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TECHNOLOGIES

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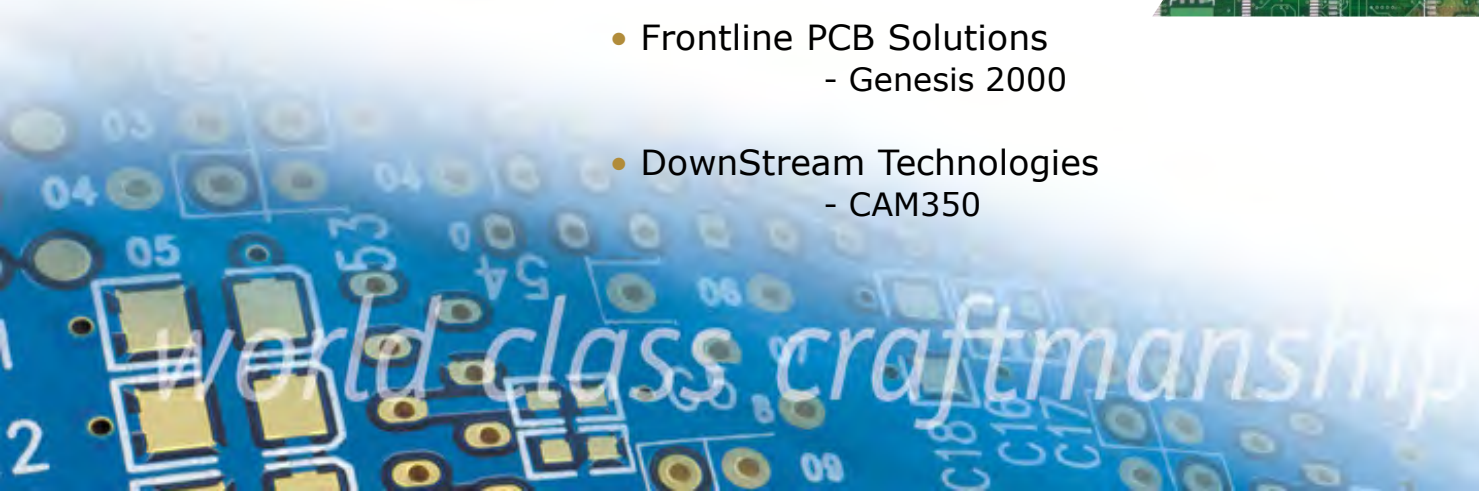
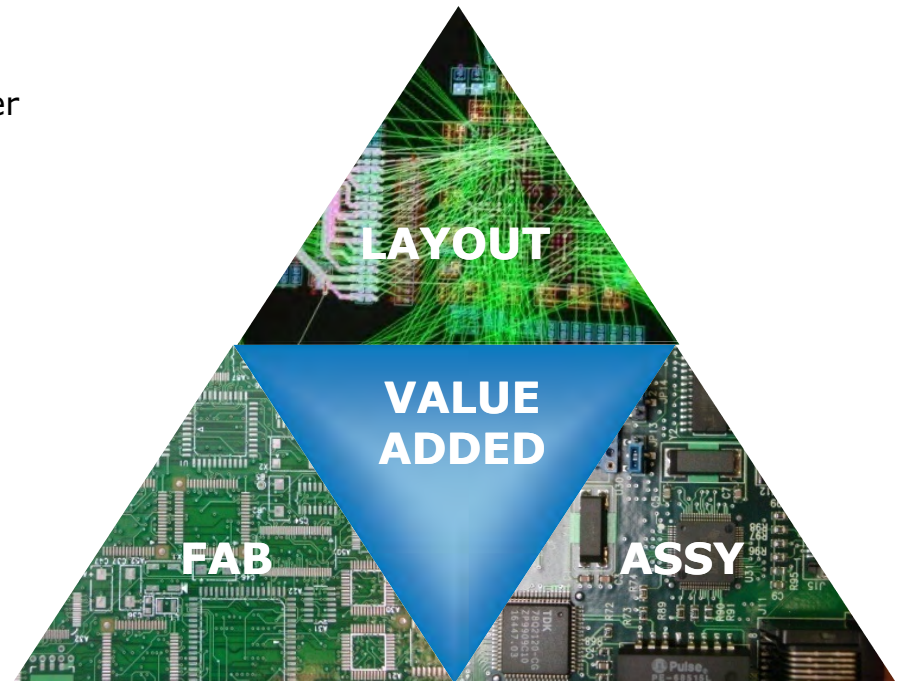


