

Synopsys and Orbbec

DesignWare MIPI IP Helps Orbbec Achieve First-Pass Silicon Success for 3D Camera with Intelligent Computing

“We needed a quality camera interface IP solution that provided low-power consumption, small silicon footprint, and real-time data connectivity for our 3D camera with intelligent computing. With Synopsys’ DesignWare MIPI IP, we achieved first-pass silicon success, integrated the IP in two weeks, and accelerated our time-to-market by a month, all while meeting our design goals.”

~Xiaolu Mei, Co-Founder and R&D VP at Orbbec



Business

Orbbec's 3D camera-computer provides artificial intelligence capabilities and the best accuracy, range, resolution, and responsiveness. The company employs the best in artificial intelligence, optics, hardware engineering, silicon chip design, software development, machine learning, and manufacturing across China and the United States.

Challenges

- Acquire IP that met quality and stringent power, area requirements
- Meet aggressive design schedules for smart, 3D camera SoC
- Ease integration efforts while minimizing risk

DesignWare IP Solution

- DesignWare MIPI D-PHY IP

Benefits

- Achieved first pass silicon success, accelerated time-to-market by a month
- Met quality, power, and area requirements for new SoC targeting 3D camera with intelligent computing capabilities
- Reduced integration risk with silicon-proven DesignWare IP

Overview

Orbbec, founded in 2013 by a group of engineers and researchers, has created the best 3D camera available for computer vision, people/object tracking, and VR/AR. A worldwide company, Orbbec's 3D cameras can see, hear, and respond to people and their environments with unprecedented accuracy, making it smarter than a regular camera. Orbbec's 3D camera is compact and a home device perfect for surveillance, home assistance, and home automation.

Orbbec's stringent SoC design requirements prompted them to select a camera interface IP solution that offers high-quality, low-power, and small area. They turned to Synopsys. "We needed a quality camera interface IP solution that provided low-power consumption, small silicon footprint, and real-time data connectivity for our 3D camera with intelligent computing. With Synopsys' DesignWare MIPI IP, we achieved first-pass silicon success, integrated the IP in two weeks, and accelerated our time-to-market by a month, all while meeting our design goals," said Xiaolu Mei, Co-Founder and R&D VP at Orbbec.

High-Quality DesignWare IP

In addition to area and power requirements, it was important for Orbbec to implement an AI-ready camera interface IP solution that allowed real-time data connectivity between the image sensor and application processor. Orbbec leveraged the Synopsys MIPI D-PHY's standard configuration including a clock lane and up to four data lanes for an aggregate throughput of 10 Mbps. "We believe in the quality and performance of Synopsys' IP and what it adds to our new chip," said Mei.

An essential element for SoCs targeting battery-operated mobile devices is power savings, which the DesignWare MIPI D-PHY IP provides through its support for multiple low-power modes including shut-down. The PHY also provides test modes for increased reliability. "We integrated the IP into our SoC in two weeks and achieved first-pass silicon success on first full-mask tape-out," said Mei.

Expert and Responsive Technical Support

To ease IP integration and keep the project on schedule, Orbbec relied on Synopsys' expert technical support team. "It wasn't very often, but when we needed expert help, we received good and timely responses from Synopsys' technical support," said Mei.

“We have completed many successful design projects with Synopsys IP. We believe in the quality and performance of Synopsys' DesignWare MIPI IP and what it adds to our new 3D camera SoC.”

~Xiaolu Mei, Co-Founder and R&D VP