

Ucam Basic Training Guide



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UCAM Training Guide January 2021

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CREATE	
Modify	
Layer	
Extra	
Drill	
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BUILDUP MENU (JOB EDITOR)	
LOAD	
SUPPORT	



UCAM Main Window

When you start UCAM, the Main Window appears with an empty main drawing area. The title bar of this the main window displays the version and subversion number of UCAM that you are currently working with. The screenshot below displays the main drawing area with a loaded job.





Job menu

New...

📠 Job Definiti	on			×
Name	:	Multi		
Revision	:	1		
Customer	:	cus		
Size	:	0	0	
Path	:	C:\Denis		~ 🖸 🖬 📩
CheckList	:			~
Info	:			
	ОK		Apply	Cancel

Name

This is the Ucam job name.

Revision

Enter here the revision number of the PCB.

Customer

This is the name of the customer job.

Size

Displays the X and Y size of the PCB.

Path

Directory path where you want to save the Job file on the hard disk.

Checklist

Link checklist to the job.

Info

Displays information related to the job.



Open...

📊 File Select				×
Look <u>i</u> n:	📙 Training2		+ 🖽 🍤 🦚	
Recent Items	autosave clean Coupon Gerber PlotJob reference SAL Multi.job			
Documents				
This PC				
Network	File <u>n</u> ame: Files of <u>t</u> ype:	Multi.job .job files	~ [Open Cancel

Open an existing Ucam job.

Edit...

Multi					a x
Layers	Buildup	Subjobs	Activate	View	
		P II			
		L N			
		<u>A P</u>			
🗆 PAS				PasteTop	
🗆 SIL				SilkTop	
🗆 MAS				MaskTop	
🗖 OUT	↓				
🗆 INN	↓			Inl	
	↑			In2	
	↓ 			In3	
	↑ 			In4	
				BOU	
				Maskbut SilbBot	
	======			Outline	
D ROU	======	========	=====	Rout	
🗆 ROU	======	=======	=====	Rout2	
		L L		Unplated	
				Plated	
-1-	2	3 4	5	0 🔚	
	6	7 8	9	10 11	
Delete la	vor			itor	
Delete la	iyel			itei	~



Merge...

🚂 Merge Job		×
		Load
🗹 Layer		
🗹 Drill		
🗌 Extra		
ОК	Apply	Cancel

Use this dialog box to add the data of another existing job to the current job.

Layer

Merges the layers of class LAYER.

Drill

Merges the layers of class DRILL.

Extra

Merges the layers of class EXTRA.

Parameters...

The Parameters dialog box is identical to the Job Definition dialog box displayed after choosing New... from the Job menu (See above).

Save v3

Save the current job using DPF version 3 format.



Save As...

🙀 Save				×
Save <u>i</u> n:	📙 Training2	~	🧊 📂 🛄 -	
Recent Items	autosave clean Coupon Gerber PlotJob reference SAL Multi.job			
	File <u>n</u> ame:	Multi.job		Save
Network	Files of <u>t</u> ype:	*.job	\sim	Cancel



SmartStart...

a SmartStart	
Add Files Rescan Analyze Filter Dump Delete/Clean Image: Image in the second seco	Language ger274x Default arc interpolation mode None © G75 © G74 Reset coordinates at new layer © Yes No Delete non-isolated full arcs in contour No No
Top. dpf dpf L Training. job jobfile L fc. dpf dpf L fs. dpf dpf L in2. dpf dpf L maskBot. dpf dpf L maskBot. dpf dpf L outline. dpf dpf L outline. dpf dpf L ImaskBot. dpf L	No ● Yes Regular polygon aperture dimension ● ● Outer ● Inner Macro polygon primitive dimension ● ● Outer ● Inner Exposure off in macro ● ● Transparent ● Reverse Hole in circle aperture exposure ● ● Transparent ● Reverse Hole in circle apenture exposure ● ● Transparent ● Reverse
Sort Alphabetic Unzip Zip Keep extension during input	Transparent Reverse Hole in obround aperture exposure Transparent Reverse
Add To Job Options <	Hole in regular polygon aperture exposure © Transparent © Reverse Following Polygon Area Fill Clear © Reverse © Transparent ▼

Use this dialog box to add data files to the current job. The SmartStart dialog box contains a list of files in the job directory.

Add Files

🖪 Select Input F	ile(s)			×
Rechercher da	ns : 🕕 Nouveau d	lossier	- 🤌 📂 📰	
Documents récents				
Bureau				
Mes documents				
Ordinateur				
	<u>N</u> om de fichier :			vrir
Réseau	Fichiers du <u>t</u> ype :	Tous les fichiers	✓ Anr	uler



Graphical Aperture Reader – Apertures (GAR)

	d U	cam W	/heeleditor : I	D:\Denis\Doc\u	ucam\Training\l	Jcam Basio	: Training\Day_1	1_Exercises\	Exercise01	\A1.ape		×
	File	List	Setup Code	'S								
	\bigcirc	Whee	l 💿 Gar	Loaded Setu	ip: None							
ľ	Con	vert	Normal	🔘 Modal				ľ			4	
l	Pars	e :	Position	Oelimiter					MIL	 Scale 	1	
l	Mod	e	Oefine	🔘 Undefin	e 💿 Set Rar	nge 🔳						\mathbf{M}
l	1	UND	Dcode	Shape	X-size	Y-size						<u>^</u>
l	2	CIR	10 CI	R 8								
l	3	CIR		R 10								
l	4	CIR		R 50								
L	5 6	CIR	13 UI 14 CT	к 32 р 40								
L	° 7	CTD	14 UI 15 CT	к 40 Ъ 56								
	8	CTR	16 CT	R 60								
	9	CIR	17 CT	R 226								
l	10	REC	18 RE	C 24								
l	11	REC	19 RE	C 24								
l	12	REC	20 RE	C 40								
l	13	REC	21 RE	C 40								
L	14	REC	22 RE	C 44								E
l	15	REC	23 RE	C 52								
L	16	REC	24 RE	C 62								
l	17	REC	25 RE	C 66								
l	18	REC	26 RE	C 90								
l	19	REC	27 RE	C 100								
l	20	REC	28 RE	C 110								
l	21	REC	29 RE	C 138								
l	22	UND	30 RE	C 160								
l												
l												
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	∍Ē											
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	J	~-	i O	♦۞⊟	$\diamond \bullet \checkmark$							
	0	Displa	y CIR =	dcode CIR ou	uter : 8							
	0	Recon	vert REC = 1	doode REC x	size ysize	: 13						Ξ
	0	-										
	() F	Remov	ve									Ŧ
			•		111							•



Graphical Aperture Reader – Parameters (GAR)

