March 15, 2007

KLA-Tencor's New High-Resolution TeraScanHR System Takes Reticle Inspection to 45nm Node Production and Beyond

SAN JOSE, Calif.--(BUSINESS WIRE)--

KLA-Tencor, Inc. (NASDAQ:KLAC), the global leader in photomask inspection, introduces the TeraScanHR system, the industry's first production-capable 45nm-generation photomask inspection system. With significantly improved resolution required for the small defects and extremely complex OPC(1) of the 45nm node and beyond, coupled with extensive productivity gains, the TeraScanHR offers customers the compelling combination of the highest sensitivity for 45nm critical layer production, with a lower cost per inspection for less aggressive layers and chip generations.

"Our new TeraScanHR system provides photomask manufacturers with a remarkable new set of technological and economic capabilities that enable cost-effective production use across multiple generations of photomasks, from the extraordinarily complex 45nm photomasks to current and older-generation designs such as 65nm and 90nm," said Harold Lehon, vice president and general manager of KLA-Tencor's Reticle and Photomask Inspection Division. "The superior resolution of this new system also enables OPC designers to more fully utilize highly complex OPC shapes with very small dimensions and spacings, in order to improve manufacturing process windows and increase the device density of current and future designs."

Comprehensive evaluation at customer sites has proven the system's ability to inspect all of the latest photomask types and complex OPC shapes characteristic of 45nm-generation photomasks, as well as providing superior ultra-small defect detection in both die-to-die and die-to-database inspection modes. The newly developed system is highly configurable with a broad range of pixel sizes; this flexibility gives customers the ability to optimize productivity and cost-effectiveness in day-to-day production across several chip generations. KLA-Tencor has already shipped multiple TeraScanHR systems, and has received orders from all leading-edge merchant photomask suppliers, as well as logic, memory and foundry IC manufacturers for 45nm pre-production and 32nm development and demonstration.

Mathias Kamolz, Managing Director, Advanced Mask Technology Center (AMTC) in Dresden, Germany, said, "The new TeraScanHR inspection system enables the AMTC to deliver high-quality 45nm photomasks to our leading edge wafer fab customers. The system has shown higher productivity for inspection of 65nm and 90nm masks and its reflected light capabilities are important in our ability to help customers manage the difficult jump to 45nm and ultimately to 32nm."

The TeraScanHR features a new image acquisition system with high NA, ultra-low aberration optics, a new high-precision autofocus capability, and an improved stage with lower vibration; combined, these features result in imaging performance unmatched in the industry. In addition, new database modeling algorithms significantly improve the handling of complex OPC shapes, for higher defect sensitivity and a lower rate of nuisance and false detections. Integrating the latest generation of supercomputer technology, the system operates with higher throughput when using the highest-quality inspection modes, leading to faster reticle delivery and faster ramping of new chip designs.

About KLA-Tencor: KLA-Tencor is the world leader in yield management and process control solutions for semiconductor manufacturing and related industries. Headquartered in San Jose, California, the Company has sales and service offices around the world. An S&P 500 company, KLA-Tencor is traded on the NASDAQ Global Select Market under the symbol KLAC. Additional information about the Company is available at http://www.kla-tencor.com.

TeraScanHR Technology Summary

Designed to handle the demands of the 45nm node, with its small linewidths and complex OPC, the TeraScanHR system features higher imaging resolution and precise database modeling for high defect detection sensitivity and low false detections in both die-to-die and die-to-database modes. The system has higher-speed image processing for improved productivity when using integrated illumination modes (e.g. transmitted + reflected) which are required to achieve the highest quality photomasks for 45nm, as well as some 65nm layers and designs.

The system can be configured to cost effectively inspect critical and non-critical photomasks across many device generations. Its larger pixels permit faster scan times for 130nm to 65nm nodes while the highest resolution 72nm pixel is aimed at 45nm and below photomasks.

New Inspection Technology

The TeraScanHR introduces new optical imaging sub-systems and a new 72nm pixel to resolve small OPC structures, small lines and spaces, and small defects.

```
    --  Higher NA optics with ultra-low aberration elevates imaging
        performance to new levels.

    --  A new autofocus subsystem reduces error and improves imaging
        uniformity for the tighter depth of focus of the high NA
        optics. This autofocus uses a separate beam and a pre-mapping
        technique to maintain proper focus on the photomask surface
        while compensating for photomask flatness, bow, tilt,
        vibration, thermal effects, etc. The autofocus system also
        enables the tool to maintain proper focus on complex
        photomasks with significant topology, such as etched quartz
        and tri-tone mask types.

    --  TeraScanHR systems can be configured with multiple pixel sizes
        so a larger pixel can be selected for faster scan times when a
        less sensitive inspection is desired, thus improving
        productivity.

    Highly Accurate Database Modeling
```

In the die-to-database inspection mode, sophisticated new database modeling algorithms ensure that the database image precisely matches the optical image and provides highly accurate modeling of small OPC structures. This allows the system to maintain high sensitivity and low false detections for product photomasks, not just simple test photomasks. (Previous-generation systems often must inspect complex OPC with reduced detector settings in order to avoid excessive false detections; this results in reduced overall defect detection performance.)

New Computing Capabilities

The newest Tera Image Supercomputer features higher speed processors and up to 2x the number of processors compared with the previous systems, thus providing significant gains in computational power. This additional processing power dramatically improves scan time for processing-intensive modes such as the integrated T+R mode (see below), enabling a much more cost-effective, comprehensive inspection than the previous system and achieving a more cost-effective, high-quality photomask manufacturing flow.

Fast Transmitted and Reflected Illumination Modes

Transmitted illumination mode (T) has been traditionally used for inspection; however, reflected illumination (R) has become a requirement at 65nm and beyond to ensure that all defects are detected with the best sensitivity possible. For example, reflected light mode can better detect some defect types, such as pinholes, clear extensions, clear bridges, contamination, etc. Furthermore, reflected illumination mode improves performance for clear SRAF designs which are becoming increasingly common for the advanced mask generations.

The TeraScanHR system's fully integrated transmitted plus reflected ("T+R") mode provides the highest quality inspection in both die-to-die and die-to-database modes. Both T and R inspection modes are now integrated into a single inspection with one setup and scan for an efficient operation. While the T+R mode was available on prior-generation systems, the TeraScanHR's new supercomputer offers much faster T+R inspection for significant productivity gains, making this a cost-effective inspection mode.

Production Economics

While previous generation systems offered reflected light capability, in many cases it was too slow to be cost effective, leaving photomask manufacturers without a viable solution for many advanced photomasks. The new "Fast T+R" modes of the TeraScanHR now provide photomask manufacturers the opportunity to cost-effectively improve the detection of clear defects, thereby improving photomask quality.

The TeraScanHR system can be configured into many different models to best match the inspection needs and economics of each user. Different models offer a range of features, including various mode, sensitivity, and speed configurations. Beginning with the lowest-priced models aimed at older-generation wafer fabs, customers can incrementally add capability leading to the fully configured die-to-database models for the most advanced reticle manufacturers in pre-production of 45nm generation photomasks. Field upgrades are available to add capability as needs change; for example, a user with a system configured for the 130nm generation can easily upgrade it to 90nm, then 65nm, and then 45nm.

Alternatively, a user can start with a lower-cost STARlight mode, and then upgrade the STARlight capability to 65nm mode re-qualification with the current 90nm pixel. Further upgrades can be easily added to achieve die-to-die, and then die-to-database mode inspection. Similarly, a slower speed system can be the starting point, with additional speed increments added to the system as volume ramps.

(1)OPC = optical proximity correction

Source: KLA-Tencor, Inc.