# PCB Layout

- 14 PCB Layout Designers
- 2 Field Application Engineer
- 2 working shifts, 16 hours a day, 5 days a week
- SWAT Team available on week-ends

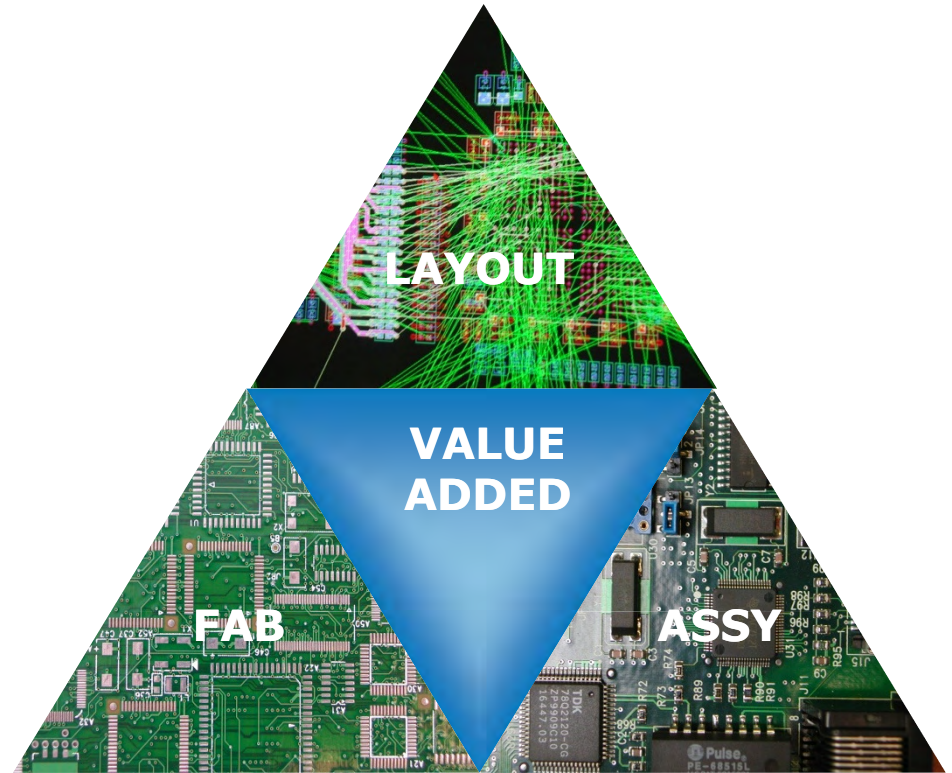
## Software includes:

- Cadence Design Systems
  - Concept HDL
  - Allegro PCB
  - Allegro PCB Router
  - OrCAD Capture
  - OrCAD Layout
- Mentor Graphics
  - Design Architect
  - Board Station RE
  - DxDesigner
  - Expedition PCB
  - PADS Logic
  - PADS Layout
- Altium
  - Altium Designer
- Frontline PCB Solutions
  - Genesis 2000
- DownStream Technologies
  - CAM350



# PCB Manufacturing

- 2 working shifts, 18 hrs a day, 5 days a week
- SWAT Team available on week-ends
- 5 to 15 working days turn around time
- Our machinery includes:
  - ASI
  - Chemcut Corporation
  - Colight
  - ESI
  - Excellon concept 129
  - First EIE SA
  - HJM Precision Inc.
  - IPS Copper Lines
  - Ishii Hyoki Inc.
  - Kodak
  - Lauffer
  - Lloyd-Doyle
  - Microcraft
  - Microvu
  - Nikon
  - Olec Corporation
  - Plasma Etch
  - Polar
  - Wabash
  - HACH



