The premier source of modular solutions for high performance electronics applications
High Connection Density, Inc.

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HCD’s core value proposition is performance-driven design and manufacturing expertise to provide the best products available to address customer needs. Committed to the developing needs of the OEM community, HCD focuses on addressing the ever-increasing demands in advanced electronic systems. This focus has positioned HCD to be a key partner for development and manufacturing of next-generation subsystems.
HCD focuses on the development and manufacture of high performance modular subsystems offering innovative, cost-effective solutions to today’s technology challenges. The HCD Module Product Line offers high-speed modules incorporating advanced memory technology, and advanced products featuring compact footprint solutions for performance and spatial efficiency. Innovative product definition and responsiveness to customer feedback distinguish the HCD design philosophy, and a commitment to quality and reliability is reflected in all of its products.

**THE HCD ADVANTAGE**

**Engineering Expertise**

HCD’s in-house engineering staff includes experts in high-frequency digital and RF design targeting the increasing complexity of today’s high speed signaling devices. Advances on the silicon level are pushing the limits of high speed signaling - challenging existing PCB design to ensure signal speed and integrity. HCD’s design team leverages their extensive engineering expertise and product design experience in addressing these issues, developing innovative, reliable products incorporating high-performance technologies used in Rambus, Double Data Rate (DDR) SDRAM, embedded ASICs and network processors.

The increasing complexity of mainboard routing has been the catalyst for HCD’s innovative subsystem designs. HCD’s specialists in interconnect technology and packaging design offer configurable component assemblies that meet customers’ specifications on both performance and physical parameters. Component subassemblies incorporating compact footprints facilitate increased complexity while improving signal quality and allowing savings in mainboard real estate.

As strict reliability standards are a key concern of our customers, HCD has developed capacities in design and testing geared towards addressing both thermal management and mechanical reliability requirements. One of the keys of enabling low cost and highest reliability is accurate modeling and simulation to build confidence that a particular modular solution is the best fit for a customer’s needs. HCD employs extensive electrical, mechanical and thermal modeling and simulation very early in the design cycle. This is especially important for space-constrained applications, which typically have very demanding thermal requirements. Advanced modeling and simulation enabling quick-turn prototyping and extensive thermal and reliability testing is an integral part of the development cycle.

**High Volume Manufacturing**

HCD's extensive packaging expertise ensures high quality product design geared for high-volume production. ISO 9001 certified in 2000, HCD’s manufacturing facility in Taiwan boasts state of the art prototyping and high-volume manufacturing capability, including high precision, high-speed assembly equipment and a full range of electrical and reliability test equipment. HCD maintains key relationships with major component manufacturers - ensuring a strong and reliable supply chain worldwide - facilitating quick-turn prototyping and fast product delivery. HCD manufactures its products in accordance with stringent industry specifications. HCD is an active member of the JEDEC (Joint Electron Device Engineering Council) Solid State Technology Association that develops standards to meet industry and user needs. This dedication to quality and efficiency provides HCD’s customers a full range of modular solutions that meet the highest quality and reliability standards in the industry while remaining competitive in price and performance.

**Commitment to Service**

Dedicated Customer Service is the backbone of HCD’s success. In its entire portfolio of products from leading-edge standard memory products to advanced and customized module solutions, HCD strives to determine and address each customer’s primary concerns and needs. HCD’s products are sold and supported through a worldwide network of HCD personnel, and authorized sales representatives.
The variety and range of HCD products support today’s diverse market driven requirements and is continuously evolving to provide innovative solutions for the ever-changing, competitive landscape. HCD’s products are highly reliable with proven system compatibility and can be configured for a variety of form factors.

Leading-Edge Standard Products

HCD offers a comprehensive line of high performance memory modules. The standard module line includes Rambus standard RIMMs, leading-edge SO-RIMMs and JEDEC compliant DDR modules. In line with HCD’s strong commitment to quality, all HCD modules are 100% tested to ensure performance and reliability.

HCD’s Rambus product offerings provide high performance memory for systems requiring high bandwidth and low pin count. Both the standard RIMM and SO-RIMM modules deliver up to 1.6GB per second bandwidth per Direct Rambus channel and can achieve transfer rates of up to 800MHz.