📑 Ucam W	Vheeleditor : D	:\Denis\Doc\uc	am\Trainin	ig\Ucam	Basic Traini	ng\Day_1_	Exercises	Exercis	e01\A	1.ape			×
File List	Setup Codes	3											
N/hoo	l 🔊 Gor	Loaded Setun	· None										
	a 🥑 Gai		. None										
Convert	Normal	🔘 Modal								_	Qeolo	1	
Parse	Position	Oelimiter							VIII	•	Juaie	L	
Mode	Oefine	🔘 Undefine	💿 Set I	Range									₩
	Doode	Shane	Y_giza	v									
2 UND		3.11dpc - 3	N-012C	1	0120								
3 UND	іі сп	R 10											
4 UND	12 CII	R 50											
5 UND	из спя	२ 32											
6 UND	14 CII	R 40											
7 UND	15 CII	२ 56											
8 UND	16 CII	R 60											
9 UND	17 CII 10 DE	R 226	60										
10 UND	18 REU 10 DEG	24	6U 00										
	ידא פידו ואס הס	- 24 - 40	90 36										
13 UND	20 RE(2 40	52										
14 UND	22 RE(C 44	66										E
15 UND	23 RE(52	40										
16 UND	24 RE(62	48										
17 UND	25 RE(C 66	44										
18 UND	26 RE(C 90	24										
19 UND	27 RE(C 100	80										
20 UND	28 RE(2 110	90										
21 UND	29 RE(C 138	80										
22 UND	אין אבי	: 160	90										
													.
	[[ት if 👧	$L^{L} \rightarrow$	A									
	•	→ min @e	0.00										
Oispla	iy 🗌												*
C Recon	vert												E
Remo	ve												
- Kenio													-
	•												•



Save .gar file

🔝 Prompt Dialog	×			
Save as				
D:\Denis\Temp\Training\A1				
OK Cancel Help				

Load .gar file

J
ł



Wheel Editor

📑 Ucam Wheeledi	tor : D:\Denis\Doc\ucam\Training\Ucam Basic T	raining\Day_1_Exercises\Exercise01\A1.ape				X
File List Setup	Codes					
🖲 Wheel 🔘 Ga	ır					
Gerber		<pre>18 = REC,0.6096,1.524 19 = REC,0.6096,2.286 20 = REC,1.016,0.9144 21 = REC,1.016,1.3208 22 = REC,1.176,1.6764 23 = REC,1.5748,1.2192 25 = REC,1.5748,1.2192 25 = REC,2.286,0.6096 27 = REC,2.24,2.032 28 = REC,2.794,2.286 29 = REC,3.5052,2.032 30 = REC,4.064,2.286</pre>	Type Type	Parameters Number Name Diameter Reverse	Replace	Delete
			Auu		Replace	Delete



Auto Format

🖬 Auto Format	x
Settings Board Size 0 Unit Mil	
Files Analyzed Files Input Files Analyzed Files D: \Denis\Temp\Training\Bot. dpf >> D: \Denis\Temp\Training\Det. dpf >> D: \Denis\Logs\B359278-TECN0\Hyouka_Board <	
OK Apply Cancel	

Import Job

GWK Input
IPC-D-356A Input
IPC-D-356B Input
MET Input
ODB++ Input
World Feature Input

Import a job from other CAM system.

Quit

Quit Ucam.



View menu

Select...

General

Selections		×				
SelectAll	Reset	Toggle				
• + • - 0						
General Objects Con	General Objects Contours Advanced Attributes					
Reverse	Chained	Painted				
Aperture	Ref Layer	Overlaps				
Ape Definitio	n	Current Object				
Select Windo	w V In m Out	Shape Object				

Reverse

Select all reverse apertures

Chained

Selects all draws and arcs in plane 1 connected to the one you click

Painted

Selects all areas where a combination of flashes, draws and arcs touch or overlap, to describe a large (copper) surface.

Aperture

Selects the objects using the current aperture in the Aperture List.

Ref Layer

Click Ref (reference) Layer to use selections on another layer (Plane 2) as a selection criterion

Overlaps

Selects all objects in all active layers that overlap objects in the reference layer, i.e. plane 2.

Ape Definition

Selects the objects using the current aperture and using an aperture definition identical to the current definition.

Current Object

The object being examined by Query Object is selected when you click Current Object.



Info



Objects

Selections		×				
SelectAll	Reset	Toggle				
◎ + ○ -	1268					
General Objects Con	tours Advanced Attribute	:S				
Shape 🔴 🗘						
Object 📃 Flas	sh 🔲 Draw 📄 Arc 📄 VTxt					
Without Pads Net						
Testpoints / Net	Testpoints / Net					

Shape

Select objects with specified object shape.

Object

Select objects with specified object type.

Without Pads

Enables you to select electrical nets without any flashes. Netlist information must be available.

Net

Click on Net button and click on an object to select all objects belonging to the same electrical net.

Testpoints/Net

Select nets with a certain number of test points.



Contours

Selections		×			
SelectAll	Reset	Toggle			
◎ + ○ -	1268				
General Objects Cont	tours Advanced Attribute	95			
Regions Outers Inners PickContour All					
Contours < 0	0				
Surface < 0					
Open	Overlap	Ambiguous			

PickContour : Picks all regions, all outer or all inner contours.

All : Selects all regions, outers or inners in the active layers.

Contour < : For every contour area in all active layers, UCAM calculates the X and Y size of the area's enclosing rectangle. If these sizes are smaller than the values you entered in the Contour fields, the area is selected. **Surface <** : Selects contours smaller than the specified area.

Open: Selects all open contours in all active layers

Open : Selects all open contours in all active layers.

Overlap : Selects all contours of the same aperture that overlap in all active layers.

Ambiguous : Selects all ambiguous contours in all active layers.

Rule	Error Message	Selected object(s)
1	Intersecting Shared Point	The contour which has the shared point is selected
2	Contour intersecting with contour of same aperture containing shared point	The contour which has the shared point is selected
3	Contour can be attributed to different intersecting parents of different polarity	The inner contour is selected
4	Contour can be attributed to different intersecting parents of same polarity and intersects with children of possible parents	The enclosing box of the offending contour is marked using a diagonal line
5	Small distance between Inner and Outer	The (almost) touching contours are selected
	Small distance between 2 Contours	
6	Self-intersecting contour	The self-intersecting contour is selected



Advanced

Selections					
SelectAll	Reset	Toggle			
◎ + ○ -	1268				
General Objects Con	tours Advanced Attribute	95			
Doubles Tol. Em	Doubles Tol. Embedded Obj.				
Length < 0					
Ratio < 0 ● ① ‡ ○ ① ‡					
Ape Ratio >= 0					
Ape > Ape < 0 0					
Isolated Flashes					

Doubles Tol.

Selects all doubles which have a difference in coordinates less then the tolerance value. Doubles are objects with identical shape and position. If more than two objects have the same shape and coordinates Doubles Tol selects all objects but one.

Embedded Obj.

Selects objects which are embedded inside other objects. You can use this function to find redundant objects that can be deleted without modifying the image.

Length <

Selects all draws which have a smaller length than the length indicated in the Length field.

Ratio <

Enter the ratio for the draw(s) to be selected. Ratio = draw length / aperture width.

Ape >

Select apertures with X and Y sizes larger than the specified X and Y values.

Ape <

Select apertures with X and Y sizes smaller or equal than the specified X and Y values.

Isolated Flashes

Select all flashes that are not connected to any other objects on the same layer.



Attributes

Selections						
SelectAll	Reset	Toggle				
● + ○ -	1268					
General Objects Con	tours Advanced Attribute	s				
Category: AOI		•				
Name uAOI_	AngleBm	•				
Value <ignor< td=""><th>re></th><td>•</td></ignor<>	re>	•				
	Refresh					

History

Choose History from the view menu to redisplay any of the last five views. Click repeatedly to scroll through the different views.

