

Filling out an IST Design Worksheet

Page 1 – Who you are and when you need coupon

[Print Form](#)



PWB interconnect solutions inc.
IST testing systems and services

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CANADA

Date	15-Jul-2015	Requested Delivery Date	22-Jul-2015
Company	Acme OEM	PWB Fabricator	
Customer Contact	John Doe	PWB Contact	
Phone Number	1-613-123-456	Phone Number	
Email	fred@acme.com	Email	

We design the Test Coupon to be as close to the product as possible. In order to create the Test Coupon to accurately represent the product, we need the physical attributes of the product. (i.e. number of layers, copper weights, hole/pad sizes, etc).

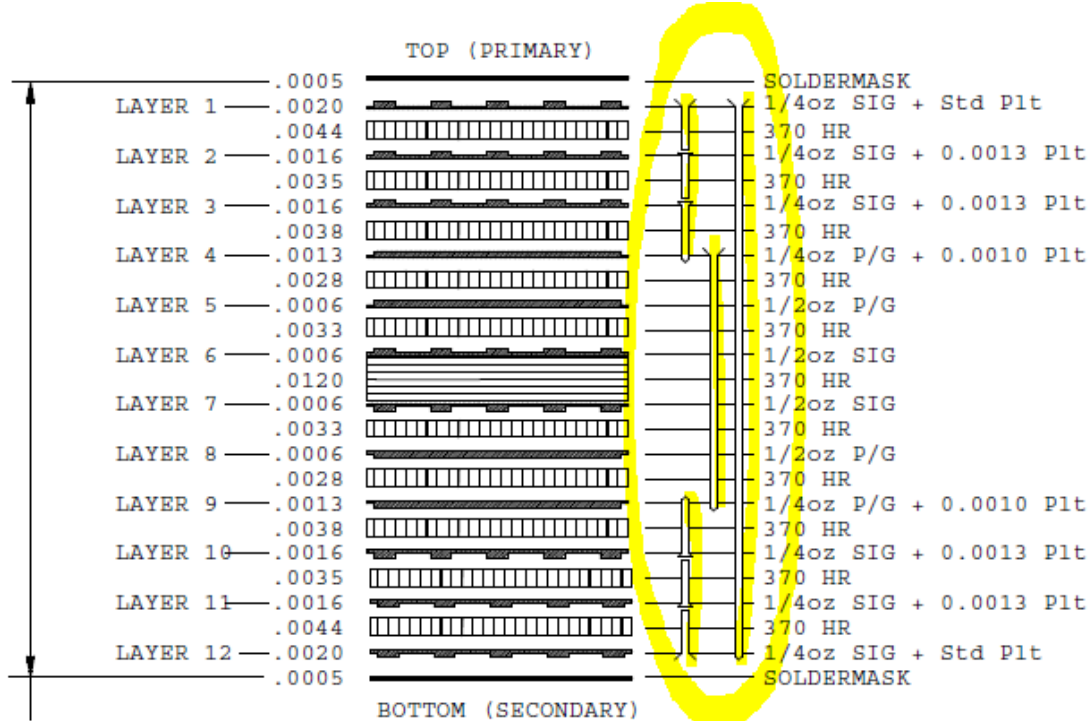
The physical attributes of the product can be provided in one of two ways:

- Option A - attributes are extracted from the CAD/CAM files provided by the customer by PWB.*
 - 1) via structures (micro via, buried via etc) and attributes (hole/pad/anti-pad sizes etc) in either:*
 - a) an ODB++ file*
 - b) Gerber files and drill file(s)*
 - 2) pcb fabrication or stack up information*
- Option B - attributes are provided in this form because CAD/CAM files are not available or cannot be provided.*

Page 1 – Basic information about the Printed Wiring Board

PWB Construction Information:

Part Number:	Acme1234	Nominal Thickness:	.062" (1.57mm)
Layer Count	12	Base Material	370HR

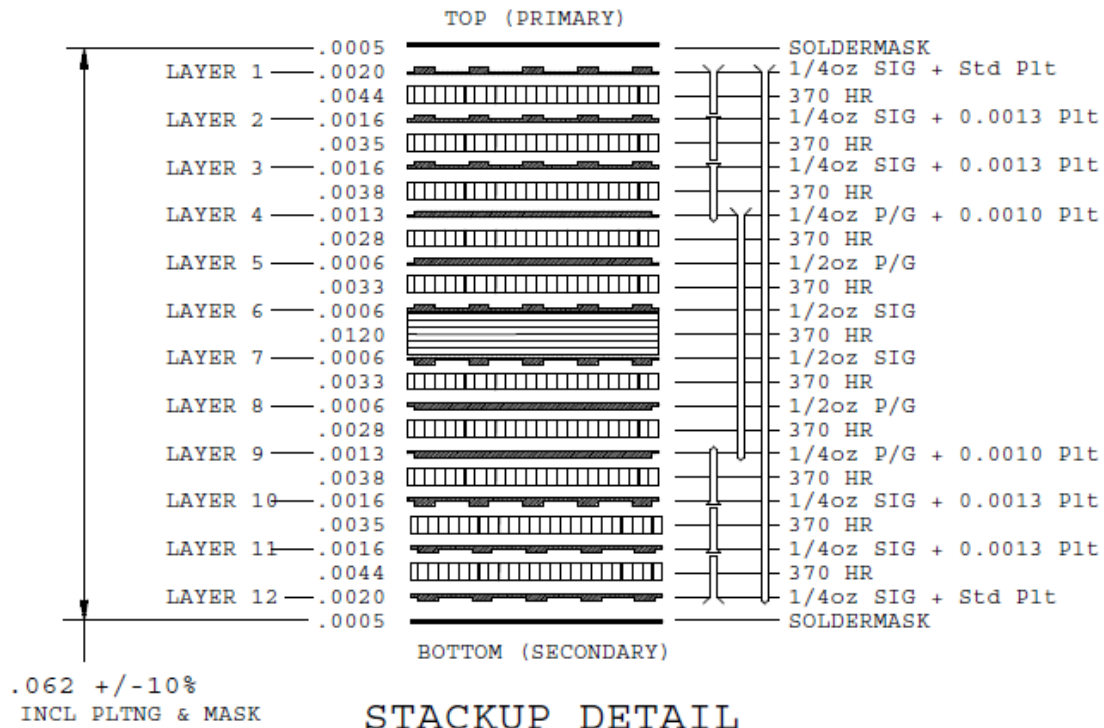


DELAM test capability (capacitance) <input checked="" type="radio"/> Yes <input type="radio"/> No	Stacked MicroVias present <input checked="" type="radio"/> Yes <input type="radio"/> No
Planarization test circuit <input checked="" type="radio"/> Yes <input type="radio"/> No	Staggered MicroVias present <input type="radio"/> Yes <input checked="" type="radio"/> No
Controlled depth drill circuit (back drill / counterbore) <input type="radio"/> Yes <input checked="" type="radio"/> No	Stacked MicroVias on Buried Vias <input type="radio"/> Yes <input checked="" type="radio"/> No
Plated Cu is planarized (chemically or mechanically removed) prior to additional laminations <input type="radio"/> Yes <input checked="" type="radio"/> No	Stacked MicroVias off Buried Vias <input checked="" type="radio"/> Yes <input type="radio"/> No
	Staggered MicroVias on Buried Vias <input type="radio"/> Yes <input checked="" type="radio"/> No
	Staggered MicroVias off Buried Vias <input type="radio"/> Yes <input checked="" type="radio"/> No

