KLA TENCOR CORP
Form 10-K
August 20, 2007
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UNITED STATES

SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 10-K

(Mark One)

x **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the Fiscal Year Ended June 30, 2007

OR

¨ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the Transition Period from to

Commission File No. 0-9992

KLA-TENCOR CORPORATION

(Exact Name of Registrant as Specified in its Charter)

Delaware	**04-2564110**
(State or Other Jurisdiction of	**(I.R.S. Employer**

Incorporation or Organization)	Identification Number)
160 Rio Robles, San Jose, California	**95134**
(Address of Principal Executive Offices)	**(Zip Code)**

Registrant s Telephone Number, Including Area Code: (408) 875-3000

Securities Registered Pursuant to Section 12(b) of the Act:

Title of Each Class	Name of Each Exchange on Which Registered
Common Stock, $0.001 par value per share	**The NASDAQ**
Common Stock Purchase Rights	**Stock Market LLC**

Securities Registered Pursuant to Section 12(g) of the Act:

None

(Title of Class)

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ¨ No x

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes ¨ No x

Indicate by check mark whether the registrant: (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes x No ¨

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of registrant s knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. x

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, or a non-accelerated filer. See definition of accelerated filer and large accelerated filer in Rule 12b-2 of the Exchange Act.

Large accelerated filer x Accelerated filer ¨ Non-accelerated filer ¨

Indicate by checkmark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ¨ No x

The aggregate market value of the voting and non-voting common stock held by non-affiliates of the registrant based upon the closing price of the registrant s stock, as of December 31, 2006, was $6.8 billion. Shares of common stock held by each officer and director and by each person or group who owns 5% or more of the outstanding common stock have been excluded in that such persons or groups may be deemed to be affiliates. This determination of affiliate status is not necessarily a conclusive determination for other purposes.

The registrant had 193,153,711 shares of common stock outstanding as of July 31, 2007.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the Proxy Statement for the 2007 Annual Meeting of Stockholders to be held on November 15, 2007 (Proxy Statement), and to be filed pursuant to Regulation 14A within 120 days after the registrant s fiscal year ended June 30, 2007, are incorporated by reference into Part III of this report.

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SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This report contains certain forward-looking statements within the meaning of Section 27A of the Securities Act of 1933 and Section 21E of the Securities Exchange Act of 1934. All statements other than statements of historical fact may be forward-looking statements. You can identify these and other forward-looking statements by the use of words such as may, will, could, would, should, expects, plans, anticipates, relies, believes, estimates, predicts, intends, potential, continue, or the negative of such terms, or other comparable terminology. Forward-looking statements also include the assumptions underlying or relating to any of the foregoing statements. Such forward-looking statements include, among others, forecasts of the future results of our operations; the percentage of spending that our customers allocate to process control; orders for our products and capital equipment generally; sales of semiconductors; the allocation of capital spending by our customers; growth of revenue in the semiconductor industry, the semiconductor capital equipment industry and business; technological trends in the semiconductor industry; the future impact of the restatement of our historical financial statements, shareholder litigation and related matters arising from the discovery that we had retroactively priced stock options (primarily from July 1, 1997 to June 30, 2002) and had not accounted for them correctly; our future product offerings and product features; the success and market acceptance of new products; timing of shipment of backlog; the future of our product shipments and our product and service revenues; our future gross margins; the future of our selling, general and administrative expenses; international sales and operations; maintenance of our competitive advantage; success of our product offerings; creation and funding of programs for research and development; attraction and retention of employees; results of our investment in leading edge technologies; the effects of hedging transactions; the effect of the sale of trade receivables and promissory notes from customers; our future income tax rate; dividends; the completion of any acquisitions of third parties, or the technology or assets thereof; benefits received from any acquisitions and development of acquired technologies; sufficiency of our existing cash balance, investments and cash generated from operations to meet our operating and working capital requirements; and the adoption of new accounting pronouncements.

Our actual results may differ significantly from those projected in the forward-looking statements in this report. Factors that might cause or contribute to such differences include, but are not limited to, those discussed in Item 1A, Risk Factors as well as in Item 1, Business and Item 7, Management s Discussion and Analysis of Financial Condition and Results of Operations in this Annual Report on Form 10-K. You should carefully review these risks and also review the risks described in other documents we file from time to time with the Securities and Exchange Commission, including the Quarterly Reports on Form 10-Q that we will file in the fiscal year ending June 30, 2008. You are cautioned not to place undue reliance on these forward-looking statements, and we expressly assume no obligation to update the forward-looking statements in this report after the date hereof.

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PART I

ITEM 1. BUSINESS

The Company

KLA-Tencor Corporation (KLA-Tencor or the Company and also referred to as we or our) is the world s leading supplier of process control ar yield management solutions for the semiconductor and related microelectronics industries. Our products are also used in a number of other industries, including wafer manufacturing and data storage.

Within our primary area of focus, our comprehensive portfolio of products, services, software and expertise helps integrated circuit (IC) manufacturers manage yield throughout the entire fabrication process from research and development to final volume production. These products and solutions are designed to help customers accelerate their development cycles, bring their fabs to production more quickly and achieve higher and more stable yields.

KLA-Tencor s products and services are used by virtually every major wafer, IC and photomask manufacturer in the world. These customers turn to us for inline wafer defect monitoring; reticle and photomask defect inspection; critical dimension (CD) metrology; wafer overlay metrology; film and surface measurement; and overall yield and fab-wide data analysis. Our advanced products, coupled with our unique yield technology services, allow us to deliver the yield management solutions our customers need to accelerate their yield learning rates, reduce their yield excursion risks and adopt industry-leading yield management practices.