Pan

Choose Pan from the View Menu to view data adjacent to the current viewport.Repaint

Zoom

The Zoom submenu contains options for setting the enlargement factor by which data is displayed.

Options

The Options submenu contains options for setting the visibility of data, reference and zero points.



Grid...

Grid Parameters					
🗂 🔳 Display Gri	id]			
Origin	0	0			
Step	2.54	2.54			
Show as	🖲 Cross 🔘 Lines				
ОК	Apply	Cancel			

Select Grid from the View menu to define, display or hide a grid in the main drawing area.

Guide...



Choose Guide from the View menu to display the View Guide-dialog box. Use this dialog box to change the view on the data in the main drawing area.

You can use the View Guide-dialog box to examine (specific parts of) the visible data to view for example the outcome of an action or to find selected objects.



Apertures Manager...

Aperture	ApertureManagerDialog - Top						
<u>A</u> perture E	dit Viev	W					
i 🐴 🖬	🕋 🗗 🗹 🛃 🌾 🧰 🐹						
Current A	perture						
– Anorturo I	iet Plar	o 1 (12 anor	turas 1 notari				
	.1311 101	ie i (42 apei	tures, i polari	(y levels)			
. NR		NAME	DEF	PL	F/R	D	
	10		CIR,0.15	1P		2684	
	11		CIR,0.75	1P	582		
	12		CIR,0.3	1P		334 💻	
	13		CIR,0.7	1P		4	
	227		CON	1P	3	564	
	16		CIR,0.2	1P		4	
	2		CIR,0.05	1P		401	
	19		CIR,1.6	1P	27		
	226		CIR,1.6	1P	1		
	20		CIR,1.7	1P	93		
	21		CIR,0.25	1P		11 🔫	
•			III	1		•	

Aperture Manager allows you to view and manage all apertures for the layer currently loaded in Plane 1. The name of this layer is displayed in the title bar. Loading a different layer in Plane 1 will automatically refresh the information displayed in the Aperture Manager dialog.

🛃 Aperto	ure Editor					x
Number	13			Shape	Circle	•
Name						
Outer ().7					
·						
Reve	rse	Attributes				
Mirror	No -	Rotation	0.0			
Pattern						
	0	0				
	ок		Apply		Cancel	

Create Circle



Create Rectangle

Aperture Editor				x
Number 13		Shape	Rectangle	•
Name				
Xsize 1				
Ysize 2				
Reverse Reverse	Attributes			
Mirror No	Rotation 0.0			
Pattern				
0	0			
ОК	Apply		Cancel	

Create Box

🖪 Apert	ure Editor			X
Number	13		Shape	Box 🔹
Name				
ſ	•			
Size	1	2		
Cutoff	0.5	0.5		
Reve	rse	Attributes		
Mirror	No -	Rotation 0.0		
Pattern				
	0	0		
	ОК	Apply		Cancel



Create Octagon

🛃 Apert	ure Editor		Sec.	-	×	
Number	13			Shape	Octagon 👻]
Name						4
Size 1						
🔲 Reve	rse	Attribute	IS			
Mirror	No 🔻	Rotation	0.0			
Pattern	-					
	0	0				
	ок		Apply		Cancel	

Create Donut

Aperture Editor		-	×
Number 13		Shape	Donut 👻
Name			
Outer 1	0 -		
Inner 0.8			
Reverse	Attributes		
Mirror No 🗸	Rotation 0.0		
Pattern			
0	0		
ОК	Apply		Cancel



Create Thermal

🖪 Aper	ture Editor	-			×
Numbe	r 13		Shape	Thermal	•
Name					
Outer	1		\cap		
Inner	0.8			•	
Gap	0.2	# 4			
Angle	45				
Revi	erse	Attributes			
Mirror	No 🔻	Rotation 0.0			
Pattern					
	0	0			
	ок	Apply		Cancel	

Create Complex

R Aperture Creator		1	×
Number 233		Shape Complex	•
Name			
Size	0		
Scale 1			
Region	ins		
With Center			
Reverse	Attributes		
Mirror No -	Rotation 0		
Pattern			
0	0		
ОК	Apply	Cancel	



Create Contour

🖪 Apert	ure Editor			
Number	13		Shape Contour -]
Name				
Stroke	0			
🔲 Reve	rse	Attributes		
Mirror	No -	Rotation 0		
Pattern	-			
	0	0		
	OK	Apply	Cancel	

Create Text

🖪 Apert	ure Editor				×
Number	13			Shape	Text 🗸
Name				<u>.</u>	
Height	k				
Width	4.2105				
String	Ucam				
Reve	rse	Attributes			
Mirror	No -	Rotation 0			
Pattern	-				
	0	0			
	OK) A	pply		Cancel



Create Block

🖪 Aperti	ure Creator				X
Number	233			Shape 👘	Block 🗸
Name				2	
Xsize 0)	Ysize ()		
💿 Emp	ty block	🔲 With Cent	er		
💿 Sele	ctions Definition				
💿 Link	to DPF Object				
Reve	rse	Attributes			
Mirror	No -	Rotation 0			
Pattern					
	0	0			
	0K	A	\pply		Cancel



Edit Complex

Aperture Editor	
Number ₁₃ Name	Shape Complex -
Xsize 0.7 Ysize 0.7 Scale 1.0 Edit	
Reverse	Attributes
Mirror No V Pattern	Rotation 0
0	0
ОК	Apply Cancel

Edit Block

Aperture Editor			×
Number 13 Name		Shape Block	•
Xsize 0 Edit Multi Edit Reload Update	Ysize 0 Keep Link		
Reverse	Attributes		
Mirror No 🔻 Pattern 🔳 👻	Rotation 0		
0	0		
ок	Apply	Cancel	



Load

🛃 Ouvrir			-			×
Rechercher dan	s : 🕕 Nouveau di	ossier		- 🔊 🛛	🤌 🔜 📰	
Documents récents						
Bureau						
Mes documents						
i 🔍 Ordinateur						
	<u>N</u> om de fichier :				<u></u> u	Jvrir
Réseau	Fichiers du <u>t</u> ype :	Tous les fichiers	3	•	Anı	nuler

Load aperture from the selected DPF file and add them at the end of the aperture list

Print

🖪 Apertures Page Se	etup 🗾
Paper]
Size: A4	•
Orientation	Scale
Ortrait	Fit to Page
🔘 Landscape	🔘 Scale: 1.0
Margins	
Left: 1"	Right: 1"
Top: 1"	Bottom: 1"
Header	Alignment
📃 Add Header 🛛 💿 Top Left	
	Center
Print	Save Cancel



Errors...

🛃 Error	Handling : CopperClearance
<u>E</u> rrors ¿	<u>A</u> ctions ⊻erify <u>O</u> ptions
Errors L	oaded:
Active	1398 out Of Total # 1398
Туре	ALL
Layer [
Status	
Scroll	💿 Scan 🛛 💿 Propose 💿 Repair
P	
Curre	ent Fault
Туре	TRACK TO TRACK
Layer	1208
Info	Annotations
Clear	c: 0.257 mm
Metho	od :
N- 64	en file in Frult Data Data
NO CI	.g file in fault baca base
Status	
F:	



Numbers...

