SYNOPSYS®

SUCCESS STORY

Synopsys and Novatek

Novatek Achieves First-Pass Silicon Success for Mobile Display SoC with Synopsys MIPI IP Portfolio

"We achieved first-pass silicon success for our mobile display SoC with Synopsys' high-quality MIPI IP portfolio, including C-PHY/D-PHY, CSI-2 and DSI-2, while saving 6 months of design time."

~Dr. Daniel Ping, Assistant Vice President

Business

Novatek Microelectronics Corp. is a leading fabless chip design company specializing in the design, development and sales of a wide range of display driver IC & SoC solutions. Novatek's chips help companies meet emerging needs for sophisticated flat-panel display and audio/video applications for all digital devices.

Challenges

- Obtain available high-quality display IP on FinFET processes with advanced low-power features
- Meet aggressive time-to-market and cost requirements for mobile display SoC
- Select a vendor with proven track record, complete MIPI IP and Foundation IP solutions and expert technical services

Synopsys IP Solution

- Synopsys MIPI C-PHY/D-PHY IP
- Synopsys MIPI CSI-2 and DSI-2 Controllers
- Synopsys Duet Packages of Embedded Memories and Logic Libraries

Benefits

- Achieved first-pass silicon success with high-quality MIPI display IP while meeting power and quality requirements
- Significantly saved time-to-market, integrating the IP in 1 month and saving design time by more than 6 months
- Received excellent technical support from an experienced engineering team that helped ease the integration

Overview

For their latest mobile display SoC, Novatek looked to incorporate many advanced functionalities and features that gave consumers the most immersive viewing experience. For this reason, they initiated a brand new SoC design and architecture in partnership with Synopsys.

With aggressive design and time-to-market requirements, Novatek put their focus on selecting the vendor that delivered high-quality, power-optimized MIPI IP and Foundation IP on FinFET processes and allowed them to significantly accelerate their time to volume production.

"Availability of the Synopsys MIPI IP on our target FinFET processes allowing us to meet stringent power requirements were among the many reasons we chose Synopsys."

~Dr. Daniel Ping, Assistant Vice President

After evaluating several IP vendors, Novatek recognized Synopsys' successful track record and adopted the silicon-proven MIPI IP and Foundation IP to minimize integration risk and quickly deliver differentiated products to market. Synopsys' dedicated team of engineering experts helped Novatek shorten their design time significantly and integrate the MIPI IP on FinFET processes into their SoCs in only one month.

In addition, to obtain all the essential elements needed to implement a complete system-on-chip (SoC), Novatek leveraged Synopsys Duet Packages of Embedded Memories and Logic Libraries.

High-Quality Synopsys IP

One of the most essential requirements for mobile devices is power efficiency. For that reason, it was essential for Novatek to significantly minimize power consumption in their SoC. Novatek leveraged the Synopsys C-PHY/D-PHY IP solution's shut-down, low-power escape and ultra-low power state modes to optimize energy consumption in their high-resolution display.

For efficient connectivity to image sensors and displays, Novatek also adopted Synopsys CSI-2 and DSI-2 Controllers, which seamlessly interoperate with the Synopsys MIPI PHY IP. Synopsys controllers support the latest key features of the MIPI camera and display standards, such as wider PHY protocol interface (PPI), multiple virtual channels, advanced RAW data types and display command set, which Novatek looked to incorporate in their SoC.

Novatek was also targeting a specific process technology for their SoC. They needed to adopt silicon-proven MIPI IP solutions that not only allowed them to minimize design risk and accelerate time-to-volume, but also offered available IP that was consistent with their target process technology roadmap schedules, including 12-nm and 6-nm.

Novatek also utilized the optimized combinations of high-performance and high-density SRAMs, register files, ROMs, standard cells, and Power Optimization Kits (POKs) from the Synopsys Duet Packages to achieve optimal power, performance and area (PPA) for their SoC.

Expert Technical Support

It was important for Novatek to deliver their SoC to the market well ahead of their competition. Having access to proven and available IP was of the utmost importance, but Novatek also needed to ensure easy collaboration with a team of engineering experts to ensure a smooth IP integration. Novatek relied on Synopsys' worldwide support team for their power efficient NT72325 mobile display SoC. "Synopsys' responsive technical support team played a key role in shortening our time-to-production and helped us achieve first-pass silicon success," said Dr. Ping.

Future Product Development

As a result of this successful project, Novatek is engaging with Synopsys and discussing future IP needs for their next generation display SoCs.

"Because of this project's tremendous success and available IP supporting MIPI's next-generation standards, such as C-PHY v2.0, we are considering Synopsys for our future designs."

~Dr. Daniel Ping, Assistant Vice President

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