CYBEROPTICS CORP
Form 10-K
March 10, 2008
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SECURITIES AND EXCHANGE COMMISSION

WASHINGTON, D.C. 20549

FORM 10-K

x ANNUAL REPORT PURSUANT TO SECTION 13 or 15(d) of the Securities Exchange Act of 1934 for the Year Ended December 31, 2007.

o TRANSITION PURSUANT TO SECTION 13 or 15(d) of the Securities Exchange Act of 1934

for the transition period from _____ to _____.

COMMISSION FILE NO. (0-16577)

CYBEROPTICS CORPORATION

(Exact name of registrant as specified in its charter)

Minnesota (State or other jurisdiction of incorporation or organization)	**41-1472057** (I.R.S. Employer Identification No.)
5900 Golden Hills Drive **MINNEAPOLIS, MINNESOTA** (Address of principal executive offices)	**55416** (Zip Code)

(763) 542-5000

(Registrant s telephone number, including area code)

Securities registered pursuant to Section 12(b) of the Exchange Act: Title of each class: Common Stock, no par value

Name of Exchange: NASDAQ Stock Market LLC

Securities registered pursuant to Section 12(g) of the Exchange Act: None

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Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act.

YES o 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 o 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 o

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§ 229.405 of this chapter) 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.

Large accelerated filer o Accelerated filer x Non-accelerated filer o Smaller Reporting Company o

Indicate by checkmark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act).

YES o NO x

State the aggregate market value of the voting and non-voting common equity held by non-affiliates computed by reference to the price at which the common equity was last sold, or the average bid and asked price of such common equity, as of the last business day of the registrant s most recently completed second fiscal quarter: $114,232,370.

As of February 29, 2008, there were 8,498,168 shares of the registrant s Common Stock, no par value, issued and outstanding.

DOCUMENTS INCORPORATED BY REFERENCE:

The responses to items 10, 11, 12 and 13 herein are incorporated by reference to certain information in the Company s Definitive Proxy Statement for its Annual Meeting of Shareholders to be held May 19, 2008.

CYBEROPTICS CORPORATION

FORM 10-K

For the Fiscal Year Ended December 31, 2007

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PART I.

ITEM 1. DESCRIPTION OF BUSINESS

Background

CyberOptics® Corporation was founded in 1984 by Dr. Steven K. Case (Chairman of the Board of CyberOptics and full-time employee), a former professor at the University of Minnesota, with the goal of commercializing technology for non-contact three-dimensional sensing. Our headquarters are located at 5900 Golden Hills Drive in Golden Valley, Minnesota. Our website address is www.cyberoptics.com. You can access, free of charge, our filings with the Securities and Exchange Commission, including our annual report on Form 10-K, our quarterly reports on Form 10-Q, current reports on Form 8-K and any other amendments to those reports, at our website, or at the Commission s website at www.sec.gov.

We are a leading global supplier of optical process control sensors and inspection systems that are used to control the manufacturing process and to ensure the quality of electronic circuit boards manufactured by our customers using surface mount technology (SMT). We also manufacture and sell sensors that assist with yield improvement, and the placement and transport of wafers during semiconductor fabrication. Our products assist the global SMT and semiconductor industries in meeting the rigorous quality demands for printed circuit board assembly and semiconductor wafers. Using a variety of proprietary technologies such as lasers, optics and machine vision, combined with software, electronics and mechanical design, our products enable manufacturers to increase production volume, product yields and quality by measuring the characteristics and placement of components both during and after the manufacturing process.

Our business is organized in two operating segments. Our Electronic Assembly segment designs, manufactures and sells optical process control sensors and inspection systems for the electronic assembly equipment market. Our Semiconductor segment designs, manufactures and sells optical and other process control sensors and related equipment for the semiconductor capital equipment market.

Most of our products (91% of revenue in 2007) are developed and sold for use in SMT electronic circuit board assembly or with equipment used in SMT electronic circuit board assembly as part of our Electronic Assembly segment. We sell products in this market both as sensor components that are incorporated into products manufactured by other companies for sale to circuit board assembly companies, and as more complete systems that are sold directly to circuit board assembly companies. Our sensor products are sold to manufacturers of pick-and-place

machines to align electronic surface mount components during placement on the circuit board and to solder paste printer companies to align stencils with circuit boards. Our systems products are sold to contract manufacturers and other companies with surface mount assembly lines, to control quality as in-line systems. These system level products are used by manufacturers of circuit boards to measure screen printed solder paste, to inspect circuit boards and components after component placement, to confirm proper placement after full assembly of circuit boards and to inspect solder joints on printed circuit boards. Manufacturers of DRAM memory also use our system products to inspect assembly of their memory modules.

Our Semiconductor segment develops and sells products that assist with yield improvement in semiconductor fabrication, and for use with the robotic equipment that handles semiconductor wafers during the semiconductor fabrication process. In addition, we sell a frame grabber product line for general industrial applications. These product lines are sold through CyberOptics Semiconductor, Inc. which was formed from the combination of HAMA Sensors, Inc. and Imagenation® Corporation, companies acquired in 1999 and 2000. Semiconductor products were 9% of total revenues in 2007.

