TechTalk

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Rambus and Mobiveil Drive DDR4/3 Solution

Rambus and Mobiveil Partner to Bring Pre-Validated Solution to Chip Makers, Delivering Memory Flexibility and Accelerated Time-to-Market

"Our UMMC Controller Core has successfully proven to be both flexible and configurable for real-time consumer applications," said Ravi Thummarukudy, chief executive officer of Mobiveil. "Pairing our technology with the Rambus R+ multi-modal PHY provides customers with the best DRAM solution for their particular application without changing the SoC, which substantially minimizes design time and development cycles across a broad number of applications."

"Partnering with Mobiveil to bring a complete offering to market demonstrates both companies' commitment to meeting customer needs in the face of increasingly complex and costly SoC development," said Kevin Donnelly, general manager of the Memory and Interface division at Rambus. "By working in a collaborative manner with companies like Mobiveil, we are addressing chip makers needs with proven and ready-to-use IP blocks that minimize qualification and integration time."

Rambus Partners with Mobiveil

November 18, 2014 – Rambus Inc. (NASDAQ:RMBS) and Mobiveil have validated interoperability of the Rambus R+™ DDR4 Multi-modal PHY with the Mobiveil Universal Multiport Memory Controller (UMMC) IP core for JEDEC standard DDR4/3 and LPDDR3/2 operation. As part of the overall Rambus IP Cores program, the integrated IP provides chipmakers with a pre-validated, industry standard solution that reduces costs and risk by shortening IP qualification time. In addition, the differentiated memory subsystem brings together the superior signal integrity and low power offered by the Rambus R+ multi-modal PHY with the flexibility of the Mobiveil UMMC in a single, easily integrated solution.

Rambus & Mobiveil certified interoperability of DDR4/3, LPDDR3/2 Multi-modal PHY and Universal controller combines industry-leading signal integrity and broad configurability

The Rambus R+ DDR4/3, LPDDR3/2 multi-modal PHY delivers industry-leading performance while providing SoC makers a comprehensive array of memory choices, ranging from high-performance to low-power applications. To complement its broad applicability, the R+ DDR4/3 multi-modal PHY delivers versatile configuration options for both area- and power-optimized consumer applications and performance-intensive compute applications. Additionally, the enhanced standards IP cores are designed with system-aware methodology to ensure superior signal integrity and system margin for optimal DRAM vendor interoperability. The PHY is available in several low-power foundry processes and can be configured for both flip-chip and wire bond packages with data rates ranging from 800 to 3200Mbps.

Mobiveil's UMMC Controller is a highly flexible and configurable design. It is targeted for high bandwidth access and low power consumption such as next-generation mobile, networking and consumer applications. The controller architecture is carefully tailored to achieve reliable high-frequency operation with dynamic power management and rapid system debug capabilities. Its flexible AXI System interface makes it easy to be integrated into a wide range of applications.
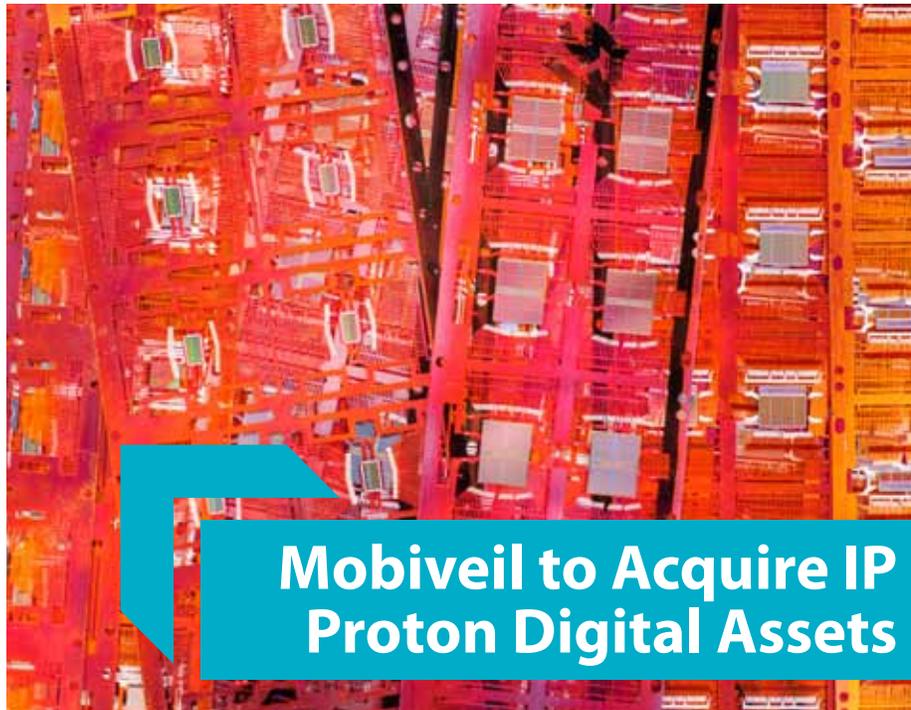
Mobiveil to Acquire IP Proton Digital Assets