KLA-Tencor Corporation was formed in April 1997 through the merger of KLA Instruments Corporation and Tencor Instruments, two long-time leaders in the semiconductor equipment industry, each with over 20 years of experience. KLA Instruments Corporation was incorporated in Delaware in 1975; Tencor Instruments was incorporated in California in 1976. Effective April 30, 1997, a wholly owned subsidiary of KLA Instruments Corporation merged into Tencor Instruments, and Tencor Instruments became a wholly owned subsidiary of KLA Instruments Corporation. Immediately following this merger, KLA Instruments Corporation changed its name to KLA-Tencor Corporation.

Additional information about KLA-Tencor is available on our web site at www.kla-tencor.com. We make available free of charge on our web site our Annual Report on Form 10-K, our Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended, as soon as reasonably practicable after we electronically file them with or furnish them to the Securities and Exchange Commission (SEC). Information contained on our web site is not part of this Annual Report on Form 10-K or our other filings with the SEC. Additionally, these filings may be obtained by visiting the Public Reference Room of the SEC at 100 F Street, NE, Washington, DC 20549 or by calling the SEC at 1-800-SEC-0330, by sending an electronic message to the SEC at publicinfo@sec.gov or by sending a fax to the SEC at 1-202-777-1027. In addition, the SEC maintains a website (www.sec.gov) that contains reports, proxy and information statements, and other information regarding issuers that file electronically.

Industry

General Background

The semiconductor or integrated circuit (IC or chip) industry is KLA-Tencor s core focus. The semiconductor fabrication process begins with a bare silicon wafer a round disk that is six, eight or twelve inches in diameter, about as thick as a credit card and gray in color. The process of manufacturing wafers is itself highly sophisticated, involving the creation of large ingots of silicon by pulling them out of a vat of molten silicon. The ingots are then sliced into wafers and polished to a mirror finish.

The manufacturing cycle of an IC is grouped into three phases: design, fabrication and testing. IC design involves the architectural layout of the circuit, as well as design verification and photomask or reticle generation.

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The fabrication of a chip is accomplished by depositing a series of film layers that act as conductors, semiconductors or insulators. The deposition of these film layers is interspersed with numerous other process steps that create circuit patterns, remove portions of the film layers, and perform other functions such as heat treatment, measurement and inspection. Most advanced chip designs require hundreds of individual steps, many of which are performed multiple times. Most chips consist of two main structures: the lower structure, typically consisting of transistors or capacitors, which performs the smart functions of the chip; and the upper interconnect structure, typically consisting of circuitry which connects the components in the lower structure. When all of the layers on the wafer have been completed, each die on the wafer is then tested for functionality.

Current Trends

Companies that anticipate future market demands by developing and refining new technologies and manufacturing processes are better positioned to lead in the semiconductor market. During past industry cycles, semiconductor manufacturers generally contended with one key new technology or market trend, such as a specific design rule shrink. In today s market, the leading semiconductor manufacturers are investing in bringing a multitude of new technologies into production at the same time, including new substrate and film materials and advanced lithography techniques.

While many of these technologies have been adopted at the development and pilot production stages, significant challenges and risks associated with each technology have affected their adoption into full-volume production. For example, as design rules decrease, yields become more sensitive to the size and density of defects, while device performance characteristics (namely speed or capacity) become more sensitive to such parameters as linewidth and film thickness variation. New process materials, such as high-k dielectrics, silicon-on-insulator (SOI) wafers and immersion lithography-capable photoresists require extensive characterization before they can be used in the manufacturing process. Moving several of these advanced technologies into production at once only adds to the risks that chipmakers face.

The continuing evolution of semiconductor devices to smaller geometries and more complex multi-level circuitry has significantly increased the cost and performance requirements of the capital equipment used to manufacture these devices. Construction of an advanced wafer fabrication facility today can cost over $3 billion, substantially more than previous generation facilities. As a result, chipmakers are demanding increased productivity and higher returns from their manufacturing equipment.

By developing new process control and yield management tools that help chipmakers accelerate the adoption of these new technologies into volume production, we enable our customers to better leverage these increasingly expensive facilities, reduce their production costs and significantly improve their return on investment (ROI). Once customers production lines are operating at high volume, our tools help ensure that yields are stable and process excursions are identified and quickly resolved. Historically, the move to each new generation s smaller design rules has increased in-process variability and thus has often required increased inspection and metrology sampling.

With our broad portfolio of application-focused technologies and our dedicated yield technology expertise, we are in position to be a key supplier of comprehensive yield management solutions for customers next-generation products, including those required for the 45nm generation and beyond.

Our Process Control and Yield Acceleration Solutions

Accelerating the yield ramp and maximizing production yields of high-performance devices are key goals of modern semiconductor manufacturing. Ramping to high-volume production ahead of competitors can dramatically increase the revenue an IC manufacturer realizes for a given product. KLA-Tencor systems not only analyze defectivity and metrology issues at critical points in the wafer, photomask and IC manufacturing processes, but also provide information to our customers so that they can identify and address the underlying process problems. The ability to locate the source of defects and characterize process issues enables our

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customers to improve control over their manufacturing processes, so they can increase their yield of high-performance parts thus maximizing their profit.

Products

KLA-Tencor operates primarily in one segment for the design, manufacture and marketing of process control and yield management systems for the semiconductor and related microelectronics industry. We also currently offer products that serve the wafer manufacturing, data storage and other industries. We design, market, manufacture and sell our equipment consisting of patterned and unpatterned wafer inspection, optical overlay metrology, electron-beam (e-beam) review, reticle and photomask inspection, and film and surface measurement tools as well as our advanced yield analysis and defect classification software to provide fab-wide yield management solutions. These solutions are optimized for the manufacturing process cells used in IC production, including lithography, deposition, etch, and chemical mechanical planarization (CMP). Our offerings can be broadly categorized into four groups: Defect Inspection; Metrology; product related services; and Software. For our customers manufacturing larger design-rule devices, we provide refurbished KLA-Tencor Certified tools along with warranty and support.