S Number	s in : mm	×
🔽 Point1	508.127	501.015
📝 Point2	508.1778	500.5832
Center	508.1524	500.7991
Offset	0.0508	-0.4318
Distance	0.4348	
Angle	-83.29	
Clearance	0.257	
Res	et	DO
Measure		
Obje	cts Points	Layer

Point1

Displays the coordinates of the first point indicated by a small cross.

Point2

Displays the coordinates of the second point indicated by a small cross.

Center

Displays the center coordinates between Point1 and Point2.

Offset

Displays the X and Y size of the enclosing rectangle. This is also the size of the job. Negative values are indicated by a right to left or an up to down offset.

Distance

Displays the distance between Point1 and Point2.

Angle

Displays the angle between the virtual line connecting Point1 and Point2. The angle is between -180 and 180 degrees. CCW is the positive orientation.

Clearance

Displays the minimal clearance detected between Point1 and Point2.



Query Object...

🖪 Query	Object
	1 of 1 True Objects
Туре	DRAW Attributes >>
From	507.365,501.015
То	508.127,501.015
	-
Net	0
Aperture	25 = CIR,0.1778
	Query Object



Edit menu

Cut

Choose Cut to remove objects from the layer in plane 1 and puts them in the clipboard.

Сору

Choose Copy to copy objects (and their netlist information) from the layer in plane 1 to the clipboard.

Paste

Choose Paste to place the clipboard's contents into all active layers, even when they are in plane 0 (hide).

Clear

Clear the clipboard.

Delete

Delete all selected objects on activated layers.

Apertures

Clean

Remove all unused apertures all aperture lists of all active layers

Group Definition

All objects that use a duplicate aperture definition are attached to the first aperture in the list which has this definition.

Group number

All objects that use a duplicate aperture definition and number are attached to the first aperture in the list which has this definition and number.

Group Pos/Neg

Minimize the number of polarity levels (i.e. positive and negative sections) in the Aperture List without changing the image.

Replace

Replace an object's aperture definition with the current aperture definition of the layer in plane 1.



Transform...

On Reference Points : Enables reference points in the layer(s) to be shifted along with the objects. Use Center : Select 'Use center' to Use the Center of the X and Y coordinates as specified in the Numbers dialog box.

Edit

Transform Objects
On Reference Points Use Center
Edit Rescale BGA Tracks BGA Pads
Direction 💿 🛟 🔿 🕶 🔿 🕇
🕞 🕞 💭 🗖 On Multiple Draws
TÊR 🛱 🖆 F.

₿+ Moves objects over relative distances to new positions in the same layer.

Copies objects within the same layer.

Drags vector starting or end points, to new locations.

On Multiple Draws : Lengthens or shortens a number of parallel draws. You can also use Multi drag when you want to work on multiple vector points, located on different chains of vectors.



IF I ⊨ Mirrors objects along the X and Y axis.



 $\mathbf{LF} \mathbb{F}$ Rotates objects in a layer.

Reverses an objects polarity.

Actates objects in a layer.



Rescale

Transform Objects
On Reference Points
Edit Rescale BGA Tracks BGA Pads
Image: Second secon
Register On Points
• 🚺 🖸
🔿 🕵 💿 Straight 🔿 Rounded

Click [Set Origin] to change the Origin (zero point) of the job's layers.

Click [Set Origin Center] to set the Origin (zero point) of the job's layers to the centerpoint.

Click [Scale] to apply a proportional Scale factor to the DPF data.

Register On Points : Click [Register On Points] to shrink, expand or distort a complete DPF layer.

[Thicken] & [Thin] : Click on [Thicken] or [Thin] to make shapes larger or smaller.


BGA Tracks

Transform Objects
🔲 On Reference Points
🔲 Use Center
Edit Rescale BGA Tracks BGA Pads
Min. Length: 0
Chamfer 0 0
Fillet
Round 0

Drags a draw maintaining the angle of its connection with two other draws.

Min. Length : If during a Drag Constant Angle action one of the dragged lines becomes smaller than the specified length, dragging will not continue. Enter 0 if you do not want to specify a minimum length.

Use limit : If during a Drag Constant Angle action using numbers one of the dragged line becomes smaller than the specified minimum length, dragging will not continue.

Here are a space between selected draws using the outer two draws as reference.

Connects the draws from a Ball Grid Array to a selected draw. Select the required draws from the BGA and select the required draw. Clicking Drag to Line will connect the BGA with the draw.

Chamfer : From to
Fillet : From to
Round : From to



🖬 Tr	ansform Ol	bjects 🗾		
		On Reference Points		
		📃 Use Center		
Edit	Rescale	BGA Tracks BGA Pads		
	exclude co	ntour regions		
	📰 only on BGA's (uBGA attribute)			
۲	absolute	0		
0	relative	5 %		
E	inlarge			

[Enlarge] : Starts the enlarge action

Absolute : The longest side of the BGA pad will be enlarged using the specified absolute value (current unit).

Relative : The longest side of the BGA pad will be enlarged using the specified relative value (%)

exclude contour regions : Disables enlarge action on contours.

only on BGA's (uBGA attribute) : Restricts enlarge action to objects that have the uBGA attribute set.



Insert

Toolbox

Editing Toolbox	
Insert	٦
Flash	1
Draw	1
$\mathbb{Z} \times \mathbb{Z} \otimes \mathbb{Z} \times \mathbb{Z} \times \mathbb{Z} \times \mathbb{Z} \otimes \mathbb{Z} \times $	
Arc	1
Full Arc	1
Edit	
_ Delete	
\times \times	
Snap	

Insert > Flash



Insert > Draw





- : To insert a draw as a tangent of 2 circles.
- I: To insert a draw as a tangent of an arc.
 - : To insert 4 connected draws in a rectangular shape (see Insert>Box)
 - : To insert a draw as an orthogonal draw with respect to a selected draw.
 - : To duplicate an existing draw as a parallel draw at a specified distance.

Insert>Arc

: To insert an arc which is defined by 3 points (start, end and intersection point)
 : To insert an arc which is defined by 2 points (start and middle point)
 : To insert similar arc with smaller/bigger diameter

Insert>Full Arc

- 🥗 : To insert a full arc. The radius of the arc can be set to a fixed value or can be set by dragging the mouse.
 - : To insert a full arc which is going trough 3 specified points.
 - : To insert a full arc in between 2 selected tangent lines.
 - To insert a full arc in between 3 selected tangent lines.
 - : To insert similar full arc with smaller/bigger diameter

Edit



: To modify the coordinates of an indicated object.

: To insert a break

Delete

: To delete selected objects. : To delete an indicated object. : To keep the indicated segment of an object.

Snap



: Deactivate any Snap mode or use hotkey x.

Entering 1,2 or 3 on numerical keyboard will set snap plane color (sets outline color of "No Snap" button)

😟 : Activate/Deactivate Snap to Grid.



Activate/Deactivate Snap to the endpoints of a line or arc.
 Selecting this option will deactivate the "Snap to virtual point".
 Activate the "Snap to Outline" toggle to snap to any corner of the outline.