"We are very pleased to announce this agreement with Proton Digital as we believe that Proton's superior LDPC based flash reliability IP can complement our existing IP portfolio for the fast growing flash SSD market" said Ravi Thummarukudy, CEO of Mobiveil. "We are excited to make this IP available to our customers worldwide as well as integrate in to our NVM Express based NVMStor SSD platform"

"Our LDPC based flash reliability IP is designed to deliver unsurpassed reliability for next generation MLC and TLC Flash used in consumer, client and enterprise applications," Dr. Andrei Vityaev, CEO of Proton Digital Systems, stated "Our technology is optimized through advanced mathematics to achieve the smallest footprint and consume half the power of comparable solutions. This agreement enables customers worldwide to have access to this valuable technology"

At the conclusion of the proposed agreement, Dr. Andrei Vityaev will join Mobiveil's Technical advisory board and will help guide the future development and deployment of this technology.

Sanjay Srivastava, Chairman of Proton Digital Systems stated, "We believe that the combined portfolio offers Mobiveil an exciting opportunity to accelerate flash based SSD product development for customers worldwide"

About Proton Digital

Proton Digital Systems delivers Flash Reliability Solutions based on proprietary advanced LDPC Error Correction and Statistical Digital Signal Processing (S-DSP) technologies. These technologies work at the actual physics-based Flash device characteristics and implemented in the smallest area with the industry's lowest power consumption.

Proton Digital System's FlashPro Media Managers dramatically extend the endurance and retention of NAND Flash and other block-based memories compared to currently available solutions, enabling next-generation solutions to use 1x/1y/1z nm, 3D technologies with significantly improved reliability.

Proton Digital Systems provides an adaptive, scalable next-generation Flash Controller platform. Our FlashPro Media Managers have been adopted by some of the world's largest Flash players.

Ravi Thummarukudy,
CEO of Mobiveil

Sanjay Srivastava,
Chairman of Proton Digital

CloudWave has licensed Mobiveil's Universal NVM Express Controller (UNEX™) IP to build a hardware solution that will accelerate database management system accesses. By licensing a UNH certified high quality NVMe IP solution that can drop into a design, CloudWave can develop its unique implementation to accelerate DBMS access using solid state storage to get ahead of a rapidly developing market opportunity.

Mobiveil's NVM Express Controller is part of its High speed Serial Interconnect and Storage family of IP solutions that also includes Gen4/3 PCI Express, Gen3/2 RapidIO, Flash Controllers, 10G/1G Ethernet MACs, PCI Express Bridge and Switch solutions. Mobiveil IPs offer the most Feature-rich, power-efficient, highly interoperable and silicon-proven solutions for different form factors providing the optimum balance

between power and performance.

"We are excited that CloudWave chose our UNEX NVMe controller IP for their new design," said Ravi Thummarukudy, CEO of Mobiveil, Inc. "Mobiveil's UNEX IP is highly flexible and configurable and targeted for both enterprise and client class solutions. It is architected to unlock the current and future potential of PCIe-based solid-state drives. Since our NVM

UNH-IOL Certified, High-Quality IP Enable CloudWave to Cut Time and Risk to Build NVMe Flash Drive

Express IP, has passed the University of New Hampshire 1.1 specification compliance and interoperability testing, CloudWave can concentrate on creating its unique value and be assured their design will derive the full performance benefit from the NVMe interface."