## Board Technology

High Layer Count (52+)  
 High Aspect Ratio (30:1 +)  
 Dual Lamination  
 Mix Lamination  
 Impedance Control ( $\pm 5\%$ )

BOARD CONSTRUCTION	Standard Capability	Special Capability
Panel size	12" x 18" 18" x 24" 24" x 24" 24" x 27"	
Maximum board size	22" x 25"	
Maximum number of layers	Up to 40	40 to 58
Maximum finished PCB thickness	.400"	
Board thickness tolerance (0.062" thick & over)	$\pm 10\%$	$\pm 5\%$
Board thickness tolerance (below 0.062" thick)	$\pm 0.006"$	
Warpage (With balanced construction)	0.7%	0.5%
Minimum dielectric thickness	0.004"	0.0035"
Minimum core thickness (rigid)	0.0027"	
Minimum core thick. Flex	0.0005"	
Layer to layer registration	$\pm 0.004"$	
Dimensions – hole location	$\pm 0.003"$	
Minimum router size	0.031"	0.020"
Dimensional tolerance for routing	$\pm 0.005"$	$\pm 0.0025"$
Minimum space, PCB edge to conductor	0.005"	
Maximum beveling angle	50 degrees	
Angle of beveling	$\pm 2$ degrees	
Dimensional tolerance for beveling	$\pm 0.005"$	
Minimum space, PCB edge-to-conductor	0.030"	
Scoring web thickness tolerance	$\pm 0.003"$	

## Materials

FR406 (170 Tg) - IS410 - 370 HR  
 Duroid (3003, 4003, 4350, 5880, 6002, 6010, TMM-3)  
 Polyimide - Kapton - ESD G10/FR4 Black  
 Nelco N4000-13 - Nelco N4000-13 SI - Teflon (TLC-27, TLX-8)  
 Special construction using mixed laminates

BOARD CONSTRUCTION	Standard Capability	Special Capability
Inner layer:		
Minimum line width	0.004"	0.003"
Minimum space trace/pad	0.004"	0.002"
Minimum space trace/trace	0.004"	0.003"
Tolerance-line width & spacing	$\pm 0.00025"$	
Outer layer:		
Minimum line width	0.004"	0.003"
Minimum space trace/pad	0.004"	0.003"
Minimum space trace/trace	0.004"	0.003"
Tolerance-line width & spacing	$\pm 0.0005"$	$\pm 0.00025"$
Minimum SMT size	0.005"	0.004"

- For ½ oz Outer layers add 0.001" to all linewidths on artworks
- For 1 oz Outer layers add 0.0015" to all linewidths on artworks



PAD TO HOLE SIZE	Standard Capability	Special Capability
Minimum plated hole size (finished)	0.004"	
Tolerance – plated hole size	± 0.002"	± 0.001"
Min. mech. drilled hole size	0.004"	
Min. mech. Drilled hole size (on 0.062" thick board)	0.008"	0.006"
Minimum outer layer pad (IPC-6012 Class 2)	FHS + 0.016"	DHS + 0.006"
Minimum inner layer pad (IPC-6012 Class 2)	FHS + 0.016"	DHS + 0.008"
Minimum outer layer pad (IPC-6012 Class 3)	FHS + 0.020"	
Minimum inner layer pad (IPC-6012 Class 3)	FHS + 0.018"	
Plane relief diameter	FHS + 0.022"	DHS + 0.016"
Min. inner plated hole to metal	0.008"	0.007"
Min. outer non-plated hole to metal	0.007"	0.005"
Min. inner non-plated hole to metal	0.008"	0.007"
Aspect ratio	Up to 25:1	Up to 32:1

PHOTO IMAGEABLE SOLDERMASK CRITERIA	Standard Capability	Special Capability
Pad clearance (min/side)	0.002"	
Minimum s/m web	0.004"	
SMT Minimum pad spacing for damming	0.009"	0.008"
Line to SMT minimum space	0.004"	
Via plugging capability	96% +	99% plug
Colors	Black, green, blue, red, clear, white	

