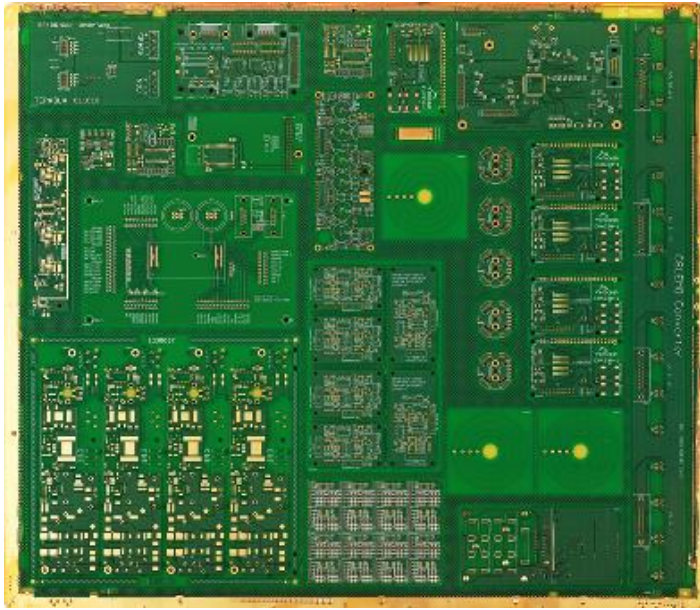
Van CAD-data tot en met bestukte printplaat in de eC-cloud

- Eurocircuits neemt u mee in de virtuele wereld van de eC-cloud. Vertrekkende van uw CAD-data produceert Eurocircuits uw print virtueel inclusief bestukking. DRC en DFM tot op het niveau van de bestukte print nog voor u iets bestelt vermijdt dure fouten. En nadien is er de levering van het geheel. Een overzicht.
- Dirk Stans, Eurocircuits

What services - Eurocircuits



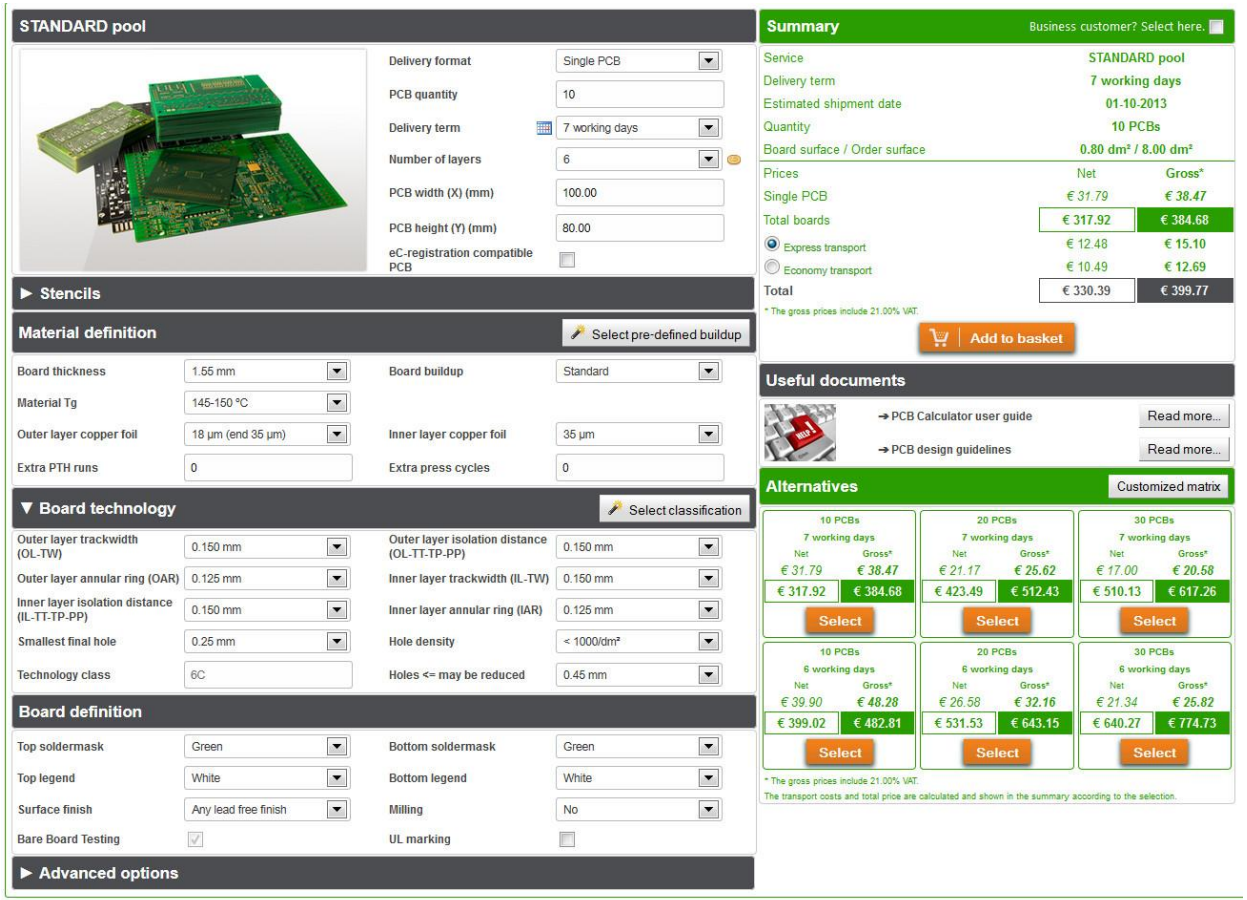
- PCB prototypes & small series
- Specialized in order pooling
- Up to 16 layers – pooling until 8 layers
- Standard technology boards (90µm, not HDI)
- From 1 WD onwards
- Online customer account:
  - Online price calculator for all services
  - Smart menus avoid the use of catalogues
  - PCB and PCBA visualization prior to order
  - Many smart tools: panel, marking, buildup, PCB PIXture, BOM, etc…
  - Online DRC/DFM
  - Online communication platform (incl Live Chat) and history data base

Defining your Circuit

- Defining your BOM (Bill Of Material)
  - Functionality of components.
  - Availability of components ?
  - Package to use ? Footprint definition.
  - Testing implications ?
  - Heat Management ?
  - Pricing ?
  - Etc …
- Schematics

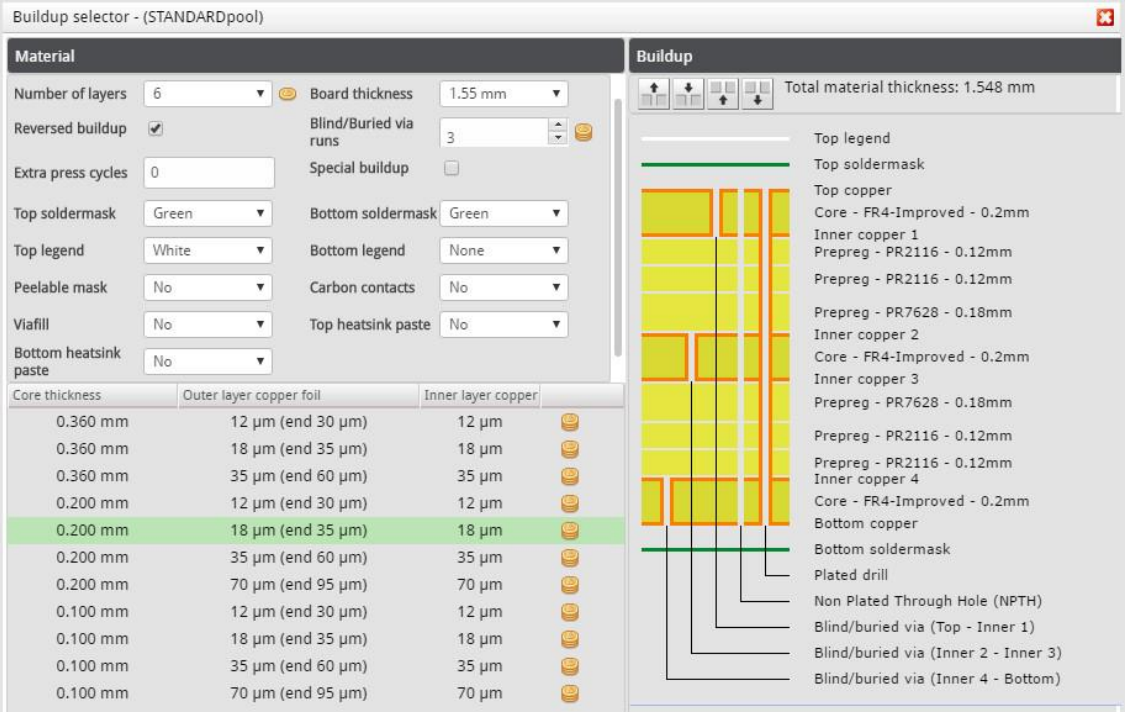
Defining your Printed Circuit Board

- What are the PCB cost drivers ?
- What makes a PCB hard/impossible to make ?
- Which tools are available to help me ?
  - Offline direct consulting Quotation - All
  - Online capability catalogues - All
  - Online smart menus - Eurocircuits


STANDARD pool
Delivery format
Single PCB
PCB quantity
10
Delivery term
7 working days
Number of layers
6
PCB width (X) (mm)
100.00
PCB height (Y) (mm)
80.00
eC-registration compatible PCB
Stencils
Material definition
Select pre-defined buildup
Board thickness
1.55 mm
Board buildup
Standard
Material Tg
145-150 °C
Outer layer copper foil
18 µm (end 35 µm)
Inner layer copper foil
35 µm
Extra PTH runs
0
Extra press cycles
0
Board technology
Select classification
Outer layer trackwidth (OL-TW)
0.150 mm
Outer layer isolation distance (OL-TT-TP-PP)
0.150 mm
Outer layer annular ring (OAR)
0.125 mm
Inner layer trackwidth (IL-TW)
0.150 mm
Inner layer isolation distance (IL-TT-TP-PP)
0.150 mm
Inner layer annular ring (IAR)
0.125 mm
Smallest final hole
0.25 mm
Hole density
< 1000/dm²
Technology class
6C
Holes <= may be reduced
0.45 mm
Board definition
Top soldermask
Green
Bottom soldermask
Green
Top legend
White
Bottom legend
White
Surface finish
Any lead free finish
Milling
No
Bare Board Testing
UL marking
Advanced options
Summary
Business customer? Select here.
Service
STANDARD pool
Delivery term
7 working days
Estimated shipment date
01-10-2013
Quantity
10 PCBs
Board surface / Order surface
0.80 dm² / 8.00 dm²
Prices
Net
Gross*
Single PCB
€ 31.79
€ 38.47
Total boards
€ 317.92
€ 384.68
Express transport
€ 12.48
€ 15.10
Economy transport
€ 10.49
€ 12.69
Total
€ 330.39
€ 399.77
* The gross prices include 21.00% VAT.
Add to basket
Useful documents
PCB Calculator user guide
Read more...
PCB design guidelines
Read more...
Alternatives
Customized matrix
10 PCBs
7 working days
Net
Gross*
€ 31.79
€ 38.47
€ 317.92
€ 384.68
Select
20 PCBs
7 working days
Net
Gross*
€ 21.17
€ 25.62
€ 423.49
€ 512.43
Select
30 PCBs
7 working days
Net
Gross*
€ 17.00
€ 20.58
€ 510.13
€ 617.26
Select
10 PCBs
6 working days
Net
Gross*
€ 39.90
€ 48.28
€ 399.02
€ 482.81
Select
20 PCBs
6 working days
Net
Gross*
€ 26.58
€ 32.16
€ 531.53
€ 643.15
Select
30 PCBs
6 working days
Net
Gross*
€ 21.34
€ 25.82
€ 640.27
€ 774.73
Select
* The gross prices include 21.00% VAT.
The transport costs and total price are calculated and shown in the summary according to the selection.