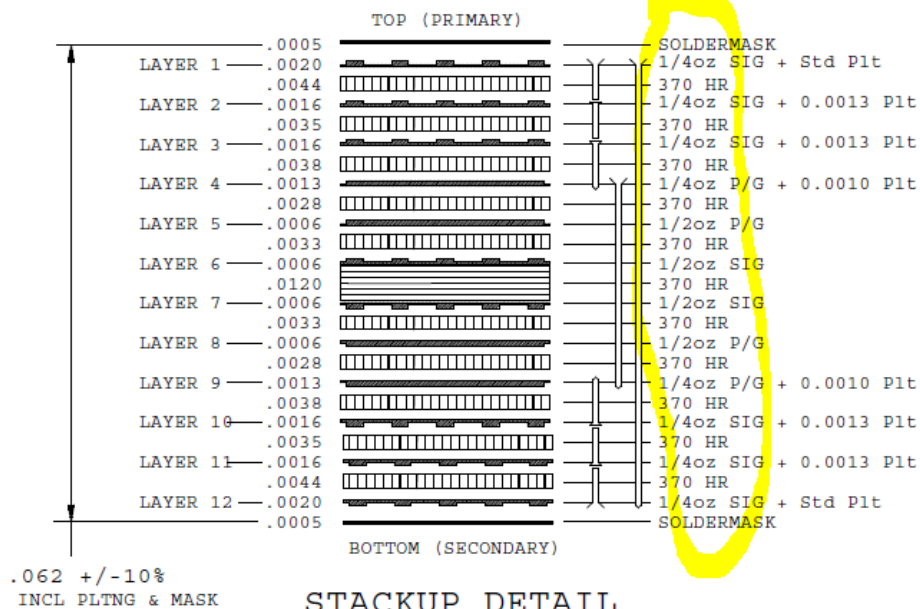
NOTES - , Size Restrictions, Special Instructions etc:
e.g. 1) Stacked vias between L1-2, L2-3, L24-25, L25-26;
2) Staggered vias between L1-2, L2-3, L3-24, L24-25, L25-26;

1) buried vias L4-9
2) stacked microvias L1-2, L2-3, L3-4, L9-10, L10-11, L11-12 - staggered off buried vias
3) PTH L1-12

Page 2 -Stack-up Information



Page 2 - Starting Foil Weights

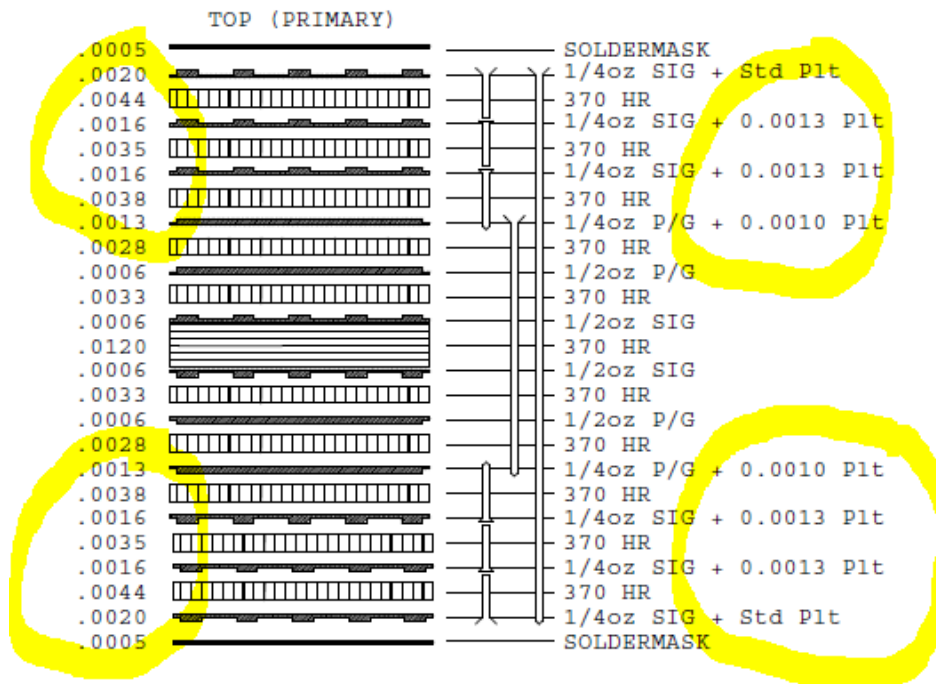


The Test Coupon must be designed so the bulk resistance is approximately 400 ohm target. thickness, width and length. We need to know the expected finished copper thickness.

Please specify the "Starting Foil" thickness for each layer. For layers that will be plating and planarization processes.

Layer	Starting Foil	Finished Cu Thickness	Function	L
1	1/4oz or 8.5um	mil		:
2	1/4oz or 8.5um	mil		:
3	1/4oz or 8.5um	mil		:
4	1/4oz or 8.5um	mil		:
5	1/2oz or 17um	mil		:
6	1/2oz or 17um	mil		:
7	1/2oz or 17um	mil		:
8	1/2oz or 17um	mil		:
9	1/4oz or 8.5um	mil		:
10	1/4oz or 8.5um	mil		:
11	1/4oz or 8.5um	mil		:
12	1/4oz or 8.5um	mil		:
13		mil		:
14		mil		:
15		mil		:

Page 2 - Finished Copper Thickness after Plating



Layer	Starting Foil	Finished Cu Thickness	Function
1	1/4oz or 8.5um	2.0 mil	
2	1/4oz or 8.5um	1.6 mil	
3	1/4oz or 8.5um	1.6 mil	
4	1/4oz or 8.5um	1.3 mil	
5	1/2oz or 17um		
6	1/2oz or 17um		
7	1/2oz or 17um		
8	1/2oz or 17um		
9	1/4oz or 8.5um	1.3 mil	
10	1/4oz or 8.5um	1.6 mil	
11	1/4oz or 8.5um	1.6 mil	
12	1/4oz or 8.5um	2.0 mil	