EXACTIVATE/Deactivate Snap to the nearest object (arc or line). Activate the "Snap to Outline" toggle to snap to any point of the outline.

: Activate/Deactivate Snap to the center of a line or arc.

Activate the "Snap to Outline" toggle to snap to any mid point of the outline.

: Activate/Deactivate Snap to the intersection of 2 or more objects.

Activate the "Snap to Outline" toggle to snap to any intersection point of the outlines.

Sectivate/Deactivate Plane Intersect & Object Intersect.

Snap to any location where objects on a Data layer intersects with objects on a work layer.

The work layer should have the same plane color as the outline of the Snap button.

Activate the "Snap to Outline" toggle to snap to any intersection point of the outlines on Data and Work layer.

: Activate/Deactivate Snap to a virtual intersection point. Selecting this option will activate the "Snap to intersection" mode and deactivate the "Snap to Endpoints" mode.

Activate the "Snap to Outline" toggle to snap to any virtual intersection point of the outlines.

Ŷ

: Activate/Deactivate Snap to outline mode.

When deactivated, all snap actions apply to the skeleton view (default). When activated, all snap actions apply to the outline view.

This toggle affects ALL snap modes (except snap to grid)



Vector Text...

🖪 Insert	Vector Text
String	
Font	ODBstandard
Width	0
Space	0
Rotation	
Scale	1
Mirror	None -
ОК	Apply Cancel

Barcode 39...

Barcode39	×
Value	
Barcode Height	10.668
Narrow Bar Width	0.254
Wide To Narrow Ratio	3
OK Apply	Cancel



Reference...

Reference Points	
On All Active Layers Auto-increment index	
Point 0 Add/Modify	0 Delete

Reference is used to place a hot spot on a DPF, this point can be used later for outputting data. It is also used in combination of "Register On Points" for scanned data.



Undo menu

Undo

Choose Undo from the Edit menu to undo the last UCAM operation.

Redo

Choose Redo from the Edit menu to redo the operation which was last undone.

Clear

Choose Undo Clear from the Edit menu to clear the contents of the undo buffer.

Options...

🛃 Undo / Red		X
Undo	Select All	
Redo	nothing	

[Undo] : Click Undo to undo the last UCAM operation which is displayed in the Undo field. [Redo] : Click Redo to redo the last UCAM operation which is displayed in the Redo field.



Verify submenu (Tools menu)

Arcs...

Verify Arcs & Draws
Invalid Arcs Select Validate
Zero Length Draws and Arcs
Maximum length: 0
Functional Draws/Arcs
🔲 Non Functional Draws/Arcs
Select Delete Replace with Flash
Cancel

Use this dialog box to check all active layers for the presence of invalid arcs or (near) zero-length draws

Copper Repair...

📑 Copper Repair	. X
📝 Pinholes	
Smaller than	0.0254
Expand	0.0025
🔽 Peelables	
Smaller than	0.1016
Minimum size	0.0254
Expand	0.0025
Slivers	
Smaller than	0.1016
Minimum size	0.0254
Expand	0.0025
ОК	Apply Cancel



SmartDRC...

📓 Smart Design	Rule Check		-	— ×-
Setup Results				
Configuration	Classe4	-	Class All	•
Checks (All)				
Active	Class	Check	Value	Tolerance
	LAYER	PAD TO PAD	0.2	0
	LAYER	PAD TO TRA	0.2	0
	LAYER	TRACK TO T	0.2	0
	LAYER	MIN TRACK	0.2	0
v	LAYER	COPPER C	0.2	0
	LAYER	SP		
	LAYER	ST		
	LAYER	ST	0	
	LAYER.rout	MIN RING LA	0.254	0
	LAYER.rout	PARTIAL OV		
	LAYER.DRILL	PAD CLEAR	0.3048	0
	LAYER.DRILL	TRACK CLE	0.3048	0
	outer.DRILL	ISOLATED P		
	outer.DRILL	PARTIAL OV		
Options				
Tolerance %				
📃 Build netlist 🔘 Layer 💿 Job				
✓ Use netlist				
Select faults				
				Check



🔝 Smart Design Rule Check	_	X
Setup Results		
Summary (All)		
Class Check Value Toler	Min. found Una	Acce Rep
LAYER PAD T 0.2 0	0,139 26	
LAYER TRAC 0.2 0	0,129 855	
Filter		
Number of errors: 262	0 0	
Status: 📝 Unaccepted	📝 Accepted 📝	Repaired
Layer selection:	•	
Error navigation		
▶ ? 4 4 53 ▶ 1	₩	repair all
Scroll mode: 💿 Scan 🦳 Propo	ise 🦱 Renair	
Feedback: O All errors O Erro	rs on plane1/2 🔘	Current error
Current fault		
Layer Top	Туре	PAD TO TRACK
Original status: 🗶 unaccepted	Current status:	🗶 unaccepted
Info		
Clear: 0.1596 mm		
Error preview		
		×
		%



Layer Rules

DRC Class Editor			-				-			x
LAYER	*	LAYER]	class		lahel		in m	1
outer		outer		Add Lav	outer		Outer Laver C	hock		
inner	=	inner	-		LAYER.D	RILL	Layer Drill che	eck	V	
mixed	=	mixed	-		LAYER.m	nask	Layer Mask C	heck	V	1
power		power		Add Lay-Lay	LAYER		Unused Pads		V	
ground		ground			outer.DR	ILL			v	
DRILL		DRILL		Remove						
drill		drill			_					
buried		puried								
plind		pling								
upplated		upplated								
fiving		fiving								
nihhlo	Ŧ	nihhlo	-							
Tolerance Vse Netlist	0.	0 %								
Туре	V	alue +/- Tol 🛛 Tolerance	La	abel	Туре		Label			
📝 Pad Pad	0.	149 0			🔳 Single	Pad				
📝 Pad Track	0.	149 0			🔳 Single	Track				
🔽 Track Track	0.	149 0			📃 Ign	ore Embedded Object	s			
🔲 Track Diff	0.	254 0			📃 Track A	Angle				
📝 Min Track	0.	15 0			📄 Overlaj	oping Pads				
🔲 Min Pad Size	0	0			📃 Therm	al Gap				
📃 Min Thermal Gap	0	0			📃 Non-pl	ateble Holes				
🔲 Min Character Thickness	0	0			Exclud	e Text				
V Peelable SMD	0.	0762 0								
Min Size	0	0								
Peelable Round	0.	0762 0								
Min Size	0	0								
Predrilled Hole	0.	254 0								
Center Center Overlap	0	0								
Center Center Distance	0.	254 0								
Copper Cut-in	0.	254 0								
Same Net Spacing	0.	254 0								
Check		Save		Save As		Reset		Cance	I	