Defect Inspection

KLA-Tencor s defect inspection tools allow our customers to detect, count, classify and characterize yield failures caused by particles, pattern defects, surface anomalies and electrical issues during all stages of the IC manufacturing process. Our portfolio of tools enables our customers to ramp their production lines faster by finding new defect types during development and ramp, and to maintain high and stable yields by monitoring defect count by type during production.

Defect inspection is especially critical as our customers move to production of 65nm design-rule devices, and begin development of the 45nm node. The number of yield-relevant defects increases as semiconductor process tolerances (process windows) become tighter, a result of smaller, more densely packed semiconductor circuit patterns. Also, new defect types and yield issues arise from the necessary introduction of innovative materials, device structures and lithography techniques. As a result, chip manufacturers need to inspect more wafers per lot, more process layers and more area on the wafer, at higher sensitivities. KLA-Tencor supplies a wide portfolio of high performance inspection, classification and analysis systems that enable our customers to solve their toughest yield issues.

High-Sensitivity Broadband Brightfield Inspection

Brightfield inspection systems provide benchmark sensitivity to small defects, and capture the greatest range of defect types, which becomes increasingly important as our customers move to 45nm and smaller production. Our 2800 Series brightfield inspection system has been widely adopted at leading-edge memory, logic and foundry fabs worldwide, because it delivers the sensitivity and production-worthy performance that chipmakers need to produce market-leading devices. Key to the 2800 inspection system s success is the industry s only full-spectrum broadband light source, spanning deep ultraviolet to visible wavelengths. With the ability to tune its wavelength and employ various optical modes and algorithms, the 2800 inspection system provides sensitivity to an unequalled range of defect types throughout the chip manufacturing process. In June 2007 we introduced the newest additions to our 28xx product series, the 2810 and 2815. Targeting the 45nm node, these are the first inspection systems designed specifically for memory or logic applications. The 2810 and 2815 have twice the computing speed of the 2800 and new optical modes that enable increased defect capture.

High-Performance Darkfield Inspection

Darkfield inspection systems are used to cost effectively monitor process tools for defect yield excursions. Our widely-adopted Puma Series darkfield inspection platform leverages our patented Streak

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laser imaging technology to produce the highest sensitivities at production throughputs of any darkfield inspection system on the market. Combining advanced UV-laser illumination optics with a solid-state sensor to image the scattered light, Streak is scalable for multiple technology generations.

In September 2006, we introduced the Puma 9110 and 9130. The Puma 91xx platform builds on the advantages of the Puma 9000, with double its throughput, as well as greater sensitivity and ease of use. In June 2007, we added to the 91xx family by introducing the Puma 9150, which features enhancements that further increase the range of defect types that the system can capture.

High Resolution Electron Beam Review and Classification

Once a defect has been identified, a chipmaker must be able to review and classify the defect in order to identify and address the cause of the defect. As chipmakers moved to the 45nm node, however, inspection tools were identifying defects that fell below the resolution limit of the review tools commercially available at that time. To address this situation, we re-entered the defect review and classification market by introducing the eDR-5200 in early July 2007. The eDR-5200 features a lens system that delivers a significant improvement in resolution, meeting production and process development requirements for advanced design-rule semiconductor devices. Unique connectivity technology between the eDR-5200 and our market-leading inspection systems provides additional benefits to our customers with respect to defect re-detection, classification and speed. Because the eDR-5200 was introduced after the end of the fiscal year covered by this Annual Report on Form 10-K, sales of this product are not reflected in the financial statements included in this report.

Wafer and Film Surface Inspection

All chipmakers extensively utilize inspection tools to detect defects on blanket (unpatterned) films and bare wafer surfaces. Our Surfscan SP2 and Surfscan® SP2^{XP} products are designed to detect those types of defects.

Unpatterned Wafer and Film Surface Inspection: For certain types of inspection, such as the qualification of new process tools, periodic checks of process tools already in production, or qualification of process tools after maintenance, chipmakers may prefer to use bare or blanket-film wafers instead of patterned wafers. The Surfscan SP2 incorporates UV illumination technology to significantly enhance inspection sensitivity and speed on IC films, as well as both traditional silicon and engineered substrates. The Surfscan SP2 is capable of detecting defects as small as 30nm at higher throughputs than that of the previous-generation Surfscan SP1^{DLS} inspection system.

Bare Wafer Surface Inspection*:* The wafer substrate is the foundation of an integrated circuit. Having a defect-free wafer substrate is essential, since defects on the surface of the wafer can adversely affect subsequent semiconductor processes, and ultimately impact IC performance. In January 2007 we introduced the Surfscan SP2^{XP}, a system which has the speed and sensitivity of the Surfscan SP2, plus a new optical subsystem that allows the tool to distinguish between inherent defects in the silicon crystal which can kill transistors and thus require scrapping the wafer and other defect types that may be eliminated through cleaning or re-polishing the wafer. The Surfscan SP2^{XP} provides wafer manufacturers with the ability to scrap fewer wafers, enhancing their profitability. This tool has been adopted by all major wafer manufacturers worldwide.

Electron-Beam Inspection

For advanced IC manufacturing, e-beam inspection is essential not only during IC development, where the highest sensitivity is needed to discover defects, but also in production, where dedicated systems are required to monitor key process steps for defect excursions. Only e-beam technology can find the smallest physical defects and the subtle electrical defects that plague customers as they introduce new materials and device structures at the 65nm and 45nm nodes.

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In February 2006, we introduced the latest addition to our eS3x series of e-beam inspection systems the eS32A single system spanning development and production applications, the eS32 e-beam inspection system provides the best sensitivity at throughput for defect types that optical systems cannot find.

