling
- Automatic assignment of the "backdrill" function to the different drill layers in the job
- Automated drill span assignment (from-to) for all backdrilling programs
- Sophisticated and comprehensive QED backdrill analysis and QED report extensions to flag inconsistencies in the backdrill data:
  - Min clearance copper to backdrill
  - Backdrill annular ring detection
  - Detailed images
  - …



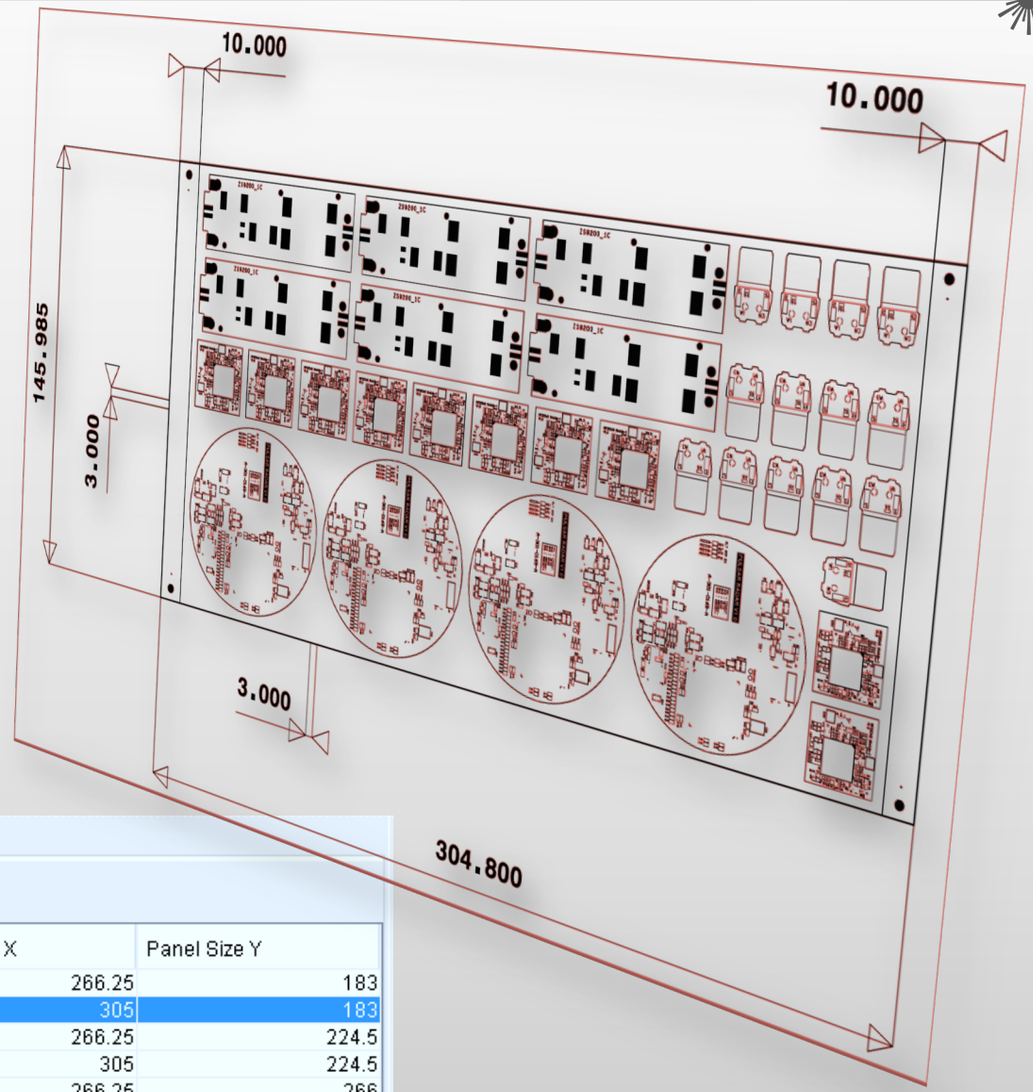
Backdrill support (9680154)