Market Conditions Recent Developments of the Business

Our operations are heavily influenced by market conditions in worldwide electronics markets, and particularly in the SMT electronic assembly segment of these markets. Historically, these markets have been very cyclical, with periods of strong growth followed by periods of excess capacity and reduced levels of capital spending. However, in the last two to three years the cyclicality in the SMT market has become more moderate, reflecting the maturing nature of the market.

Consistent with our past practice, we continued to invest heavily throughout the 2005 to 2007 time period in new product development. In the third quarter of 2005, we began shipping a new sensor to DEK International, GmbH, an important new original equipment manufacturer, for their industry leading line of solder paste screen printers. Late in 2006 we completed development of our 5th generation LaserAlign sensor for the industry leading line of pick-and-place machines of Juki Corporation. The new sensor provides Juki with a 25% throughput improvement, alignment capability for the smallest components, improved reliability and the lowest cost of ownership. Sales to Juki accounted for 28% of our total revenue in 2007. We believe that the introduction of this new sensor will help ensure that Juki remains a significant customer for the foreseeable future.

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In 2005, we launched an enhanced version of our industry leading SE 300 solder paste inspection system, the SE 300 Ultra. In 2006 we introduced an enhanced version of our Flex series automated optical inspection system, the Flex Ultra. In 2007 we introduced the Flex Ultra HR, a new version of our Flex Ultra system that provides higher image resolution for the smaller component sizes used in the latest electronic devices. We continued to make improvements to all of our system products throughout 2006 and 2007 to improve speed, measurement performance, reliability and ease of use, including simplified operator interfaces with foreign language capability. Also in 2007, we started work on next generation system products for both solder paste and automated optical inspection.

In February 2008, we announced plans to move a portion of our systems related product development and manufacturing operations to Singapore, the location of our Asian sales office. The move will allow us to become more responsive to the needs of our growing base of Asian SMT systems customers, permit our core Minneapolis based optical engineering resources to work on future OEM opportunities, and attain significant cost savings.

Throughout the 2005 to 2007 time period, we introduced or continued to develop various new sensors for our WaferSense family of precision measurement tools, including new automated leveling, gapping, teaching and vibration sensors to assist with process optimization and yield improvement in the semiconductor fabrication process.

Objective

Our objective is to develop complete surface mount technology process control solutions for our customers. We intend to build upon our innovative products in systems for solder paste inspection, automated optical inspection and component alignment, with new sensing products that will be embedded inside SMT production equipment. We eventually intend to tie these products together as a full-line process control solution. We believe our new embedded process verification (EPV) sensor will eventually gain acceptance among manufacturers of pick and place machines as a further enhancement to inspection and control. During 2005, we introduced a new InPrinter Inspection Camera for DEK International GmbH. The camera is mounted inside their industry leading screen printer to ensure accurate board registration as well as to provide DEK with upgraded capability for solder paste and stencil inspection. Late in 2006 we completed development of our new 5th generation LaserAlign sensor for Juki s industry leading line of pick-and-place machines, providing Juki with a 25% throughput improvement, alignment capability for the smallest components, improved reliability and the lowest cost of ownership.

Throughout 2005 to 2007, our Semiconductor segment continued to invest in our WaferSense product line, a family of wireless, wafer like precision measurement tools for in-situ setup, calibration and process optimization in semiconductor processing equipment. Our first WaferSense product, the Automatic Leveling Sensor (ALS) was introduced late in 2004. During 2007, we introduced several new additions to the WaferSense family of products, including gapping, teaching and vibration sensors that will improve up-time and yield for semiconductor manufacturers.

We established a sales office in Singapore in 2001 and in China in 2004 to further penetrate the growing market for manufacturing production equipment there and to increase the percentage of worldwide production lines that use inspection in their production process to improve production yields and reduce cost. To bring our development and manufacturing closer to these developing markets, to reduce cost and to free development personnel at our home office in Minneapolis to focus on sensor technology development, during 2008 we are moving a portion of our systems development, and eventually our manufacturing operations for our systems products, to Singapore. We will consolidate these activities in a new office in Singapore that we expect to have open and operational by the second quarter of 2008.

Our ability to implement our strategy effectively is subject to numerous uncertainties and risks, including market conditions in the global SMT circuit board assembly and semiconductor fabrication capital equipment markets and our timely completion of development and successful commercial introduction of planned new products. We cannot assure you that our efforts will be successful.

OPERATIONS AND PRODUCTS

We develop, manufacture and sell intelligent, non-contact sensors and systems for process control and inspection. Our products are used primarily in the SMT electronic assembly and semiconductor fabrication sectors of the electronics industry and enable manufacturers to increase operating efficiencies, product yields and quality. In addition to proprietary hardware designs that combine precision optics, various light sources and multiple detectors, our products incorporate software that controls the hardware and filters and converts raw data into application specific information. Our product offerings are sold both to original equipment manufacturers that supply the SMT and semiconductor fabrication industries and to end-user customers who use our SMT systems products directly for process and quality control in the circuit board manufacturing process.

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SMT Electronic Assembly Sensors

Our SMT electronic assembly sensor product line, which has generated the largest component of our sales during the past ten years, is a family of sensors that uses similar technology, but that are customized for each customer and incorporated into the equipment manufactured by our customers for use in SMT circuit board assembly. We work closely with our original equipment manufacturer customers to integrate sensors into their equipment.