Smart menu

- Technical support
  - Build wizard
    - 892 builds



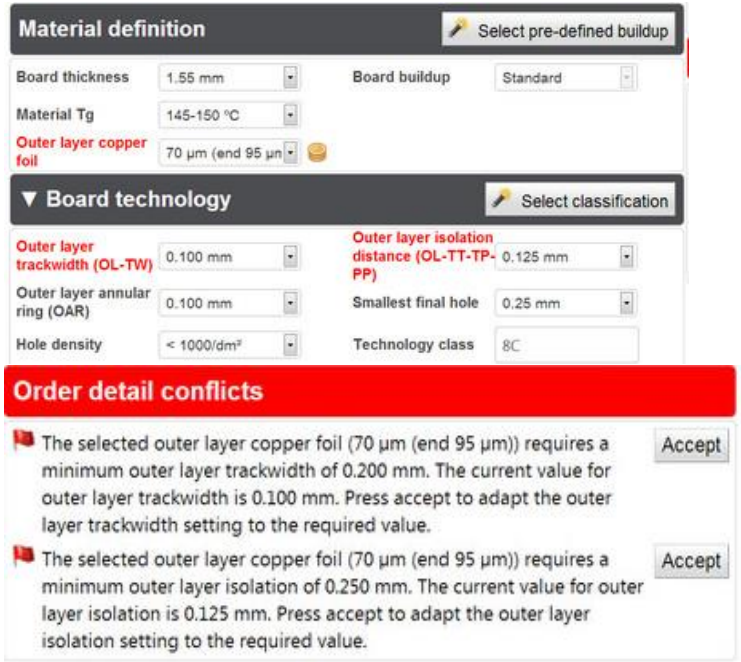
Smart menu

Build-up validation!

➢ faster prices, faster deliveries, lower costs

Virtual production in the eC-cloud - Your Populated Board produced “right first time”

- Technical support
  - Technical validation
    - > 300 rules



Smart menu

Technical validations!

- No production delays

Virtual production in the eC-cloud - Your Populated Board produced “right first time”

- Technical support
  - Classification wizard
    - Pattern
    - Holes
    - Copper weight

Classification wizard

Pattern class

	Design values	Pattern class 3	4	5	6	7	8	9
Outer layer trackwidth (OL-TW)	0.150	≥ 0.250 mm	≥ 0.200 mm	≥ 0.175 mm	≥ 0.150 mm	≥ 0.125 mm	≥ 0.100 mm	≥ 0.090 mm
Outer layer isolation distance (OL-TT-TP-PP)	0.150	≥ 0.250 mm	≥ 0.200 mm	≥ 0.175 mm	≥ 0.150 mm	≥ 0.125 mm	≥ 0.125 mm ⚠	≥ 0.125 mm ⚠
Outer layer annular ring (OAR)	0.125	≥ 0.200 mm	≥ 0.150 mm	≥ 0.150 mm	≥ 0.125 mm	≥ 0.125 mm	≥ 0.100 mm	≥ 0.100 mm
Inner layer trackwidth (IL-TW)	0.150	≥ 0.250 mm	≥ 0.200 mm	≥ 0.175 mm	≥ 0.150 mm	≥ 0.125 mm	≥ 0.100 mm	≥ 0.090 mm
Inner layer isolation distance (IL-TT-TP-PP)	0.150	≥ 0.250 mm	≥ 0.200 mm	≥ 0.175 mm	≥ 0.150 mm	≥ 0.125 mm	≥ 0.100 mm	≥ 0.100 mm ⚠
Inner layer annular ring (IAR)	0.125	≥ 0.200 mm	≥ 0.150 mm	≥ 0.150 mm	≥ 0.125 mm	≥ 0.125 mm	≥ 0.125 mm	≥ 0.125 mm

⚠ The selected outer copper foil thickness (18 µm) requires a minimum outer layer isolation of 0.125 mm.

⚠ The selected inner copper foil thickness (18 µm) requires a minimum inner layer isolation of 0.100 mm.

Drill class

	Design values	Drill class A	B	C	D	E
Smallest final hole	0.25	≥ 0.50 mm	≥ 0.35 mm	≥ 0.25 mm	≥ 0.15 mm	≥ 0.10 mm

Cancel Apply

Smart menu

Classification aide!

Smart menu

Price guidance!

- Poolable options
  - Extra cost expressed as single coin symbol

Board definition

Top soldermask	Green
Top legend	White
Surface finish	Che Ni/Au selectif
Bare Board Testing	✓

- Non-poolable options
  - Extra cost expressed as multiple coin symbol and remark

Material definition

Board thickness	1.55 mm
Material Tg	145-150 °C
Outer layer copper foil	1[illegible] µm (end 35 µm)
Extra PTH runs	1

Remarks

Pooling conditions no longer met due to the following order details:
- Extra PTH runs

Make your board layout

- Place your components
  - Footprints
- PCB Layout
  - Tracks, vias, …

PCB - details	Possible issues	Clearly defined in:			PCB Visualizer
		Gerber X	Gerber X2	Native EAGLE/KiCAD	defines
Base material	On stock / on offer	no	no	no	PCB Configurator
Number of layers	Layers complete or not	no	no	yes	Buildup editor
Definition of the layers	Clear definition / assignment	no	yes	yes	Buildup editor
Board size	Possible open or more contours	no	no	no	Outline editor
Customer panel	Definition not standardized	no	no	no	Panel editor
Copper thickness	Definition base/end Cu	no	no	no/yes	Buildup editor
build up	Definition not standardized	no	no	no/yes	Buildup editor
PTH		no	yes	yes	Drill Editor
Via / component hole		no	yes	yes	Drill Editor
NPTH		no	yes	yes	Drill Editor
Slots & Cut outs	Definition not standardized	no	yes	yes	Outline editor / Drill editor
blind & burried vias	Define the layer name correct	no/yes	yes	yes	Buildup editor
Thermal pads	Defined in CAD or not	no	no/yes	no/yes	-
Surface finish		no	no	no	PCB Configurator
Soldermask colour		no	no	no	PCB Configurator
Legend colour		no	no	no	PCB Configurator
press fit holes	Definition not standardized	no	no	no	PCB Configurator parameter
peelable mask	Definition not standardized	no	no	no	Buildup editor
Carbon contacts	Definition not standardized	no	no	no	Buildup editor
edge connector / beveling	Definition not standardized	no	no	no	PCB Configurator parameter
depth routing	Definition not standardized	no	no	no	PCB Configurator / Drill editor
via-fill	Definition not standardized	no	no	no	PCB Configurator / Drill editor
chamfered holes	Definition not standardized	no	no	no	PCB Configurator / Drill editor
PTH on the board edge	Definition not standardized	no	no	no	PCB Configurator parameter
round-edge plating	Definition not standardized	no	no	no	PCB Configurator parameter
heatsink paste	Definition not standardized	no	no	no	Buildup editor

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D&E event 2017

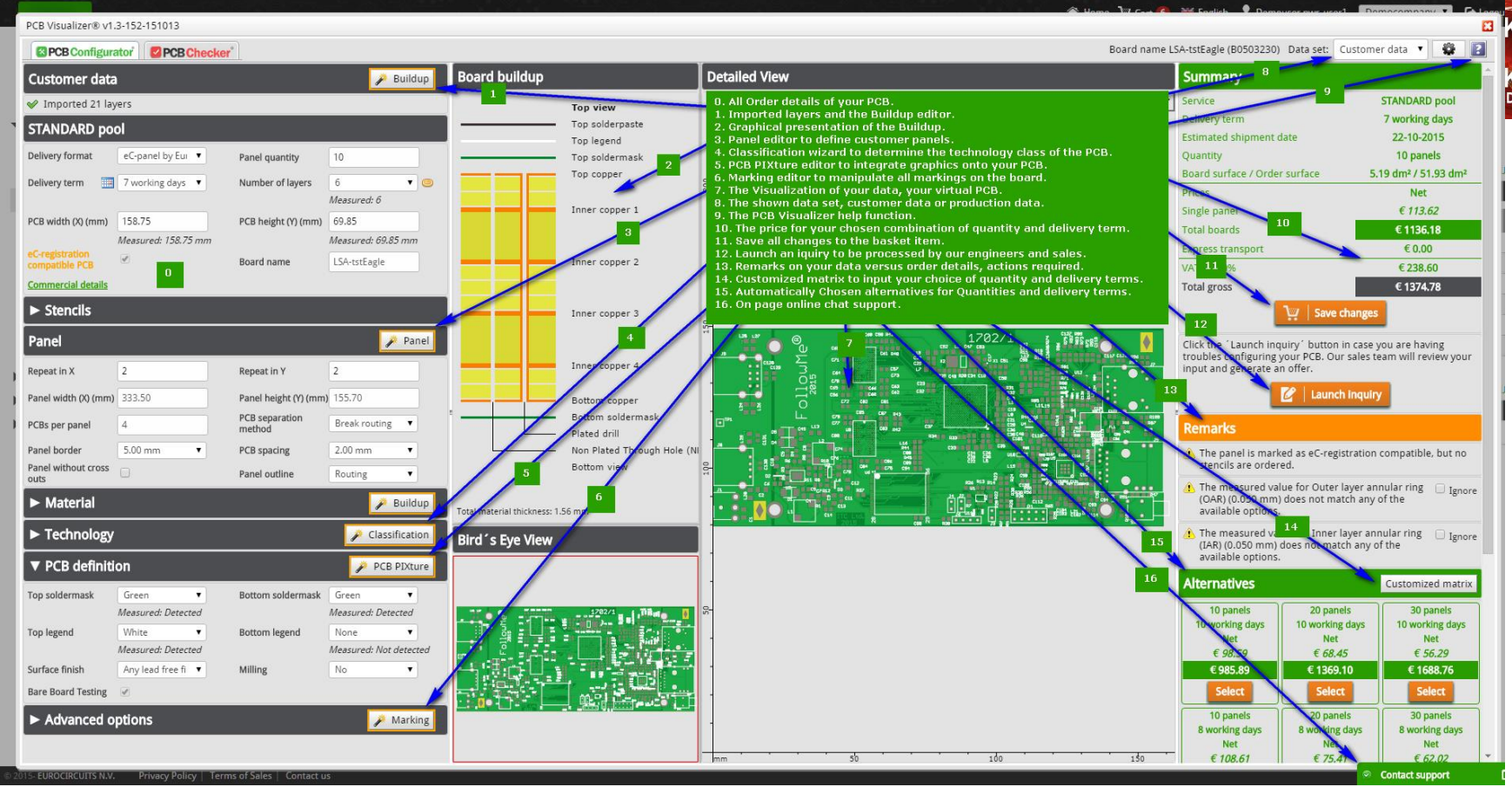
PCB data CAD

(Computer Aided Design)

to CAM

(Computer Aided Manufacturing)

EURO CIRCUITS



PCB Configurator :
Remove data ambiguities online

Virtual production in the eC-cloud - Your Populated Board produced “right first time”

