Company Overview
• Summit is one of the largest PCB companies in North America – over $130 million in revenue
• Total of 240,000 sq. ft. of manufacturing space and over 800 employees
• Four North American based plants: Anaheim, Orange, Santa Clara, and Toronto
• Additional scale available utilizing Mass-Lamination Partners (DDTC licensed for ITAR)
• Additional manufacturing through Summit Global provides competitive global pricing
  • Multi-Site, Multi-Country (Taiwan, China, Vietnam, Korea)
• Focused on advanced technology PCBs for domestic manufacturing
• Multiple sites with similar capabilities provides redundancy for customer risk mitigation
• **Provides a total PCB solution from prototype & quick-turn to volume production**
Invest in Advancing Our Capabilities

• Fund Well Capitalized Facilities
  – Keep pace with advanced technology PCB designs
  – Provide a platform for additional growth
  – Ensure long-term stability and viability

• Leverage Information Technology
  – Proprietary shop management system
  – Shop loading & capacity planning
  – Engineering & Quality records

• Focus on Advanced Technology
  – Complex HDI
  – Complex rigid-flex
  – RF/Microwave

• Provide a Total PCB Solution
  – Prototype / QTA
  – High mix / low volume
  – Domestic & off-shore volume
<table>
<thead>
<tr>
<th>End Market</th>
<th>Application / Program</th>
<th>Key Customers</th>
</tr>
</thead>
</table>
| Aerospace & Defense | ![Aircraft](image1.png) ![Helicopter](image2.png) ![Tank](image3.png) ![Airplane](image4.png) | **Commercial Avionics**: aircraft controls, communications, radar systems, entertainment systems  
**Military**: avionics, munitions, missiles, radar systems, secure communications, simulation, surveillance |
| Commercial       | ![Doctor](image5.png) ![Surgical](image6.png) ![Patient Monitoring](image7.png) ![Implantable Devices](image8.png) | **Health care**: imaging, diagnosis, surgical, patient monitoring, implantable devices  
**Semiconductor**: ATE, reference boards, probe cards, burn-in boards  
**Computing/Datacom**: wireline & wireless |
| Space            | ![Satellite](image9.png) ![Launch System](image10.png) ![Communications/Surveillance](image11.png) ![Payload](image12.png) | **Flight and non-flight**: launch systems, communications/surveillance, payload |
# PCB Products

## Rigid
- High layer count
- Stacked microvias
- Blind/buried vias
- Back drilling
- Multiple sequential lam
- Via fill (copper, epoxy)
- Heat sinks
- Bonded and embedded coins
- Terminal & standoff assembly

## Flexible
- Multilayer, Loose-leaf, Rigid-Flex, Bookbinder
- Adhesiveless & adhesive
- Stiffeners
- Laser ablation
- Thin flex laminates
- Oversized panel layouts
- Assembly options

## RF/Microwave
- Wide range of PTFE materials
- RF/Digital hybrid designs
- Mixed material stackups
- Plated cavities, edge plating
- Mode suppression/stitching
- Buried resistors
- Edge launch features
- Rogers® strategic partner

## Semiconductor
- Reference Cards, Probe, DUT, Burn-in-Boards
- High Aspect Ratio
- Low Loss Materials
- Bondable Gold
- Tight Tolerance Drilling
- Sintering
- Oversized Panel Options
Facility Profile – Anaheim

Facility size: 60,000 sq ft
Employees: 190
Annual revenue: ≈ $40 million
Technology focus: Rigid-flex, bookbinder, oversized flex
Service focus: Mid to high volume, standard lead time

Certifications
ISO9001, AS9100, MIL-31032, MIL-55110, MIL-50884, NADCAP, ITAR registered, RoHS compliant
Facility Profile – Orange

Facility size: 40,000 sq ft
Employees: 170
Annual revenue: ≈ $35 million
Technology focus: HDI, Sequential lam, RF/microwave
Service focus: High mix / low volume

Business Mix
- Commercial: 40%
- Aerospace, Defense & Space: 60%

Product Mix
- High-speed Digital: 65%
- RF / Microwave: 35%

Production Mix
- QTA, Evaluation, Prototype: 40%
- Production: 60%

Certifications
ISO9001, AS9100, ITAR registered, RoHS compliant
Facility Profile – Santa Clara

Facility size: 75,000 sq ft
Employees: 310
Annual revenue: ≈ $55 million
Technology focus: Sequential Lam, Complex HDI, Flex & Rigid-Flex
Service focus: Quick turn, new product development, pre-production volume

**Business Mix**
- Commercial: 70%
- Aerospace & Defense: 30%

**Product Mix**
- Rigid: 80%
- Flex & Rigid-Flex: 20%

**Production Mix**
- Quick-turn, prototype: 70%
- Production: 30%

Certifications
ISO9001, AS9100, NADCAP, ITAR registered, RoHS compliant
Facility Profile – Toronto

Facility size: 65,000 sq ft
Employees: 145
Annual revenue: ≈ $22 million USD
Technology focus: Rigid PCBs up to 30+ layers, BBV, microvia, sequential lam, RF/Microwave, thermal management
Service focus: Mid volume production, pilot builds to support production

