Tango To Ares Conversion

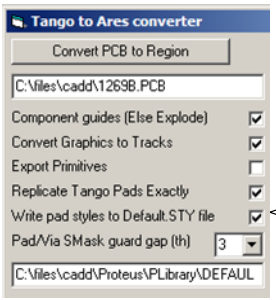
Tango2Ares generates a "Default.STY" file which describes for Ares every track, via and pad found in the Tango design!

Install Tango2Ares converter utility

Export a Tango format netlist from the schematic

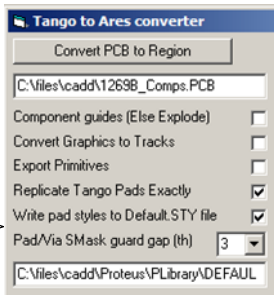
Save the source PCB file in ASCII format

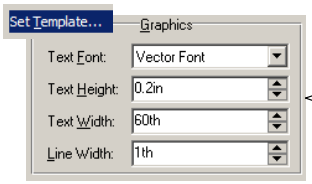
Create a subset PCB file in Tango and save in ASCII format which contains 1 copy of each component type with all components flipped to lie on the "Top" layer



Process the main Tango PCB ASCII file to a region file with options shown

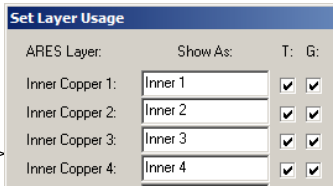
Process the subset Tango PCB ASCII file to a region file with options shown



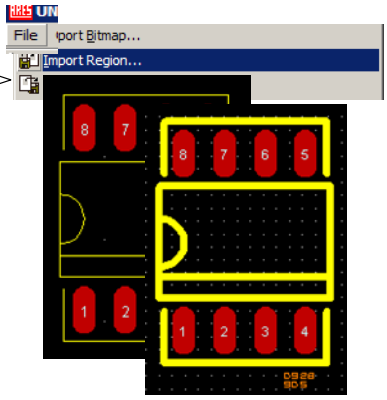


Set Ares graphics template default line width to 1 mil to allow reading component creation and placement guides

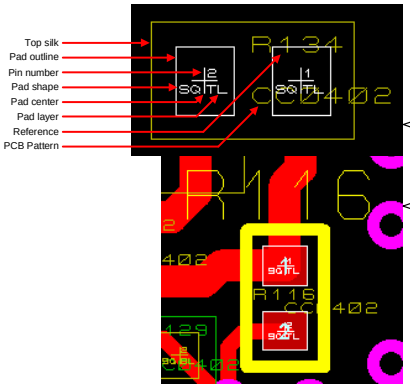
Set layer editing usage for all layers to both (T)rack and (G)raphic mode (This populates the layer selection lists)



Import subset region file into empty Ares workspace and create components. Save this file as the design symbol master. (This is a good time to set the silk line widths)



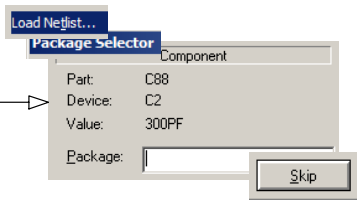
Import main region file into empty Ares and place components (No RefDes at this point) according to the guides on M1/2 (Top components) and M3/4 (Bottom components). Ensure pin numbers match guide layers



Set reference designators to match those shown on guide layers

Convert the Tango netlist to SDF format

Import the SDF netlist converted from Tango. If the package selector comes up, this indicates an expected component has not been placed. Record the device numbers and select "Skip" for each one. Place the missing parts and repeat until the package selector does not come up after the netlist load (All parts placed)



Schematic Replication

Tango2Ares Converter Notes

1. When placing components, pin 1 will be the handle when initially brought to the cursor. Rotate the selected component before bring the selected part to the cursor using the preview window because once on the cursor the rotate function will usually move the handle off pin one and therefore off grid.

2. When placing components onto the imported region tracks, the track will be attached to the pad for net listing purposes. If the tracks are loaded on top of the components however, they must be manually associated with the components with a right-click / left-click / right-click sequence (Mouse does not move) while in the track edit mode for that layer. This will only need to be done if the region file needs to be reloaded, for instance when a block of tracks is damaged in the process of adding the components: A flip of a through hole component will drag tracks that may not be noticed if the dragged layer is not displayed at the time.

3. Ares is very particular about how it sees connectivity of tracks and other elements. Track end points and centerlines must align exactly to other tracks and vias, pads etc.