- Benefits
  - Automation: fully automated solution for an otherwise intricate and error-prone task: the manual set-up of as many as 20 backdrill files or more in a product is not an evident thing to do
  - Ease-of-use: software recognizes backdrilled products and takes care of the complex drill layer setup – no additional skills or knowledge required
  - Accurate quoting: backdrilling is an important cost driver; missing it during quotation is a costly oversight



Multi-Job Dynamic Panel Optimizer - MDPO (9680137)

- Features
  - Client application for creating PDF assembly panel drawings
  - Allows the design of single-job (same PCB) as well as multi-job (different PCBs) assembly panels
  - Calculates several assembly panel layouts and sizes and reports the panel usage for each of them
  - Automatically dimensions sizes and spaces on the panel drawing
  - Visualizes assembly panel tooling holes and fiducial locations
  - Connects live to the Integr8tor job queue to pick up the jobs required to go onto the assembly panel
  - Combines the PCB outline and legend layers for clear visualization and easy recognition

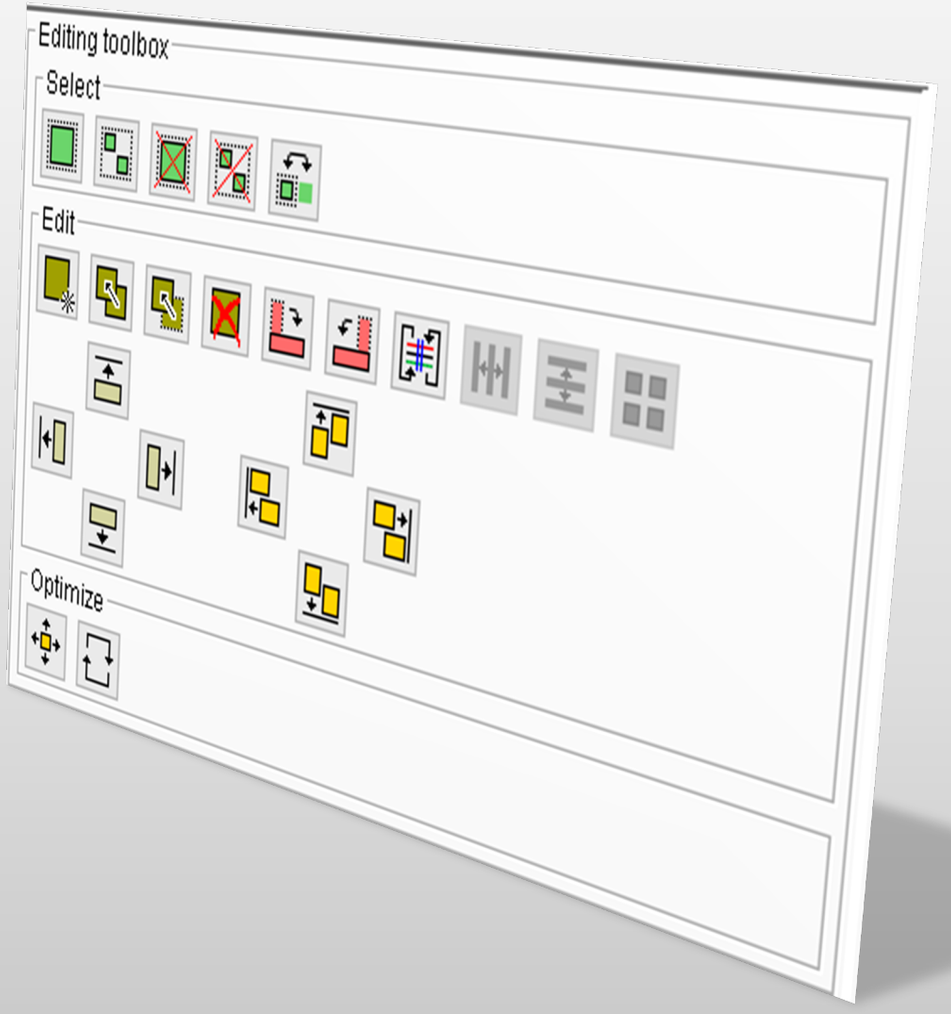


Job List | Solutions | Shuffled Jobs

ID	Panel Usage (%)	# panels	# jobs	Panel Size X	Panel Size Y
1	60	1	4/4	266.25	183
1	52	1	4/4	305	183
1	49	1	4/4	266.25	224.5
1	43	1	4/4	305	224.5
1	41	1	4/4	266.25	266
1	36	1	4/4	305	266

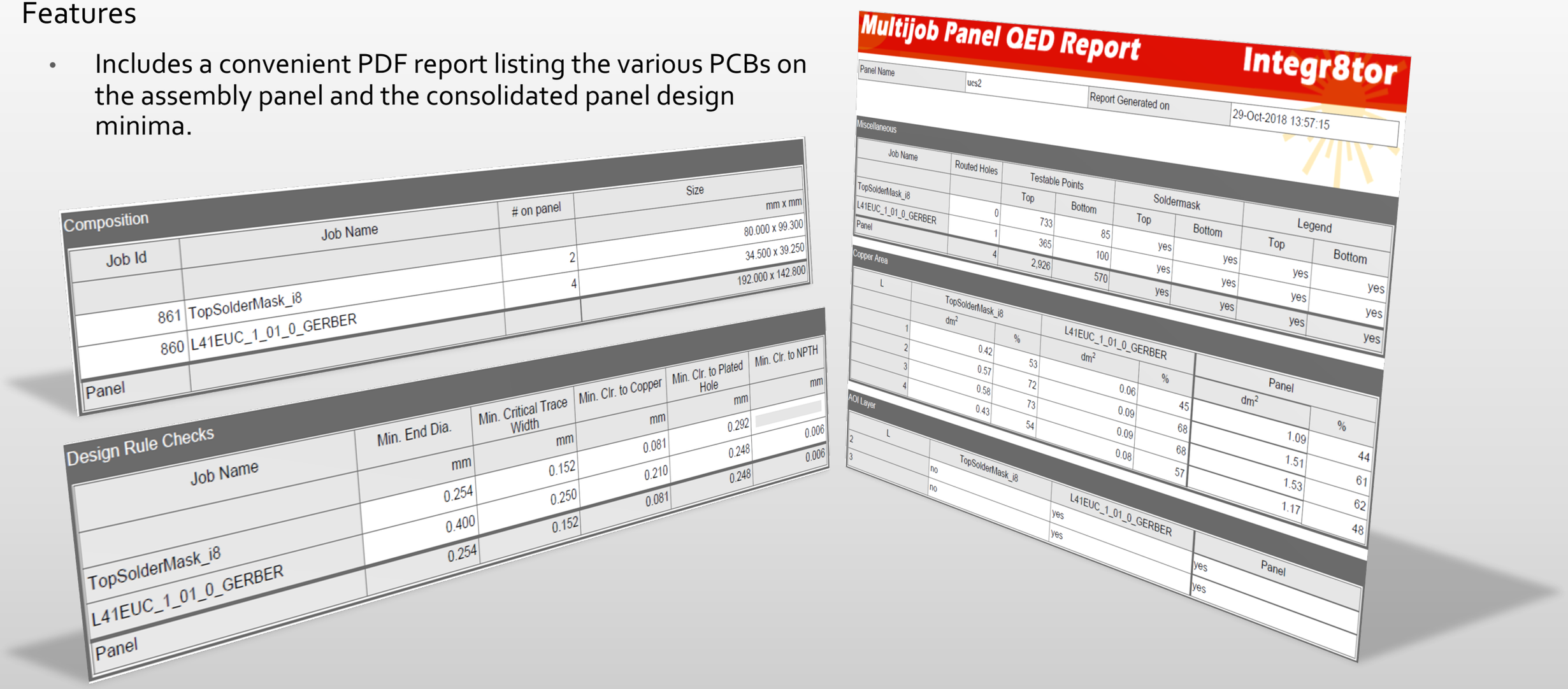
Multi-Job Dynamic Panel Optimizer - MDPO (9680137)