Layer-Layer Rules

DRC Class Editor							-		x
LAYER outer inner mixed power ground DRILL drill buried blind plated unplated fixing mibble		LAYER outer inner mixed power ground DRILL drill buried blind plated unplated fixing wikblo	* H	Add Lay Add Lay-Lay Remove	class outer LAYER.I LAYER.I LAYER.outer.Df	lab Out DRILL Lay nask Lay NLL -	el er Layer Check er Mask Check Ised Pads	in m	
Vse Netlist	0.0	5 N							
Type Pad Clearance Track Clearance Ring Lay2->Lay1 Ring Lay1->Lay2 Center Center	Va 0.4 0.1 0.1 0.1	alue +/- Tol Tolerance 8 0 4 0 16 0 254 0 254 0 254 0 0			Type Isolati Partia Powe Cleara	ed Pad Lay1 ed Pad Lay2 I Overlap r Ground Short ance Of 0 Is Error earance on Embedded Pads			
Check		Save		Save As		Reset	Cance		



Net Compare

al Net Compare								
Basic Tests : Shorts - Opens - Lost Elements								
💿 Basic Tests + Test if reference pad tou	ches more than 1 net							
💿 Basic Tests + Test if reference pad tou	◯ Basic Tests + Test if reference pad touches more than 1 net + Test if reference pad is not fully covered by copper							
🔲 Test if reference pad is missing a flash								
MultiJob Net Compare								
D:\Denis\Temp\Training\reference\Training.job								
Panelize Reference								
ОК	Apply	Cancel						

Choose Net Compare from the Verify submenu to compare a job's current netlist information for electrical changing (golden reference).

Object Compare...

DPF Object Compare							
Reference Tolerance	0						
 Window (drill Points) Objects Moved Aperture Shape Objects Added Aperture Size Objects Net Aperture Order 							
OK Apply	Cancel						

Choose Object Compare from the Verify submenu to display the DPF Object Compare dialog box. Use this dialog box to check for changes to individual objects in the DPF data. Each object in the active layers of the current job is compared with the corresponding object on the same layer in a reference job. Depending on the checks you have activated, changes to the object's characteristics are reported as errors in the Error handling dialog box.



Image Compare...

🖪 ImageCompare			×						
Reference									
💿 İmage to Image	Image to Image								
Compare laye	r in plane 1 a	against layer in plan	e 2						
O External Layer									
🔲 Auto Alignr	ment								
Layer Polarity	Copper Tol	lerance							
Current 🔳	Missing	0.254							
Reference 🕭	Exceeding	0.254							
View Errors Accuracy									
0									
Ok	Apply	Canc	el						

Choose Image Compare from the Verify submenu to display the Image Compare dialog box. Use this dialog box to optically inspect a complete job against a reference job or one layer against a reference layer.

Image Compare can verify complete job against a reference job, or verify any kind of layer (copper, drill, rout paths, soldermasks, paste layers, silk screens,..) against a reference (dpf) layer.

The outcome of an Image Compare process is an error list. The errors in this list can be viewed with the functions in the Error Handling dialog box.

All differences can be saved as an *.ufd file and loaded again later.



Editing submenu (Tools menu)

Clipping...

🗔 Clipping			
Clip Reference	Outline	•	
Clip Side	Olip Inside	🔘 Clip Outside	
Clip Clearance	0		
Minimum Length	0		
Rounded Lines			
ок	Apply	Cancel	

Connect...

Connect Pad Track								
Active Radius	0							
Snap Radius	0							
		📃 Use Netlist						
ок	Apply	Cancel						

Choose Connect from the Editing submenu to display the Connect Pad Track dialog box. Use this dialog box to connect pads and tracks that are close enough to one another.

Active Radius : Defines which pads and tracks should be connected to each other. The connection takes place when the pads and tracks are closer to each other than the active radius.

The new track is drawn with the smallest aperture (of the two endpoints) or a new circular aperture (with the size of the smallest pad) is used if the two pads are non draw apertures.

Snap Radius

The snap radius defines **how** these pads and tracks should be connected. If the distance between the end points is smaller than the snap radius, one of the end points snaps to the other. If the distance between the end points is larger than the distance specified then a new vector is created to close the gap. Note that Snap radius is ignored when tracks are in a direct line with each other: in this case one of the two tracks is lengthened by dragging its end point to the end point of the other track (no connecting draw is added).

The Snap Radius should be smaller than the Active Radius.

Use Netlist

When the toggle is activated, only objects which have identical and valid netlist numbers can be connected. Objects for which there is no valid netlist info available will provoke an error message and will be disregarded.



Contours...

🛃 Contour Hand	ling 💌					
measure						
Measure	Edit Recognize					
Replace						
Gap	0.0025					
Overlap	0					
Generate						
💿 Bitmap 🔘 Exact						
Ppi	8000					
Margin	0.0127					
Dxdy	0					
Dx	0					
Dy	0					
Contourize						
Merge Single Add						
Replace Inne	rs with Outers					

Expand...

🛃 Expand	-	×
Arcs	🗖 Text 📄 True	e Objects
ОК	Apply	Cancel



FlashMaker...

FlashMaker		— ×
Find	Replace	Setup
<u>g</u>		
Next	Change	Edit
Delete	Deselect	Pick
Delete Compl	Deselect Co	
M 1 BOX,0.5994,2.02	:18,R=0.025:0.025	
M 1 COM,2.413,2.209	98	



Setup

🛃 FlashMaker Setup							
Min Cutoff	0						
Min Size	0						
Max Size	5.08						
Tolerance 0.0127							
🔲 Use Masks							
Deselect Nonmodel							
OK Apply Cancel							

Min Cutoff field

Enter a value in the Min Cutoff field to define the minimum size of the cutoff corner of a model. A model with cutoff corners larger than Min Cutoff remains a box with rounded corners and a model with cutoff corners smaller or equal than Min Cutoff is converted into a rectangle.

A value of 0 means that only those painted models that are perfect rectangles are converted to rectangular apertures.



Min Size field

Enter a value in the Min Size field to define the minimum size of the enclosing rectangle of the models to be converted. Models eligible for replacement that are smaller (in the x-direction or in the y-direction) than the minimum size are not converted.

A value of 0 means that you should convert all (or selected) painted models smaller than the maximum size (see below).

Max Size field

Enter a value in the Max Size field to define the maximum size of the enclosing rectangle of the models to be converted. Models eligible for replacement that are larger (in the x-direction or in the y-direction) than the maximum size are not converted.

Example:

A value of 200 mils, means that anything over 200 mils is not considered by FlashMaker.

Tolerance

Deactivate Tolerance to use the best tolerance. This tolerance is determined based on the painted data. This is the default.

Activate Tolerance to use the tolerance value specified in the Tolerance field.

While converting, a small difference remains between the painted models and the flashed models. Only the conversions that have a difference smaller than the indicated tolerance are completed.

Use Masks

Limit find/replace only to objects in signal layers which are (partially) free of mask.



Deselect Nonmodel

Searches for models in 'selected data` only. Objects not belonging to model instances are deselected.



Flip Job...



Flip Job Buildup

Flips the entire job as one, and not each layer separately. Therefore the first layer becomes the last and so on. Non attached layers are not flipped and preserve their order in the buildup.

Flip Attach `None'

Flips the extra layers with `None' attachment. Normally the extra non-attached layers are not flipped.

Rename

Adds the extension specified in the Rename field to the flipped layers. The flipped layers lose the extension when they are flipped back to their original position

Models	-	x
	Xsize	0.6858
	Ysize	2.1082
	🔲 Tolerance	0
	Instances	0
	Define	Selections
	Creat	e Standard
	Creat	e Complex
	Select	Replace

Models...