Confusing layer naming corrected with buildup editor

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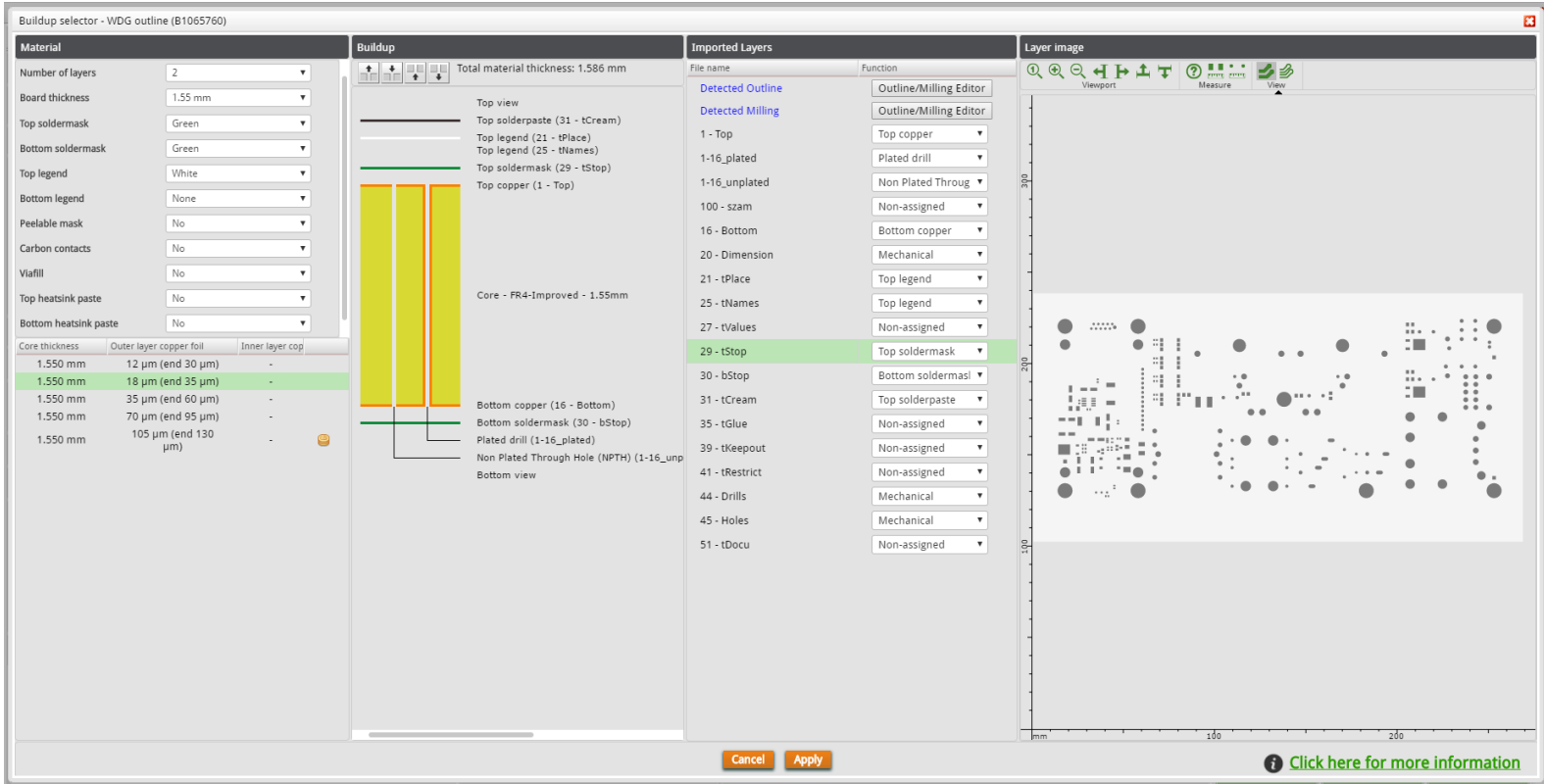
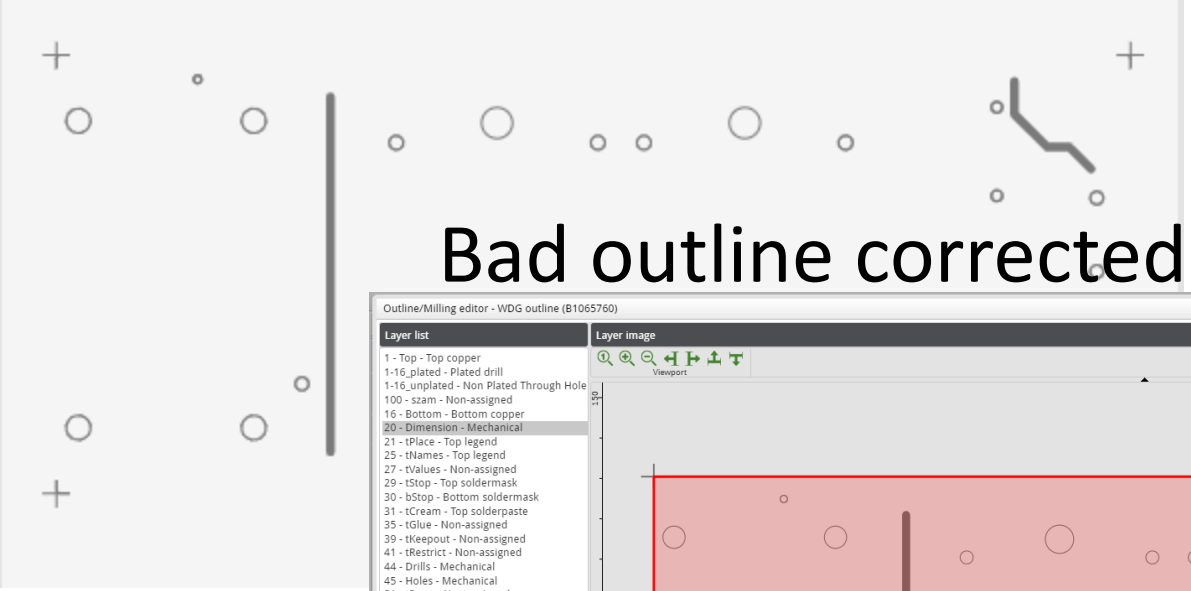
12 OKT NEDERLAND
D&E event 2017

- controllerBoard_L1.gbr
- controllerBoard_L2.gbr
- controllerBoard_L3.gbr
- controllerBoard_L4.gbr
- controllerBoard_L5.gbr
- controllerBoard_L6.gbr
- controllerBoard_L7.gbr
- controllerBoard_L8.gbr
- controllerBoard_L9.gbr
- controllerBoard_L10.gbr
- controllerBoard_L11.gbr
- controllerBoard_L12.gbr
- controllerBoard_L13.gbr
- controllerBoard_L14.gbr
- controllerBoard_L15.gbr
- controllerBoard_L16.gbr
- controllerBoard_L17.gbr
- controllerBoard_L18.gbr





Bad outline corrected with outline editor

Outline/Milling editor - WDG outline (B1065760)

Layer list

1 - Top - Top copper
1-16_plated - Plated drill
1-16_unplated - Non Plated Through Hole
100 - szam - Non-assigned
16 - Bottom - Bottom copper
20 - Dimension - Mechanical
21 - tPlace - Top legend
25 - tNames - Top legend
27 - tValues - Non-assigned
29 - tStop - Top soldermask
30 - bStop - Bottom soldermask
31 - tCream - Top solderpaste
35 - tGlue - Non-assigned
39 - tKeepout - Non-assigned
41 - tRestrict - Non-assigned
44 - Drills - Mechanical
45 - Holes - Mechanical
51 - tDocu - Non-assigned
Top preview
Bottom preview

Board size

Measured: 245.00 x 100.00 mm
Required: 268.24 x 136.12 mm

Legend

- Board surface
- Board outline
- Object to pick
- Open chain end
- Small gap/Short chain
- Intersection

Layer image

Viewport

Click to define first corner point.

Tools

- Undo last operation
- Redo last operation
- Reset

Pick from selected layer

- Outline candidates
- Pick single line/arc
- Pick chain of lines/arcs

Editing

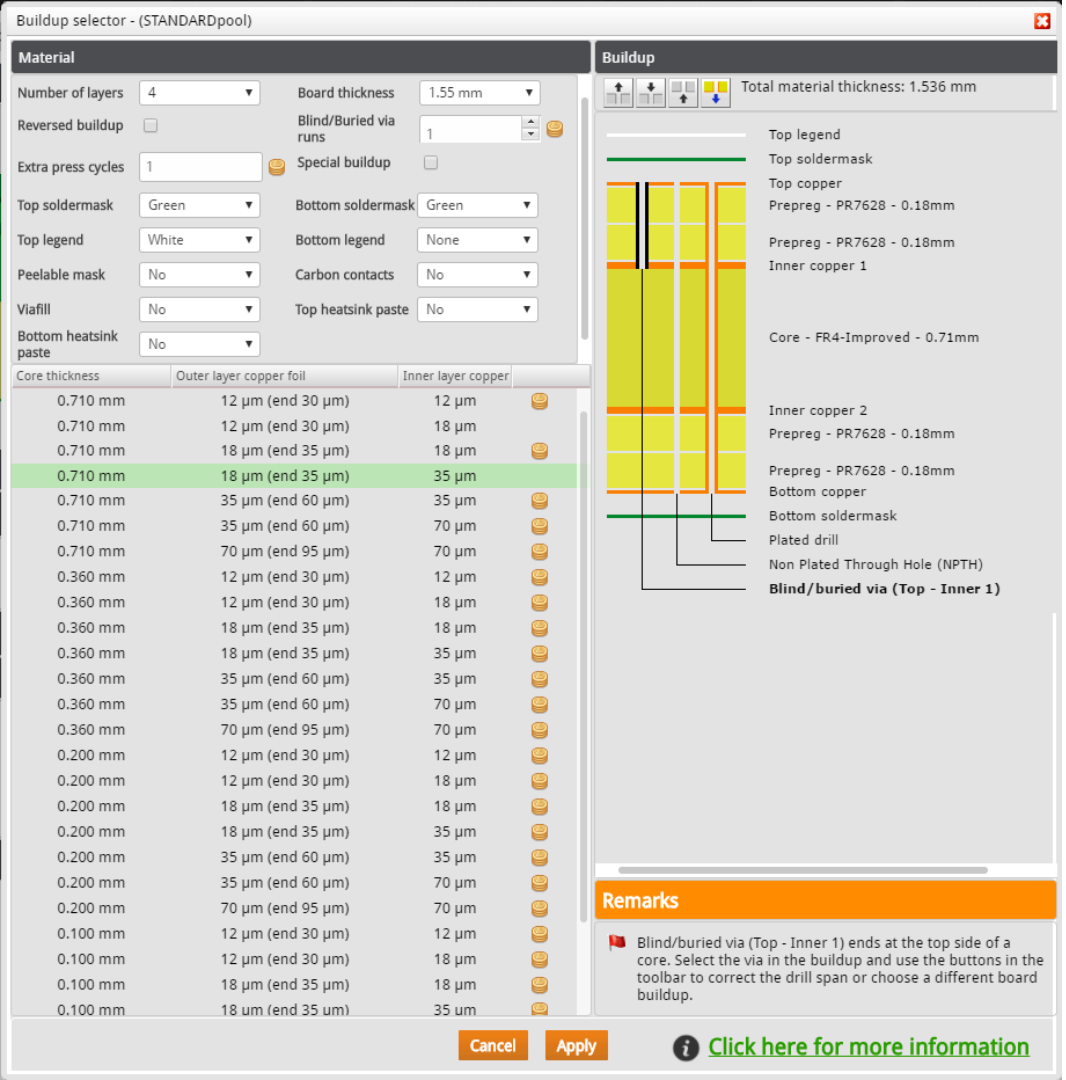
- Draw line
- Draw chain
- Draw rectangle
- Connect
- Intersect