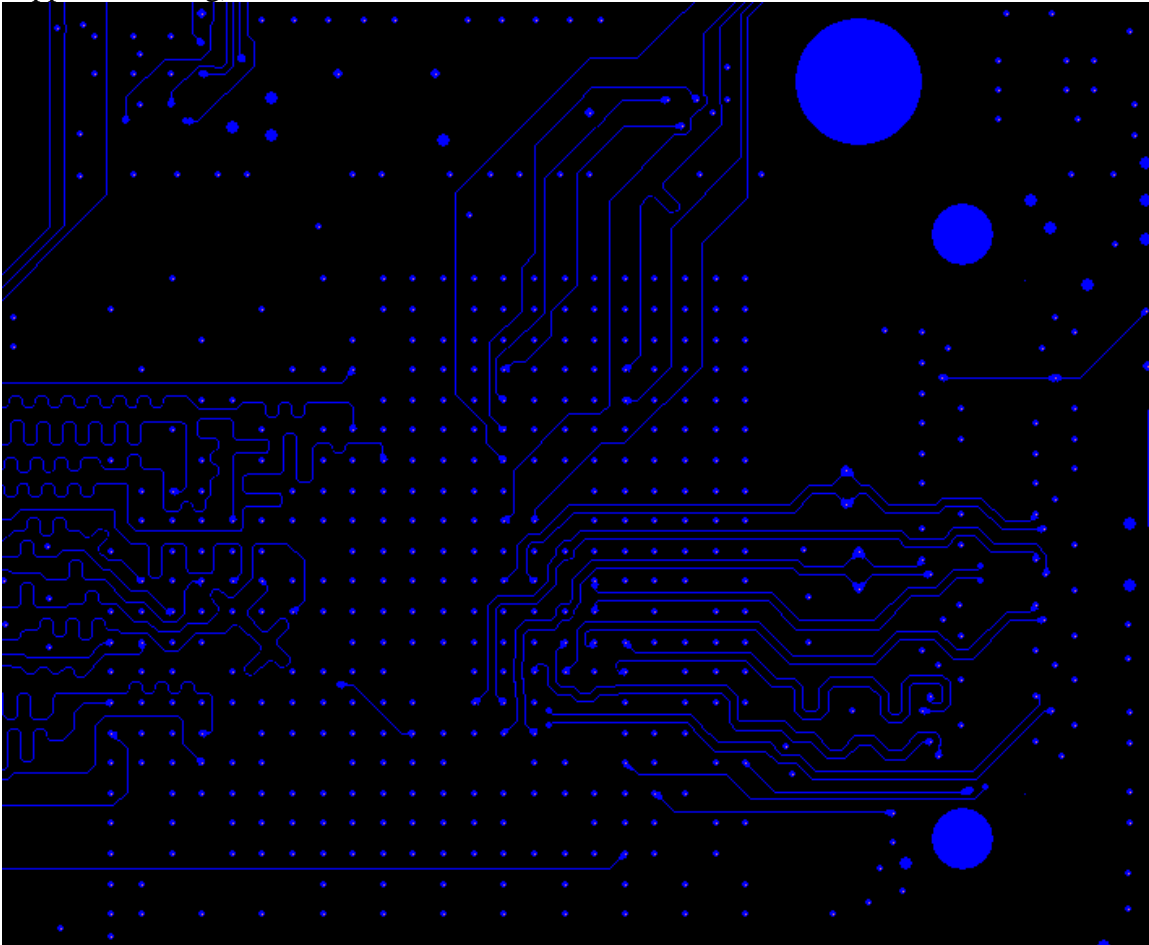
Page 2 - Copper Function

ohm target .

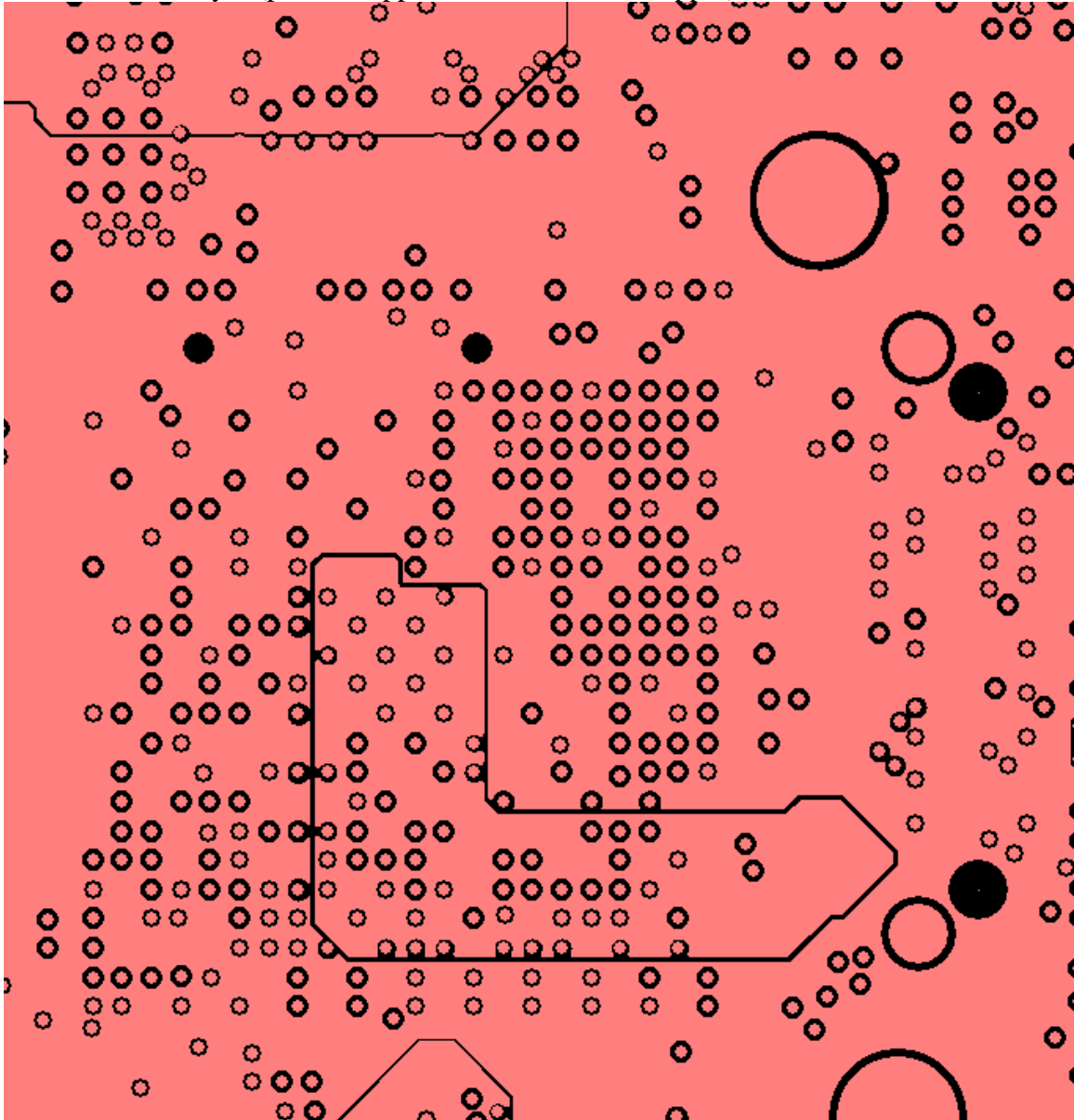
Please specify the "Starting Foil" thickness for each layer. For layers that will be plating and planarization processes.