4. Arcs in Tango are converted to segment sequences where the segment to segment angle varies between 1 and 10 degrees depending on the radius of the source arc.

6. Numerical conversion is from Tango 1mil to Ares 10nm (x2540).

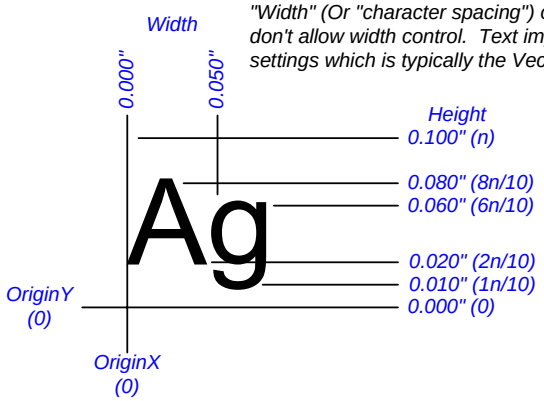
7. When converted as tracks, free lines on TSK, BSK, TAS, BAS, TMK, BMK may only be selected with "Block select" because they are translated as tracks instead of graphics to retain width attributes. Ares currently does not populate the track drop down lists with graphics layers (Silks screens etc).

LAYER TRANSLATION TABLE

Layer	PCB	Ares	Notes
Top	0	TOP	
Bottom	1	BOT	
Power	2	TM*	This is the top SMT paste mask, must be deleted before CAM
Ground	3	BM*	This is the bottom SMT paste mask, must be deleted before CAM
Middle-1	4	I1	
Middle-2	5	I2	
Middle-3	6	I3	
Middle-4	7	I4	
Top Silk	8	TS*	This is where top silk / assembly free lines, text etc land
Bottom Silk	9	BS*	This is where bottom silk / assembly free lines, text etc land
Top Mask	10	TR*	
Bottom Mask	11	BR*	
Top Assy	12	TS*	Merged with top silk
Bottom Assy	13	BS*	Merged with bottom silk
Board	14	ED	
Nets	15	KO	Keepout layer is the trash bin for Net/Drill/Title free lines and text!
Drill	16	KO	
Keep Out	17	KO	
Title	18	KO	
Middle-5	19	I5	
Middle-6	20	I6	
Middle-7	21	I7	
Middle-8	22	I8	
(Top Comps)	---	M1	Top component text, outlines and reference information
(Top Pads)	---	M2	Top component pad outlines, shapes, layers and pin numbers
(Bot Comps)	---	M3	Bottom component text, outlines and reference information
(Bot Pads)	---	M4	Bottom component pad outlines, shapes, layers and pin numbers

*Free elements may be exported as tracks to maintain original widths. Component elements are always exported as graphics.

Labcenter Ares



"Width" (Or "character spacing") only applies to the Vector Font, as bitmapped fonts don't allow width control. Text imported in a region block will default to the text default settings which is typically the Vector Font..

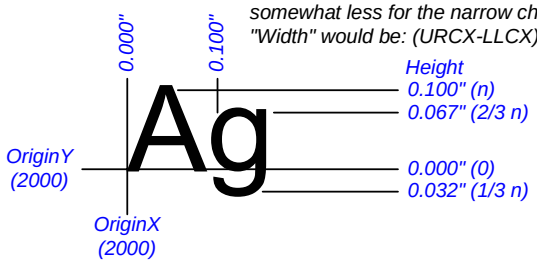
GRAPHIC	TS	TEXT	0	0	0	0	25400	12700	0	"Ag"
Mode	*Layer*	*Type*	*OriginX*	*OriginY*	*Rot*	*Flip*	*Height(n)*	*Width*	*?*	*Text*

```
ARES REGION FILE

*HEADER
VERSION 609 600
UNITS 10nm
AREA -1143000 -1143000 3810000 1270000

*OBJECTS
GRAPHIC TS LINE 4 0 -12700 0 12700
GRAPHIC TS LINE 4 12700 0 -12700 0
GRAPHIC TS TEXT 254000 -673100 0 0 254000 127000 0 "[Text is 100H, 50w at (0,0)]"
GRAPHIC TS TEXT 0 0 0 0 254000 127000 0 "AgROT=0"
GRAPHIC TS TEXT 0 0 900 0 254000 127000 0 "AgROT=90"
GRAPHIC TS TEXT 0 0 1800 0 254000 127000 0 "AgROT=180"
GRAPHIC TS TEXT 0 0 2700 0 254000 127000 0 "AgROT=270"
GRAPHIC BS TEXT 0 0 0 1 254000 127000 0 "AgROT=-0"
GRAPHIC BS TEXT 0 0 900 1 254000 127000 0 "AgROT=-90"
GRAPHIC BS TEXT 0 0 1800 1 254000 127000 0 "AgROT=-180"
GRAPHIC BS TEXT 0 0 2700 1 254000 127000 0 "AgROT=-270"
*END_OBJECTS
```