- Features
  - Full-scale interactive functionality to finetune chosen panel layout if needed
    - Increase/decrease clearance
    - Move/Copy
    - Rotate
    - Delete
    - Flip
    - Distribute evenly
    - Align
    - Bump



Multi-Job Dynamic Panel Optimizer - MDPO (9680137)

- Features
  - Includes a convenient PDF report listing the various PCBs on the assembly panel and the consolidated panel design minima.



Composition

Job Id	Job Name	# on panel	Size
			mm x mm
861	TopSolderMask_i8	2	80.000 x 99.300
860	L41EUC_1_01_0_GERBER	4	34.500 x 39.250
Panel			192.000 x 142.800

Design Rule Checks

Job Name	Min. End Dia.	Min. Critical Trace Width	Min. Clr. to Copper	Min. Clr. to Plated Hole	Min. Clr. to NPTH
	mm	mm	mm	mm	mm
TopSolderMask_i8	0.254	0.152	0.081	0.292	
L41EUC_1_01_0_GERBER	0.400	0.250	0.210	0.248	0.006
Panel	0.254	0.152	0.081	0.248	0.006

Multijob Panel QED Report — Integr8tor

Panel Name	ucs2	Report Generated on	29-Oct-2018 13:57:15

Miscellaneous

Job Name	Routed Holes	Testable Points		Soldermask		Legend	
		Top	Bottom	Top	Bottom	Top	Bottom
TopSolderMask_i8	0	733	85	yes	yes	yes	yes
L41EUC_1_01_0_GERBER	1	365	100	yes	yes	yes	yes
Panel	4	2,926	570	yes	yes	yes	yes

