

# ACCELERATING HIGH-PERFORMANCE COMPUTING INNOVATION WITH ADVANCED PCB DESIGN

- **Project:** High-Performance Data Centre PCB Development
- **Industry:** Semiconductor
- **Duration:** Ongoing, established in 2024
- **Engagement Model:** Staff Augmentation
- **Expertise:** PCB Design, High-Speed Digital Design, Hardware Expertise, Library Management

## CHALLENGE

A leading global semiconductor company, recognised as one of the world's largest, faced a significant challenge due to the rapid expansion of its product portfolio, particularly in the highly competitive data centre and AI segments. This surge in new product introductions created an immediate and acute shortage of specialised engineering resources. The client required expertise in designing incredibly complex, high-layer-count Printed Circuit Boards (PCBs) – often with 64 layers or more – for their advanced data centre infrastructure. Finding and onboarding engineers with the specific knowledge of high-speed design, intricate board complexities, and familiarity with their proprietary systems and processes proved to be a major hurdle. The company also sought a flexible solution that could scale with fluctuating workloads, avoiding the long-term commitment and overhead of hiring full-time staff for temporary spikes in demand.

## SOLUTION / APPROACH

Syntronic engaged with the client as a flexible and agile extension of their engineering team, leveraging our deep expertise in PCB design and hardware development. Our approach was tailored to address their immediate resource needs and long-term strategic objectives:

- **Rapid Deployment of Specialised Expertise:** Syntronic quickly deployed senior PCB design experts, many of whom had previous experience

### AT A GLANCE

#### Challenge

- Rapidly increasing product portfolio led to resource shortages.
- Need for highly specialised expertise in complex, multi-layer PCB design.
- Desire for flexible, on-demand engineering support without long-term hiring commitments.

#### Solution

- Deployed senior PCB design experts with prior experience in the client's environment.
- Offered a flexible, on-demand engagement model, providing services on an as-needed retainer basis.
- Leveraged in-house capabilities and tools, minimising client onboarding.

#### Outcome

- Reliable and on-time delivery of critical PCB design milestones.
- Enabled the client to manage peak workloads without internal delays.
- Reduced overhead and risk associated with full-time hires for fluctuating demands.
- Established a trusted, agile partnership for ongoing support.

working on similar high-complexity boards and were already familiar with the client's tooling and software. This prior experience significantly minimised onboarding time and allowed for immediate value contribution. The acquisition of Vision Circuit further bolstered this capability, as the client already had confidence in the expertise of the acquired team members.

- **Flexible, On-Demand Engagement Model:** Understanding the client's need for agility, Syntronic proposed a flexible, on-demand engagement model, providing services on an as-needed retainer basis. This allowed the client to access our specialised services on an as-needed basis, drawing upon our team for specific projects

or during peak workloads without the commitment of long-term staff augmentation. This model provided the flexibility to adjust resource allocation based on project demands, optimising their cash flow and cost management.

- **Seamless Integration and Reduced Overhead:** Syntronic was able to provide services using our own infrastructure and tools. This eliminated the need for the client to go through lengthy internal processes, enabling a rapid ramp-up and immediate project execution. Our team seamlessly integrated with the client's PCB and library department, communicating directly with their lead and providing deliverables without continuous on-site presence.
- **Addressing Complex Technical Requirements:** Our team directly addressed the technical pain point of designing highly complex, multi-layer PCBs for data centres. This involved navigating intricate high-speed design challenges and working within the client's specific schematic and system requirements, areas where Syntronic's deep engineering expertise proved critical.

## RESULTS & IMPACT

The ongoing partnership with Syntronic has yielded significant benefits for the leading global semiconductor company, enabling them to maintain their aggressive product development timelines and competitive edge:

- **Reliable and On-Time Project Delivery:** Syntronic consistently hit all project milestones, ensuring that the client's critical PCB design work did not cause any delays in their overall product development roadmap. This reliable delivery was crucial in a fast-paced and competitive market.
- **Optimised Resource Management:** By leveraging Syntronic's flexible staff augmentation model, the client successfully managed a significant spike in workload driven by multiple concurrent product introductions. This allowed them to avoid the challenges and costs associated with hiring full-time, highly specialised engineers for temporary needs.
- **Reduced Risk:** The ability to engage Syntronic on a direct PO basis, utilising our equipment and a flexible, on-demand model, significantly

reduced the client's administrative overhead and long-term financial risk associated with staffing.

## WHY SYNTRONIC

The leading global semiconductor company chose and continues to partner with Syntronic due to our unique capabilities as a design-led product realisation partner.

- **Unmatched PCB Design & High-Speed Hardware Expertise:** Syntronic provided immediate access to senior engineers with extensive experience in designing complex, multi-layer PCBs (including 64-layer boards) and high-speed digital hardware for data centre applications. Our team's familiarity with the client's systems ensured minimal ramp-up time and immediate productivity, aligning with Syntronic's core expertise across RF, DSP, FPGA, Digital, Analog, Power, PCB, Antenna, embedded software, full-stack software, and DevOps.
- **Agile and Flexible Engagement:** Our ability to offer a flexible, on-demand model, allowing the client to scale resources up or down based on fluctuating demands, was a key differentiator.
- **Seamless Integration and Trust:** Syntronic's team seamlessly integrated into the client's workflow, building profound technical trust through consistent, reliable delivery.

## ABOUT SYNTRONIC

Syntronic is an Integrated Design & Product Realisation Partner that empowers technology-intensive companies in demanding markets like Communications, Automotive, Industrial, and Defence to accelerate innovation and bring complex electronic systems to market faster and more reliably. With over 40 years of product and system development experience and 4000+ projects delivered globally, Syntronic provides deep engineering expertise across the entire product lifecycle—from idea to aftermarket support—with the agility and collaborative partnership needed for success at any scale.