Delete

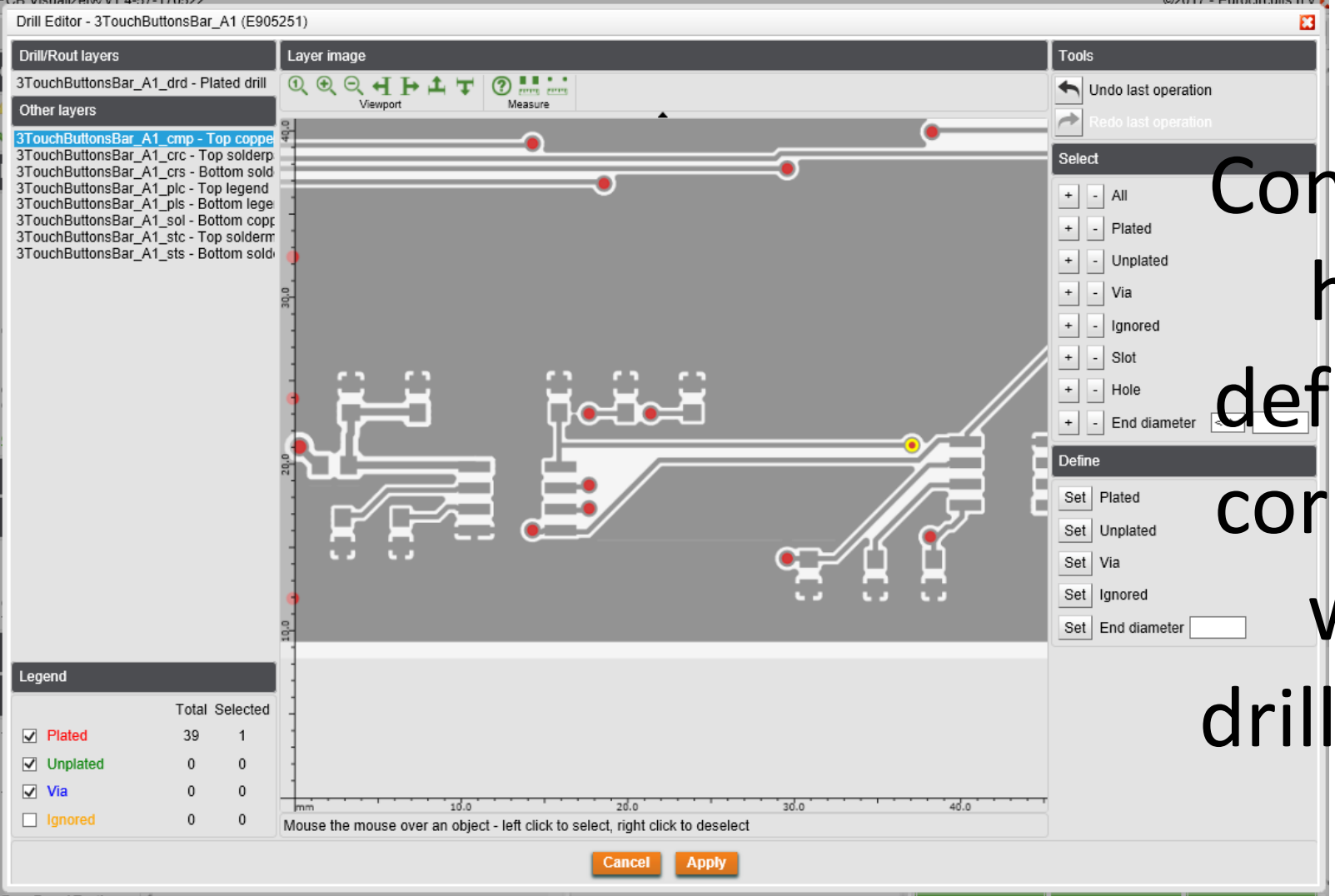
- Delete single line/arc
- Delete chain of lines/arcs
- Delete selected lines/arcs
- Delete selected chains
- Delete all

Draws a rectangle.
Click to define the first corner point. Press ESC to stop editing.