Copper Area

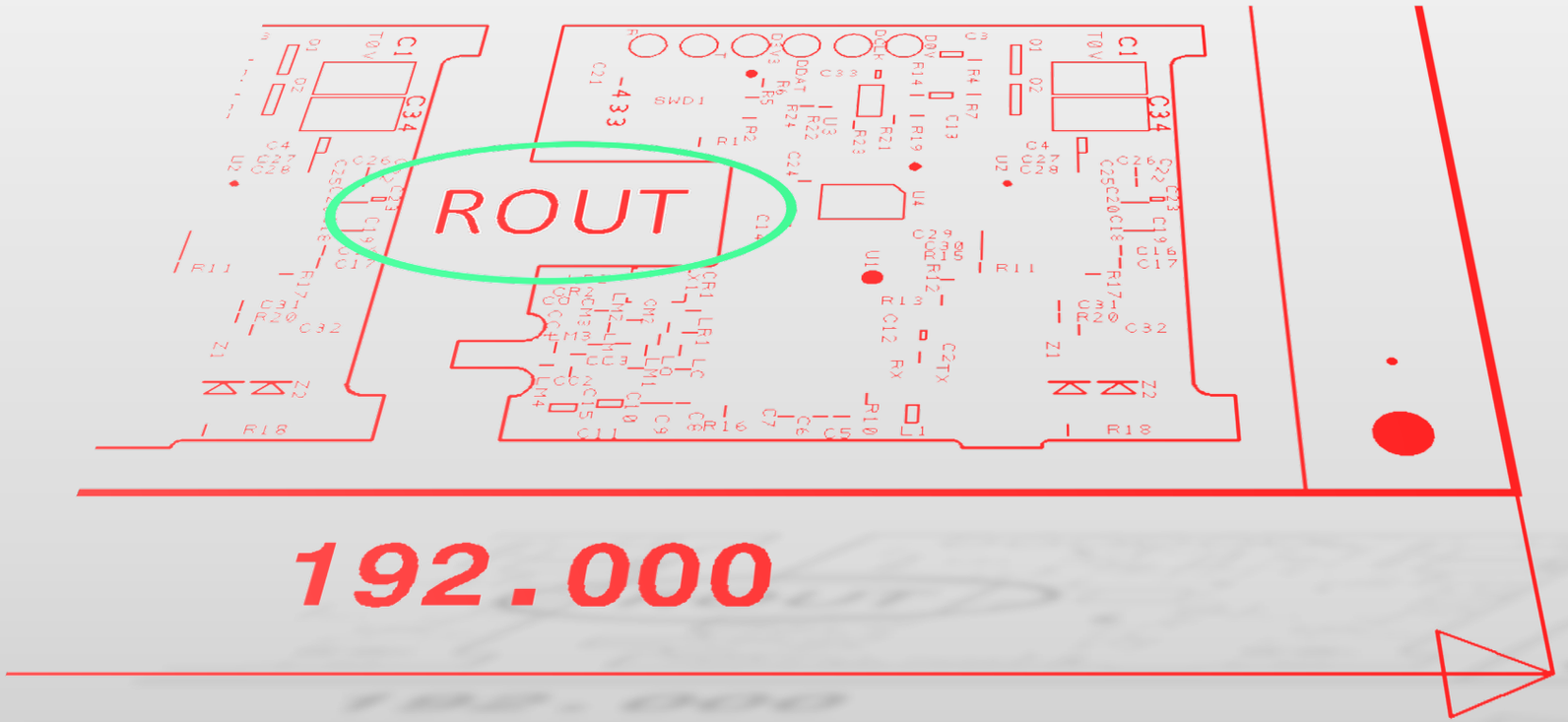
L	TopSolderMask_i8		L41EUC_1_01_0_GERBER		Panel	
	dm^2	%	dm^2	%	dm^2	%
1	0.42	53	0.06	45	1.09	44
2	0.57	72	0.09	68	1.51	61
3	0.58	73	0.09	68	1.53	62
4	0.43	54	0.08	57	1.17	48

AOI Layer

L	TopSolderMask_i8	L41EUC_1_01_0_GERBER	Panel
2	no	yes	yes
3	no	yes	yes

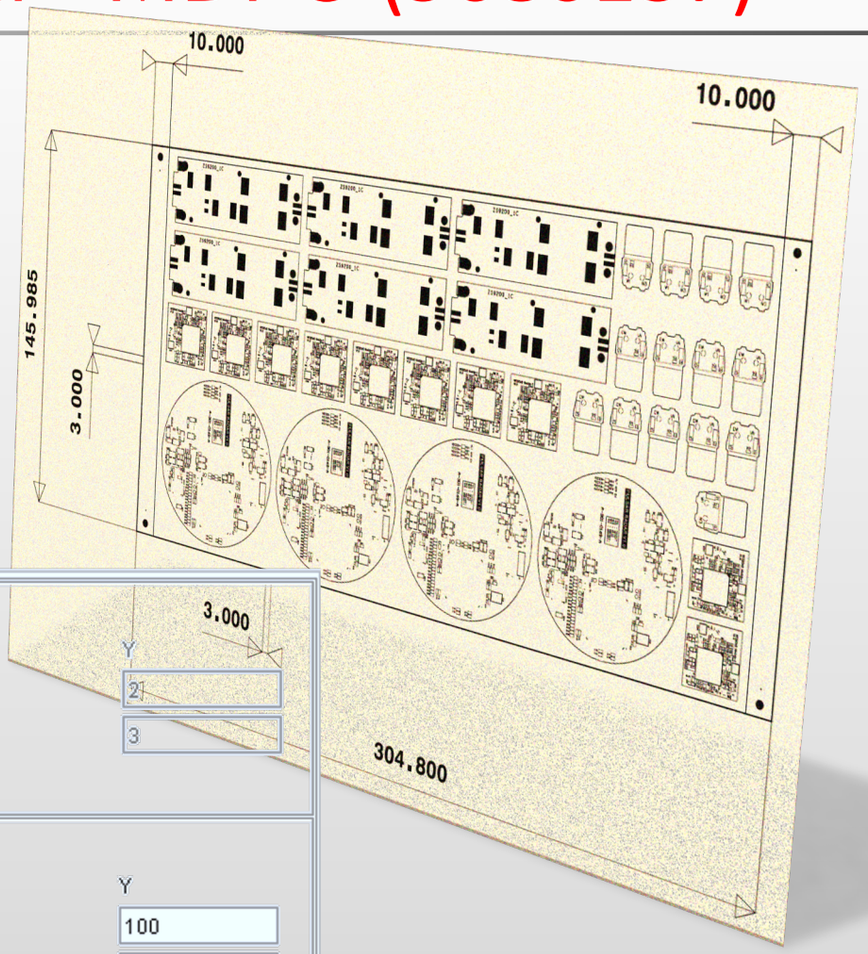
Multi-Job Dynamic Panel Optimizer - MDPO (9680137)