LaserAlign. Our LaserAlign sensor family has accounted for the vast majority of sales in the SMT electronic assembly sensors product line. These sensors are sold for incorporation into component placement machines used in the SMT production line that are manufactured by a number of different OEM customers. Sales of these products, including service repairs, to Juki Corporation accounted for approximately 28% of our revenue in 2007and 29% of our revenue in 2006. Sales of these products, including service repairs, to Assembleon B.V., accounted for approximately 13% of our revenue in 2007 and 14% of our revenue in 2006. Accordingly, revenues and operations are currently heavily influenced by the level of purchases from these two customers (including purchases of Board Align Camera (see below) Assembleon B.V. accounts for 20% of our revenue) and by the cyclical nature of the SMT production industry.

The LaserAlign family of products aligns components during transport on a pick-and-place machine prior to placement on a circuit board. After solder paste has been deposited and inspected, extremely small surface mount components known as chip capacitors and resistors are placed on the solder pads by component placement machines. LaserAlign sensors are incorporated into the placement heads of component placement machines to ensure accurate component placement at high production speeds. Various high-speed component placement machines use between one and twenty LaserAlign sensors per machine. LaserAlign integrates an intelligent sensor, composed of a laser, optics and detectors with a microprocessor and software for making specific measurements. LaserAlign enables quick and accurate alignment of each component as it is being transported by the pick-and-place arm for surface mount assembly. Using non-contact technology, LaserAlign facilitates orientation and placement of components at higher speeds than can be achieved using conventional mechanical or machine vision component centering systems.

The LaserAlign sensor is offered in several different configurations to satisfy the requirements of the different machines on which it is used. The latest version of the LaserAlign sensor technology was introduced in 2006 in a 5th generation sensor for Juki Corporation. Revenue from new product shipments of LaserAlign sensors has been a principal contributor to our growth during the past five years and accounted for 35% of our revenue in 2007, 36% in 2006 and 30% in 2005.

BoardAlign Camera (BA Camera). The BA Camera, which is incorporated directly into the placement head of component placement machines, identifies fiducial markings on a circuit board and aligns the board in the component placement machine prior to component placement. The BA Camera was introduced in a sensor for Assembleon B.V. during 2003 to be incorporated into their latest version component placement machine. Revenue from shipments of BA Camera sensors to Assembleon B.V. accounted for 7% of our revenue in 2007, 6% in 2006 and 6% in 2005.

InPrinter Inspection Camera. The InPrinter Inspection Camera, which is mounted directly in screen printers manufactured by DEK International GmbH, identifies fiducial markings on a circuit board to ensure accurate board registration prior to placement of solder paste, as well as to provide an upgraded capability for 2D solder paste and stencil inspection. The Inprinter Inspection Camera was introduced for DEK International GmbH during the third quarter 2005. Revenue from shipments of the InPrinter Inspection Camera accounted for 4% of our revenue in 2007, 4% of our revenue in 2006 and 3% in 2005.

SMT Systems Products

Our SMT systems product line consists of stand-alone measurement and inspection systems used in the SMT electronic assembly industry for process control and inspection. These systems are sold directly to end-user manufacturing customers that use them in a production line or along-side a production line to maintain process and quality control. Our products incorporate proprietary sensors as well as substantial, off the shelf, translation or robotics hardware and complete computer systems or processors with internally developed software.

SE 300 Ultra. We introduced the SE 300, our first in-line solder paste measurement machine, in March 2000. During 2005, we introduced the SE 300 Ultra, an enhanced version of our SE 300 product that offers faster inspection speeds, a conveyor that can accommodate a greater range of board sizes than the SE 300, flexible conveyor options and additional defect review options in run-time software. In addition, we introduced a sensor upgrade for the SE 300 that will provide some of the performance improvements that are available in the SE 300 Ultra.

The SE 300 Ultra is an in-line system that measures in three dimensions the amount of solder paste applied to the circuit board after the first step of the SMT assembly process. Because of the small size of the components that must be placed on each pad of solder paste and the density of components placed on the circuit board, a significant amount of SMT assembly problems are related to the quality of solder paste deposition. Misplaced solder paste or excess or inadequate amounts of paste can lead to

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improper connections or bridges between leads causing an entire circuit board to malfunction. The SE 300 Ultra is designed to inspect the height, area and volume of 100% of a circuit board at production line speeds and with resolution that allows it to measure the smallest chip scale packages and micro ball array component sites. The SE 300 Ultra can be retrofitted and integrated into most SMT production lines, providing real time quality control immediately after a printed circuit board leaves the screen printer and before component placement commences.

We made regular improvements to the SE 300 from its introduction in 2000 until the SE 300 Ultra was introduced in 2005. We continued to enhance the SE 300 Ultra throughout 2006 and 2007 to improve speed, reliability and ease of use, including simplified operator interfaces with foreign language capability, to provide an inspection capability for flexible circuits, and to offer a new MicroPad sensor as an option to improve inspection measurement performance for the smallest solder paste deposits. In 2007 we also started engineering work on our next generation in-line solder paste inspection system.

Revenues from shipments of the SE 300, SE 300 Ultra and sensor upgrades accounted for 23% of our revenue in 2007, 20% of our revenue in 2006 and 25% in 2005.