Layer	Starting Foil	Finished Cu Thickness	Function	Lay
1	1/4oz or 8.5um	2.0 mil		29
2	1/4oz or 8.5um	1.6 mil	signal layer	30
3	1/4oz or 8.5um	1.6 mil	positive plane layer	31
4	1/4oz or 8.5um	1.3 mil	negative plane layer	32
5	1/2oz or 17um		mixed -signal 25% / plane 75%	33
6	1/2oz or 17um		mixed -signal 50% / plane 50%	34
7	1/2oz or 17um		mixed -signal 75% / plane 25%	35
8	1/2oz or 17um		signal layer with flooded cu fill	36

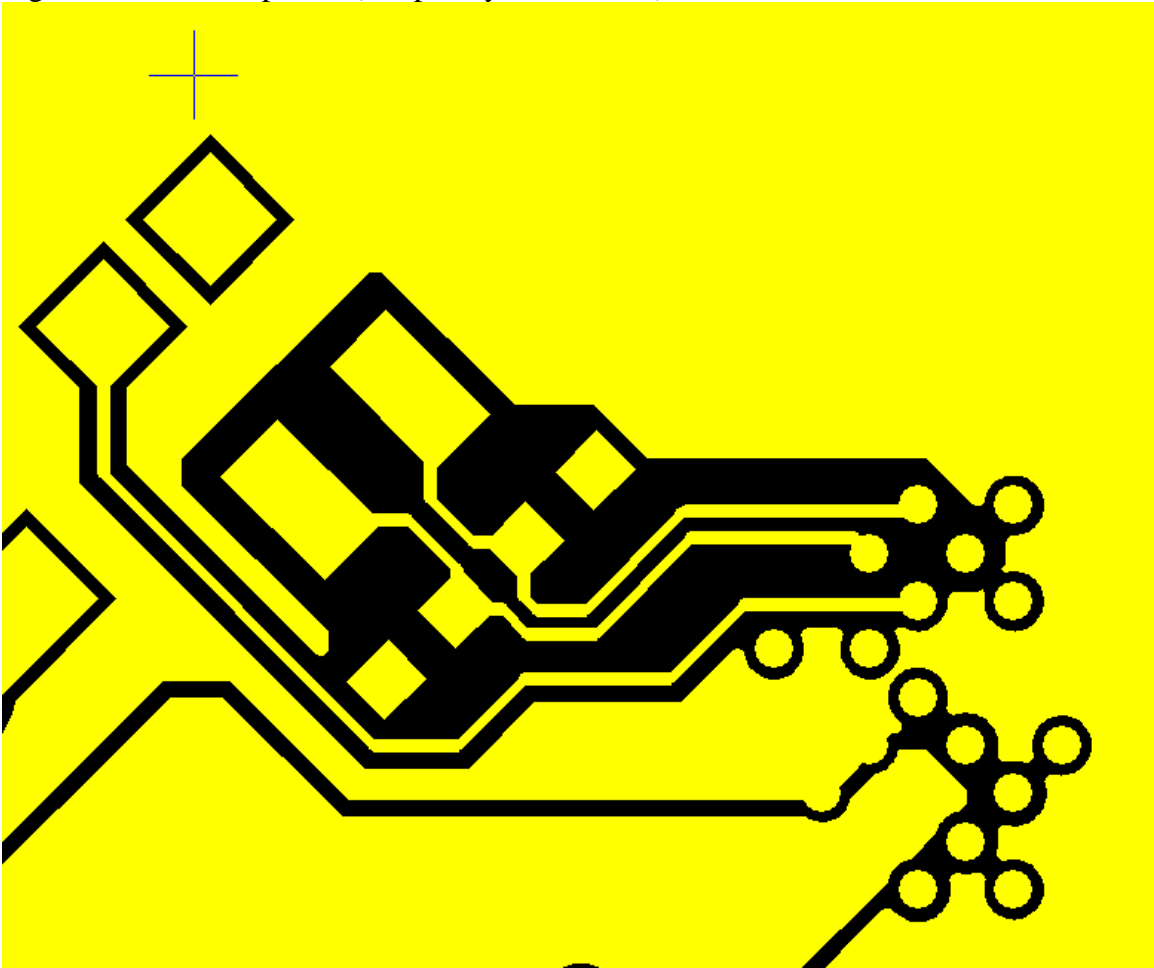
Signal Layer (sample layers 2, 3, 10 and 11 – critical high speed signal layers – no copper balancing)



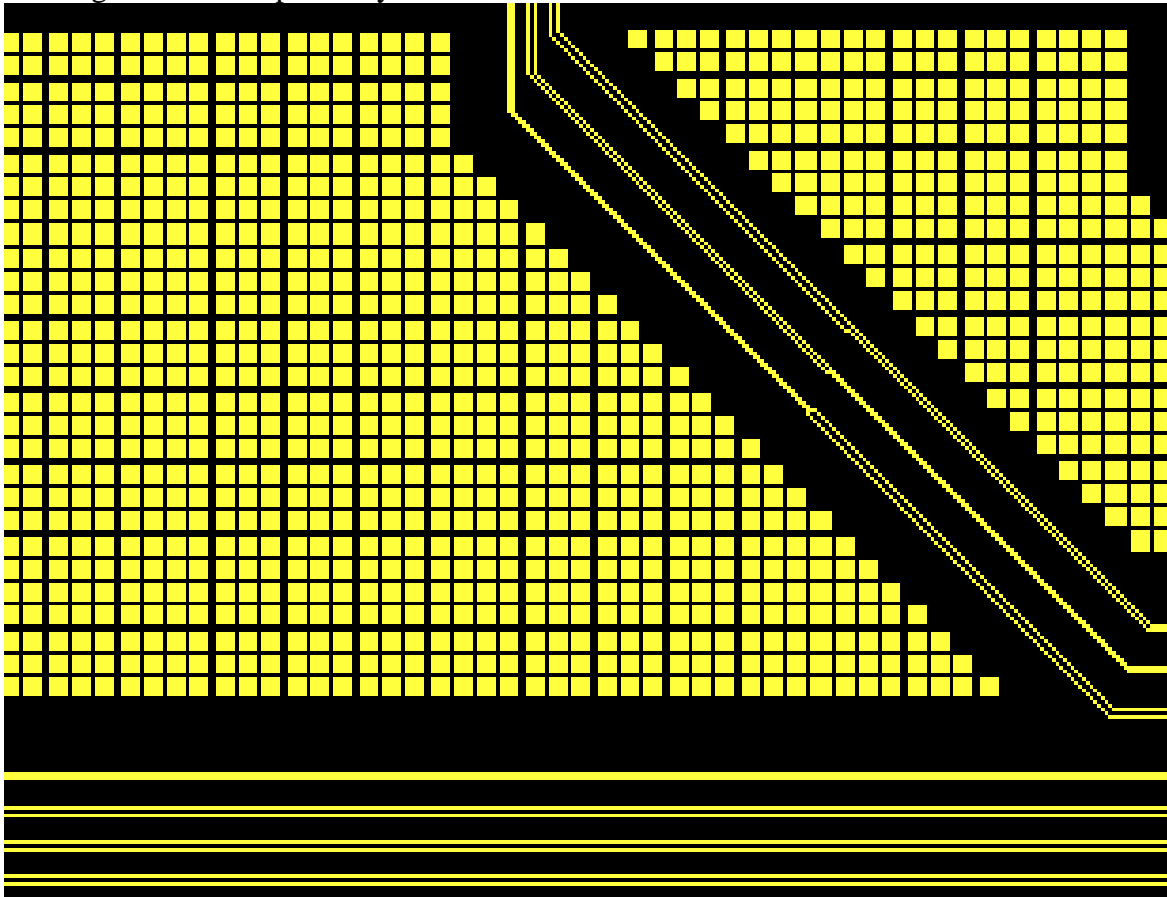
Positive Plane Layer (pink is copper and black is non-copper)