Tolerance

After clicking Select, "UCAM" selects instances of the defined model using a tolerance. This tolerance is derived from the length of the tracks in the model.



Register...

🛃 Register			
	Radius X	Radius Y	
On Grid	0	0	
On Pads	0		
🔲 On Pad Flashpoint			
A	lign Layers	Close	

[On Grid]

Snaps all selected objects within the (rectangular) action area of a grid point to the grid. The action area is defined in the Radius X and Radius Y fields. All other objects are left at their original position.

[On Pads]

Pads in the active layers are registered to the nearest flash point of corresponding pads on a layer in plane 2. If the size of the pad on plane 2 is more than 3 times the size of the pad to be registered, registration will be done on the closest of 3 points :

Flashpoint

Start position of a virtual track covering the pad on which to be registered

End position of a virtual track covering the pad on which to be registered

Tracks are offset with the average offset of the pads.

On Pad Flashpoint

Activate this toggle to register on flashpoint only.

[Align Layers]

Adjusts the relative position of all active layers using translations, rotations and mirroring. A report on the result of the registration appears in the startup window.

The reference layer for the registration is defined with the following priority:

The reference layer is the active layer in Plane 3 is taken first.

The leftmost drill layer in the Job Editor is the reference layer if there is no active layer in Plane 3.

Reverse Layer

Choose Reverse Layer to reverse objects on all active layers (that are strictly positive). The outline layer is used to determine which objects to reverse. Objects residing inside the outline layer are reversed.



Tooling submenu (Tools menu)

Rout...

		🐻 Rout Manager 📃	٢	
		Cleanup Editor Tools Dimensioning		
		Optimize Path		
		Simulate		
		Modify Corners		
Rout Manager		Open Path		
Cleanup Editor Tools Dimens	ioning	→ <u></u>		
Parameter Set	- 🔳 💼	Generate Arcs		
🔽 Reconstruct Arcs	0.0254			
🔽 Validate Arcs	0			
📝 Remove Small Objects	0.0003			
📝 Connect Objects	0.0003		-	
🔽 Remove Redundant Objects				
Cleanup				
Snap		Snap		
	\sim \sim	$\blacksquare \blacksquare \times \heartsuit \heartsuit \times \heartsuit \land \checkmark \blacksquare$		

Parameter Set

Enter new Parameter Set name or select existing Set from drop-down list

Reconstruct Arcs

Expanded arcs are reconstructed when they contain draws smaller than a specified value.

Validate Arcs

Automatic replacement of invalid arcs by valid ones.

Remove Small Objects

- Objects smaller than the specified value are removed.

- Objects which length is smaller than two times the aperture size are detected and connected. Connecting objects are trimmed if necessary.

Connect Objects

Connect all objects in a chain if they are not connected within a specified tolerance. Vectors which are not connected are, where possible, changed in length until they connect.

Remove Redundant Objects

Removes all objects which are no longer needed.



Distort...

🛃 Distort	X
X Factor	1
Y Factor	1
🔲 Use Ce	enter
ОК	Apply Cancel

Drill Map...

📑 Drill Map	þ		- 10 Mar 1	X
Number	Diameter	Symbol	Symbols	
2 1	4.500000 1.000000	-		
			0	
			đ	
	Replace	Cancel	Symbol	



Fill Pattern...

Fill with Pads

🖬 Fill Pattern
Fill With Pads
💿 Odd Even 🔿 Full
🥅 Keep Edge
OK Apply Cancel

Fill with Tracks

📑 Fill Pattern		— X
Fill Wi	th Tracks 🔹	
	•	
Step	0	
Width	0	
Rotation		
📃 Keep E	dge	
ок	Apply	Cancel



Fill with Starburst

🛃 Fill Pattern	
Fill With Starburst	
Segments	
💿 Odd 🛛 🔘 Even 🔘 Alternate	
Black % 50	
🔲 With Center	
🗖 Keep Edge	
Edge Width 0	
OK Apply Cancel	

Fill Vector...

📑 Fill Vecto	r	×
Overlap Diameter Ape Count Ape Num	0.127 1 1	Complexes Thermals Text Boxes Donuts
Ок	Apply	Cancel

Overlap

The minimum overlap between two adjacent draws.

Diameter

The diameter of the smallest aperture used for filling.

Ape Count

Maximum number of apertures that can be used for filling.

For each new aperture, the diameter is doubled. So, if you enter 4 and the smallest aperture is 2 mils, the filling algorithm uses 2 mil, 4 mil, 8 mil and 16 mil apertures.

Ape Num

Lowest number that may be used as aperture number for newly created apertures.

Complexes, Thermals, Text, Boxes, Donuts

If complexes, thermals, text, boxes and/or donuts also have to be filled, activate the corresponding toggle.



Shave...

Pad Shave
Method: Clip 🗸
Clearance:
Pad Track: 🚺
Pad Pad: 0
Shave inside COMplex aperture 🔽
OK Apply Cancel

Silk Optimize...

Silk Clipping			
Silk Clipping]	
Silk Clearance	0.127	7	
Minimum Length	0.127	7	
		Apply	
Scale Text			
Define as Tex	đ	Undefine as Text	
Select Text		Deselect Text	
Factor 1.0		Scale Text	
Min. Clr. 0			
		Cancel	



Soldermask...

🛃 Soldermask					
Create New Sold	Create New Soldermask				
Pad Thicken: 0.1	27				
Shave Soldermas	sk				
Mask to Track: 0.	127				
Mask to Pad: 0.	127				
🗖 Optimize Mask—					
Minimum Ring:	0.0508				
Maximum Ring:	0.254				
Mask to Copper:	0.127				
Mask to Mask:	0.127				
Exclude Big Pads					
Big Pad Ring: 2.54					
OK Apply Defaults Cancel					



Teardrop...

🛃 Tear Drop			×
•	•	ages B	
Distance			
Relative	50	%	
💿 Absolute	0.762]	
Diameter		_	
Relative	66	%	
🔘 Absolute	0.381		
Min Clearance:	0.381		
On Rectangles and Boxes			
ОК	Apply	Defaults	Cancel



Panel submenu (Tools menu)

PanelPlus...

PanelPlus						— × —
Input O	Results 🔲 Create	DPF Object Links			Input Sets	s: ml 🔻
Panel	inale 🦱 Multi		General			Save Delete
Ordered:	100		☑ Add Coupons In ☑ L-shape Nesting	nl		
Total:	0.0 % 0	Dummies	● Frame zero ○ Panel Layout	Job zero		
PCBs/panel			Outline	120.0164 3	119.9896 3]
Useful Area Frames Trame	▼ mi	•	Fixed Step Rout Clearance	123.01642.54	122.9896]
Area			PCB Rotation	Auto	_	
Batch :			Step Repeat		¥. •	
	ок	Repr	oduce	Save Report		Cancel



PanelPlus Results

🛃 PanelF	Plus	_	_										_	×
🔘 Inpi	ut 💿 🗄	Results	🔲 Create D	PF Object Links								Input Sets:	ml Save	▼ Delete
Results	3													
Fra	me		Siz	e PCBs	Rot F	ill Yie	ld Par	nels	Total	Over				
13x1	19		384 x	530 6	0.0	51 5	1	7	102	2				
14x1	17		364 x	441 6	0.0	65 6:	1	7	102	2				
vari	lable		500 x	650 15	0.0	78 7-		7	105	5				
					•		19/ 51	21 / 96	ann					
	1	<u> </u>		וו		2:	307.50	21.485	5 90.0					
	13	14	15		~	3:	430.49	21.485	5 90.0					
						4:	184.51	144.50	90.0					
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								5011101	- comparing		rannig.pri			
	0	К		Rep	roduce				Save F	Report			Cancel	



StepRepeat...