Automated Optical Inspection (Flex Ultra and Flex Ultra HR) Products. The Flex Ultra series of Automated Optical Inspection (AOI) products were initially introduced in the fourth quarter of 2000 and incorporate in-process technology acquired from Kestra, Ltd in 1999. Our Flex Ultra products allow for a variety of machine configurations (different number of cameras based on board size and resolution requirements) based on customer needs. These in-line products measure and inspect circuit boards after component placement to determine whether all components are present, that all components have been placed correctly and measure the quality of solder joints after reflow. These products incorporate high-resolution color cameras for improved imaging, and are designed to inspect the placement of the smallest components on circuit boards. The principal advantage of the Flex Ultra series of AOI products is the low level of false calls at in line speeds compared to other AOI machines.

We have introduced a number of versions of the Flex series AOI products since their initial introduction in 2000. The latest Flex version introduced in 2007, the Flex Ultra HR, is capable of inspecting down to 0105 components with 5.0 megapixel camera technology. We continue to sell both our Flex Ultra and Flex Ultra HR products. Flex Ultra HR offers improved imaging resolution, while Flex Ultra offers faster inspection speeds than the Flex Ultra HR.

Revenues from shipments of the Flex and Flex Ultra accounted for 12% of our revenue in 2007, 11% of our revenue in 2006 and 10% in 2005.

Semiconductor Products

Although we had sold some sensors for semiconductor wafer inspection prior to 1999, the semiconductor product line became a significant part of our business with the acquisition of certain assets of HAMA Laboratories, Inc. in 1999 and was further expanded with the acquisition of Imagenation Corporation in 2000. Currently, our principal semiconductor products are sensors that inspect the presence and orientation of semiconductor wafers in cassettes and FOUPS during the fabrication process. Other products include frame grabber and machine vision subsystems that were developed and sold by Imagenation. The majority of our semiconductor products are sold to original equipment manufacturers for incorporation into their workstations and systems. We have also introduced WaferSense , a family of wireless sensors intended to go where wafers go in semiconductor fabrication. WaferSense provides measurements of critical factors in the semiconductor fabrication process that are currently impossible or extremely difficult to obtain, without powering down the fabrication process equipment. We anticipate that a greater proportion of our WaferSense sales will be to end-user customers than with our other semiconductor products. Sales of our semiconductor products constituted 9% of our revenue in 2007, 10% of our revenue in 2006, and 13% in 2005.

Wafer Mapping and Alignment Sensors. We manufacture and sell laser based reflective sensors that improve the performance of robotic wafer handling equipment. During the fabrication process, semiconductor wafers are stored in slotted cassettes during transport to various fabrication tools. Robotic equipment removes the wafers from the cassettes and inserts them into a fabrication tool. Our wafer mapping sensors inspect for the presence of wafers in the cassettes and determine if the wafer is properly present and located in the cassette. We introduced an improved version of the wafer mapper product, the EXQ mapper, in late 2003, and a new smaller form factor of this product, the EXQS, in 2005.

Frame Grabber Products and Machine Vision Subsystems. Frame grabber products are a machine vision component that captures, digitizes, and stores video images. These products are currently sold into a broad array of applications in a number of different industries, with strategic emphasis on semiconductor customers. We offer both digital and analog versions of frame grabbers under the Imagenation brand.

WaferSense Sensors. Our WaferSense family of sensors are intended to go where wafers go in semiconductor fabrication and provide measurements of critical factors that are currently impossible or extremely difficult to obtain to assist with process optimization and yield improvement in the semiconductor fabrication process.

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We introduced our first WaferSense product, the automatic leveling sensor (ALS), a level calibration tool for semiconductor process tools, in late 2004. The WaferSense ALS is a wireless, vacuum-compatible sensor that can be placed in cassettes, FOUPS, on end effectors, aligners, in load locks and process chambers used in semiconductor fabrication to ensure that all stations are level and coplanar. We have continued to enhance our WaferSense ALS products and recently introduced a thinner version of WaferSense ALS.

In 2007, we introduced three new products in the WaferSense family, the automatic gapping sensor (AGS), the automatic teaching sensor (ATS) and the automatic vibration sensor (AVS). AGS is a gapping tool that measures the gap in three places between the shower head and pedestal in semiconductor process equipment. The automatic teaching sensor (ATS), measures X-Y-Z offset from robotic transfers of wafers to the pedestal in semiconductor process equipment. The amount of gap and offset after robotic transfer of wafers to the shower pedestal can affect film thickness and uniformity when material is deposited on semiconductor wafers, impacting quality and product yields. The automatic vibration sensor (AVS) measures X-Y-Z acceleration for shock and vibration, which can generate wafer particles, scratches or wafer breakage, thereby reducing yield. Because the user is not required to break down semiconductor fabrication equipment when using our WaferSense products, we believe significant time is saved and accuracy is increased compared to the manual techniques currently used by many customers when checking the process parameters measured by our WaferSense products. As a result, up-time, through-put and process yield for semiconductor fabrication equipment is improved.