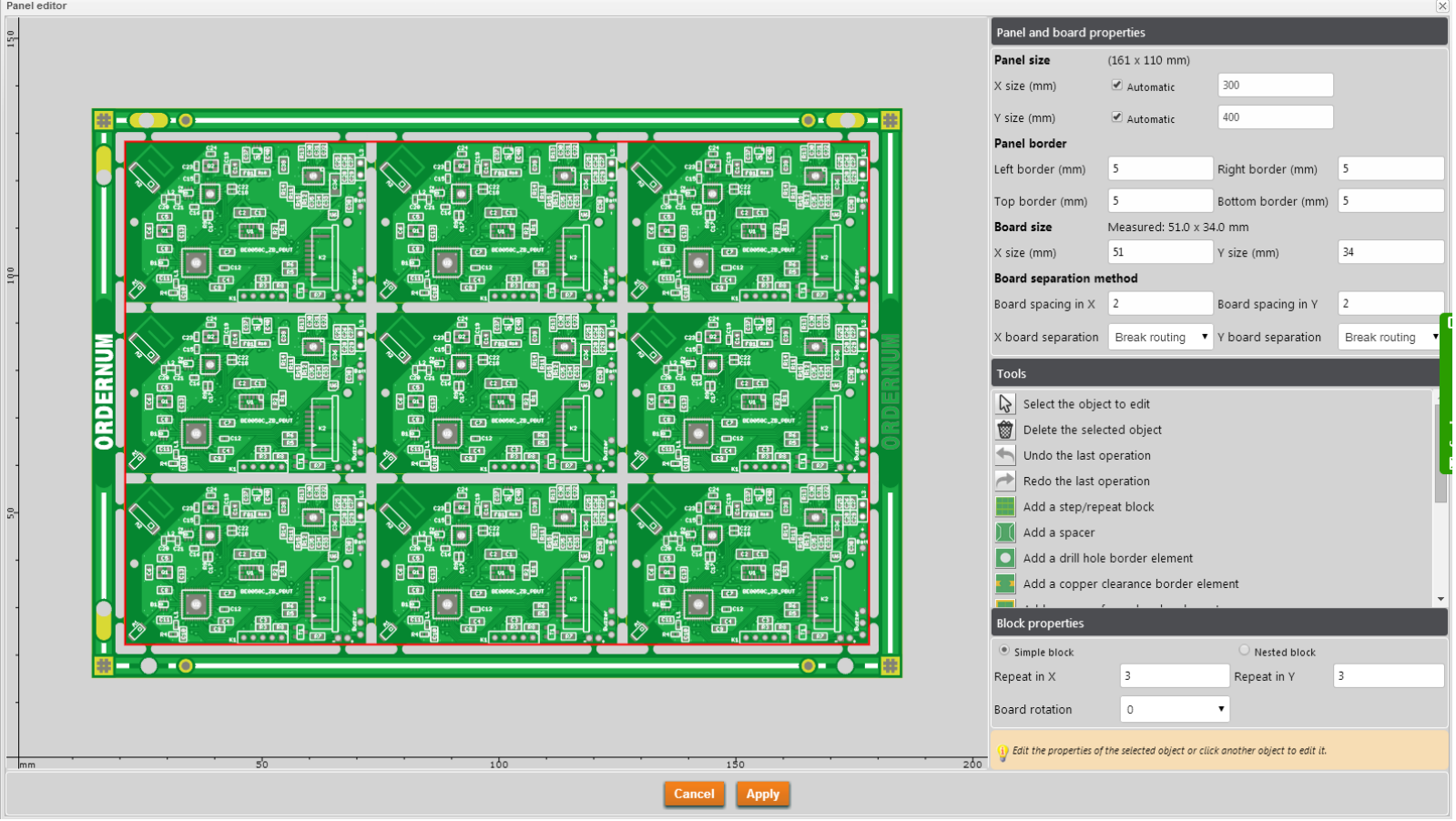
Cancel Apply



Bad buildup edited with buildup editor

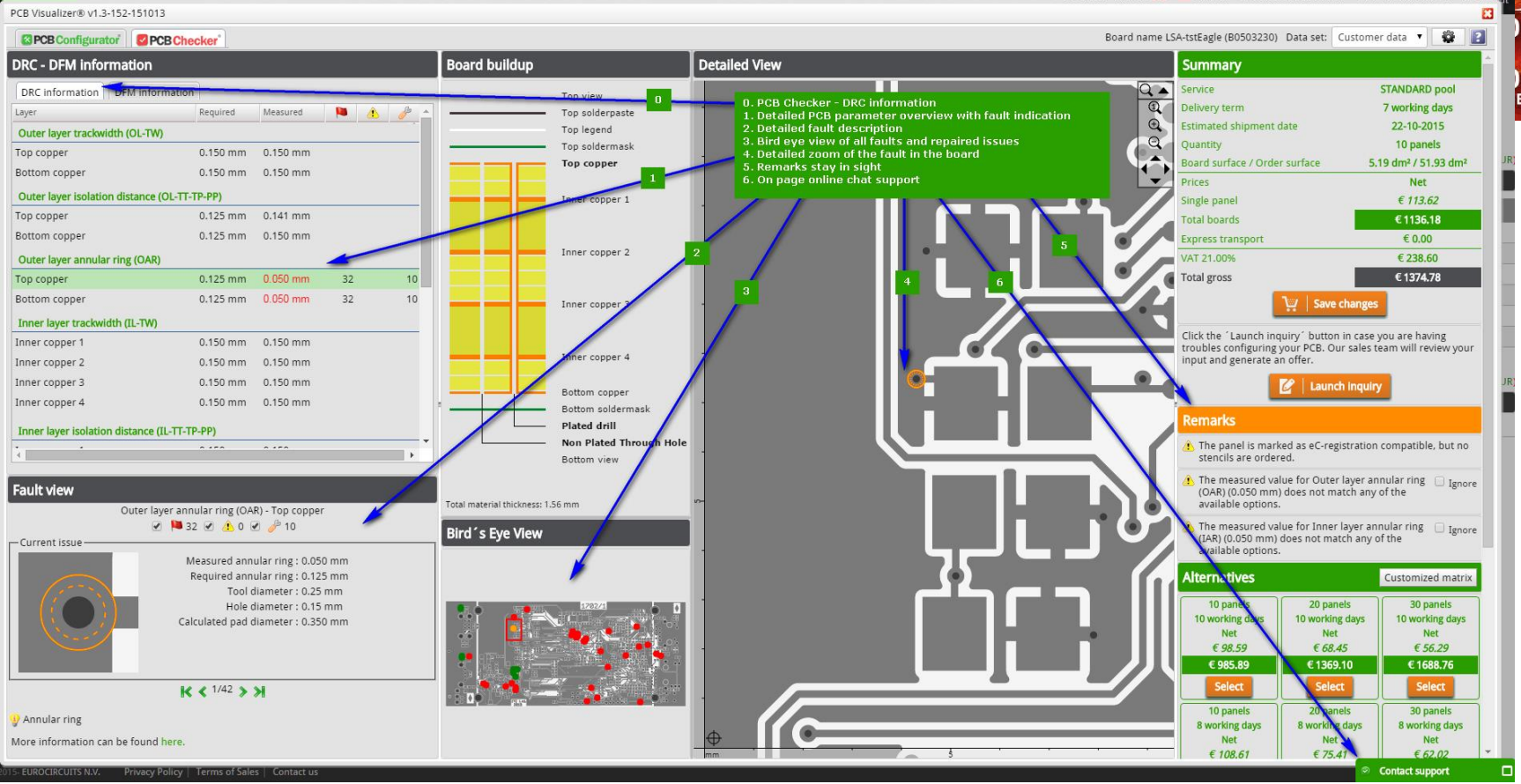


Confusing hole definition corrected with drill editor

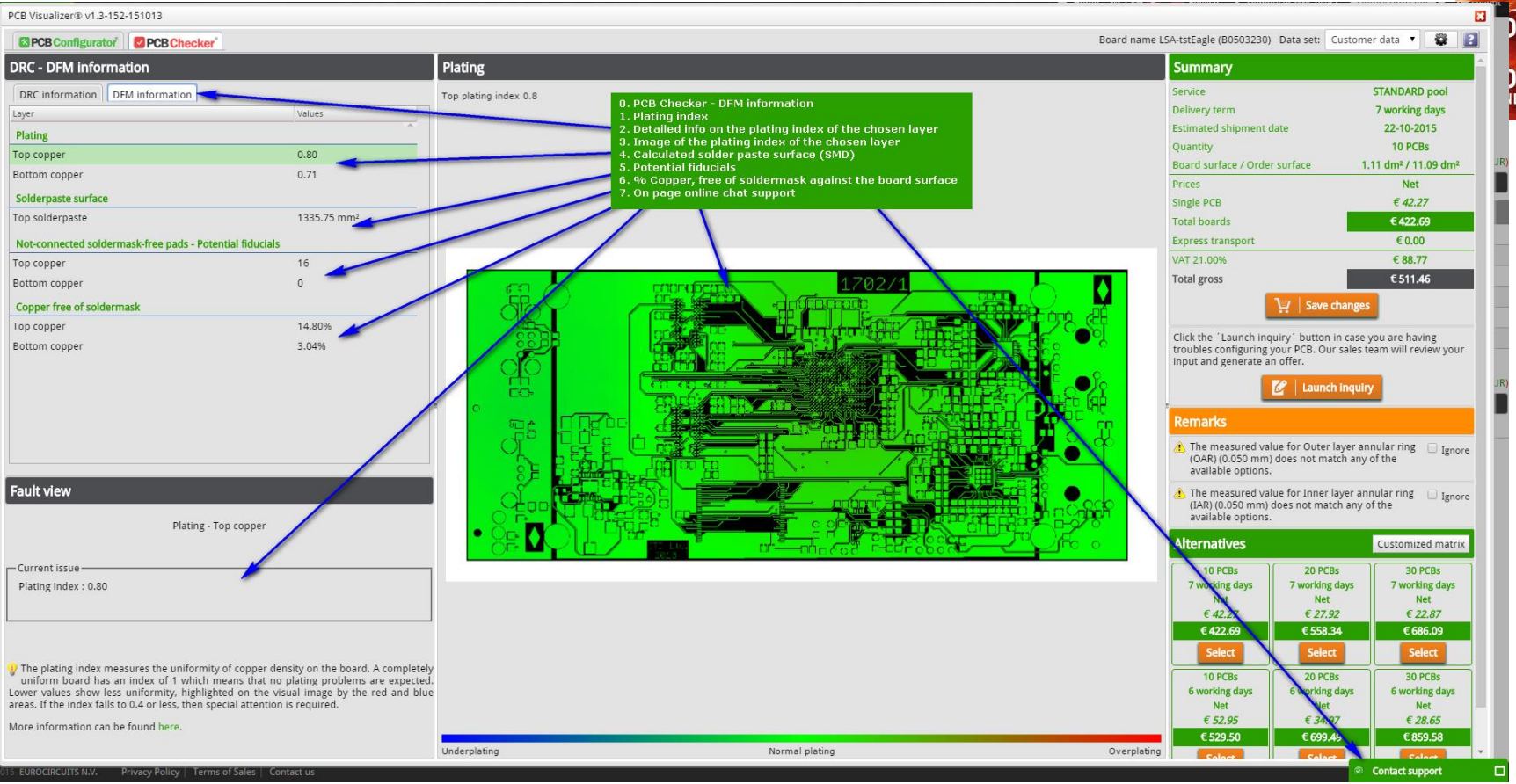


“Panel editor”

Virtual production in the eC-cloud - Your Populated Board produced “right first time”



PCB Checker :
Evaluate possible Design Rule Check issues



PCB Checker :
Evaluate possible Design For Manufacturing issues

PCBAssembly data - CAD to CAM

PCBA - details	Possible issues	Clearly defined in:			PCBA Visualizer
		BOM	CPL	Native EAGLE/KiCAD	defines
File format	Definition not standardized	no	no	yes	BOM editor / CPL editor
Component description	Definition not standardized	no	no	no	BOM editor
Manufacturing Part Number	Not clear or partial description	no	no	no	BOM editor
Supplier Part Number	Not clear or partial description	no	no	no	BOM editor
Component package	Poor definition leads to different package link in manufacturing DB	no	no	no	BOM editor
Component origin (Offset)	Different origin than manufacturing DB	no	no	no	CPL editor
Component Rotation (pin 1)	Different rotation than manufacturing DB	no	no	no	CPL editor
Component centroid	Different centroid than manufacturing DB	no	no	no	CPL editor
Component footprint	Poor definition leads to different footprint link in manufacturing DB	no	no	no	-
IPC definition of the footprint	Almost never available	no	no	no	show
Component Packaging	Need to be decided by the manufacturer	no	no	no	removed in BOM editor

	A	B	C	D	E	F
10	9	10k	R_0603	0603_TYPE_B	R6, R7, R8, R9, R10, R11, R12, R25, R26	
11	6	10n	C_0603	0603_TYPE_B	C45, C46, C47, C48, C49, C50	
12	1	10u	C_0805	0805_TYPE_A	C34	
13	1	15EDGRC-3.5/6P	CON_TERMINAL_3.5MM_6-PIN	CON_TERMINAL_3.5MM_6-PIN	CN6	
14	2	18p	C_0603	0603_TYPE_B	C56, C57	
15	1	1k	R_0603	0603_TYPE_B	R13	
16	1	1u	CPOL-EUSMCA	SMC_A	C31	POLARI Europe
17	2	1u	C_0603	0603_TYPE_B	C36, C39	
18	2	2.2u	CPOL-EUSMCA	SMC_A	C25, C28	POLARI Europe
19	3	20k	R_0603	0603_TYPE_B	R16, R19, R22	
20	4	22	R_0603	0603_TYPE_B	R2, R3, R4, R14	
21	1	22uH	L-EUL3225M	L3225M	L1	INDUCT
22	4	4.7u	CPOL-EUSMCA	SMC_A	C1, C33, C35, C37	POLARI Europe
23	1	40_PIM_CON_0.5_MM WURTH	40_PIM_CON_0.5_MMWURTH	CON_FFC_40-PIN_0.5MM_WURTH-687140149022	CN2	
24	1	5	R_0603	0603_TYPE_B	R15	
25	1	8MHz	CRYSTAL_2PIN	CRYSTAL_3.2MM_2PIN	Q1	
26	1	AP5724WG-7	AP5724	SOT23-6	IC4	
27	1	AS4C4M16S-6BIN	SDRAM_16-BIT	TFBGA-54	IC2	
28	1	IP4252CZ8-4-TTL,13	EMIF_4CH_IP4252	EMIF_4CH_IP4252	IC7	
29	2	IRLML2246TRPBF	BSS84	SOT23	T1, T2	P-CHAN
30	1	LD-BZEN-0803	BUZZER_01	BUZZER_01	BZ1	
31	1	M95512-WMN6P	EEPROM_SPI_SO8	SO08	IC5	
32	3	MAX31856MUD+	MAX31856MUD+	TSSOP14	IC8, IC9, IC10	
33	1	MCP130T-300	MCP130	SOT-23-II	IC3	
34	2	PMEG4005AEA.115	SMF5.0AT1	SOD123FL	D2, D3	200 W T Suppre
35	1	SMLVT3V3	DIODE_SUPRESSOR_UNIDRECTION ALDO-214AA	DO-214AA	D1	
36	1	STM32F429NI	STM32F429N	TFBGA	IC1	
37	1	TSC2046	TSC2046	TSSOP16	IC11	
38	1	W25Q32FVSSIG	EEPROM_SPI_SO8SOIC8_WIDE	SO08W	IC6	

Qty	Value	Device	Package	Parts	Description
1		JP_1X14	JP_1X14	CN1	
1		JP_1X4	JP_1X4	CN5	
1		JP_1X5	JP_1X5	CN3	
1		JP_1X6	JP_1X6	CN4	
1		JUMPER_SMD_ROUND	JUMPER_SMD_ROUND	JP1	
6	100	R_0603	0603_TYPE_B	R17, R18, R20, R21, R23, R24	
2	100k	R_0603	0603_TYPE_B	R1, R27	
40	100n	C_0402	0402_TYPE_C	C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17	
9	10k	R_0603	0603_TYPE_B	R6, R7, R8, R9, R10, R11, R12, R25, R26	
6	10n	C_0603	0603_TYPE_B	C45, C46, C47, C48, C49, C50	
1	10u	C_0805	0805_TYPE_A	C34	
1	15EDGRC-3.5/6P	CON_TERMINAL_3.5MM_6-PIN	CON_TERMINAL_3.5MM_6-PIN	CN6	
2	18p	C_0603	0603_TYPE_B	C56, C57	
1	1k	R_0603	0603_TYPE_B	R13	
1	1u	CPOL-EUSMCA	SMC_A	C31	POLARIZED CAPACITOR, European symbol
2	1u	C_0603	0603_TYPE_B	C36, C39	
2	2.2u	CPOL-EUSMCA	SMC_A	C25, C28	POLARIZED CAPACITOR, European symbol
3	20k	R_0603	0603_TYPE_B	R16, R19, R22	
4	22	R_0603	0603_TYPE_B	R2, R3, R4, R14	
1	22uH	L-EUL3225M	L3225M	L1	INDUCTOR, European symbol
4	4.7u	CPOL-EUSMCA	SMC_A	C1, C33, C35, C37	POLARIZED CAPACITOR, European symbol
1	40_PIM_CON_0.5_MMWURTH	40_PIM_CON_0.5_MMWURTH	CON_FFC_40-PIN_0.5MM_WURTH-687140149022	CN2	
1	5	R_0603	0603_TYPE_B	R15	
1	8MHz	CRYSTAL_2PIN	CRYSTAL_3.2MM_2PIN	Q1	
1	AP5724WG-7	AP5724	SOT23-6	IC4	
1	AS4C4M16S-6BIN	SDRAM_16-BIT	TFBGA-54	IC2	
1	IP4252CZ8-4-TTL,13	EMIF_4CH_IP4252	EMIF_4CH_IP4252	IC7	
2	IRLML2246TRPBF	BSS84	SOT23	T1, T2	P-CHANNEL MOS FET
1	LD-BZEN-0803	BUZZER_01	BUZZER_01	BZ1	
1	M95512-WMN6P	EEPROM_SPI_SO8	SO08	IC5	
3	MAX31856MUD+	MAX31856MUD+	TSSOP14	IC8, IC9, IC10	
1	MCP130T-300	MCP130	SOT-23-II	IC3	
2	PMEG4005AEA.115	SMF5.0AT1	SOD123FL	D2, D3	200 W Transient Voltage Suppressor
1	SMLVT3V3	DIODE_SUPRESSOR_UNIDRECTIONALDO-214AA	DO-214AA	D1	
1	STM32F429NI	STM32F429N	TFBGA	IC1	
1	TSC2046	TSC2046	TSSOP16	IC11	
1	W25Q32FVSSIG	EEPROM_SPI_SO8SOIC8_WIDE	SO08W	IC6	

- Different file formats used
- BOM output from CAD system is limited - Cryptic description of component and package

- **Virtual production in the eC-cloud -** Your Populated Board produced “right first time”