Macro Defect Inspection for Wafer Dispositioning

Advanced fabs require accurate and rapid disposition decision making during manufacturing, as well as quick assessment of tool and process module output. Operators have historically performed this task by visually inspecting a small sample of wafers for macro defects under a manual or semi-automated light microscope. However, advanced 300mm manufacturing, with large wafer surfaces, smaller device features and factory automation, challenges the ability of the operator to assess wafers and lots in a reliable and repeatable manner. These conditions place large quantities of valuable wafers at risk.

In May 2006, we introduced the Viper 2435XP automated 300mm wafer and tool dispositioning system, which captures a broad range of defect types at very high throughput enabling inspection of 100% of wafer lots. Delivering quick go/no-go decisions, the system enables fab engineers to take corrective action early, when wafers can be reworked or process tool problems can be repaired before additional lots are put at risk. Viper 2435XP can be integrated rapidly and seamlessly into a production environment in the lithography, CMP, etch, and films process modules.

Wafer Edge Inspection

As customers move to smaller design rules and new, more complex material stacks, the high stress wafer edge region has become a source of yield-limiting defects. Material at the edge of the wafer can flake off and fall onto the regions where the chips are being built, causing loss of yield. The recent introduction of immersion lithography adds to the potential for flakes to migrate and cause yield loss, since the flakes can be transported by the immersion fluid.

To help customers identify and fix these edge-related yield issues, KLA-Tencor introduced the VisEdge CV300, in October 2006. The tool s unique optics design and advanced defect classification capabilities allow IC manufacturers to capture a wide range of wafer-edge defect types with high sensitivity.

Reticle Inspection

Reticles are high-precision quartz plates that contain microscopic images of electronic circuits. Placed into steppers or scanners, reticles are used to transfer circuit patterns onto wafers to fabricate ICs. It is extremely important that these features are printed correctly on the reticles; very small variations in line width or placement, or defects within or adjacent to these structures, can cause devastating yield loss in the printed die.

In 2007, we introduced the TeraScanHR reticle inspection system, which provides unique defect-detection and productivity features that enable the production of defect-free reticles. The new system includes higher resolution optical imaging and several new inspection modes that enable the system to find all types of reticle defects. The TeraScanHR system s high sensitivity, improved productivity, and flexible configurations make it a cost-effective solution that meets the needs of reticle manufacturers.

IC wafer fabs use the STAR*light*-2 inspection system to qualify incoming reticles for use in IC production, and also to re-check the reticle periodically as it is used in production. Based on the TeraScan platform, STAR*light-2* offers high sensitivity to contamination, progressive defects (crystals which grow on the reticles over time), and the damage from electrostatic discharge.

Process Window Qualification

Reticles used in the manufacture of today s advanced ICs incorporate complex techniques that enable lithographers to extend existing lithographic processes to print features smaller than the wavelength of light

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used a process called sub-wavelength lithography. These techniques reduce the size and fine-tune the shape of features on the wafer. During the photolithography patterning process, marginal designs can print as out-of-focus features or not print at all, creating open circuits that translate to electrical failures within the device. However, since these errors represent design marginalities rather than physical defects on the reticle, they cannot be caught using traditional reticle inspection.

Our Process Window Qualification (PWQ) solution enables device manufacturers to identify reticle design marginalities by examining the wafer for poorly printed features using our broadband brightfield wafer inspection systems, so the manufacturers can then make more informed decisions about how closely they will operate near the boundaries of the process window, and how to address any design marginalities resulting from that decision.

Transparent Film and Opaque Substrate Inspection

Understanding the optical surface properties of modern materials has become a critical part of manufacturing. With the increasing complexity of manufacturing processes and products comes the need for extremely precise analysis and control of surface properties such as film thickness uniformity, contamination and defectivity, often in real time and online. The Candela CS20 Optical Surface Analyzer automatically detects and classifies surface defects on optoelectronic and semiconductor wafers, including wafers made of transparent materials such as sapphire and glass. By simultaneously measuring reflectivity and topographic variations on the surface, these systems enable customers to inspect epitaxial layers and film coatings for uniformity issues and defects.

Metrology

Metrology is a critical discipline in the production of high performance, reliable devices. Whether verifying that a design will be manufacturable, characterizing a new process, or monitoring high-volume manufacturing, our comprehensive set of metrology, analysis and process window optimization products gives IC manufacturers the ability to maintain tight control of their processes.

Optical Overlay Metrology

Decreasing linewidths, larger die sizes and increasing chip density all affect the tolerances for layer-to-layer alignment, or *overlay*. Mis-registration errors represent a crucial cause of yield loss. Today s lithography scanners or steppers require in-line monitoring to ensure layer-to-layer alignment is within-spec. These advanced lithography systems also require regular maintenance and performance tests to ensure they are meeting process requirements. Overlay metrology systems verify scanner or stepper performance by measuring the pattern alignment between adjacent layers of the chip, as it is built.

In 2006, we introduced the Archer 100 Overlay Control System, based on the industry-proven Archer platform. Fully redesigned optics, tighter stage tolerances, and new imaging and illumination modes combine to deliver the high levels of performance and productivity needed to address increasingly tighter overlay error budgets.

CD Metrology

The critical dimension (CD) is the smallest intended linewidth for a given device. While a useful measurement for previous-generation devices, traditional CD measurements no longer provide all the information that chipmakers need to accurately predict yield and transistor performance. Instead, complete profile information, including the width at the top and bottom of the feature, the sidewall angle and the height or depth of the feature, are needed. For this reason, CD control in the fab is increasingly changing from traditional CD-SEM (scanning electron microscope) measurements to optical CD.

In 2006, we introduced the SpectraCD-XT our fourth-generation of inline optical CD metrology systems for advanced patterning process control. The SpectraCD-XT is a non-destructive, dedicated CD and

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profile metrology system built on our high-throughput, production-proven Archer platform. With a move-acquire-measure (MAM) time under two seconds and a throughput of over 100 wafers per hour, the SpectraCD-XT leads the industry in productivity, allowing chipmakers to detect even the smallest profile excursions rapidly and repeatably.