Markets and Customers

We sell the vast majority of our products into the electronics manufacturing market (91% of total revenues in 2007), particularly the portion servicing manufacturers doing SMT circuit board assembly. The value of automation is high in this market because the products produced have high unit costs and are manufactured at speeds too high for effective human intervention. Moreover, the trend in these industries toward smaller devices with higher circuit densities, smaller circuit paths and extremely small components requires manufacturing and testing equipment capable of extremely accurate alignment and multidimensional measurement such as achieved using non-contact optical sensors. Customers in these industries also employ knowledgeable engineers who are competent with computer-related equipment. Our LaserAlign products are sold to OEM s serving this market and the SE 300 Ultra, Flex Ultra and Flex Ultra HR inspection systems are sold to end-user electronic assembly manufacturers in this market.

We sell our semiconductor products into the semiconductor capital equipment market, for use in the fabrication of semiconductor devices. This market has many of the same characteristics as the SMT electronics assembly market and requires non-contact optical measurement tools that enable the production of more complex, higher density and smaller semiconductor devices. We sell our wafer mapping and alignment sensors to manufacturers of equipment that transport wafers during the semiconductor manufacturing (front-end fabrication) process. Our new WaferSense family of precision measurement tools for process optimization in semiconductor processing equipment is sold directly to semiconductor fabrication facilities for use by process and equipment engineers during the production of semiconductor wafers.

An increasing proportion of our end-user SMT system sales are being originated in the low cost geographies of Asia where most of the new worldwide production capacity for circuit board assembly is being added. Consequently, most capital equipment suppliers are increasing their sales and operational capabilities in Asia to pursue sales in this market. In response, we opened our Singapore office in 2001 to support SMT systems sales throughout Asia and opened a sales office in China in October 2004. This market is also important to our OEM electronic assembly sensor product lines as our OEM customers are looking to sell their pick-and-place equipment into this market.

In February 2008, in part to be more responsive to our growing base of Asian SMT systems customers, we announced plans to move a portion of our systems related product development and manufacturing operations to Singapore, the location of our Asian sales office.

We sell our products worldwide to many of the leading manufacturers of electronic circuit board assembly equipment, manufacturers of semiconductor DRAM memory, semiconductor capital equipment manufacturers and end-user electronic assembly manufacturers, including Asian original design manufacturers (ODM s) and EMS s, who manufacture cell phones, notebook computers and server boards, among other electronic devices. Although we maintain sales offices in the UK, Singapore and China, all manufacturing of our products presently occurs in the United States and all sales originate in the United States. Singapore based manufacturing of SMT systems is expected to commence by late 2008, with all systems manufacturing scheduled for Singapore by the end of 2009.

There has been an increase in export sales from 2005 to 2007 as the result of the majority of new worldwide electronics and semiconductor capacity being added in Asia. In addition, a significant portion of our export sales to Europe are OEM electronic assembly sensors that ultimately are sold by our OEM customer into Asia.

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The following table sets forth the percentage of total sales revenue represented by total export sales (sales for delivery to countries other than the United States, including sales delivered through distributors) by location during the past three years:

	Year Ended December 31,		
	2007	**2006**	**2005**
Asia	51%	50%	51%
Europe	34%	33%	30%
Other (1)	2%	1%	1%

(1) Includes export sales in the Americas, primarily export sales to Canada, Mexico and Latin America.

See Note 11 to the Company s Consolidated Financial Statements contained in item 8 of this Form 10-K.

All export sales are negotiated, invoiced and paid in U.S. dollars. Accordingly, although changes in exchange rates do not affect revenue and income per unit, they can influence the willingness of customers to purchase units.

Sales and Marketing

Our electronic assembly sensors are sold to large OEM customers by a direct sales staff located in Minnesota. Our systems products are primarily sold through independent representatives and distributors managed by direct sales personnel located in Minnesota, as well as in the UK, Singapore and China. We have agreements with 15 representatives and distributors in North and South America who focus primarily on SMT systems products sold to end-users. We make most of our sales to international end-users of systems products through 25 representatives and distributors covering Europe (16) and the Pacific Rim (9).

Our wafer mapping semiconductor products are sold to large OEM customers by a direct sales staff located in Oregon. We sell our semiconductor frame grabber products through direct sales staff located in Portland, Oregon, and through 11 sales representatives throughout the world. These representatives are not under contract, but are authorized to sell frame grabber products and in many cases act as system integrators for our products. We have established a worldwide sales representative organization for our WaferSense semiconductor products. We currently have agreements in place or in process with sales representatives in the U.S. (3), Europe (3) and the Pacific Rim (5). Most of these sales representatives will also be authorized to sell wafer mapping semiconductor products.

We market our products through appearances at industry trade shows, advertising in industry journals, articles published in industry and technical journals and on the Internet. In addition, we have strategic relationships with certain key customers that serve as highly visible references.

Backlog

Our products are typically shipped two weeks to two months after the receipt of an order. Product backlog was $6.1 million at December 31, 2007, compared to $6.9 million on December 31, 2006, and $6.9 million on December 31, 2005. Backlog at December 31, 2007 totaling $5.2 million is deliverable in the first quarter of 2008. Sales of some surface mount technology (SMT) products may require customer acceptance due to performance or other acceptance criteria included in the terms of sale. For these SMT product sales, revenue is recognized at the time of customer acceptance. Although our business is generally not of a highly seasonal nature, sales may vary based on the capital procurement practices in the electronics and semiconductor industries. For example, production capacity expansion for anticipated holiday or back to school demands can impact our revenue. In addition, New Year celebrations in Asia may have some impact on first quarter sales. We are not able to quantify with any level of precision, the impact of these events on our sales in any given quarterly period. Our scheduled backlog at any time may vary significantly based on the timing of orders from OEM customers. Accordingly, backlog may not be an accurate indicator of performance in the future.