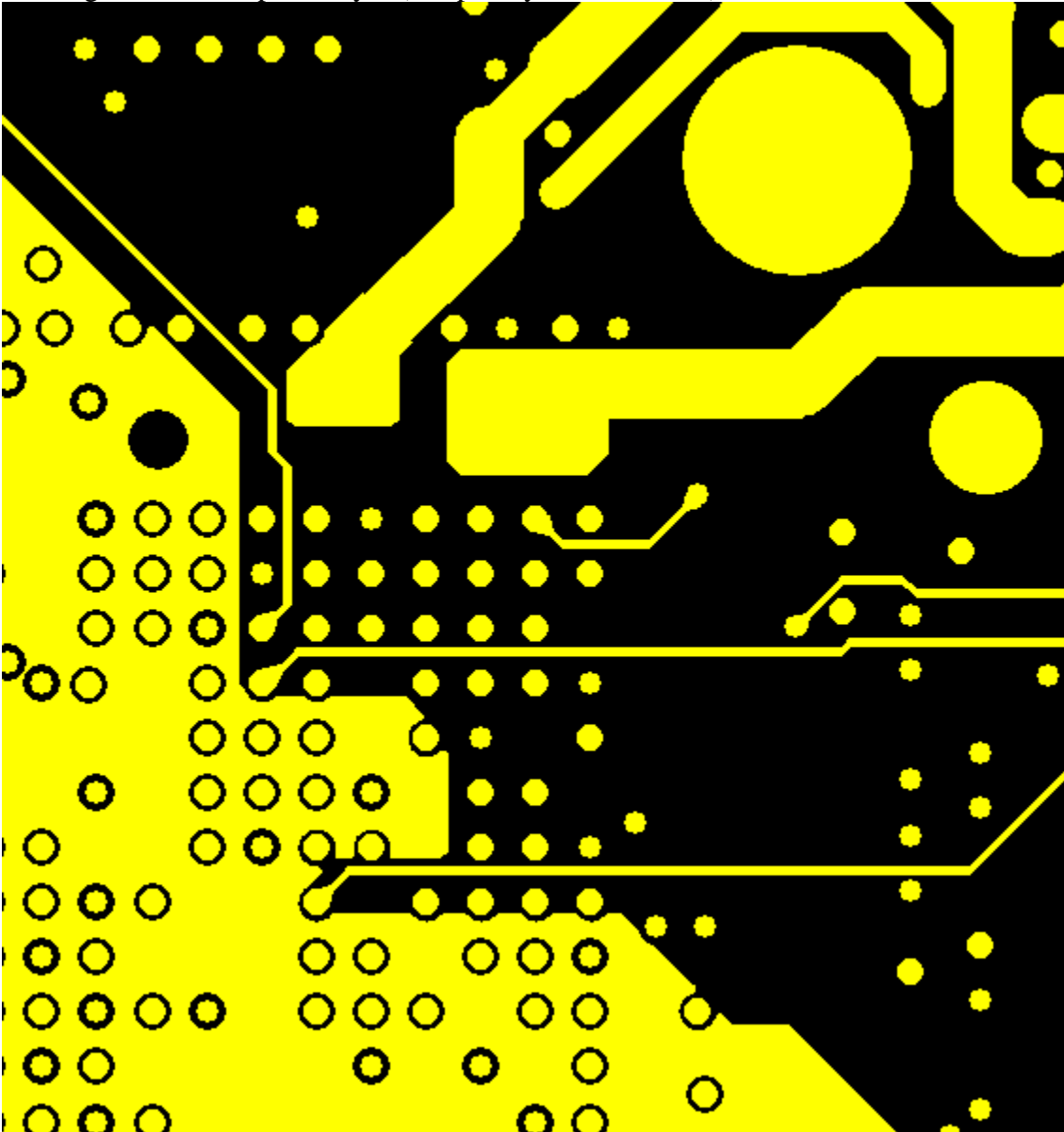
Signal with flooded planes (sample layers 1 and 12)