Film Measurement

Our film metrology systems measure a variety of optical and electrical properties of thin films deposited on a wafer. These systems are used to control a wide range of wafer fabrication steps, where both within-wafer and wafer-to-wafer process uniformity are critical to achieving high device performance at low cost.

SpectraFx 200, our seventh-generation thin-film metrology system, builds upon our expertise in spectroscopic ellipsometry (SE) to measure the thickness and optical properties of complex, multi-layer film stacks. SpectraFx 200 introduces new technology to extend the measurement results from patterned targets to predict in-die process variation. This technique enables IC manufacturers to achieve cost-effective production control over their advanced film processes at the 65nm node and below.

Contamination Monitoring

One of the key parts of a transistor is called the gate, and the quality of the dielectric that comprises it is critical to the overall speed and reliability of the IC device. In today s devices, gate dielectric films have become so thin that their electrical performance characteristics are as critical as their physical characteristics in determining overall transistor performance. Our Quantox product line provides non-contact, inline electrical performance measurements of key parameters that determine the quality of advanced gate dielectric films, including contamination and oxide thickness, as well as electrical capacitance and leakage. Our latest Quantox XP system provides information on both the physical and electrical properties of advanced gate dielectric materials. Quantox data from the gate dielectric has shown high correlation to electrical test data on the finished device. This correlation enables chipmakers to predict transistor performance inline, rather than having to wait until an end-of-line electrical test a process that normally takes days or weeks to complete.

Implant Metrology

KLA-Tencor now offers implant and anneal micro-uniformity monitoring with the Therma-Probe® solution. Therma-Probe is the industry standard for implant dose metrology. With its advances in modulated optical reflectance, Therma-Probe provides dose measurements for in-line monitoring, including anneal and ultra-shallow junction (USJ) depth profiling. The system contributes to higher yield by monitoring for process excursions.

Substrate & Surface Metrology

At the 45nm node and below, small deviations in wafer shape such as bow, warp and edge roll-off can translate to intolerable errors in the IC s critical dimensions and layer-to-layer alignment. With our acquisition of ADE Corporation, we are well positioned to provide the wafer shape metrology equipment required by both wafer and IC manufacturers, for the 45nm node and beyond.

WaferSight and NanoMapper are high-precision surface mapping systems for bare wafers, based on optical interferometry. The WaferSight system measures full-wafer dimensional parameters such as flatness, bow and thickness. These measurements are made on every advanced bare wafer shipped to fabs, to ensure it meets the stringent requirements of advanced lithography and chemical mechanical polishing (CMP). NanoMapper provides whole-wafer nanotopography measurements for polished wafer surfaces with sub-nanometer height sensitivity. NanoMapper also includes interactive 3D graphics and analysis software, allowing rapid visualization and quantification of nanotopography effects, for faster process development and precision process control during production.

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In substrate and media manufacturing, we offer metrology and defect inspection solutions with our Candela and ADE series of optical and magnetic inspection systems. Our Candela 6100 and 6300 series patented X-beam optical surface analyzers are the industry leaders in defect sensitivity and characterization for substrate and media manufacturing. Those products are now complemented by certain products that we acquired from ADE, such as the MicroXam and OptiFLAT optical interferometers for disk flatness and waviness metrology, as well as the magnetic products that provide critical metrology for perpendicular magnetic recording process control, including the Diskmapper® M3.

Our stylus profilers measure the surface topography of films and etched surfaces, and are used in basic research and development as well as semiconductor production and quality control. We also offer the P-16+ benchtop contact stylus profiler, designed for automated step height, surface contour, waviness and roughness measurements, with detailed 2D and 3D topographic analysis of a variety of surfaces and materials.

Process Metrology Systems

KLA-Tencor now offers specialized, instrumented substrates that measure a wafer s response to the process inside the process chamber, while the process is occurring. These metrology wafers measure the temperature variation of the process over time, to optimize, troubleshoot and monitor complex processes, such as plasma etch. Other measurement parameters are also available, including plasma monitoring. Both chipmakers and process equipment manufacturers use these wafers to visualize, diagnose and control their processes and process tools in a wide variety of applications.

Services

KLA-Tencor enables customers to maximize the performance and productivity of their metrology and inspection systems over the entire life cycle of a tool. We deliver yield management expertise spanning all technology nodes, and collaborate with customers to determine the best products and services to meet technology requirements and optimize cost of ownership. We help customers meet their production goals by maximizing tool uptime and performance with a menu of support services, unique expertise from local service engineers, worldwide spares and consumables depots, and round-the-clock tech support experts in our Online Support Centers accessed through our iSupport secure network. KLA-Tencor s Technology Engagement Services (TES) collaborates with customers to use effective recipes to improve baseline performance and avoid costly process errors, as well as extend the life of their installed base and determine when new tools and upgrades would be beneficial.

Software and Other

Our productivity and analysis solutions translate inspection and metrology data into consolidated information that can reveal process problems and help semiconductor manufacturers develop long-term yield improvement strategies.

Yield Management & Analysis Solutions

Klarity Defect® is an automated inline defect analysis module and defect data management system designed to help fabs achieve faster yield learning cycles. By identifying excursions in real time, Klarity Defect enables fabs to embed expert decision-making processes within analysis recipes. These processes are automatically triggered when user-specified events occur. In addition to freeing fab engineers from repetitive analysis tasks, this capability dramatically improves fab operating efficiency by providing relevant information in less time and with less effort for faster identification of yield problems.

Our Klarity ACE yield analysis solution enables fast integration, correlation and analysis of yield- and process-related data to accurately determine the source of defects and process excursions. It can differentiate between random and systematic yield problems, providing users with the data they need in order to take appropriate corrective measures.