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Research and Development

We differentiate our products primarily on the basis of customer benefits afforded by the use of clever and proprietary technology and on our ability to combine several different technical disciplines to address industry and customer needs. CyberOptics was founded by research scientists and has retained relationships with academic institutions to ensure that the most current information on technological developments is obtained. In addition, we actively seek ongoing strategic customer relationships with leading product innovators in our served markets and actively investigate the needs of, and seek input from, these customers to identify opportunities to improve manufacturing processes. Our engineers have frequent interactions with our customers to ensure adoption of current technologies. In some instances, we receive funding from these customers through development contracts that provide the customer with an exclusive selling period but allow us to retain technology and distribution rights.

We believe that continued and timely development of new products and enhancements to existing products is essential to maintaining our industry leading position in the market. As a technology based company, we commit substantial resources to research and development efforts, which play a critical role in maintaining and advancing our position as a leading provider of optical sensors and systems. During 2005 through 2007, research and development efforts were focused on a number of development activities, including a 5th generation LaserAlign sensor for Juki, a new InPrinter Inspection Camera for DEK International GmbH, continued development of our Embedded Process Verification (EPV®) technology initiative, and continued development of and enhancements to the SE and Flex series inspection systems, including our SE 300 Ultra solder paste inspection system, new Flex Ultra and Flex Ultra HR automated optical inspection systems and next generation systems for both solder paste and automated optical inspection.

In addition, we have continued to enhance our semiconductor wafer mapping sensors for the semiconductor market. In 2005, we commenced shipment of the EXQS wafer mapping sensor. In 2005 through 2007, we continued development of our WaferSense family of precision measurement tools, including new automated leveling, gapping, teaching and vibration sensors to assist with process automation and yield improvement in the semiconductor fabrication process.

Research and development expenses were $9.8 million in 2007, $8.1 million in 2006 and $7.1 million in 2005. These amounts represented 17% of revenues in 2007, 14% of revenues in 2006 and 17% of revenues in 2005. Research and development expenses consist primarily of salaries, project materials, contract labor and other costs associated with ongoing product development and enhancement efforts. Research and development resource utilization is centrally managed based on market opportunities and the status of individual projects. We expect research and development expenses in 2008 to increase by up to $2.0 million as we move a portion of our development for systems to Singapore, but expect cost savings of approximately $1.5 to $2.0 million per year resulting from the move to Singapore starting in 2009.

Manufacturing

Much of our product manufacturing, which is primarily circuit board manufacturing, lens manufacturing and metal parts production, is contracted with outside suppliers. Our production personnel inspect incoming parts, assemble sensor heads and calibrate and perform final quality control testing of finished products. Our products are not well suited for the large production runs that would justify the capital investment necessary for complete internal manufacturing. Our electronic assembly sensor products and SMT systems products are assembled in Minneapolis, MN, and our semiconductor products are assembled in Portland, OR. We recently announced plans to commence manufacturing of our SMT systems products in Singapore by the end of 2008, with manufacturing of all SMT systems products scheduled for Singapore by the end of 2009. We believe that sourcing of mechanical components for our system products in Asia and distribution of these products from Singapore to our customers, the majority of whom are located in Asia, will be less expensive than if we continued these activities at our U.S. headquarters facility.

A variety of components used in our products are available only from single sources and involve relatively long order cycles, in some cases over one year. We have located sources for substitute components. Use of those alternative components could require substantial rework of the product designs, resulting in periods during which we could not satisfy customer orders. We believe we have identified alternative assembly contractors for most of our subassemblies. An actual change in such contractors would likely require a period of training and testing. Accordingly, an interruption in a supply relationship or the production capacity of one or more of such contractors could result in the inability to deliver one or more products for a period of several months. To help prevent delays in the shipment of our products, we maintain in inventory, or on scheduled delivery from suppliers, what we believe to be a sufficient amount of certain components based on forecasted demand (forecast extends a minimum of 6 months).

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Competition

Although we believe that our products offer unique capabilities, competitors offer technologies and systems that perform some of the visual inspection and alignment functions performed by our products. We face competition from a number of companies in the machine vision, image processing and inspection systems market, some of which are larger and have greater financial resources.

Our electronic assembly sensor products face competition in the market for alignment and inspection on OEM component placement machines primarily from manufacturers of vision (camera and software based) systems. Potential competitors in these markets include Cognex Corporation and Electro Scientific Industries, Inc. We compete in this market based on our ability to custom design products with stringent physical form requirements, speed, flexibility, cost and ease of control. In addition, our products compete with systems developed by OEMs using their own design staff for incorporation into their products. Our electronic assembly sensor products have historically competed favorably on the basis of these factors, and particularly on the basis of speed and product cost. Our sensor products are also better suited to align the smaller electronic component sizes currently available in the market. Nevertheless, advances in terms of speed by vision systems have reduced some of the advantages of our products in some configurations. We have introduced newer configurations adapted by several customers that we believe allow our sensors, and the component placement machines in which they are incorporated, to compete favorably based on the speed and accuracy of their performance, and their price. In addition, we are expanding our focus to incorporate additional inspection capabilities into our sensors, including our embedded process verification (EPV) technology initiative, which could give us a competitive advantage in this market.