"Mobiveil's UNH certified NVM Express IP helps us keep pace with the complexities of this new standard without dedicating our own engineering resources to do so," said Dmitriy Gusev, CEO of CloudWave. "We chose Mobiveil NVMe IP because of its feature set, configurability, protocol certification record, extensive system level validation process and efficient technical support. This enables our engineers to concentrate on building value-add features of our product that will provide our customers the fastest

and efficient solution for boosting their storage system."

About UNEX NVMe IP

The UNEX controller core efficiently supports multi-core architectures ensuring thread(s) may run on each core with their own queue and interrupt without any locks required. It provides support for end-to-end data protection, security and encryption as well as robust error reporting and management capabilities. The controller architecture is carefully tailored to optimize link and throughput utilization, latency, reliability, power consumption, and silicon footprint. Mobiveil's UNEX controller can be used in SOC, FPGA or Structured ASIC platforms.

Dmitriy Gusev, CEO of CloudWave

About CloudWave

CloudWave is a technology startup based in Paris, France. CloudWave develops breakthrough storage class memory technology systems enabling lowest access latencies. For more information contact dmgusev@cloud-wave.com

## AMD and ARM Join RapidIO 64-bit Coherent Scale Out development

AMD and ARM have joined the RapidIO.org community to collaborate with RapidIO.org member companies in the development of an open specification for multi-node / core coherent scale out of 64-bit ARM® processors using RapidIO as a coherent unified fabric.

Market and industry trends are changing the way enterprises and communications infrastructure carriers approach their data center and computing strategies. Many enterprises are looking to virtualization, fabric-based infrastructure and scalable modular designs as they explore how best to optimize their resources. In order to meet this challenge, carriers have started to leverage datacenters to help create these services bridging the traditional gap between datacom and telecom networks to form a more unified network. This unified datacenter-network paradigm is being deployed by extending virtualization technologies such as software-defined networking (SDN) and Network Function Virtualization (NFV) into the carrier network domain delivering improved overall end-to-end network utilization and operational efficiencies.

This type of overall system flexibility is at the very core of RapidIO as the specification
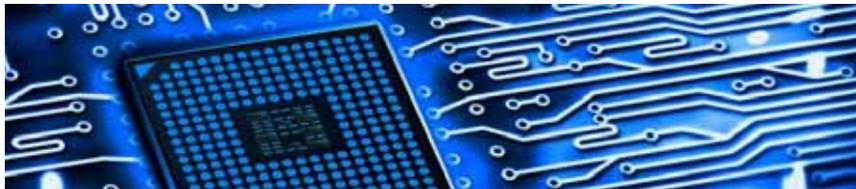
assumes there are multiple master, heterogeneous processors in a system needing to communicate with each other through shared memory, interrupts and messages. Also, RapidIO based systems can include up to 64K processors, each with their own complete address space and supporting north/south, east/west peer-to-peer transactions within a RapidIO fabric. Creating an open specification for multi-node / core coherent scale out of 64-bit ARM processors using RapidIO as a coherent unified fabric will extent the utility of RapidIO even further..

A dedicated ARM 64-bit Coherent Scale Out task group has been formed within the RapidIO.org Technical Working Group and includes the following founding task group member companies:

AMD, ARM, Cavium, Freescale, IDT, IIT Madras, Mercury Systems, Mobiveil, Texas Instruments and Xilinx.

Ravi Thummarukudy, CEO of Mobiveil and Chair of RapidIO Marketing Working Group commented, "ARM and AMD will bring significant high-speed computing expertise to the RapidIO 64-bit Coherent Scale Out initiative to help accelerate the engineering effort to develop this major addition to the RapidIO interface specification."

SEASON'S GREETINGS

Rick O'Connor, Executive Director of RapidIO.org

About RapidIO

RapidIO is a high-performance, packet-switched, interconnect fabric, compatible with the most popular integrated host processors, communications processors, and digital signal processors. It provides chip-to-chip, board-to-board and shelf to shelf peer to peer connectivity at performance levels scaling to beyond 100s of Gbits/s.