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Klarity SSA (Spatial Signature Analysis) provides automated classification and root cause analysis of spatial signatures defect clusters and patterns that indicate a potential out-of-spec process or process tool problem. Klarity SSA can be utilized for a variety of applications where enhanced excursion detection is needed, including process line and tool monitoring, as well as engineering analysis.

FabVision is a real-time, fab-wide data management system that continuously monitors, reports and manages product quality information. Alerts on process excursions, daily reports and selected data are generated and sent automatically worldwide to better manage operations at the fab, process or customer level. The integrated database enables quick analysis and response to customers inquiries about product history and quality. With real-time production information, the FabVision system provides management, engineering and operations with the capability to proactively detect process excursions that can lead to yield loss.

Our ProDATA lithography data analysis tool, along with our PROLITH lithography and etch optimization tool, helps manufacturers reduce their advanced lithography development time and cost, as well as optimize their design-for-manufacturing (DFM) efforts.

Our iDO (inline Defect Organizer) automated defect classification (ADC) solution provides consistent and accurate classification of yield-limiting defects to help our customers accelerate their ramp to higher process yields. iDO uses an intuitive decision-tree format to split classification into a series of logical steps. Leveraging local defect geometry for improved performance, iDO works with KLA-Tencor defect inspection, review and data analysis systems for excursion monitoring, excursion problem resolution, and baseline yield improvement.

Our Archer Analyzer software provides critical post processing of overlay data into information which indicates appropriate corrective action for the relevant process tool. This function is increasing in importance with sub-65nm design rules, immersion lithography and double patterning lithography.

Computational Lithography

As customers move to smaller design rules, they must print very small features and complex patterns. The resolution required to create these features is more than today s lithography scanners can provide directly, because the features are smaller than the wavelength of the light used to create them. In order to increase the effective resolution of the process, our customers are using reticle enhancement techniques (RETs) such as Optical Proximity Correction (OPC) and Sub-Resolution Assist Features (SRAF).

Introduced in May 2007, our LithoWare lithography optimization tool analyzes design layout constraints, as well as the manufacturing process variability of focus and exposure during lithography. Systematic errors in these areas can create either open circuits that translate to electrical failures, or geometric variations that result in speed and performance issues within the device. LithoWare is designed to reduce the time and cost required to develop RET and OPC processes.

Customers

To support our growing, global customer base, we maintain a significant presence throughout the United States, Europe, Asia-Pacific and Japan, staffed with local sales and applications engineers, customer and field service engineers and yield management consultants. We count among our largest customers the leading semiconductor manufacturers from each of these regions. In the fiscal years ended June 30, 2007, 2006 and 2005, no customer accounted for more than 10% of our total revenues.

Our business depends upon the capital expenditures of semiconductor manufacturers, which in turn is driven by the current and anticipated market demand for ICs and products utilizing ICs. We do not consider our business to be seasonal in nature, but it is cyclical with respect to the capital equipment procurement practices of semiconductor manufacturers, and it is impacted by the investment patterns of such manufacturers in different global markets. Downturns in the semiconductor industry or slowdowns in the worldwide economy could have a material adverse effect on our future business and financial results.

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Sales, Service and Marketing

Our sales, service and marketing efforts are aimed at building long-term relationships with our customers. We focus on providing a single and comprehensive resource for the full breadth of process control and yield management products and services. Customers benefit from the simplified planning and coordination, as well as the increased equipment compatibility, that are realized as a result of dealing with a single supplier. Our revenues are derived primarily from product sales, mostly through our direct sales force.

We believe that the size and location of our field sales, service and applications engineering, and marketing organizations represent a competitive advantage in our served markets. We have direct sales forces in the United States, Europe, Asia-Pacific and Japan. We maintain an export compliance program that is designed to fully meet the requirements of the United States Departments of Commerce and State.

As of June 30, 2007, we employed approximately 2,500 sales and related personnel, service engineers and applications engineers. In addition to sales and service offices in the United States, we conduct sales, marketing and services out of wholly-owned subsidiaries or branches of United States subsidiaries in other countries, including China, France, Germany, India, Israel, Italy, Japan, Malaysia, Singapore, South Korea, Taiwan, Thailand and the United Kingdom. International revenues accounted for approximately 76.3%, 79.9%, and 76.3% of our total revenues in the fiscal years ended June 30, 2007, 2006 and 2005, respectively. Additional information regarding our revenues from foreign operations for our last three fiscal years can be found in Note 14, Segment Reporting and Geographic Information to the Consolidated Financial Statements.

We believe that sales outside the United States will continue to be a significant percentage of our total revenues. Our future performance will depend, in part, on our ability to continue to compete successfully in Asia, one of the largest markets for our equipment. Our ability to compete in this area is dependent upon the continuation of favorable trading relationships between countries in the region and the United States, and our continuing ability to maintain satisfactory relationships with leading semiconductor companies in the region.

International sales and operations may be adversely affected by the imposition of governmental controls, restrictions on export technology, political instability, trade restrictions, changes in tariffs and the difficulties associated with staffing and managing international operations. In addition, international sales may be adversely affected by the economic conditions in each country. The revenues from our international business may also be affected by fluctuations in currency exchange rates. Although we attempt to manage the currency risk inherent in non-dollar sales through hedging activities, there can be no assurance that such efforts will be adequate. These factors could have a material adverse effect on our future business and financial results.

Backlog

Our backlog for system shipments and associated warranty totaled $1,060.8 million and $998.7 million as of June 30, 2007 and 2006, respectively. We include in our backlog only those customer orders for which we have accepted purchase orders and assigned shipment dates within twelve months from the date of order. Orders for service and unreleased products are excluded from the backlog. We expect to fill the present backlog of orders during fiscal year 2008; however, all orders are subject to cancellation or delay by the customer. Due to possible customer changes in delivery schedules or cancellation of orders, our backlog at any particular date is not necessarily indicative of actual sales for any succeeding period.