Upload BOM

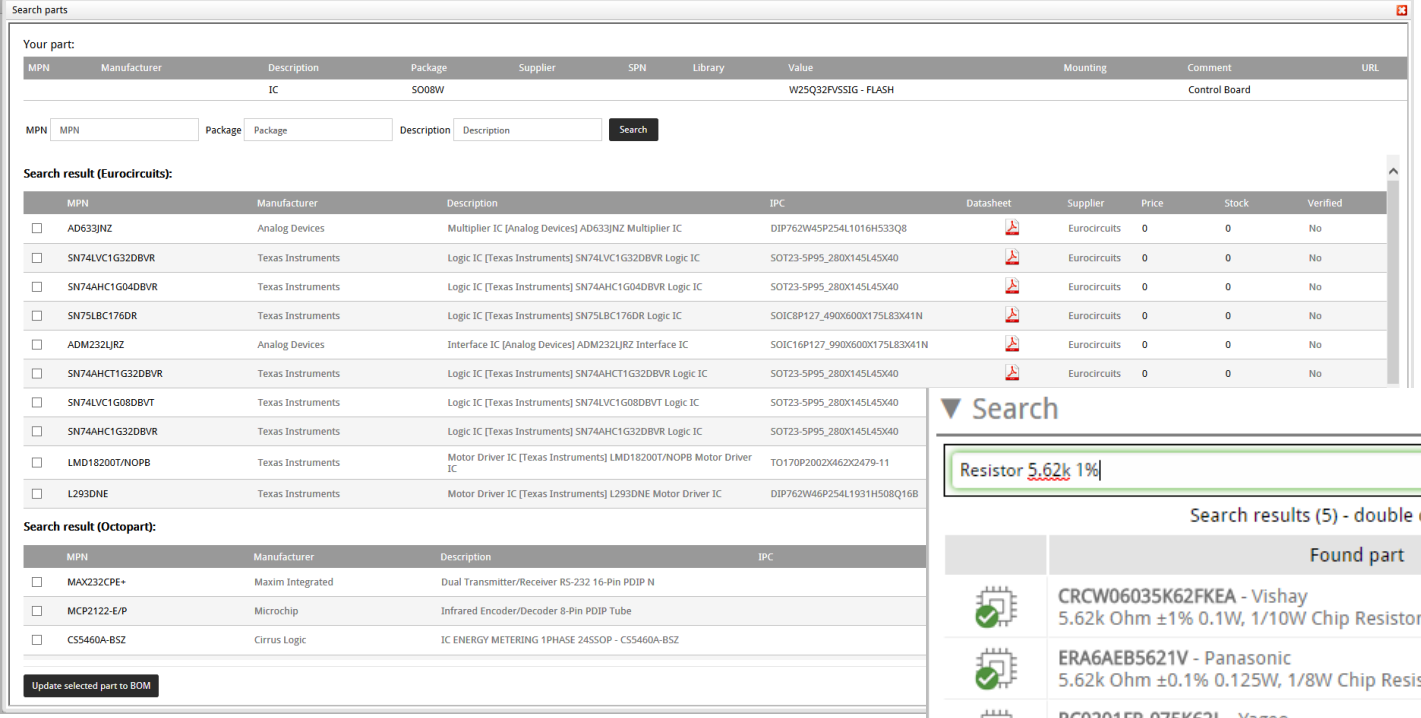
Choose columns to be used

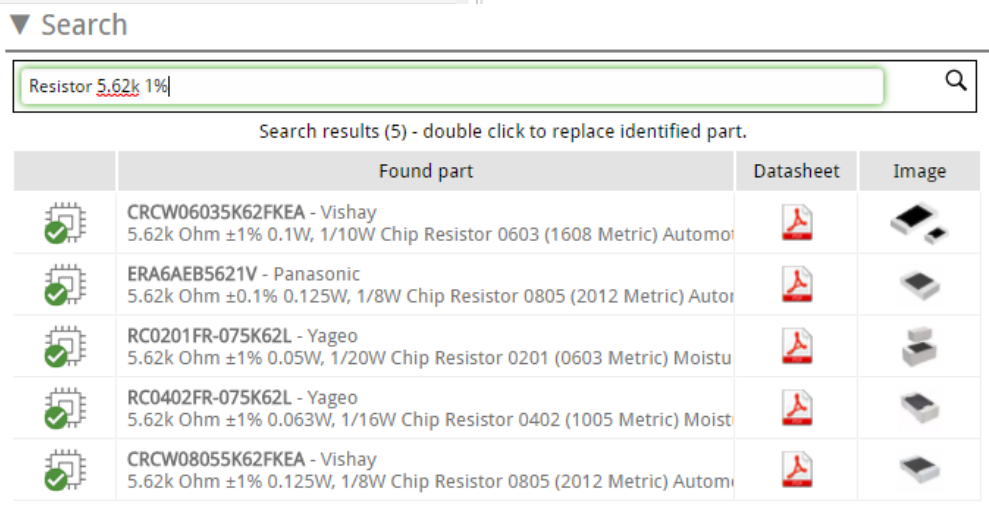
Mapping of at least one column out of MPN, Description or Package name. And, one out of Quantity and Reference designators is mandatory.

Back Submit

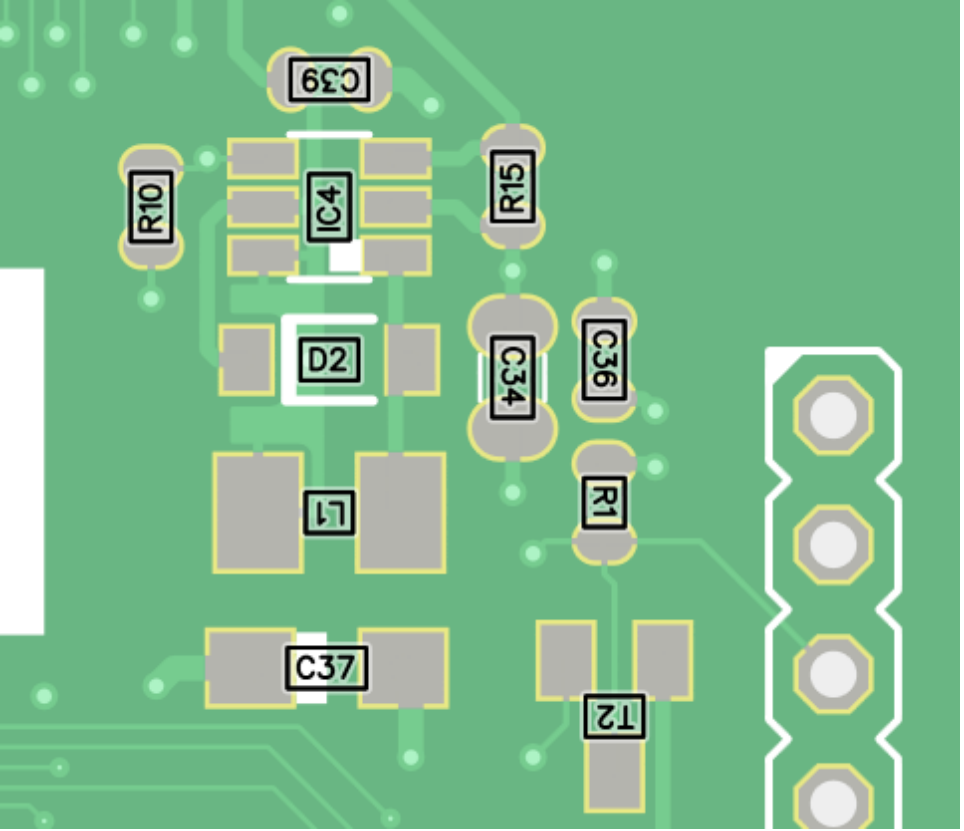
Row Nr.	Qty	Value	Description	Device	Package	Parts
	Quantity	Value	Description	Comment	Package name	Reference Designator
2	1	JP_1X14	CONNECTOR	Control Board	JP_1X14	CN1
3	1	JP_1X4	CONNECTOR	Control Board	JP_1X4	CN5
4	1	JP_1X5	CONNECTOR	Control Board	JP_1X5	CN3
5	1	JP_1X6	CONNECTOR	Control Board	JP_1X6	CN4
6	1	15EDGRC-3.5/6P	CONNECTOR	Control Board	CON_TERMINAL_3.5MM_6-PIN	CN6
7	1	15EDGK-3.5/6P	CONNECTOR	Control Board	CON_TERMINAL_3.5MM_6-PIN	CN6-pair
8	0	40_PIM_CON_0.5_MMHIROSE	CONNECTOR	Control Board	40_PIN_CON_0.5_MM_02	CN2
9	1	40_PIM_CON_0.5_MM	CONNECTOR	Control Board	40_PIN_CON_0.5_MM_02	CN2
10	2	18p SMD-0603	CAPACITOR	Control Board	0603_TYPE_B	C56, C57
11	6	10n 50V SMD-0603	CAPACITOR	Control Board	0603_TYPE_B	C45, C46, C47, C48,C49,C50
12	40	100n 16V X7R SMD-0402	CAPACITOR	Control Board	0402_TYPE_C	C2, C3, C4, C5, C6,C7,C8, C9, C10, C11, C12, C13,C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C26, C27, C29, C30, C32, C38, C40, C41, C42, C43, C44, C51,
13	2	1u 25V SMD-0603	CAPACITOR	Control Board	0603_TYPE_B	C36, C39
14	1	1u Tantal	CAPACITOR	Control Board	SMC_A	C31
15	2	2.2u Tantal	CAPACITOR	Control Board	SMC_A	C25, C28
16	4	4.7u Tantal	CAPACITOR	Control Board	SMC_A	C1, C33, C35, C37
17	1	10u 16V X5R SMD-0805	CAPACITOR	Control Board	0805_TYPE_A	C34
18	1	8MHz	CRYSTAL	Control Board	CRYSTAL_3.2MM_2PIN	Q1
19	1	SMLVT3V3	DIODE	Control Board	DO-214AA	D1
20	2	PMEG4005AEA.115	DIODE	Control Board	SOD123FL	D2, D3
21	1	STM32F429NI - MCU	IC	Control Board	TFBGA	IC1
22	1	AS4C4M16S-6BIN - SDRAM	IC	Control Board	TFBGA-54	IC2
23	1	MCP130T-300 - RESET	IC	Control Board	SOT-23-II	IC3

- BOM editor:
  - Detect BOM list format
  - Assign column types
  - Automated search
    - **Virtual production in the eC-cloud -** Your Populated Board produced “right first time”