Tango PCB



Note that "Width" only applies to width of the line used to draw the text with the character spacing being roughly equivalent to height for the widest characters and somewhat less for the narrow characters, aka "Kerning". An equivalent Ares font "Width" would be: (URCX-LLCX) / NumberOfCharacters

TEXT	"Ag"	100	0	10	8	2000	2000	1995	1995	2648	2105	0	0
Type	*Text*	*Height (n)*	*Rot*	*Width*	*Layer*	*OriginX*	*OriginY*	*LLCX*	*LLCY*	*URCX*	*URCY*	*Comp#*	*?*

```
;Tango-PCB PLUS V2.30 Series II
VERSION 1 3 A
BOARD 1050 965 3160 2962 1050 965
LINE 2 8 2000 1990 2000 2010 0 0 0
LINE 2 8 1990 2000 2010 2000 0 0 0
TEXT "[Text=100,10 @ 2000,2000]" 100 0 10 8 1055 970 1050 965 3160 1094 0 0
TEXT "AgRot=0" 100 0 10 8 2000 2000 1995 1995 2648 2105 0 0
TEXT "AgRot=90" 100 1 10 8 2000 2000 1895 1995 2005 2743 0 0
TEXT "AgRot=180" 100 2 10 8 2000 2000 1162 1895 2005 2005 0 0
TEXT "AgRot=270" 100 3 10 8 2000 2000 1995 1162 2105 2005 0 0
TEXT "AgRot=-0" 100 4 10 9 2000 2000 1228 1995 2005 2105 0 0
TEXT "AgRot=-90" 100 5 10 9 2000 2000 1895 1133 2005 2005 0 0
TEXT "AgRot=-180" 100 6 10 9 2000 2000 1995 1895 2962 2005 0 0
TEXT "AgRot=-270" 100 7 10 9 2000 2000 1995 1995 2105 2962 0 0
```

TANGO PCB ASCII FORMAT

(All numbers in mils, 0-32000 with no leading zeros)

;Tango-PCB PLUS V2.30 Series II
VERSION 1 3 A

BOARD	0	0	0	0	0	0								
Type	*LLCX*	*LLCY*	*URCX*	*URCY*	*RefX*	*RefY*								
NET	"5V"	0	0	0	0	n								
Type	*NName*	*Net#*	*Nodes*	*?*	*Display*	*Plane*								
COMP	"ref"	"typ"	"val"	"lib"	"???"	0	0	0	0	0	0	0	0	
Type	*RefDes*	*Type*	*Value*	*Library*	*?*	*X*	*Y*	*LLCX*	*LLCY*	*URCX*	*URCY*	*Comp#*	*?*	
PAD	n	0	0	0	0	n	"pin"	0	0	0	0	n		
Type	*PType*	*PadW*	*PadH*	*HoleDia*	*PLayer*	*Plane*	*Pin#*	*X*	*Y*	*Net#*	*Comp#*	*NetYN*		
VIA	n	0	0	n	0	0	0	0	n					
Type	*VType*	*ViaDia*	*HoleDia*	*Plane*	*X*	*Y*	*Net#*	*Comp#*	*NetYN*					
ARC	0	0	0	0	0	0	0	0	0	0				
Type	*Radius*	*Start*	*Sweep*	*Width*	*Layer*	*X*	*Y*	*Net#*	*Comp#*	*?*				
POLY	0	0	0	0	0									
Type	*Layer*	*Points*	*Net#*	*Comp#*	*?*									
PNT	0	0												
Type	*LocX*	*LocY*												
TEXT	"txt"	0	0	0	0	0	0	0	0	0	0	0	0	0
Type	*Text*	*Height*	*Rot*	*Width*	*Layer*	*X*	*Y*	*LLCX*	*LLCY*	*URCX*	*URCY*	*Comp#*	?	
LINE	0	0	0	0	0	0	0	0	0					
Type	*Width*	*Layer*	*X1*	*Y1*	*X2*	*Y2*	*Net#*	*Comp#*	*?*					