Research and Development

The market for yield management and process monitoring systems is characterized by rapid technological development and product innovation. These technical innovations are inherently complex and require long development cycles and appropriate professional staffing. We believe that continued and timely development of new products and enhancements to existing products are necessary to maintain our competitive position.

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Accordingly, we devote a significant portion of our human and financial resources to research and development programs and seek to maintain close relationships with customers to remain responsive to their needs. As part of our customer relationships, we may enter into certain strategic development and engineering programs whereby our customers offset certain of our research and development costs. As of June 30, 2007, we employed approximately 1,300 research and development personnel.

Our key research and development activities during fiscal year 2007 involved development of process control and yield management equipment for sub-65nm processing. For information regarding our research and development expenses during the last three fiscal years, including costs offset by our strategic development and engineering programs, see Item 7, Management s Discussion and Analysis of Financial Condition and Results of Operations in this Annual Report on Form 10-K.

In order to make continuing developments in the semiconductor industry, we are committed to significant engineering efforts toward both product improvement and new product development. New product introductions may contribute to fluctuations in operating results, since customers may defer ordering existing products. If new products have reliability or quality problems, those problems may result in reduced orders, higher manufacturing costs, delays in acceptance of and payment for new products, and additional service and warranty expenses. There can be no assurance that we will successfully develop and manufacture new products, or that new products introduced by us will be accepted in the marketplace. If we do not successfully introduce new products, our results of operations will be adversely affected.

Manufacturing, Raw Materials and Supplies

We perform system design, assembly and testing in-house and utilize an outsourcing strategy for the manufacture of components and major subassemblies. Our in-house manufacturing activities consist primarily of assembling and testing components and subassemblies that are acquired through third-party vendors and integrating those subassemblies into our finished products. Our principal manufacturing activities take place in San Jose and Milpitas, California, with additional significant operations in Migdal Ha Emek, Israel and Northtech, Singapore. As of June 30, 2007, we employed approximately 1,000 manufacturing personnel.

Many of the parts, components and subassemblies (collectively parts) that we use are standard commercial products, although certain parts are made to our specifications. We use numerous vendors to supply parts for the manufacture and support of our products. Although we make reasonable efforts to ensure that these parts are available from multiple suppliers, this is not always possible and certain parts included in our systems may be obtained only from a single supplier or a limited group of suppliers. We endeavor to minimize the risk of production interruption by selecting and qualifying alternative suppliers for key parts, by monitoring the financial condition of key suppliers, and by ensuring adequate inventories of key parts are available to maintain manufacturing schedules.

Although we seek to reduce our dependence on sole and limited source suppliers, in some cases the partial or complete loss of certain of these sources could disrupt scheduled deliveries to customers, damage customer relationships and have a material adverse effect on our results of operations.

Competition

The worldwide market for process control and yield management systems is highly competitive. In each of our product markets, we face competition from established and potential competitors, some of which may have greater financial, research, engineering, manufacturing and marketing resources than we have, such as Applied Materials, Inc. and Hitachi Electronics Engineering Co., Ltd. We may also face future competition from new market entrants from other overseas and domestic sources. We expect our competitors to continue to improve the design and performance of their current products and processes and to introduce new products and processes with

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improved price and performance characteristics. We believe that to remain competitive, we will require significant financial resources to offer a broad range of products, to maintain customer service and support centers worldwide, and to invest in product and process research and development.

Significant competitive factors in the market for process control and yield management systems include system performance, ease of use, reliability, installed base and technical service and support. We believe that, while price and delivery are important competitive factors, the customers overriding requirement is for systems that easily and effectively incorporate automated and highly accurate inspection and metrology capabilities into their existing manufacturing processes to enhance productivity.

Management believes that we are well positioned in the market with respect to both our products and services. However, any loss of competitive position could negatively impact our prices, customer orders, revenues, gross margins and market share, any of which would negatively impact our operating results and financial condition.

Acquisitions and Alliances

We continuously evaluate strategic acquisitions and alliances to expand our technologies, product offerings and distribution capabilities. Acquisitions involve numerous risks, including management issues and costs in connection with integration of the operations, technologies and products of the acquired companies, possible write-downs of impaired assets, and the potential loss of key employees of the acquired companies. The inability to manage these risks effectively could negatively impact our operating results and financial condition. Additional information regarding our business combinations during the fiscal year ended June 30, 2007 can be found in Note 5, Business Combinations to the Consolidated Financial Statements.

Patents and Other Proprietary Rights

We protect our proprietary technology through reliance on a variety of intellectual property laws, including patent, copyright and trade secret. We have filed and obtained a number of patents in the United States and abroad and intend to continue pursuing the legal protection of our technology through intellectual property laws. In addition, from time to time we acquire license rights under United States and foreign patents and other proprietary rights of third parties.

Although we consider patents and other intellectual property significant to our business, due to the rapid pace of innovation within the process control and yield management systems industry, we believe that our protection through patent and other intellectual property rights is less important than factors such as our technological expertise, continuing development of new systems, market penetration, installed base and the ability to provide comprehensive support and service to customers worldwide.

No assurance can be given that patents will be issued on any of our applications, that license assignments will be made as anticipated, or that our patents, licenses or other proprietary rights will be sufficiently broad to protect our technology. No assurance can be given that any patents issued to or licensed by us will not be challenged, invalidated or circumvented or that the rights granted thereunder will provide us with a competitive advantage. In addition, there can be no assurance that we will be able to protect our technology or that competitors will not be able to independently develop similar or functionally competitive technology.

Employees

As of June 30, 2007, we employed approximately 6,000 people. None of our employees are represented by a labor union. We have not experienced work stoppages and believe that our employee relations are good.

Competition is intense in the recruiting of personnel in the semiconductor and semiconductor equipment industry. We believe that our future success will depend, in part, on our continued ability to hire and retain qualified management, marketing and technical employees.