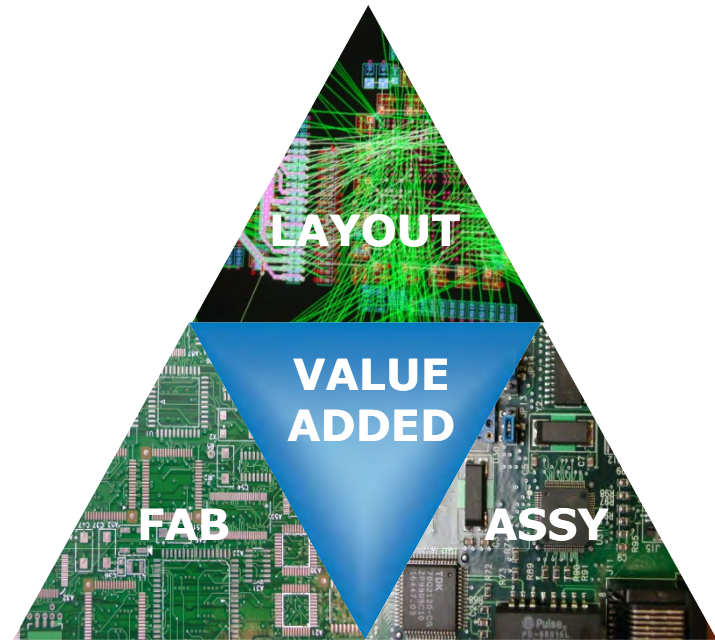
LEGEND CRITERIA	Standard Capability	Special Capability
Back print, minimum line width size	0.006"	0.005"
Back print, minimum text size (height)	0.045"	0.030"

ELECTRICAL CHARACTERISTIC	Standard Capability	Special Capability
Impedance tolerance (ohms)	±10%	±5% based on construction build up
<b>Electrical testing parameters:</b>		
Continuity threshold	>2.0 Ohms	1.0-2.0 Ohms
Isolation threshold	19 Mega Ohms at 100 Volts	Up to 65 Mega Ohms at 250 Volts
Isolation test voltage	30-250 V	
Feature density	0.006 pitch	< 0.006