LAYER NAMES

Symbol	Description
0	Top Copper
1	Bottom Copper
2	Power Plane
3	Ground Plane
4	Middle Copper 1
5	Middle Copper 2
6	Middle Copper 3
7	Middle Copper 4
8	Top Silk
9	Bottom Silk
10	Top Solder Mask
11	Bottom Solder Mask
12	Top Assembly
13	Bottom Assembly
14	Board Outline
15	Net Connections
16	Drill
17	Keep Out
18	Tittle
19	Middle Copper 5
20	Middle Copper 6
21	Middle Copper 7
22	Middle Copper 8

NetYN

Symbol	Description
0	No Net connection
1	Connected to a net

ELEMENT NAMES

Symbol	Description
HoleDia	Drill hole, mils
Points	Vertices for polygons, following lines
X, Xn	X coordinate
Y, Yn	Y coordinate
LLCX,Y	Lower Left hand Corner
LRCX,Y	Lower Right hand Corner
ULCX,Y	Upper Left hand Corner
URCX,Y	Upper Right hand Corner
Radius	Arc radius
Start	Arc start angle, degrees
Sweep	Arc sweep angle, degrees
Height	Text height
Width	Line and Text track width
Net#	Net list assignment
Nodes	Number of nodes for this net
Comp#	Component assignment, moves as group

Rot

Symbol	Angle	Flip
0	000	NO
1	090	NO
2	180	NO
3	270	NO
4	000	YES
5	090	YES
6	180	YES
7	270	YES

VTYPE

Symbol	Description
CR	Circular
SQ	Square

PTYPE

Symbol	Description
RR	Rounded Rectangle
SQ	Square
EL	Ellipse (X = Y = Round)
OV	Oval (X = Y = Round)
MH	Mounting hole
TG	Alignment Target

PLANE

Symbol	Description
NP	No plane connection
PD	Power Direct
PT	Power Thermal
GD	Ground Direct
GT	Ground Thermal

PLAYER

Symbol	Description
TL	Top Layer
BL	Bottom Layer
AL	All Layers (Including mid layers)

DISPLAY

Symbol	Description
0	Item is hidden
1	Item is displayed

Notes:

ARES REGION FILE FORMAT

(All numbers in nm x 10, 32bits with no leading zeros)

```
*OBJECTS
GRAPHIC  TS  TEXT    0  0  0  0  0  0  0  "Ag"
Mode     Layer Type  X  Y  Rot Flip Height Width ?  Text

GRAPHIC  TS  LINE    4  0  0  0  0
Mode     Layer Type  Items X1 Y1 X2 Y2

GRAPHIC  TS  BOX     5  0  0  0  0  0
Mode     Layer Type  Items LLCX LLCY ? Width Height

GRAPHIC  TS  CIRCLE  3  0  0  0
Mode     Layer Type  Items CtrX CtrY Radius

GRAPHIC  TS  BEZIER  8  0  0  0  0  0  0  0  0  0
Mode     Layer Type  Items BegX BegY Crv1X Crv1y Crv2x Crv2y EndX EndY

GRAPHIC  TS  PATH    3  0  0  0  0  0  0
Mode     Layer Type  Points P1X P2Y P2X P2Y P3X P3Y

ZONE     BOT 0000    "T12" 4  0  0  0  0  0  0  0  0  "T10" "GND" 2540 2540
Mode     Layer Flags(Hex) Bound Points P1X P1Y P2X P2Y P3X P3Y P4X P4Y Relief Net Clear Step

PAD      "4" "C50"   ALL   0  0  0  0
Mode     Pin# PadName Layer X  Y  ?  ?
*END_OBJECTS

*VIAS
"V40"    ALL 0  0  0  0
Type     Layer X  Y  ?  ?
*END_VIAS

*LAYER TOP
"T10"    S   1  0  0  0  0
"T14"    S   2  0  0  0  0  0  0
"T20"    S   3  0  0  0  0  0  0  0  0
 Name    ?   Segs X1 Y1 X2 Y2 X3 Y3 X4 Y4
*END_LAYER
```

LAYER NAMES

Symbol	Description
TOP	Top etch
I1-14	Internal etch
BOT	Bottom etch
TS	Top silk
BS	Bottom silk
TR	Top resist (Green film!)
BR	Bottom resist
TM	Top mask (Solder paste)
BM	Bottom mask
M1-4	Mechanical 1-4
KO	Keep out
OC	Occupancy
ED	Board edge