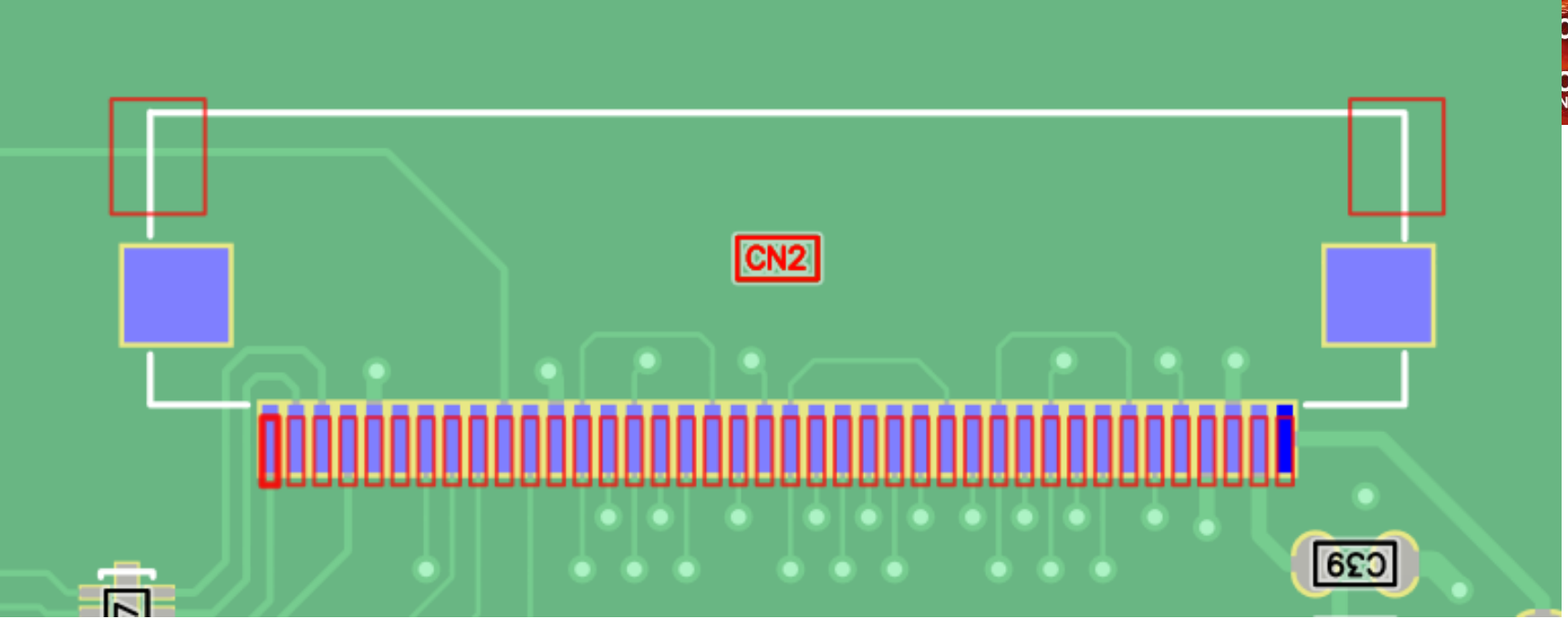




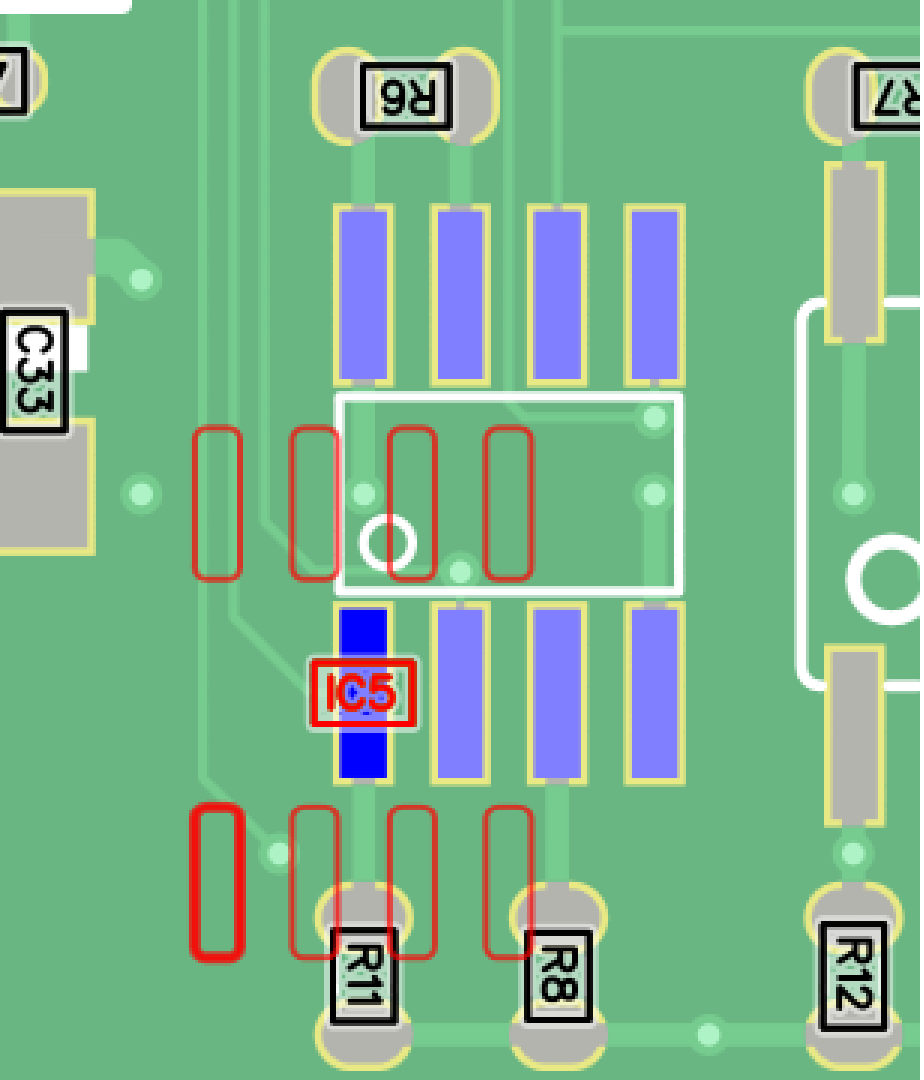
- BOM editor - Manual search
  - Integrated search on different sources
    - Eurocircuits component database
    - Supplier/Manufacturer websites
  - Direct access to spec sheets
    - **Virtual production in the eC-cloud -** Your Populated Board produced “right first time”



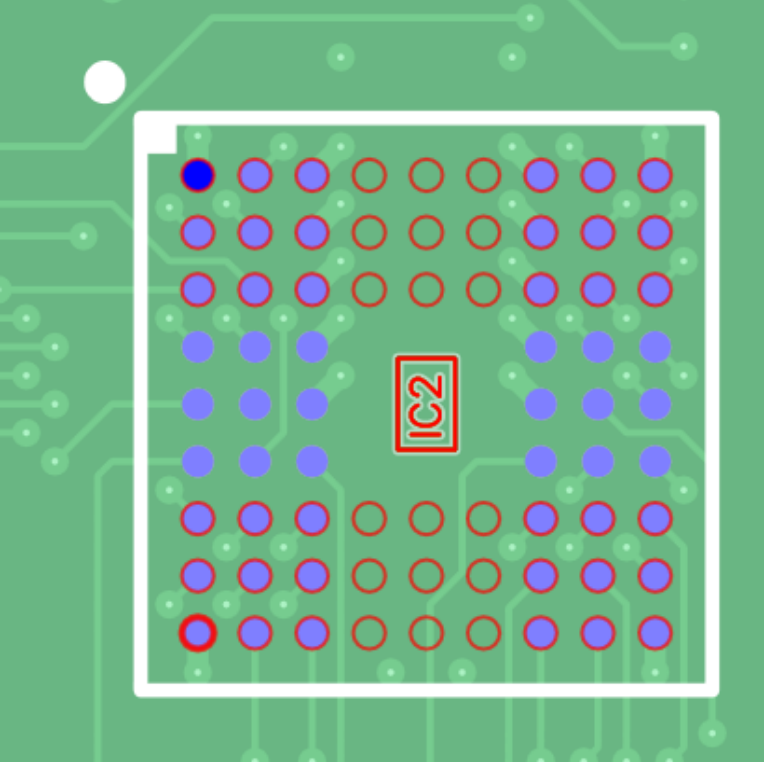
- Component Placement List editor (Read and Visualize)
  - Detect CPL format
  - Assign column types
  - Visualize component locations on PCB data

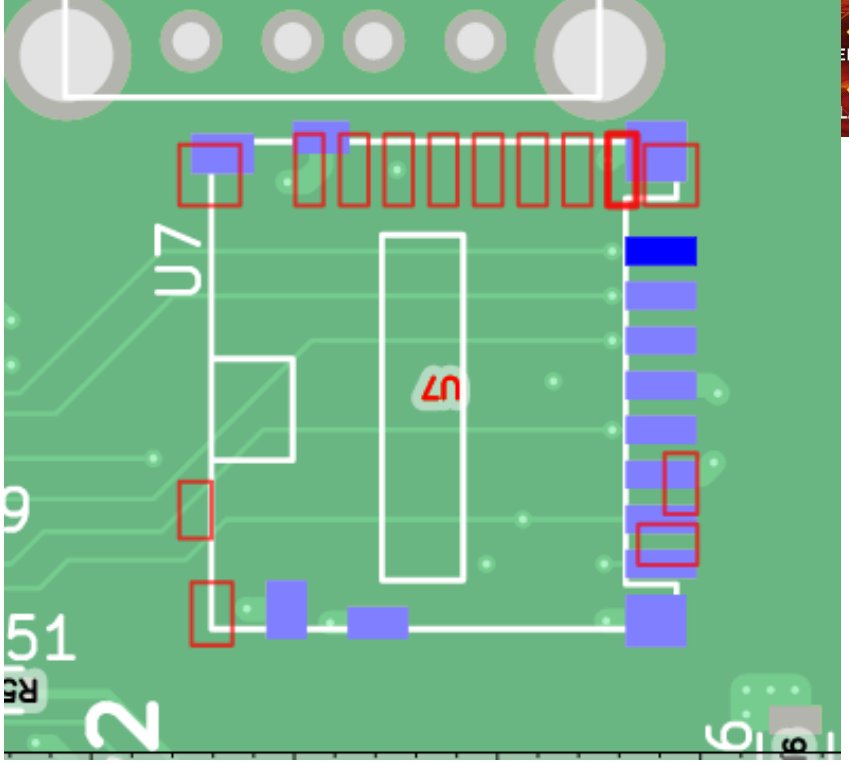


- Footprint – we check CAD-info against the eC-verified database
  - Incorrect component chosen. Same device available with different packages
  - Incorrect footprint definition in CAD library



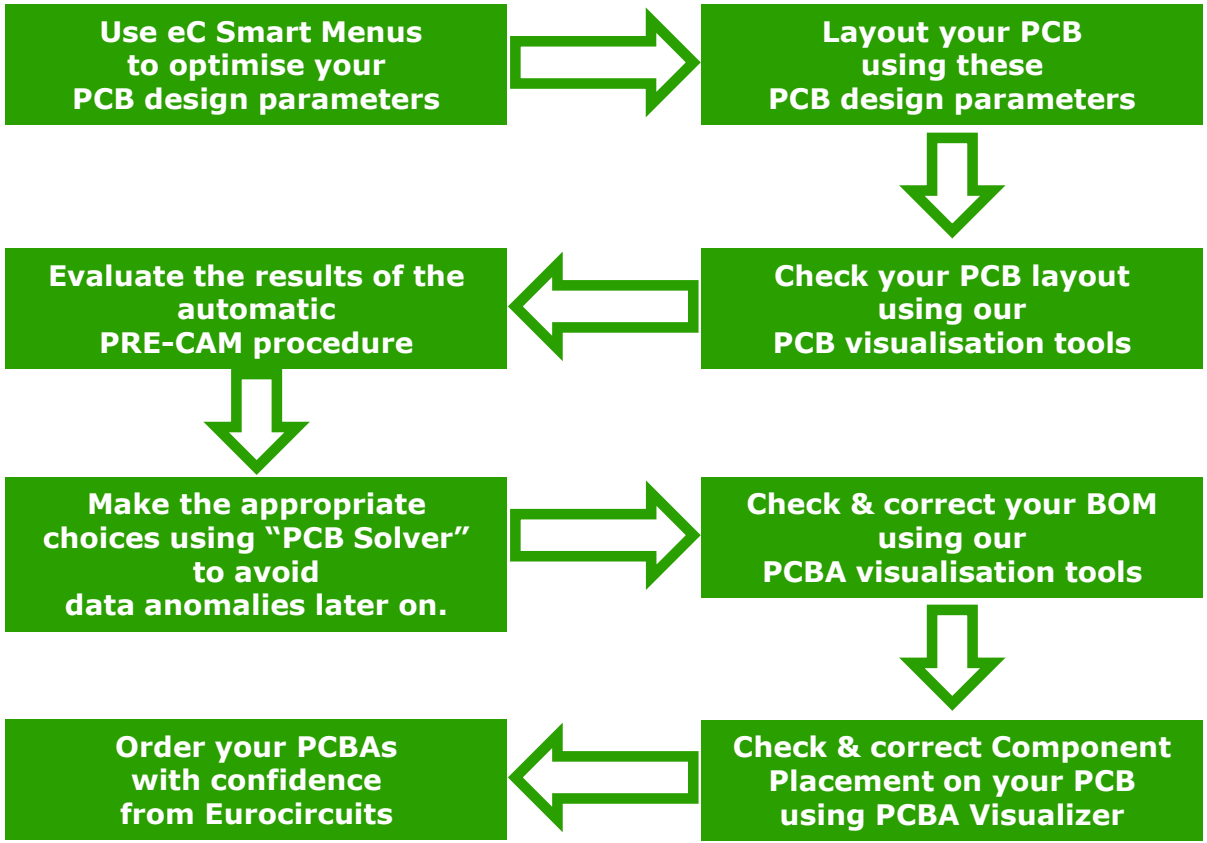
- Location
  - PIN1 vs centroid location in CPL file