The primary competition for sales of our SE 300 Ultra solder paste inspection product has been from Asian based companies such as KohYoung Technology (Korea), and Test Research, Inc. (Taiwan). Agilent Technologies, Inc., CKD Corporation (Japan) and Orbotech, Ltd. (Israel) have also been competitors. We believe that a few of these competing systems have a lower price position than our SE 300 Ultra product. Although we believe our SE 300 Ultra product competes favorably against these competitive products on the basis of performance and reliability, the introduction of lower cost competitive models has required us to decrease the price of our SE 300 Ultra product in some markets. In addition, some manufacturers of screen printing equipment provide optional 2-D solder paste inspection, and other machine vision companies (AOI companies) have started offering 2-D and occasionally 3-D solder paste inspection products.

Our AOI inspection system products (Flex Ultra and Flex Ultra HR products) face competition from a large number of AOI companies, the most significant being Agilent (formerly MVT), Orbotech, Ltd. (Israel), Viscom (Germany), Saki Corporation (Japan) and Omron, Ltd. (Japan). We believe that the technology used in the Flex Ultra series is differentiated from the competition and that it will compete effectively in this market based on measurement accuracy, cost, ease of use at rapid production line speeds and the low rate of false calls.

Our semiconductor products face competition in the wafer mapping and alignment market primarily from manufacturers of through-beam sensors developed by our customers using inexpensive sensors from general industrial market suppliers like Banner Engineering Corporation, Omron, Ltd (Japan) and Keyence, Ltd (Japan). We believe that our sensors compete favorably in this market based on performance and the unique advantages of the reflective mode of operations.

Our WaferSense family of sensors is intended to go where wafers go in semiconductor fabrication and provide measurements of critical factors that are currently impossible or extremely difficult to obtain. We believe our WaferSense products are unique to the marketplace and primarily face competition from the manual techniques currently used by most customers to monitor their semiconductor fabrication equipment. Because the user is not required to break down semiconductor fabrication equipment, or pressurize a vacuum chamber, we believe that our WaferSense products will save significant time and increase measurement accuracy over the manual techniques currently used by customers and will improve equipment up-time, through-put and process yield.

Although we believe our current products offer several advantages in terms of price and suitability for specific applications and although we have attempted to protect the proprietary nature of such products, it is possible that any of our products could be duplicated by other companies in the same general market.

Employees

As of December 31, 2007, we had 182 full-time and 4 part-time employees worldwide, including 43 in sales, marketing and customer support, 71 in manufacturing, purchasing and production engineering, 53 in research and development and 19 in finance, administration and information services. Of these employees, 138 are located at our corporate headquarters in Minneapolis and 48 are located in other offices (7 in the UK, 25 in Oregon, 8 in Singapore, 7 in China and 1 in Japan). All of our employees located in Oregon work in our Semiconductor business. To date, we have been successful in attracting and retaining qualified technical

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personnel, although there can be no assurance that this success will continue. None of our employees are covered by collective bargaining agreements or are members of a union.

Proprietary Protection

We rely on the technical expertise and know-how of our personnel and trade secret protection, as well as on patents, to maintain our competitive position. We attempt to protect intellectual property by restricting access to proprietary methods by a combination of technical and internal security measures. In addition, we make use of non-disclosure agreements with customers, consultants, suppliers and employees. Nevertheless, there can be no assurance that any of the above measures will be adequate to protect our proprietary technology.

We hold 88 patents (58 U.S. and 30 foreign) on a number of technologies, including those used in the LaserAlign systems and other products. Some of the patents relate to equipment such as pick-and-place machines, into which our sensor products are integrated. In addition, we have 127 pending patents (42 U.S. and 85 foreign). We protect the proprietary nature of our software primarily through copyright and license agreements, but also through close integration with our hardware offerings. We utilize 19 trademarks, 14 of which are registered trademarks, and 3 of which are foreign. We currently have 5 trademarks pending registration. We also have 8 domain names and several common law trademarks. It is our policy to protect the proprietary nature of our new product developments whenever they are likely to become significant sources of revenue. No guarantee can be given that we will be able to obtain patent or other protection for other products.

As the number of our products increases and the functionality of those products expands, we may become increasingly subject to attempts to duplicate our proprietary technology and to infringement claims. In addition, although we do not believe that any of our products infringe the rights of others, there can be no assurance that third parties will not assert infringement claims in the future or that any such assertion will not require us to enter into a royalty arrangement or result in litigation.

Government Regulation

Many of our products contain lasers. Products containing lasers are classified as either Class I, Class II or Class IIIb Laser Products under applicable rules and regulations of the Center for Devices and Radiological Health (CDRH) of the Food and Drug Administration. Such regulations generally require a self-certification procedure pursuant to which a manufacturer must file with the CDRH with respect to each product incorporating a laser device, periodic reporting of sales and purchases and compliance with product labeling standards. Our lasers are generally not harmful to human tissue, but could result in injury if directed into the eyes of an individual or otherwise misused. We are not aware of any incident involving injury or a claim of injury from our laser devices and believe that our sensors and sensor systems comply with all applicable laws for the manufacture of laser devices.