PAD AND VIA LAYER NAMES

Symbol	Description
ALL	All etch layers
DRL	Drill Hole only

TEXT FLIP

Symbol	Description
0	Text is normal
1	Text is mirrored (bottom)

ELEMENT NAMES

Symbol	Description
Layer	(See layer ID table)
Segs	Line Segments, defined by (X,Y) pairs
Items	Remaining items for this graphics element
Points	Vertices for paths and zones, (X,Y) pairs
X, Xn	X coordinate
Y, Yn	Y coordinate
PnX,PnY	Vertex coordinates
LLCX,Y	Lower Left hand Corner
LRCX,Y	Lower Right hand Corner
ULCX,Y	Upper Left hand Corner
URCX,Y	Upper Right hand Corner
LocX,Y	Reference point of object
CtrX,Y	Circle center
BegX,Y	Bezier curve begin point
CrvnX,Y	Bezier curve handles
EndX,Y	Bezier curve end point
Rot	Angle, degrees x 10
Flags	Zone type flags, bit mapped (Broken)
Bound	Zone boundary track name, from track list
Relief	Zone thermal relief track name, from track list
Clear	Zone clearance to other elements
Step	Zone hatching step

ZONE FLAGS

BINARY (Region file uses 2 byte hex)

XXXX XXXX HLXX ZSER

BIT	Dialog	Description
X	X	
X	X	
X	X	
X	X	
X	X	
X	X	
X	X	
X	X	
H	Type List	Hatched
L	"	Empty
X	X	X
X	X	X
Z	Checkbox	Route to this zone
S	"	Suppress Islands
E	"	Exclude tracking
R	"	Relieve Pins

Notes:

1. Only the first block found will be imported, i.e. if two OBJECT-END_OBJECT blocks are encountered then only the first will be imported.

2. Blank lines are ignored and elements may even be stacked without intervening CR/LF line terminators.

3. Curves such as the Bezier or Circle put down as graphics on an etch layer will not Netlist. Curved tracks are put down as multi segment lines.

4. The blocks must be in the order of OBJECTS, VIAS and then LAYERS.

5. Do not include "Area" data in header when generating region files externally.

ARES REGION FILE SAMPLE

```
ARES REGION FILE

*HEADER
VERSION 609 600
UNITS 10nm
AREA -698500 -1333500 5207000 254000

*OBJECTS
GRAPHIC TS TEXT 0 0 0 0 254000 127000 0 "Text (100h,50w,10l) @ (X0,Y0) on Top Silk"
GRAPHIC TOP LINE 4 381000 0 635000 0
GRAPHIC TS BOX 5 1841500 -825500 0 127000 127000
GRAPHIC TS CIRCLE 3 2095500 -762000 63500
GRAPHIC TS BEZIER 8 2222500 -825500 2273300 -787400 2171700 -736600 2222500 -698500
GRAPHIC TS PATH 6 1841500 -889000 1841500 -1016000 1905000 -1079500 1968500 -1016000 1968500 -889000
1905000
ZONE TOP 0000 "T10" 4 -698500 0 -571500 0 -571500 -127000 -698500 -127000 "T10" "" 20320 63500 -952500
PAD "1" "C_050_025_3" ALL -635000 -1270000 0 0
COMPONENT 1320800 -304800 -900 1
"C1" 1470660 -294640 0 1 76200 127000 10
"R90-Bot" 1318260 -91440 900 1 76200 127000 10
"CC0402" 0 15 2
LINE 4 1346200 -355600 1346200 -254000
LINE 4 1346200 -254000 1295400 -254000
LINE 4 1295400 -254000 1295400 -355600
LINE 4 1295400 -355600 1346200 -355600
LINE 4 1295400 -330200 1346200 -330200
LINE 4 1346200 -279400 1295400 -279400
LINE 4 1379220 -398780 1379220 -210820
LINE 4 1379220 -210820 1262380 -210820
LINE 4 1262380 -210820 1262380 -398780
LINE 4 1262380 -398780 1379220 -398780
MARKER 1320800 -304800 -900 1 "$MKRORIGIN"
MARKER 1318260 -91440 -900 1 "$MKRREFERENCE"
MARKER 1318260 -91440 -900 1 "$MKRVALUE"
LINE 4 1320800 -309880 1320800 -299720
LINE 4 1315720 -304800 1325880 -304800
"R_026_034_3" BOT 1320800 -350520 -900 1 "1"
"R_026_034_3" BOT 1320800 -259080 -900 1 "2"
*END_OBJECTS

*VIAS
"V50" ALL -635000 -1079500 0 0
*END_VIAS

*LAYER TOP
"T10" S 1 0 0 254000 0
*END_LAYER

*LAYER I1
"T10" S 1 63500 -508000 63500 -635000
*END_LAYER
```

