GLOBALFOUNDRIES and Ayar Labs Establish Strategic Collaboration to Speed Up Data Center Applications

December 4, 2017

Collaboration to push the limits of chip technology, extending optical circuits to meet rising demands in bandwidth and data center connectivity

Santa Clara and San Francisco, Calif., December 4, 2017 - GLOBALFOUNDRIES and Ayar Labs, a startup bringing optical input/output (I/O) to silicon chips, today announced a strategic collaboration to co-develop and commercialize differentiated silicon photonic technology solutions. The companies will develop and manufacture Ayar's novel CMOS optical I/O technology, using GF's 45nm CMOS fabrication process, to deliver an alternative to copper I/O that offers up to 10x higher bandwidth and up to 5x lower power. This cost-effective solution is integrated in-package with customer ASICs as a multi-chip module, and improves data speed and energy efficiency in cloud servers, datacenters and supercomputers. As part of the agreement, GF has also invested an undisclosed amount in Ayar Labs.

Modern data centers and cloud applications require high-performance, power-hungry chips to process and analyze huge volumes of data in real time. Growth in chip I/O capabilities has not matched exponential increases in computing power, because of physical limitations in electrical data transmission. Optical I/O, which leverages optical components on the CMOS die to transmit data at rapid speeds, will be a key enabler to overcoming the limitations of today's data center interconnects. In addition, Ayar's technology reduces power consumption at both the network and processor level.

"GF has demonstrated true technology leadership in recognizing optical I/O as the inevitable next step as we move into a More than Moore world," said Alex Wright-Gladstein, CEO at Ayar Labs. "This collaboration between Ayar and GF could improve chip communication bandwidth by more than an order of magnitude and at lower power, and is a validation of Ayar's viability in the current semiconductor ecosystem. This collaboration will unlock a larger market opportunity, expanding both our and GF's customer base. We look forward to working with GF to help solve the interconnect problems of today's chips and create greater value for our customers than if both companies worked independently."

"The Ayar Labs team has been designing cutting-edge silicon photonics components on GF's technology for the past eight years and has achieved exceptional results," said Mike Cadigan, senior vice president of global sales and business development at GF. "Our strategic collaboration builds on our relationship, leveraging GF's silicon photonics IP portfolio and our world-class manufacturing expertise to enable faster and more energy-efficient computing systems for data centers."

The collaboration brings together Ayar Labs' patented IP in optical technology with GF's best-in-class expertise in silicon photonics to co-develop optical solutions that will be fabricated using GF's process technology. The availability of this technology, including certain Design IP cores, will enable internet service providers, system vendors and communication systems to push data capacity to 10 Tera bits per second (Tbps) and beyond, while maintaining the low energy and cost of optical-based interconnects.

ABOUT Ayar Labs

Ayar Labs is replacing copper with optical I/O from silicon chips to improve speed and energy efficiency in computing by removing bottlenecks in moving data. The company was formed by the inventors of the first microprocessor chip to communicate using light at MIT, UC Berkeley, and CU Boulder, a breakthrough that was the result of a 10-year research collaboration funded by DARPA. For more information, visit www.ayarlabs.com.

About GF:

GLOBALFOUNDRIES is a leading full-service semiconductor foundry providing a unique combination of design, development, and fabrication services to some of the world's most inspired technology companies. With a global manufacturing footprint spanning three continents, GLOBALFOUNDRIES makes possible the technologies and systems that transform industries and give customers the power to shape their markets. GLOBALFOUNDRIES is owned by Mubadala Investment Company. For more information, visit https://www.globalfoundries.com.

Contacts:

Jason Gorss GF (518) 698-7765 jason.gorss@globalfoundries.com	Alex Wright-Gladstein Ayar Labs, Inc. info@ayarlabs.com