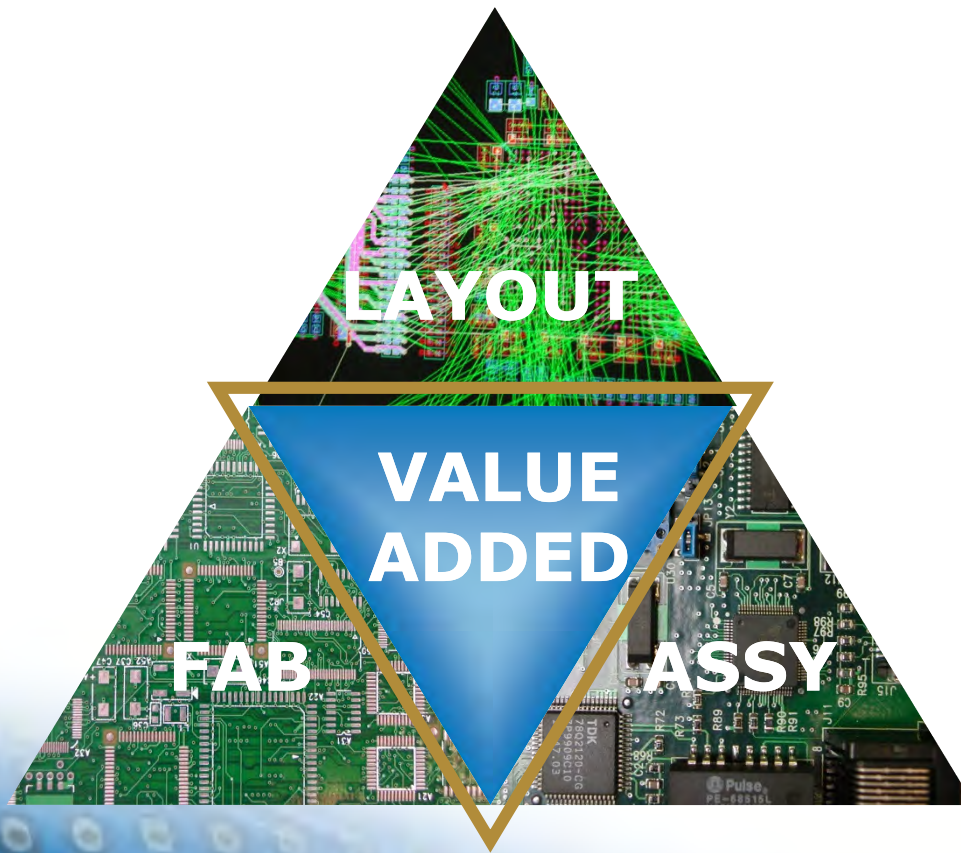
# PCB Assembly

- 2 working shift, 12 hours a day, 5 days a week
- 2-4 working days turn around time
- Surface Mount Assembly
- Through Hole Assembly
- BGA/micro-BGA install, rework, re-balling
- Prototype Builds
- Electronics Engineering
- Testing
- Repair/Rework
- Single and Double Sided Board Assembly Technology
- Press-Fit Connectors
- X-Ray

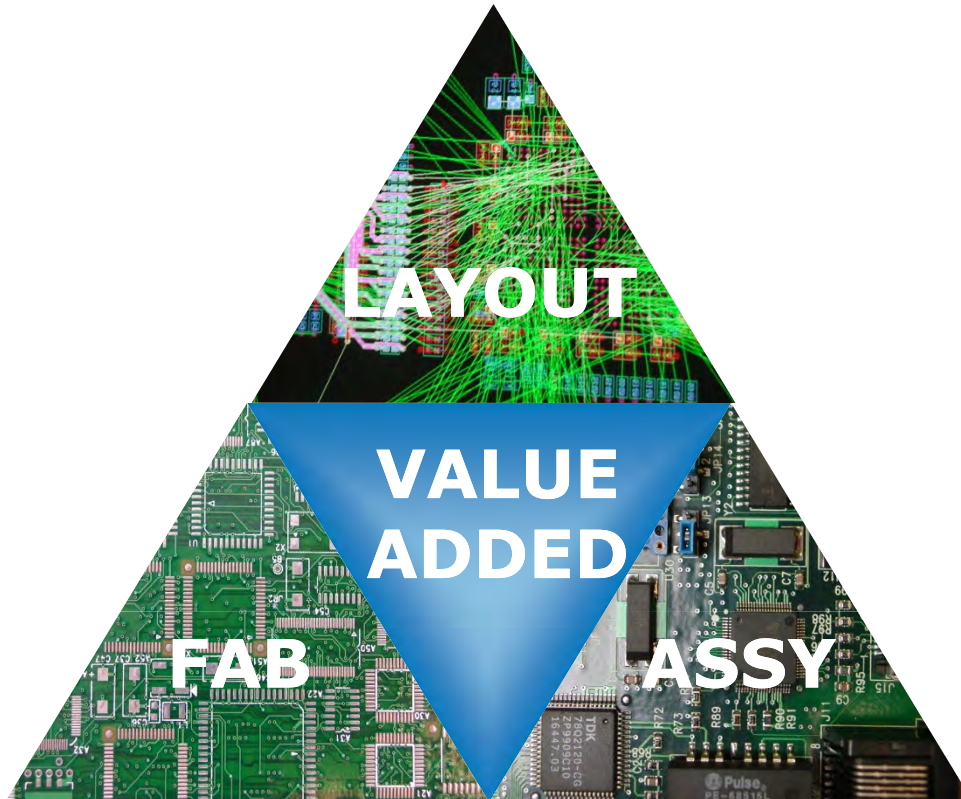


# Result : Value Added

- › One-stop shop
- › Centralized core competencies
- › Shortest time-to-market
- › Peace of mind for our customers



*world class craftsmanship*



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