Lam Research Introduces the Semiconductor Industry's First Collaborative Robot for Fab Maintenance Optimization

Dextro™'s robotic arm delivers precision and repeatability to help chipmakers drive yield improvement

FREMONT, Calif., Dec. 10, 2024 /PRNewswire/ -- Lam Research Corp. (Nasdaq: LRCX) today introduced Dextro™, the semiconductor industry's first collaborative robot (cobot) designed to optimize critical maintenance tasks on wafer fabrication equipment. Now deployed in multiple advanced wafer fabs around the world, Dextro enables accurate, high-precision maintenance to minimize tool downtime and production variability. It drives significant first-time-right (FTR) results that can enhance yield.

Today's wafer fabrication equipment utilizes advanced physics, robotics and chemistry to create semiconductors at nanoscale. A typical fab has hundreds of process tools that each require regular, complex maintenance. Dextro is designed to improve the cost effectiveness of this equipment by performing critical maintenance tasks repeatability with sub-micron precision.

"Dextro is an exciting leap forward in semiconductor manufacturing equipment maintenance. Built to work side-by-side with fab engineers, it executes complex maintenance tasks with precision and repeatability that are beyond human capability alone, enabling higher tool uptime and manufacturing yield," said Chris Carter, group vice president of the Customer Support Business Group at Lam Research. "It is a powerful addition to Lam's extensive portfolio of tools and services designed to help chipmakers optimize their fabs for cost and productivity."

As fabs continue to grow in size, geographic diversity and equipment complexity, chipmakers need to optimize the effectiveness of their fab engineers by increasing automation and adding efficiencies. This is becoming even more important as the number of semiconductor positions worldwide continues to outpace the availability of skilled engineers.[1]

Precision is crucial in tool maintenance, where the accurate reassembly of subsystems translates to the bottom line. Achieving FTR saves time and cost. Repeatable maintenance also reduces waste associated with consumable parts, labor and production downtime, leading to less variability and higher yield in production.

"When manufacturing equipment requires maintenance, the work must be done quickly and efficiently to avoid extended tool downtime and wasted cost," said Young Ju Kim, vice president and head of the Memory Etch Technology Team at Samsung Electronics. "Error-free maintenance by Dextro helps drive improvements in production variability and yield."

Dextro is a mobile unit with a robotic arm operated by a fab technician or engineer. It uses various end-effectors as hands to manage critical equipment maintenance tasks that are time-consuming and prone to errors when done manually. For example:

- It precisely installs and compresses consumable components with more than two times the accuracy of manual application. Precise assembly helps control etch performance at the wafer edge, improving yield.
- Dextro tightens vacuum-sealing, high-precision bolts to exact specifications, relieving fab engineers of a repetitive task that has up to a 5% error rate when done manually. Accurately meeting specifications eliminates chamber temperature deviations that may take a tool out of production and impact die yield.
- Using automation and cleaning technology, Dextro removes side-wall polymer build-up within the chamber, without the burden of disassembly of the lower chamber. Importantly, it does this at lower risk to humans who require heavy protective breathing equipment to perform the task manually.

Lam's Flex® G and H series dielectric etch tools are currently supported by Dextro, expanding to additional tools in 2025 and beyond.

"With the enormous increase in demand that AI is bringing to the semiconductor market, it's critical for chipmakers to keep all their manufacturing equipment working as efficiently as possible to minimize downtime," said Bob O'Donnell, president of TECHnalysis Research. "Dextro can automate tedious, time-consuming, and often intricate cleaning and maintenance tasks on chip fabrication equipment so that manufacturing output can be maximized. It offers a huge benefit for companies that choose to deploy it."

Dextro joins a portfolio of smart solutions from Lam that enhance efficiency and reduce the cost of operations for semiconductor fabs. This includes the Lam Equipment Intelligence® process tools with autonomous calibration and self-adapting maintenance

capabilities, as well as Equipment Intelligence® Services that use data, machine learning, artificial intelligence and Lam domain knowledge to achieve better productivity outcomes.

Additional Media Resources

- Visit Media Center on the Lam Newsroom for related images, video and press content
- Read the Lam blog
- Learn more about Dextro

About Lam Research
Lam Research Corporation is a global supplier of innovative wafer fabrication equipment and services to the semiconductor industry. Lam's equipment and services allow customers to build smaller and better performing devices. In fact, today, nearly every advanced chip is built with Lam technology. We combine superior systems engineering, technology leadership, and a strong values-based culture, with an unwavering commitment to our customers. Lam Research (Nasdaq: LRCX) is a FORTUNE 500® company headquartered in Fremont, Calif., with operations around the globe. Learn more atwww.lamresearch.com.

[1] The Global Semiconductor Talent Shortage, Deloitte, 2022

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