🛃 Panel Step Repeat										
Start	0	0								
Flash	Middle									
	🔘 Job Zero									
	🔘 Center									
Repeat	1	1								
Step	129.2334	237.3864								
Clear	0	0								
·										
ок	Apply	Cancel								

Middle

Takes the center of the enclosing box of the job as flash point of the block.

Job Zero

Takes the zero point of the job as flash point of the block.

Center

Takes the center coordinates from the Numbers dialog box as flash point of the block



Output menu

Drill/Rout: Machine...

Output Drill/Rout
Language Machine : sum3000 Language : Sieb & Meyer 3000
Tools Edit
Prelines Edit Edit
OK Apply Cancel

Edit Tools

Too	ol Editor	_			_	_		_				_	×
ile L Table	ist Table ::C:\mb\Der	nisUcam\cfg\si	etup\drill\sum3	000.tbl									
	TOOL	DIA	APE	APE_DIA	PREDRILL	SPEED	FEED	BACKFEED	LIFE	DVVELLTIME	HII	Z	RIGHT
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2	:	0		0	0								
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8	:	0		0	0								
9	:	0		0	0								
10	:	0		0	0								



CAD...

Extended Gerber

Language Gerber 274X - Tools Edit Resource C:\mb\ucamEngBuild\env\dat\Cad	Output CAD	
Tools Edit Resource C:\mb\ucamEngBuild\env\dat\Cad	Language	Gerber 274X
C.ImplutamEngBuildlenvldallCad	Tools	Edit
OK Apply Cancel	OK	



Setup

Ucam.db

📑 ucam.db Ec	ditor							٢			
Торіс	drc.path.buil	ł									
DAT	\$ETSCAM_D	AT/setup/drc/dr	c.ofg			Clear	Add/Modify				
CFG	SETSCAM_DAT/setup/drc/drc.cfg Clear Add/Modify										
НОМЕ	C:\mb\Denis	Ucam\DRC				Clear	Add/Modify				
RoutManager.	drc.file							-			
drc.cutin.conto	ourize										
drc.exclude											
drc.max_faults											
drc.path.build											
drc.repair.delay											
drc.repair.file											
drc.repair.local.check											
drc.repair.max_faults											
drc.tolerance											
drc_lccf.value											
drc_lccnf.value	9										
drc_icit.value								Ŧ			
Filter	drc										
Item selecte	Item selected										
0	к	Appl	у	Reset			Cancel				



Toolbars...




Layers menu (Job Editor)

Add DPF

Choose Add DPF to display the File Select dialog box. Use the options of the File Select dialog box to add a DPF file to your current job..

Create

Choose Create to create a new DPF layer within your current job. This layer can be either of class LAYER, DRILL, EXTRA or FEEDBACK, depending on where and how the layer is inserted into the cross section area..

Modify

Layer

Layer Parameters						
Name	Тор					
Alias						
Class	Layer 🗸 outer 🗸					
			Revers	e Data		
	Material			Cu		
	Number					
	ZPosition					
	Thickness					
Readable Side 💿 Top 💿 Bottom						
Plot Parameters Info						
	ж	Appl	y/Next	Cancel		

Subclass menu

UCAM comes with the following predefined subclasses for the main layer class LAYER: outer, inner, mixed.

Reverse Data

When this toggle is switched on, it indicates that the image you see in Ucam is reverse to the image of the produced PCB. You may want to execute the Reverse Layer command on such a layer.

Material

Displays the material used in the main layer class LAYER.



Position

Contains the layer number. Enter another number to change the position of the layer in your job.

Z-Position

Displays the layer's physical position (seen from top to bottom) in the PCB. The Z-axis for a job goes from top (lowest positive value) to bottom. The Z-Position is used in copper area calculations.

Thickness

Displays the copper thickness of the main layer class LAYER. The layer thickness is used in copper area calculations.

Readable Side

The readable side is displayed by an arrow indicating the direction in the cross section area.

Extra

Layer Parameters						
Name	Ton					
Alias						
Class	Evtra					
			Reverse	Data		
		Material				
		Index				
	Attach	💿 Тор	Bottom	💿 None		
Plot Parameters						
	эк ј	Apply	/Next	Cancel		

Reverse Data

When this toggle is switched on, it indicates that the image you see in Ucam is reverse to the image of the produced PCB. You may want to execute Reverse Layer command on such a layer.

Material

Displays the material of the main layer class EXTRA.

Index

Displays the index information for the guideplates subclass only.

Attach

Top : Extra layer is attached or related to the top layer. Bottom : Extra layer is attached or related to the bottom layer. None : Extra layer is not attached to any layer.

Drill



🛃 Layer Parameters						
Name	Тор					
Alias						
Class	Drill		•			
	From Layer	1				
	To Layer	4				
	Thickness	0				
Plot Parameters Info						
OK Apply/Next			Cancel			

From Layer

Displays the layer number of the layer where the drilling begins from. Enter another layer number if you want another layer to be in the From Layer for this drill layer.

To Layer

Displays the layer number of the layer that is drilled to. Enter another layer number if you want another layer to be in the To Layer for this drill layer.

Thickness

Displays the copper thickness of the main layer class DRILL. The layer thickness is used in copper area calculations.

Merge



Positive

The polarity of the layer(s) to be merged remains as it is.

Negative

The data in the layer(s) to be merged is reversed before it is put into the layer in plane 1.

Alternate

The first positive active layer to be merged remains as it is, the next one is reversed, and so on.

Delete Merged Layers

The layers that have been merged into plane 1 are deleted from the job.



Buildup menu (Job Editor)

Load...

🛃 JobMaker: Load Buildup							
	Number of layers Board Thickness Customer Copper Core PrePreg	0 cus	± 0 • •	CheckList DRC Check Technology Attributes Datums Materials	/ucamprogda	ta/DRC/classe5.cfg	
Buildup			Thickness				<u>^</u>
Demo	1.29		<u>^</u>	0.56	R-5715-6	- 0.0178	
L2MC-06	0.63 1 04			0,1016		- 0.0178	
L4Cad	0.0		=	0.1016	K-3/13-4		
Test	0.07			0.56	R-5715-6	0.0178	=
cad4l	0.88					- 0.0179	-
cbse	0.0						
es-4l	0.88		-				
Sayeiii	0.0			•			▼ ▼
ОК			Apply Cancel				



Support

The UCAM help desk offers support in English, German, French and Dutch

Availability: Monday – Thursday: 09:00 – 17:00 Friday: 09:00 – 16:00

Tel.: +32 9 216 99 00 Fax: +32 9 216 99 12 Email: support@ucamco.com