

Synopsys and Global Unichip

GUC Delivers Low Power, High-Performance Solid State Drive SoC Platform with DesignWare SATA IP



With a very aggressive time- to-market window, Synopsys' high-quality, silicon-proven SATA IP solution enabled us to achieve first-pass success and meet our project schedule. Synopsys' DesignWare IP is definitely a brand we can trust."

Richard Tseng
 Product Manager, Global Unichip Corporation

Business

Global Unichip Corporation (GUC) is a leading full service System-on-Chip (SoC) design foundry based in Taiwan. GUC provides total solutions from hardware platforms to complex time-to-market SoC turnkey design services.

Challenges

- ▶ Deploy a solid state drive SoC platform that offered the lowest power and highest performance
- ▶ Obtain a high-quality, silicon proven SATA IP solution that met low power and area requirements
- ▶ Meet time-to-market window with an aggressive six month development schedule

DesignWare IP Solutions

- ▶ SATA Device Controller, PHY and Verification IP

Benefits

- ▶ Achieved first pass silicon success for a complex design, meeting the project schedule
- ▶ Obtained a SATA IP solution that was 50% lower in power consumption and 30% smaller in area
- ▶ Reduced integration effort with a single vendor SATA controller and PHY IP solution

Overview

GUC leverages its in-house capabilities, partnership with TSMC and the entire value chain to provide customers with a one-stop turnkey solution.

In collaboration with GUC's specialty and top tier suppliers, GUC provides a full spectrum of engineering services, covering product engineering, test engineering, package engineering and reliability engineering services. GUC's turnkey services provide on-time delivery and variety of production services, including probed wafers, packaged devices, and tested packaged devices.

GUC developed its flagship GP5080 SSD SoC platform to target the growing solid state disk (SSD) market. This SoC platform was designed for high performance and lower power SSD applications such as notebooks, mobile internet devices (MIDs) and high-speed pen drives. The GP5080 SSD SoC features a 32-bit ARM7TDMI processor and a SATA interface which supports the SATA 2.6 specification, operating at 1.5 or 3 Gb/s. The GP5080 also supports 4-channel NAND Flash access with each channel having the ability to operate independently to deliver excellent sequential and random Read/Write performance.



Synopsys' proven DesignWare SATA controller and PHY IP was easy to integrate and configure, enabling us to deliver a quality product to our end-customer within six months."

Richard Tseng, Product Manager, Global Unichip Corporation

Leading DesignWare IP Solution

With the mobile mass storage market transitioning from the conventional Hard Disk Drive (HDD) to SSD, GUC set out to develop an SSD SoC platform that would address the low power and high performance requirements of these mobile applications. GUC's GP5080 SSD SoC provides designers with a solution that is significantly lower in power than competitive products, while providing high data system throughput of over 120 MB/s in sequential read and over 80 MB/s in sequential write. GUC had an aggressive six month development schedule. To achieve their critical time to market window, GUC needed to obtain a 3rd party SATA IP solution that enabled them to focus their internal expertise on the GP5080 SoC platform development.

GUC evaluated several IP vendors based on key selection criteria including quality, power consumption, performance, and feature set. Synopsys was differentiated in all three areas. GUC selected Synopsys DesignWare SATA IP solution because the PHY is 50% lower in power and 30% smaller in area compared to competitive offerings. In addition, the advanced on-chip diagnostics and ATE capabilities of the DesignWare SATA PHY enabled GUC to lower costs by conducting internal self tests on a cost-effective, high-speed digital tester. The DesignWare SATA digital controller supports sophisticated power management schemes such as partial and full slumber modes. The controller also provided an optimized software programming model, allowing GUC to meet their high system performance

requirement while maintaining low CPU overhead.

Complementing the SATA controller and PHY, is the verification IP, which was used to quickly validate the core's configuration in simulation and speed overall testbench development time.

High Quality IP and Excellent Technical Support

With a six month time to market window, Synopsys' established reputation in the industry for developing high-quality IP as an important criterion in GUC's selection process. Furthermore, Synopsys was the only IP provider at the time to offer an integrated SATA controller and PHY IP solution that passed the SATA International Organization (SATA-IO) Building Block interoperability testing, demonstrating full SATA functionality from a single vendor. Synopsys leading DesignWare SATA IP solution enabled GUC to meet their project schedule and achieve first-pass silicon success. "Synopsys delivered a high-performance IP solution with excellent quality that is supported by a knowledgeable team," said Richard Tseng.

The successful launch of the GP5080 SSD SoC has strengthened GUC's position as a leading vendor in the emerging SSD market. "Synopsys not only enabled us to deliver a highly competitive SSD platform but also enabled our end customer to meet their time to market window," commented Richard Tseng. As GUC continues to develop innovative products to the market, they will continue to rely on Synopsys DesignWare IP to help them achieve chip success with less risk.

"Low system power consumption was a key requirement. Synopsys offered a SATA IP solution that was 50% lower in power and 30% lower in area compared to competitive solutions."

Richard Tseng, Product Manager, Global Unichip Corporation