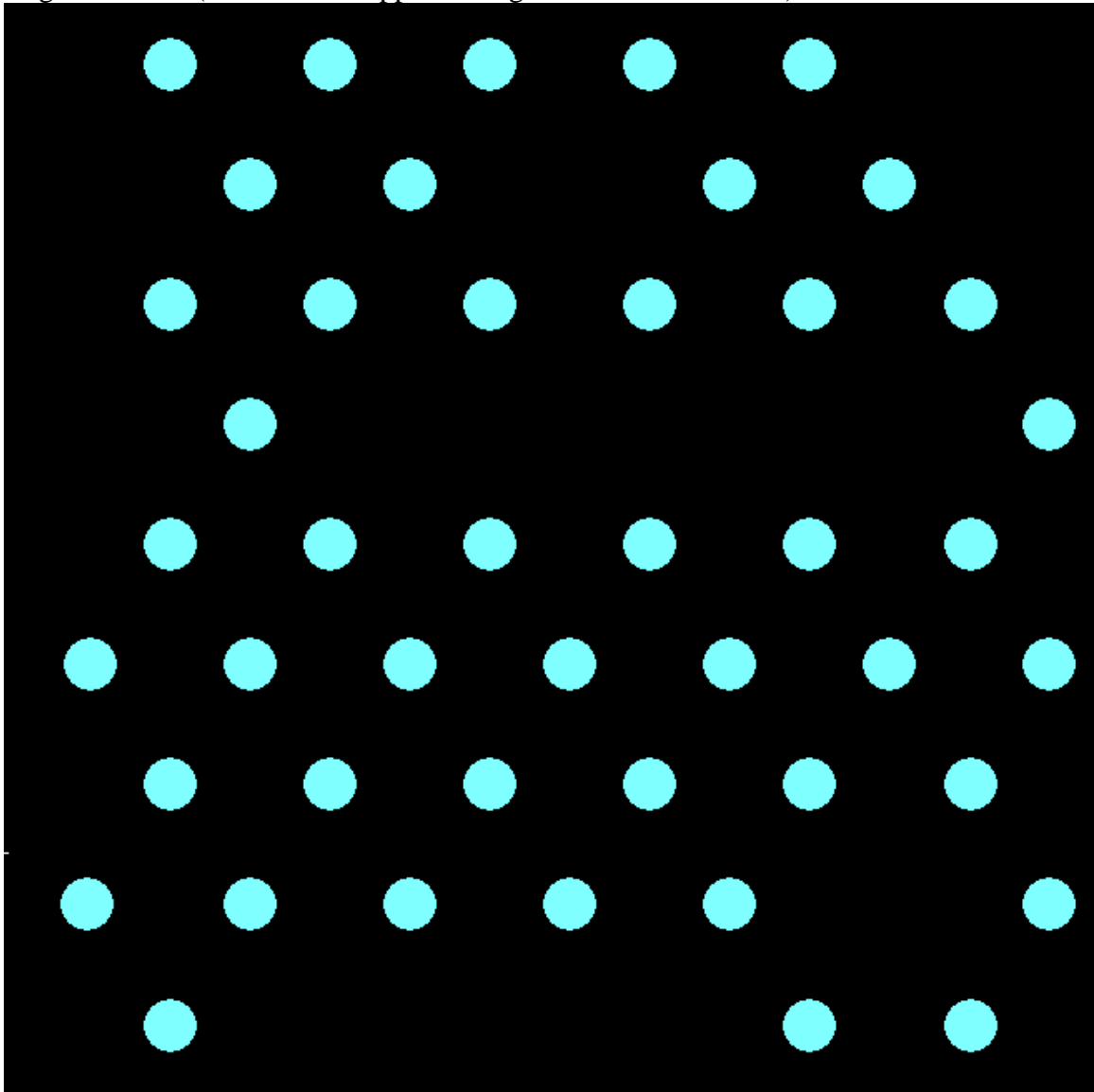
25% signal and 75% plane layer



50% signal and 50% plane layer (sample layers – 5, 6, 7, 8)



Negative Plane (i.e. black is copper and light blue are clearances)

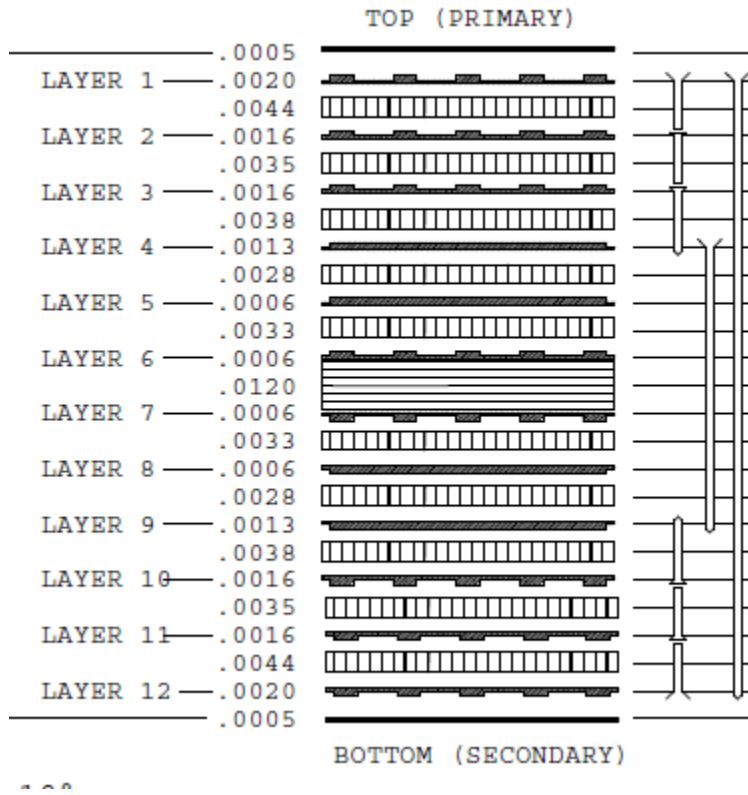


For our sample board

Please specify the "Starting Foil" thickness for each layer. For layers that will be plated and planarization processes.

Layer	Starting Foil	Finished Cu Thickness	Function
1	1/4oz or 8.5um	2.0 mil	signal layer with flooded cu fill
2	1/4oz or 8.5um	1.6 mil	signal layer
3	1/4oz or 8.5um	1.6 mil	signal layer
4	1/4oz or 8.5um	1.3 mil	positive plane layer
5	1/2oz or 17um	mil	mixed -signal 50% / plane 50%
6	1/2oz or 17um	mil	mixed -signal 50% / plane 50%
7	1/2oz or 17um	mil	mixed -signal 50% / plane 50%
8	1/2oz or 17um	mil	mixed -signal 50% / plane 50%
9	1/4oz or 8.5um	1.3 mil	positive plane layer
10	1/4oz or 8.5um	1.6 mil	signal layer
11	1/4oz or 8.5um	1.6 mil	signal layer
12	1/4oz or 8.5um	2.0 mil	signal layer with flooded cu fill
13		mil	

Page 3 – Defining the Via Structures:



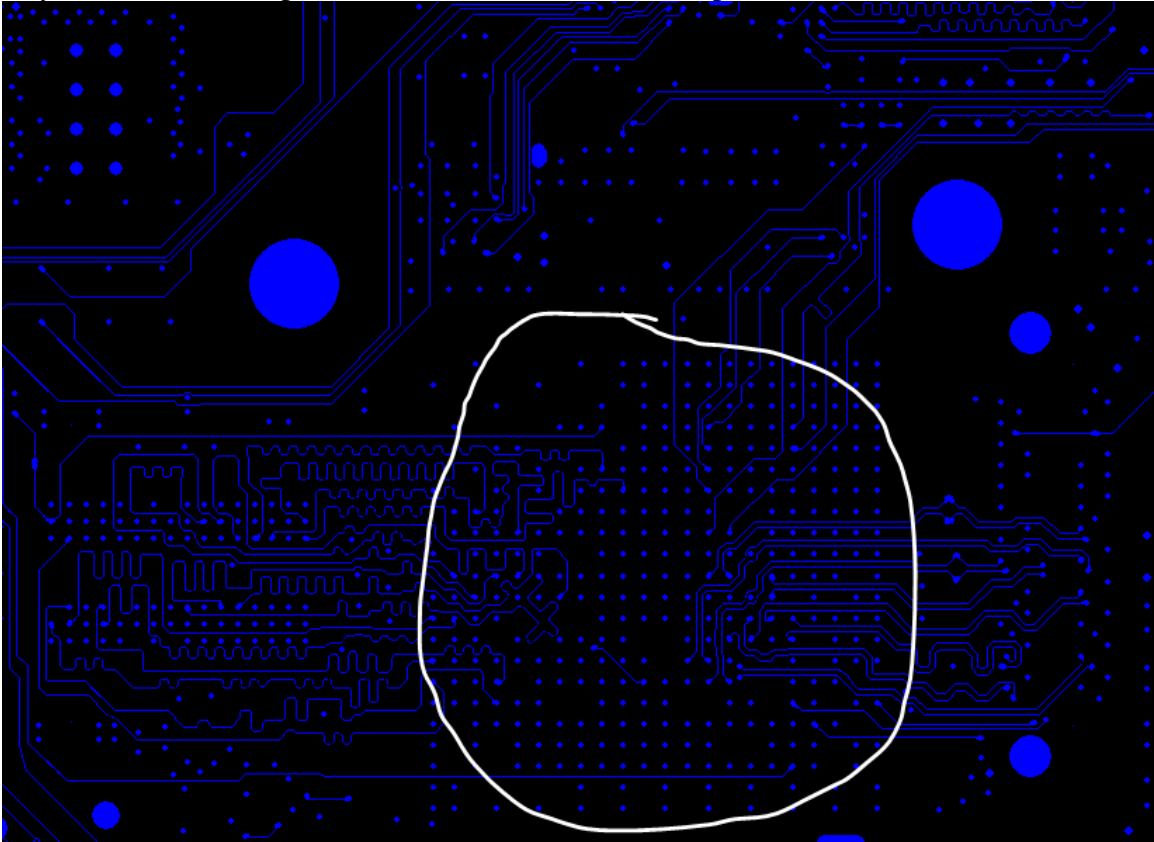
Summary:

L1-2-3-4 + L12-11-10-9 micros (stacked)

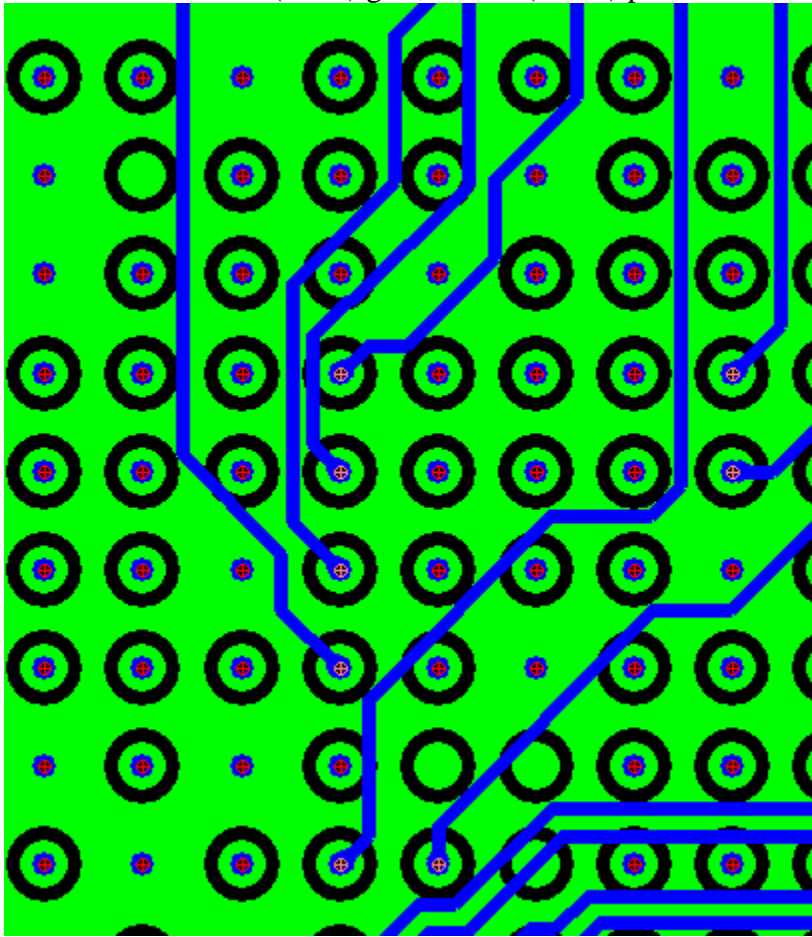
L4-9 buried (staggered to micros)

L1-12 PTH

Key or dominant component (1mm or 40 mil BGA) on product is circled.



Micro Vias – 40 mil (1mm) grid, 20 mil (.5mm) pad and 30 mil (.75mm) clearance



DRILL CHART: TOP to LYR_2					
ALL UNITS ARE IN INCHES					
FIGURE	SIZE	TOLERANCE	PLATED	NONSTANDARD	QTY
5	0.005	+0.002/-0.005	PLATED	LASER	1482

SIZES WITH 2 DIMENSIONS ARE SLOTS. LONG AXIS TOL= +/- .01.

DRILL CHART: LYR_2 to LYR_3					
ALL UNITS ARE IN INCHES					
FIGURE	SIZE	TOLERANCE	PLATED	NONSTANDARD	QTY
5	0.005	+0.002/-0.005	PLATED	LASER	1407

SIZES WITH 2 DIMENSIONS ARE SLOTS. LONG AXIS TOL= +/- .01.

DRILL CHART: LYR 3 to LYR 4					
ALL UNITS ARE IN INCHES					
FIGURE	SIZE	TOLERANCE	PLATED	NONSTANDARD	QTY
12	5	0.005	+0.002/-0.005	PLATED	LASER
1338					
SIZES WITH 2 DIMENSIONS ARE SLOTS. LONG AXIS TOL= +/- .01.					

DRILL CHART: L_YR_4 to L_YR_9					
ALL UNITS ARE IN INCHES					
FIGURE	SIZE	TOLERANCE	PLATED	NONSTANDARD	QTY
8	⊕	0.008	+0.003/-0.008	PLATED	-
1612					
SIZES WITH 2 DIMENSIONS ARE SLOTS. LONG AXIS TOL= +/- .01.					

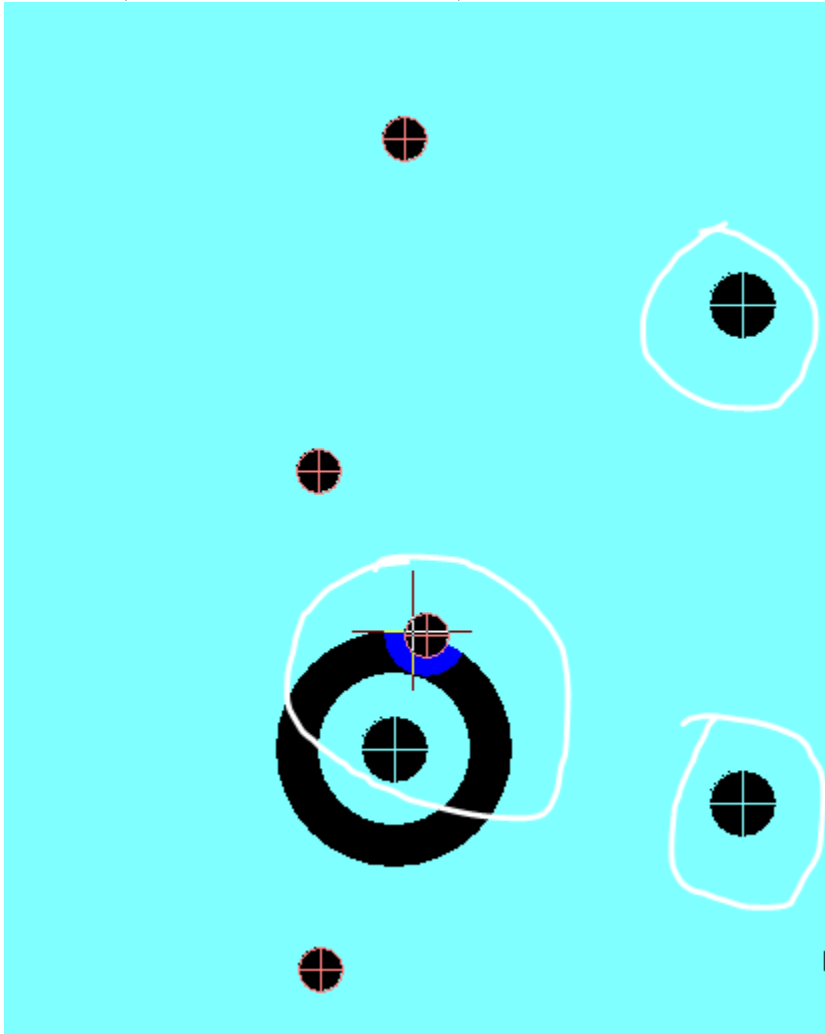
DRILL CHART: LYR_9 to LYR_10					
ALL UNITS ARE IN INCHES					
FIGURE	SIZE	TOLERANCE	PLATED	NONSTANDARD	QTY
12	5	0.005	+0.002/-0.005	PLATED	LASER
1320					
SIZES WITH 2 DIMENSIONS ARE SLOTS. LONG AXIS TOL= +/- .01.					