Business Mix
- Commercial: 33%
- Aerospace & Defense: 67%

Product Mix
- High Layer 18+: 14%
- Low Layer 1 - 8: 43%
- Mid Layer 10 - 18: 43%

Production Mix
- Prototype: 44%
- Production: 56%

Certifications
ISO9001, AS9100, NADCAP, MIL-PRF-55110, MIL-PRF-31032, CGP/JCP registered, RoHS compliant
Profile – Summit Global

Partner locations: China, Korea, Taiwan, Vietnam
Approved suppliers: 9
Revenue profile: Medium to Large companies ($150M - $1B)
Product Range: Rigid, Flex, Rigid-Flex, High-Speed Digital, RF/Microwave & Assembly
DFM & Quality Support: Summit employees in US and China

<table>
<thead>
<tr>
<th>Standard &amp; Advanced Technology</th>
<th>Specialized Capabilities</th>
<th>Quality Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low to high layer count</td>
<td>Embedded Coin</td>
<td>IPC 6012/6013, Class 2, Class 3</td>
</tr>
<tr>
<td>Wide range of material options</td>
<td>Cavity and edge plating</td>
<td>TS/IATF 16949 (automotive)</td>
</tr>
<tr>
<td>Any layer HDI</td>
<td>Heavy Copper</td>
<td>ISO 13485 (medical)</td>
</tr>
<tr>
<td>Back drilling</td>
<td>Metal backed – aluminum, copper</td>
<td>AS 9100 (aerospace)</td>
</tr>
<tr>
<td>Sequential lamination</td>
<td>Hybrid constructions</td>
<td>ISO 9001</td>
</tr>
<tr>
<td>Epoxy Via Fill</td>
<td>RF materials</td>
<td>ISO 14000 (environmental)</td>
</tr>
<tr>
<td>Fine line &amp; space</td>
<td>Substrate / chip carrier designs</td>
<td>NADCAP</td>
</tr>
</tbody>
</table>

End to End Support to Ensure Your PCB is Manufactured Exactly to Specifications
## Domestic Manufacturing Profile

<table>
<thead>
<tr>
<th>Production Capability</th>
<th>Santa Clara</th>
<th>Orange</th>
<th>Anaheim</th>
<th>Toronto</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quick turn / Evaluation</td>
<td>24 hours – 25 days</td>
<td>5 – 20 days</td>
<td>15 – 25 days</td>
<td>5 – 20 days</td>
</tr>
<tr>
<td>Typical standard lead time</td>
<td>20 – 30 days</td>
<td>25 – 35 days</td>
<td>30+ days</td>
<td>15 – 25 days</td>
</tr>
<tr>
<td>Typical production lot volume</td>
<td>4 - 24 panels</td>
<td>5 – 10 panels</td>
<td>25 – 50 panels</td>
<td>12 to 50 panels</td>
</tr>
<tr>
<td>Panel size options</td>
<td>12x18, 18x24, 21x24, 21x26, 24x30</td>
<td>12x18, 18x24, 21x24, 20x26, 24x28</td>
<td>12x18, 18x24, 21x24, 24x36</td>
<td>12x18, 18x24, 21x24</td>
</tr>
<tr>
<td>Shifts</td>
<td>3 + weekend</td>
<td>2.5 + Saturday</td>
<td>2.5 + Saturday</td>
<td>2.5 + Saturday</td>
</tr>
</tbody>
</table>

### Common Materials

<table>
<thead>
<tr>
<th></th>
<th>Santa Clara</th>
<th>Orange</th>
<th>Anaheim</th>
<th>Toronto</th>
</tr>
</thead>
<tbody>
<tr>
<td>High speed digital</td>
<td>I-Terra MT40, Tachyon 100G, Meg6 &amp; 6N, Meg7 &amp; 7N, RO4000 series, EM890/891, TUC Thunderclad 1/2/3</td>
<td>I-Terra MT40, Tachyon 100G, Meg6 &amp; 6N, Meg7 &amp; 7N, RO4000 series, EM890/891, TUC Thunderclad 1/2/3</td>
<td>I-Terra MT40, Tachyon 100G, Meg6, &amp; 6N, Meg7 and 7N, RO4000 series</td>
<td>Tachyon, Meg6, Meg6N, Meg7, I-Terra MT40, RO 4000 series</td>
</tr>
<tr>
<td>RF/Microwave</td>
<td>Rogers (all materials), Taconic (all materials), Astra MT77</td>
<td>Rogers (all materials), Taconic (all materials), Astra MT77</td>
<td>N/A</td>
<td>Rogers (all materials), Taconic (all materials)</td>
</tr>
<tr>
<td>Polyimide / High Temp</td>
<td>I-P95, I-P96, VT-901, Arlon 85N, BT</td>
<td>I-P95, I-P96, VT-901, Arlon 85N, BT</td>
<td>I-P95, I-P96, VT-901, Arlon 85N, BT</td>
<td>I-P95, I-P96, VT-901, Arlon 85N, BT</td>
</tr>
<tr>
<td>Thin core capacitance</td>
<td>Dupont HK04, Farad Flex</td>
<td>Dupont HK04, Farad Flex</td>
<td>Dupont HK04</td>
<td>3M ECM (embedded capacitance)</td>
</tr>
<tr>
<td>Flex</td>
<td>Dupont Pyralux AP, Panasonic</td>
<td>N/A</td>
<td>Dupont Pyralux AP, Panasonic</td>
<td>Dupont Pyralux AP (limited)</td>
</tr>
</tbody>
</table>