ARES DEFAULT STYLE FILE FORMAT

```
;PAD STYLES
DEFAULT,      CVIA,      50th,      50th,      25th,      3th,      10th
Default via   Type       Width      Height     HoleDia    GuardGap  DrillMark
CP080080042,  CPAD,      80th,      80th,      42th,      3th,      10th
Pad name      Type       Width      Height     HoleDia    GuardGap  DrillMark
R060090000,   RSMPAD,    60th,      90th,      0,         3th,      0
Pad name      Type       Width      Height     HoleDia    GuardGap  DrillMark
SLOT_STACK,   STACK,     SLOT,      62th,      200th,     62th
Pad name      Type       Mode       SlotWidth  SlotHeight SlotTool
HOLE_STACK,   STACK,     HOLE,      20th,      10th
Pad name      Type       Mode       HoleDia    DrillMark
SMT_STACK,    STACK,     SMT
Pad name      Type       Mode
5x5Sq_POLY,   PSMPAD,    4,         0,         0,         3th
Pad name      Type       Points     ?          ?          GuardGap
+  -2.5mm,    -2.5mm
+  X1         Y1
+  2.5mm,     -2.5mm
+  X2         Y2
+  2.5mm,     2.5mm
+  X3         Y3
+  -2.5mm,    2.5mm
+  X4         Y4
*
;TRACE STYLES
DEFAULT,      14th
RELIEF,       10th
T2            2th
T10           10th
*
```

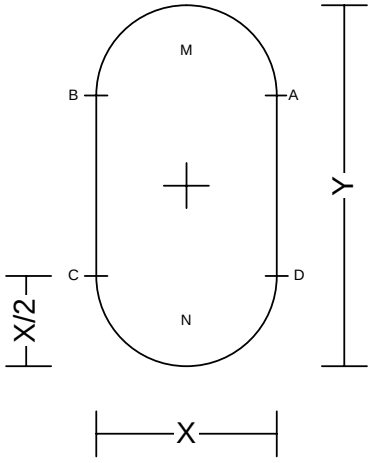
Type	**Description**
DEFAULT	First default, whether pad or via will be the only one defined
CPAD	Circular through hole pad *(Only width is used as diameter)*
SPAD	Square through hole pad *(Only width is used for Width and height)*
DPAD	DIL, similar to oval in Tango
ECPAD	Edge connector pad, just like an RSMPAD
CSMPAD	Circular SMD
RSMPAD	Rectangular SMD
PSMPAD	Polygonal SMD
STACK	Pad stack *(Followed by 20 "+" items, See next page)*
CVIA	Circular Via *(Only width is used as diameter)*
SVIA	Square Via *(Only width is used for Width and height)*

Symbol	**Size**
1th	0.001 inch (decimals are allowed)
1mm	1.000 mm

```
;PAD STYLES
DEFAULT, CVIA, 50th, 50th, 25th, 3th, 10th
CP080080042, CPAD, 80th, 80th, 42th, 3th, 10th      Prototype shape
PAD_STACK,STACK,HOLE,20th,10th                      Stack name
+ CP080080042                                       Top
+ CP080080042                                       Bottom
+ CP080080042                                       Internal 1
+ CP080080042                                       Internal 2
+ CP080080042                                       Internal 3
+ CP080080042                                       Internal 4
+ CP080080042                                       Internal 5
+ CP080080042                                       Internal 6
+ CP080080042                                       Internal 7
+ CP080080042                                       Internal 8
+ CP080080042                                       Internal 9
+ CP080080042                                       Internal 10
+ CP080080042                                       Internal 11
+ CP080080042                                       Internal 12
+ CP080080042                                       Internal 13
+ CP080080042                                       Internal 14
+ CP080080042                                       Top solder relief
+ CP080080042                                       Bottom solder relief
+ CP080080042                                       Top paste mask
+ CP080080042                                       Bottom paste mask
*
;TRACE STYLES
DEFAULT,        14th
RELIEF,         10th
T2              2th
T10             10th
*
```

Oval

End arcs are drawn at 10 degree steps



Rounded Rectangle

Corner arcs are drawn at 10 degree steps