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ITEM 1A. RISK FACTORS

Our operating results and stock price have varied widely in the past, and our future operating results will continue to be subject to quarterly variations based upon numerous factors, including those listed in this section and throughout this Annual Report on Form 10-K. Our stock price will continue to be subject to daily variations as well. In addition, our future operating results and stock price may not follow any past trends.

We believe the factors that could make our results fluctuate and difficult to predict include:

the cyclical nature of the semiconductor equipment industry;

global economic uncertainty;

competitive pressures;

our ability to develop and implement new technologies and introduce new products;

our ability to maintain supply of key components;

our ability to manage our manufacturing requirements;

our reliance on services provided by third parties;

our customers acceptance and adoption of our new products and technologies;

our ability to protect our intellectual property;

litigation regarding intellectual property and other business matters;

our ability to attract, retain and replace key employees;

our ability to manage risks associated with acquisitions and alliances;

the amount of resources we are required to devote to compliance with securities laws and listing requirements;

worldwide political instability;

earthquake and other uninsured risks;

future changes in accounting and tax standards or practices;

changing legal and regulatory environment;

our exposure to fluctuations in foreign currency exchange rates;

our ability to successfully modify new systems and guard against computer viruses; and

our ability to continue to successfully address and resolve all issues arising from the discovery that we had retroactively priced stock options (primarily from July 1, 1997 to June 30, 2002) and had not accounted for them correctly.

Operating results also could be affected by sudden changes in customer requirements and other economic conditions affecting customer demand and the cost of operations in one or more of the global markets in which we do business. As a result of these or other factors, we could fail to achieve our expectations as to future revenue, gross profit and income from operations. Our failure to meet the performance expectations set and published by external sources could result in a sudden and significant drop in the price of our stock, particularly on a short-term basis, and could negatively affect the value of any investment in our stock.

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Risks Associated with Our Industry and Market Conditions

The semiconductor equipment industry is highly cyclical. The purchasing decisions of our customers are highly dependent on the economies of both the local markets in which they are located and the semiconductor industry worldwide. If we fail to respond to industry cycles, our business could be seriously harmed.

The timing, length and severity of the up-and-down cycles in the semiconductor equipment industry are difficult to predict. This cyclical nature of the industry in which we operate affects our ability to accurately predict future revenue and, thus, future expense levels. When cyclical fluctuations result in lower than expected revenue levels, operating results may be adversely affected and cost reduction measures may be necessary in order for us to remain competitive and financially sound. During a down cycle, we must be in a position to adjust our cost and expense structure to prevailing market conditions and to continue to motivate and retain our key employees. In addition, during periods of rapid growth, we must be able to increase manufacturing capacity and personnel to meet customer demand. We can provide no assurance that these objectives can be met in a timely manner in response to industry cycles.

Our business is ultimately driven by the global demand for electronic devices by consumers and businesses. A majority of our annual revenue is derived from outside the United States, and we expect that international revenue will continue to represent a substantial percentage of our revenue. A protracted global economic slowdown may adversely affect our business and results of operations.

A majority of our annual revenue is derived from outside the United States, and we expect that international revenue will continue to represent a substantial percentage of our revenue. Our international revenue and operations are affected by economic conditions specific to each country and region. Because of our significant dependence on international revenue, a decline in the economies of any of the countries or regions in which we do business could negatively affect our operating results. Managing global operations and sites located throughout the world presents challenges associated with, among other things, cultural diversity and organizational alignment. Moreover, each region in the global semiconductor equipment market exhibits unique characteristics that can cause capital equipment investment patterns to vary significantly from period to period. Periodic local or international economic downturns, trade balance issues, political instability, legal or regulatory changes or terrorism in regions where we have operations along with fluctuations in interest and currency exchange rates could negatively affect our business and results of operations. Although we attempt to manage near-term currency risks through the use of hedging instruments, there can be no assurance that such efforts will be adequate.

Our future performance depends, in part, upon our ability to continue to compete successfully worldwide.

Our industry includes large manufacturers with substantial resources to support customers worldwide. Some of our competitors are diversified companies with greater financial resources and more extensive research, engineering, manufacturing, marketing and customer service and support capabilities than we possess. We face competition from companies whose strategy is to provide a broad array of products and services, some of which compete with the products and services that we offer. These competitors may bundle their products in a manner that may discourage customers from purchasing our products, including pricing such competitive tools significantly below our product offerings. In addition, we face competition from smaller emerging semiconductor equipment companies whose strategy is to provide a portion of the products and services that we offer, using innovative technology to sell products into specialized markets. Loss of competitive position could negatively affect our prices, customer orders, revenue, gross margins, and market share, any of which would negatively affect our operating results and financial condition.

Risks Related to Our Business

If we do not develop and introduce new products and technologies in a timely manner in response to changing market conditions or customer requirements, our business could be seriously harmed.

Success in the semiconductor equipment industry depends, in part, on continual improvement of existing technologies and rapid innovation of new solutions. For example, the size of semiconductor devices continues to

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shrink and the industry is currently transitioning to the use of new materials and innovative fab processes. While we expect these trends will increase our customers reliance on our diagnostic products, we cannot be sure that they will directly improve our business. These and other evolving customer needs require us to respond with continued development programs and to cut back or discontinue older programs, which may no longer have industry-wide support. Technical innovations are inherently complex and require long development cycles and appropriate staffing of highly qualified employees. Our competitive advantage and future business success depend on our ability to accurately predict evolving industry standards, to develop and introduce new products that successfully address changing customer needs, to win market acceptance of these new products and to manufacture these new products in a timely and cost-effective manner.

In this environment, we must continue to make significant investments in research and development in order to enhance the performance and functionality of our products, to keep pace with competitive products and to satisfy customer demands for i