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ITEM 1A. RISK FACTORS

Our operations are subject to a number of risks and uncertainties that may effect our financial results, our accounting, and the accuracy of the forward looking statements we make in this Form 10-K. We make statements regarding anticipated product introductions, changes in markets, customers and customer order rates, expenditures in research and development, growth in revenue, taxation levels, the effects of pricing, and the ability to continue to price foreign transactions in U.S. currency, all of which represent our expectations and beliefs about future events. Our actual results may vary from these expectations because of a number of factors that affect our business, the most important of which include the following:

Although our planned move of systems product development and manufacturing operations to Singapore is intended to save cost, increase responsiveness to Asian systems customers and free US development staff for sensor development, we might not achieve these objectives and the move could prove costly or result in reduced control and efficiency of systems operations. Our move to Singapore presents a number of risks related to the recruitment and retention of personnel, management of development and manufacturing, control over administrative, manufacturing and business processes, regulatory and legal issues we may encounter and other matters relating to foreign operations. Although we have a sales office there, we have no development personnel, no manufacturing personnel and no management personnel in Singapore and will be required to recruit personnel at virtually all levels in Singapore. Further, although we have enlisted a key development manager to move to Singapore for the short term, we will need to recruit, train and place reliance on other personnel as the office becomes operational. We cannot be certain that we will be able to recruit software development personnel in Singapore of the caliber required for our products, we will be able to find management on whom we can rely, or that these personnel, or manufacturing personnel, can be retained at attractive rates. Further the transfer of development on complicated systems that combine our proprietary hardware designs and software programs could take substantial time and training, which we might have underestimated. Although we anticipate that components for our systems products may be more readily available there, we cannot be certain that we will be able to import the hardware components used in our systems products necessary for manufacture in Singapore at efficient rates. Our future financial performance, ability to serve our customers and manufacture products could be negatively impacted if the move of our systems related product development and manufacturing operations to Singapore takes longer than intended, costs more than expected to hire experienced employees or rent facilities, we are unable to find experienced engineers and other employees in a timely manner, or if we are unable to locate suitable sources of supply for our products manufactured in Asia.

The market for capital equipment for the electronics industry in which we operate is cyclical and we cannot predict with precision when market downturns will occur. We operate in a very cyclical market the electronics capital equipment market. We have been unable to predict with accuracy the timing or magnitude of periodic downturns in this market. These downturns, particularly the severe downturn in electronics production markets from 2001 through 2003, have severely affected our operations in the past and generated several years of unprofitable operations. We may be unable to foresee additional changes in these markets before they affect our operations in the future.

World events beyond our control may effect our operations. Our operations and markets could be negatively affected by world events that effect economies and commerce in countries, such as China, Singapore and Japan, in which we do business. Natural disasters, such as the SARS outbreak, have affected travel patterns and accessibility in these countries in the past and other natural occurrences, such as a bird flu outbreak, could affect the business we do in these countries in the future. Further, these countries may be affected by economic forces that are different from the forces that affect the United States and change the amount of business we conduct.

We are dependent upon two customers for a significant amount of our revenue. We have been dependent on two original equipment manufacturer customers for a large portion of our revenue (48% in 2007, 49% in 2006 and 44% in 2005). If these customers are unsuccessful selling the products into which our sensors are incorporated, design their products to function without our sensors, purchase sensors from other suppliers, or otherwise terminate, change or alter their relationships with us, our results of operations would be significantly negatively affected.

We are dependent upon a single product line in our systems business for approximately a quarter of our revenue. During 2007, approximately 23% of our total revenue was generated by sales of a single SMT systems product line, the SE 300 Ultra. Sales of this product have been subject to increasing competition in the Asian markets, negatively impacting our market share and sales prices for our products. If we are not successful in continuing to sell and differentiate this product line relative to our competition, our results of operations would be negatively affected.

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We generate more than three quarters of our revenue (approximately 87% in 2007) from export sales that are subject to risks of international operations. Our export sales are subject to many of the risks of international operations including:

- currency controls and fluctuations in currency exchange rates;
- changes in local market business requirements and increased cost and development time required to modify and translate our products for local markets;
- inability to recruit qualified personnel in a specific country or region;
- difficulty in establishing and maintaining relationships with local vendors;
- differing foreign technical standards;
- differing regulatory requirements;
- export restrictions and controls, tariffs and other trade barriers;
- difficulties in staffing and managing international operations;
- reduced protection for intellectual property rights;
- changes in political and economic conditions;
- seasonal reductions in business activity;
- potentially adverse tax assessments; and
- terrorism, disease, or other events that may affect local economies and access.

Because we price our products in US dollars, our products may have difficulty competing in periods of increasing strength of the dollar. All of our international export sales are negotiated, invoiced and paid in U.S. dollars, and accordingly, currency fluctuations do not affect our revenue and income per unit. However, significant fluctuations in the value of the U.S. dollar relative to

other currencies could have an impact on the price competitiveness of our products relative to foreign competitors, which could impact the willingness of customers to purchase our products and have an impact on our results of operations.