### Surface Finishes

| In-House                  | ENIG, ENEPIG, hard Au, soft Au, Au over Cu, OSP, SnPb reflow, selective SnPb, Immersion Ag | ENIG, full body & selective Au, Immersion Ag, selective SnPb, SnPb reflow | ENIG, full body & selective Au, selective SnPb, SnPb reflow | HASL, LF HASL, ENIG, immersion Ag, immersion Sn, hard Au, soft Au, selective Au, carbon ink |
| Qualified outside service | HASL, immersion Sn         | ENEPIG, immersion Sn, OSP      | ENEPIG, immersion Sn, OSP | ENEPIG, immersion Sn, OSP |
## Global Manufacturing Capabilities

<table>
<thead>
<tr>
<th>Item</th>
<th>Technical Capability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Layers</td>
<td>1 - 68L</td>
</tr>
<tr>
<td>Maximum Board Size</td>
<td>Rigid: 49.21”x22.44” (Backplane) / Flex: 19.68”x26.37”</td>
</tr>
<tr>
<td>Maximum Board Thickness</td>
<td>394mil</td>
</tr>
<tr>
<td>Outline Tolerance</td>
<td>± 4mil</td>
</tr>
<tr>
<td>Minimum Trace Width / Space</td>
<td>2mil / 2mil</td>
</tr>
<tr>
<td>Maximum (finished) Copper Thickness</td>
<td>Inner Layer: 12oz / Outer Layer: 12oz</td>
</tr>
<tr>
<td>Minimum Drill Hole Diameter</td>
<td>6mil (Mechanical) / 4mil (Laser)</td>
</tr>
<tr>
<td>PTH / NPTH Tolerance</td>
<td>± 2mil</td>
</tr>
<tr>
<td>Registration Tolerance</td>
<td>± 2mil</td>
</tr>
<tr>
<td>Aspect Ratio</td>
<td>20 : 1</td>
</tr>
<tr>
<td>Solder mask Dams</td>
<td>3mil</td>
</tr>
<tr>
<td>Impedance Control Tolerance</td>
<td>± 8%</td>
</tr>
<tr>
<td>Rigid-flex Multilayer (max. # of layers)</td>
<td>2 - 40L</td>
</tr>
<tr>
<td>Flex Multilayer (max. # of layers)</td>
<td>1 - 12L</td>
</tr>
<tr>
<td>HDI Feature</td>
<td>Stacked Microvias (Any Layer), Blind and Buried Vias</td>
</tr>
<tr>
<td>Material Types</td>
<td>FR4 (Shengyi, ITEQ, EMC); High Speed (Meg 4, Meg 6, FR408HR); High Frequency (Ro3003, Ro4350B); Polyimide (DuPont; Thinflex); Ceramic</td>
</tr>
<tr>
<td>Surface Finishes</td>
<td>HASL/LF, HASL, ENIG, Immersion Tin, OSP, Immersion Silver, Hard Gold/Soft Gold, Flash Gold, Gold Finger, Selective OSP, ENEPIG</td>
</tr>
<tr>
<td>Certifications</td>
<td>ISO9001, ISO14001, IATF/TS16949, AS9100, NADCAP, ISO13485, ISO27001</td>
</tr>
</tbody>
</table>
Completed & Planned Capex

**Anaheim**
- DP-1500 soldermask coater
- Copper Via-Fill expansion
- (2) AOI/AVI system (Camtek)
- Pre-clean line / Auto loader (Wise)
- Planerizer (Polla Massa)
- Plating rectifiers (Baker)
- LDI system (Orbotech Nuvogo)
- Lab equipment (Struers)
- Vision Router (Pluratech)
- ERP System (ProCIM)

**Orange**
- 4 opening lam press – (OEM)
- Vision Router – (Schmoll)
- ENIG/ENIPEG line
- AOI/AVI system (Camtek)
- (2) HS Mechanical drills (Schmoll)
- UV/CO2 laser drill (Schmoll)
- Epoxy via fill system (Mass)
- LDI system (Orbotech Nuvogo)
- LDI soldermask (Limata X1000)
- Automated tester (ATG a7)
- Network infrastructure upgrade

**Santa Clara**
- ENIG/ENIPEG, Im Silver line
- (3) HS Mechanical drills (Schmoll)
- (2) Laser drills (ESI, Hitachi)
- Epoxy via fill system (Mass)
- LDI system (Orbotech Nuvogo)
- High speed TDR – 7Gb (Zymetrix)
- Strip/Etch/Strip (Chemcut)
- Planerizer (ITC)
- Wet Sander (Mass)
- (2) 6 opening presses - OEM

Over $10 million invested