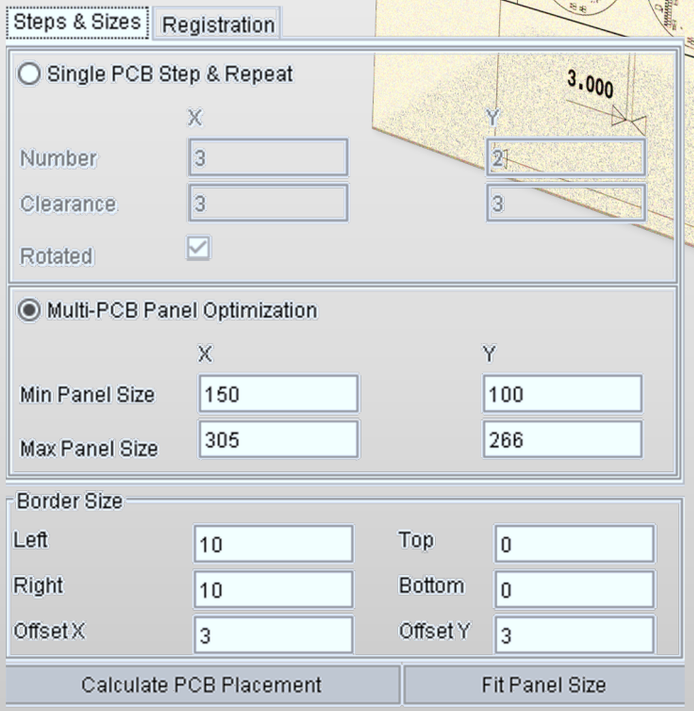
- Features
  - Outputs the assembly panel drawing in DPF format for further use with UcamX's dimensioning tool in case additional call-outs or instructions are required



Multi-Job Dynamic Panel Optimizer - MDPO (9680137)

- Benefits
  - Avoid costly mistakes or misunderstandings by including a clear assembly panel drawing and report with your quotation
  - Reduce material costs by selecting the optimum assembly panel size from the list Multi-Job Dynamic Panel Optimizer has calculated for you
  - Speed up assembly panel design and documentation dramatically thanks to the high degree of automation and an easy-to-use and intuitive user interface
  - Design consistent and high-quality assembly panels automatically, regardless of the operator's skill levels
  - Always use the correct assembly panel creation parameters for an individual customer by storing and retrieving his settings to a panel setup library





Under construction

This page is currently under construction. We will update soon.

In the meantime, please contact presales@ucamco.com for more information.