DRILL CHART: LYR_10 to LYR_11					
ALL UNITS ARE IN INCHES					
FIGURE	SIZE	TOLERANCE	PLATED	NONSTANDARD	QTY
12	5	0.005	+0.002/-0.005	PLATED	LASER
1632					
SIZES WITH 2 DIMENSIONS ARE SLOTS. LONG AXIS TOL= +/- .01.					


DRILL CHART: LYR_11 to BOTTOM					
ALL UNITS ARE IN INCHES					
FIGURE	SIZE	TOLERANCE	PLATED	NONSTANDARD	QTY
12	5	0.005	+0.002/-0.005	PLATED	LASER
1703					
SIZES WITH 2 DIMENSIONS ARE SLOTS. LONG AXIS TOL= +/- .01.					

Interconnect Information Via #1	Type of Via (eg. below)	Micro
	Grid	.040" (1mm)
	Qty of Vias in design	1,482
	Drill Diameter	.005" (.127mm)
	Finished Hole Diameter	
	Pad size	.020" (.5mm)
	Clearance Diameter	.030" (.75mm)
	Non-functional pads present?	Yes
	Start Layer	1
Stop Layer	2	
Interconnect Information Via #3	Type of Via	Micro
	Grid	.040" (1mm)
	Qty of Vias in design	1,338
	Drill Diameter	.005" (.127mm)
	Finished Hole Diameter	
	Pad size	.020" (.5mm)
	Clearance Diameter	.030" (.75mm)
	Non-functional pads present?	Yes
	Start Layer	3
Stop Layer	4	
Interconnect Information Via #5	Type of Via	Micro
	Grid	.040" (1mm)
	Qty of Vias in design	1,632
	Drill Diameter	.005" (.127mm)
	Finished Hole Diameter	
	Pad size	.020" (.5mm)
	Clearance Diameter	.030" (.75mm)
	Non-functional pads present?	Yes
	Start Layer	10
Stop Layer	11	
Interconnect Information Via #2	Type of Via	Micro
	Grid	.040" (1mm)
	Qty of Vias in design	1,407
	Drill Diameter	.005" (.127mm)
	Finished Hole Diameter	
	Pad size	.020" (.5mm)
	Clearance Diameter	.030" (.75mm)
	Non-functional pads present?	Yes
	Start Layer	2
Stop Layer	3	
Interconnect Information Via #4	Type of Via	Micro
	Grid	.040" (1mm)
	Qty of Vias in design	1,703
	Drill Diameter	.005" (.127mm)
	Finished Hole Diameter	
	Pad size	.020" (.5mm)
	Clearance Diameter	.030" (.75mm)
	Non-functional pads present?	Yes
	Start Layer	11
Stop Layer	12	
Interconnect Information Via #6	Type of Via	Micro
	Grid	.040" (1mm)
	Qty of Vias in design	1,320
	Drill Diameter	.005" (.127mm)
	Finished Hole Diameter	
	Pad size	.020" (.5mm)
	Clearance Diameter	.030" (.75mm)
	Non-functional pads present?	Yes
	Start Layer	9
Stop Layer	10	

Page 4 – buried via – 8 mil (.203mm) FHS, 18 mil (.457mm) pad and 40mil (1mm) clearance (where there is a clearance).



Interconnect Information Via #7	Type of Via (eg. below)	Buried
	Grid	none
	Qty of Vias in design	1,612
	Drill Diameter	
	Finished Hole Diameter	.008" (.203mm)
	Pad size	.018" (.457mm)
	Clearance Diameter	.040" (1mm)
	Non-functional pads present?	Yes
	Start Layer	4
	Stop Layer	9

8 

DRILL CHART: TOP to BOTTOM					
ALL UNITS ARE IN INCHES					
FIGURE	SIZE	TOLERANCE	PLATED	NONSTANDARD	QTY
⊕	0.008	+0.003/-0.008	PLATED	-	225
i	0.028	+0.003/-0.003	PLATED	-	10
u	0.040	+0.003/-0.003	PLATED	-	2
J	0.055	+0.003/-0.003	PLATED	-	1
@	0.129	+0.003/-0.003	PLATED	-	4
△	0.024	+0.003/-0.000	NON-PLATED	-	2
△	0.047	+0.003/-0.003	NON-PLATED	-	2
△	0.059	+0.003/-0.003	NON-PLATED	-	2
◇	0.150	+0.003/-0.003	NON-PLATED	-	1
⊗	0.055x0.030	+0.005/-0.005	PLATED	-	1
⊗	0.070x0.030	+0.005/-0.005	PLATED	-	1
⊗	0.080x0.042	+0.005/-0.005	PLATED	-	2

SIZES WITH 2 DIMENSIONS ARE SLOTS. LONG AXIS TOL= +/- .01.

Interconnect Information Via #8	Type of Via	PTH
	Grid	none
	Qty of Vias in design	225
	Drill Diameter	
	Finished Hole Diameter	.008" (.203mm)
	Pad size	.018" (.457mm)
	Clearance Diameter	.030" (.75mm)
	Non-functional pads present?	Yes
	Start Layer	1
Stop Layer	12	

(This PTH was picked because it had the highest quantity and aspect ratio.)

Finding a grid is sometimes difficult. In the example below, there is a localized area (circled) where the L1-2 micro vias holes are on a .016" (.3mm) grid for an HDI device. (Within the circled area, there are larger red and blue buried vias). Though the fine grid is localized, it is important to identify this L1-2 microvia structure in the IST worksheet.