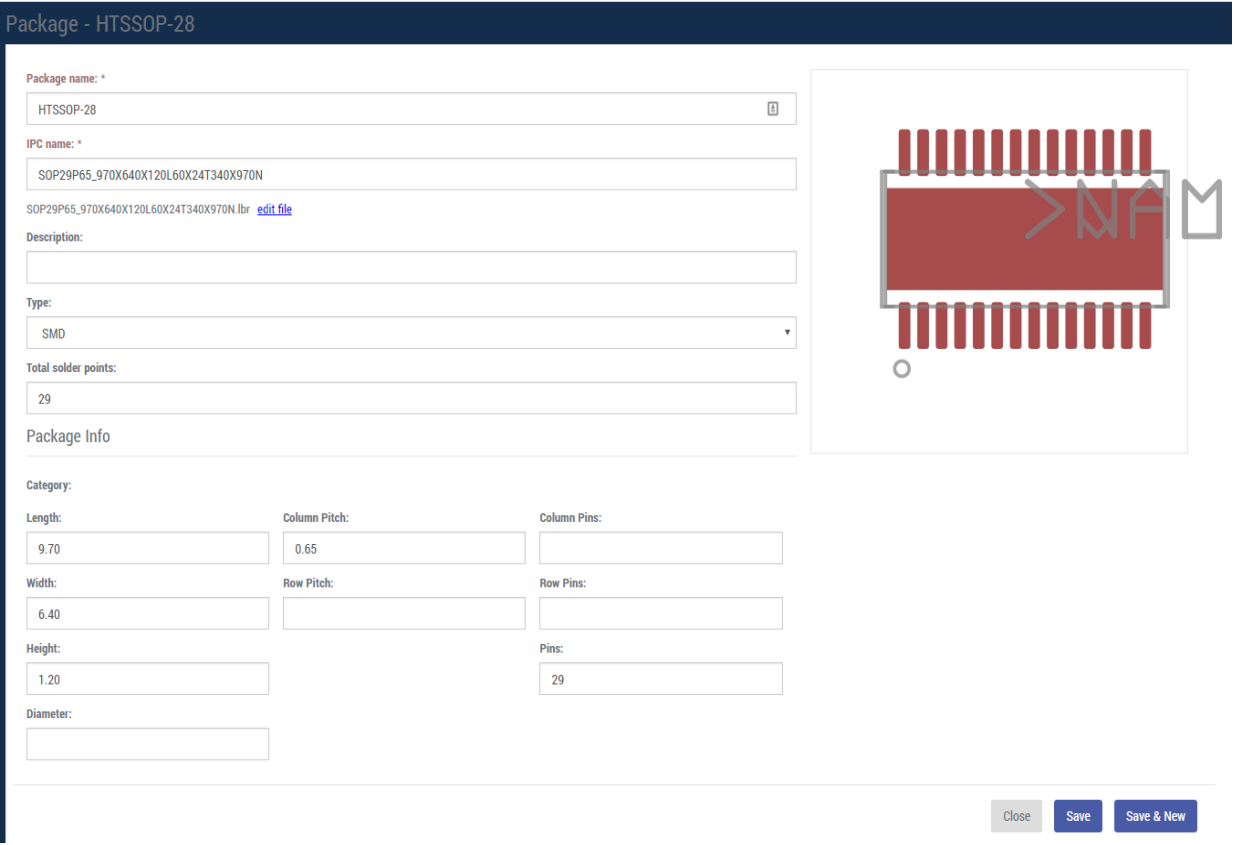


- Rotation
  - Each library can define its own default rotation
  - Verified against eC standard rotation

Virtual PCBA production How?



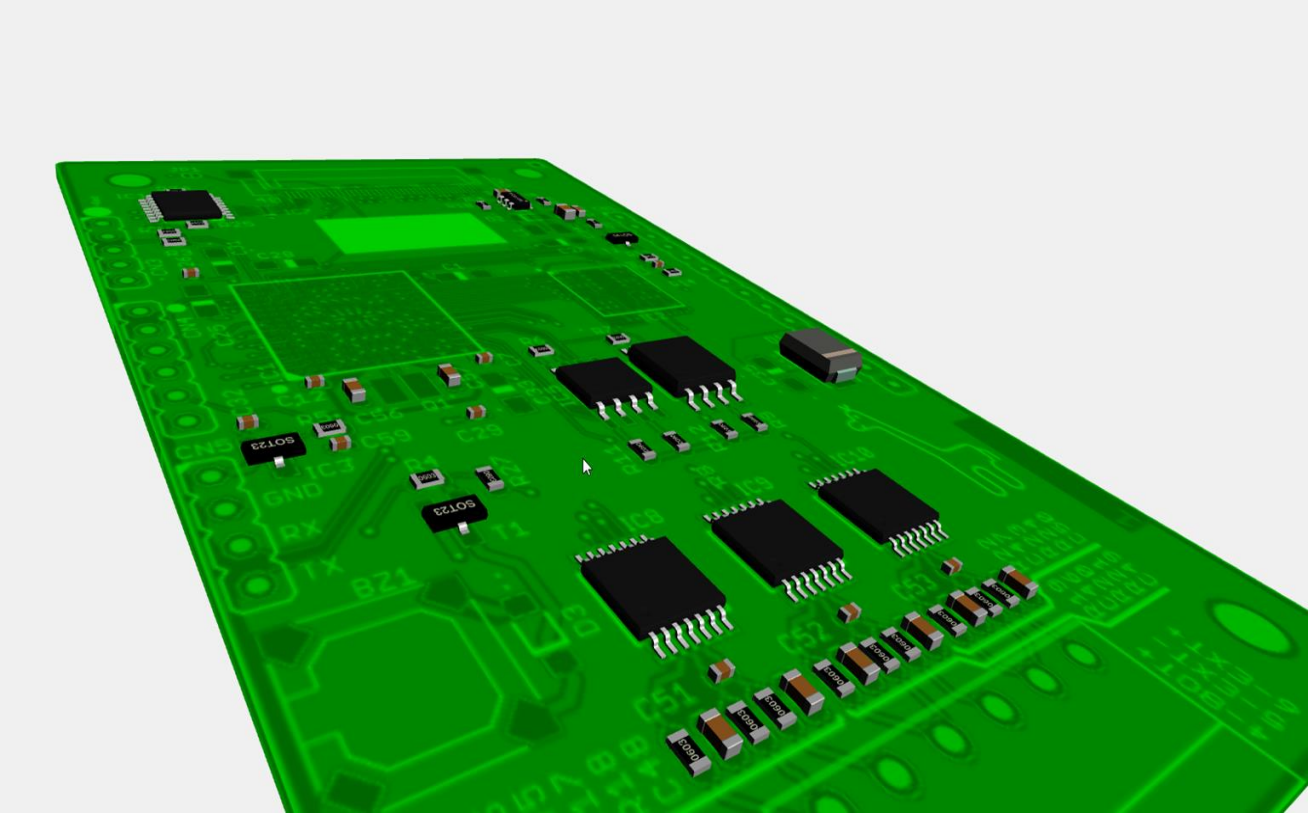
- **Virtual production in the eC-cloud -** Your Populated Board produced "right first time"



Assembly Visualizer

the way to proceed

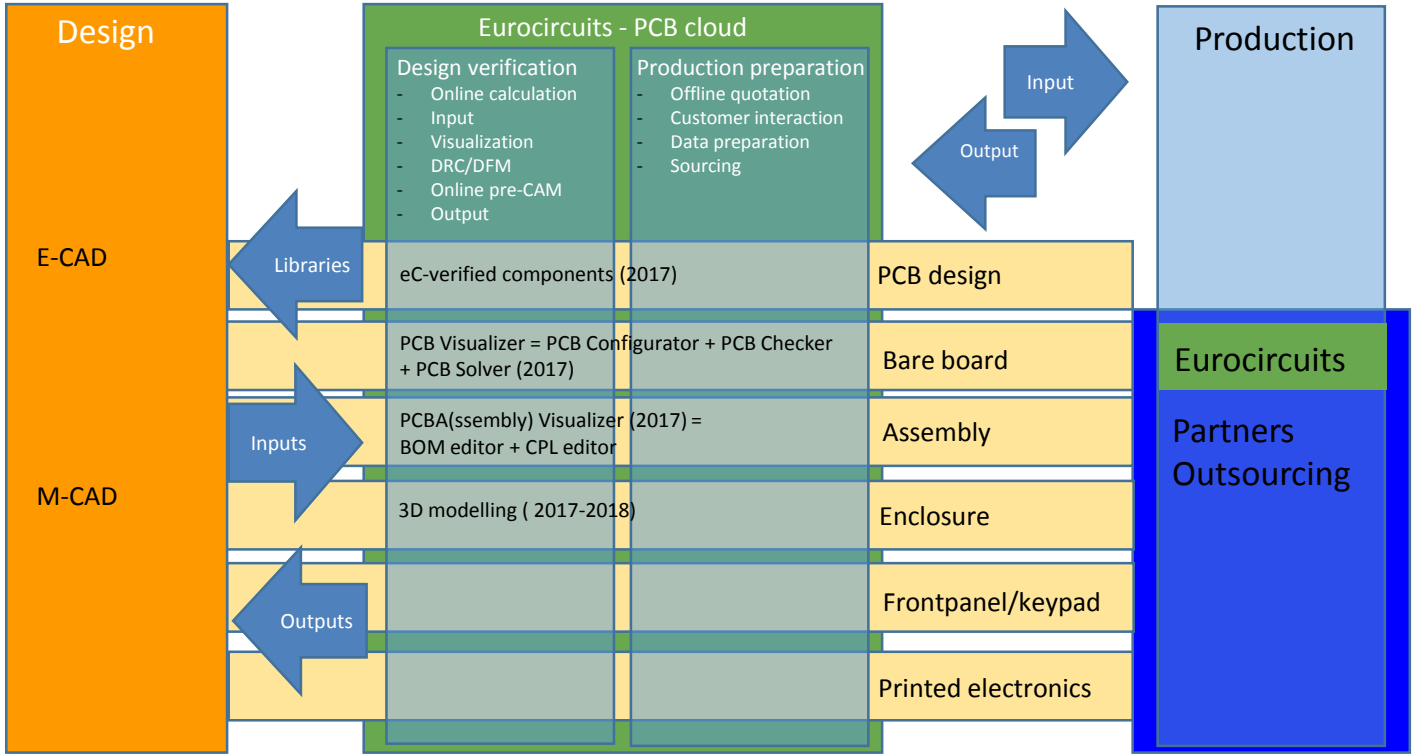
- eC-verified component database (DB)
  - Verified footprints (IPC-rules + Own practical experience)
  - Output to various CAD-packages



Assembly Visualizer

the way to proceed

- Eurocircuits CAM department
  - pool of electronics engineers for data preparation … to get a virtual 3D assembled board



Making electronic applications

Virtual production in the eC-cloud - Your Populated Board produced “right first time”

EURO CIRCUITS

- Your board "right first time"
  - on time
  - accurate to your intentions
  - at best total cost
- Thanks