Specialty workstations and servers, as well as networking switches and routers are ideal applications for HCD’s Rambus products. HCD’s leading edge SO-RIMMs are especially well suited for networking applications where many OEMs are spaced constrained and require high speed, low pin count memory.

Also addressing high frequency module requirements is HCD’s complete line of JEDEC compliant DDR DIMM and SO-DIMM products in both PC1600 and PC2100 speed grades. In a system with a 64-bit wide memory bus, DDR modules can reach a peak bandwidth of 2.13GB per second at 266MHz as compared to mainstream PC133 (SDRAM) modules, which offer a performance of 1.06GB per second.

HCD’s DDR products are well suited for a broad range of applications, which include the workstation and server markets where the high memory capacity and speed are necessary to meet the performance demands of these products. The performance improvement achieved with DDR technology helps to ensure that memory stays in step with the constantly increasing performance of microprocessors.

Flexible Form Factors

The NexMod™ Product Family

HCD’s innovative NexMod family of products offers high performance, three-dimensional solutions that enable high I/O and robust signal quality within a compact footprint. Addressing the horizontal and vertical space constraints of advanced product markets, the NexMod’s unique layered structure incorporates area array connectors and cost, space and performance advantages allowing multiple silicon chip assemblies to contact horizontally and expand vertically, all within 1U requirements.

HCD’s engineering expertise ensures highly reliable subsystems meeting stringent thermal and mechanical requirements, while enabling high frequency and strict
timing margins. Substrate materials and design parameters are based upon mechanical reliability considerations such as CTE matching and array shape and dimension. A range of thermal management options is available.

HCD’s first offering with NexMod technology is the RDRAM-based NexMod memory module. A key feature of the solution is its onboard channel termination. A typical Rambus termination scheme consumes a large amount of space on the customer’s mainboard. Bringing termination onboard the module simplifies board design and reduces propagation delay time - improving overall memory system performance. Additionally, the footprint of the module itself is significantly smaller than a SO-RIMM solution, saving space on the mainboard.

Additional memory based NexMod solutions, including a 1U DDR module, are currently under development. This DDR module is designed to fit in the space constraints found in today’s (and tomorrow’s) aggressive 1U server applications. The module will have densities starting at 512MB and will be expandable to well beyond 1GB.

The NexMod technology utilizes a ‘building block’ philosophy that extends broadly to accommodate multiple levels of integration. Incorporating advanced memory technologies such as Direct Rambus® and Double Data Rate (DDR) SDRAM, the NexMod family offers a unique solution to the datacom and 1U server markets. As device capacities increase, and space constraints become even more critical, NexMod technology facilitates the integration of network processors, ASICs, or other components with high-speed memory devices into an integrated subsystem.

ABOUT HCD

Working in Cornell University’s Electronic Packaging Program with membership spanning leading-edge technology corporations including Intel and IBM, HCD incorporated in 1997 with the challenge of solving high frequency and space constrained limitations in advanced electronic systems. Taking advantage of the research at Cornell University, HCD began initial product development addressing needs jointly defined with leading computer and data communications OEMs.

Relocation of the company headquarters from Ithaca, New York to Sunnyvale, California and expansion of in-house engineering capacity to encompass electrical, mechanical and thermal specialists marked strategic growth in 2000. HCD entered into a developer partnership with Rambus Inc. in Q2 of 2000 and established a state-of-the-art manufacturing facility with high volume production capability in Taiwan.

Development of advanced module solutions incorporating Rambus, DDR SDRAM and other leading-edge technologies are testimonials to HCD’s success in advanced products that meet current and future market needs. Developing technologies both extendable and scaleable, and enabling easy transition to next generation systems operating at increasingly higher frequencies represent HCD’s strengths.

Innovation and expertise are the hallmarks of HCD’s value-added services and products. A commitment to high quality and a dedication to providing responsive design, manufacturing, and support have made HCD the choice partner for advanced subsystem solutions. HCD’s focus on customer support and overall satisfaction further ensures mutual success.