

SECURITIES AND EXCHANGE COMMISSION

FORM S-3/A

Registration statement for specified transactions by certain issuers [amend]

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FILER

ZYGO CORP

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REGISTRATION NO. 333-43780

SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

AMENDMENT NO. 1
TO
FORM S-3

REGISTRATION STATEMENT
UNDER
THE SECURITIES ACT OF 1933

ZYGO CORPORATION
(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction of
incorporation or organization)

06-0864500
(I.R.S. Employer
Identification Number)

LAUREL BROOK ROAD
MIDDLEFIELD, CONNECTICUT 06455-0448
(860) 347-8506
(Address, including zip code, and telephone number, including
area code, of registrant's principal executive offices)

J. BRUCE ROBINSON
PRESIDENT AND CHIEF EXECUTIVE OFFICER
LAUREL BROOK ROAD
MIDDLEFIELD, CONNECTICUT 06455-0448
(860) 347-8506

(Name, address, including zip code, and telephone number,
including area code, of agent for service)

Copies of all communications, including all communications
sent to the agent for service, should be sent to:

PAUL JACOBS, ESQ.
FULBRIGHT & JAWORSKI L.L.P.
666 FIFTH AVENUE
NEW YORK, NEW YORK 10103

APPROXIMATE DATE OF COMMENCEMENT OF PROPOSED SALE TO THE PUBLIC: From time
to time after the effective date of this Registration Statement.

If the only securities being registered on this Form are being offered
pursuant to dividend or interest reinvestment plans, please check the following
box. []

If any of the securities being registered on this Form are to be offered on
a delayed or continuous basis pursuant to Rule 415 under the Securities Act of
1933, as amended, other than securities offered only in connection with dividend
or interest reinvestment plans, check the following box. [X]

If this Form is filed to register additional securities for an offering
pursuant to Rule 462(b) under the Securities Act, please check the following box
and list the Securities Act registration statement number of the earlier
effective registration statement for the same offering. []

If this Form is a post-effective amendment filed pursuant to Rule 462(c)
under the Securities Act, check the following box and list the Securities Act
registration statement number of the earlier effective registration statement
for the same offering. []

If delivery of the prospectus is expected to be made pursuant to Rule 434,

please check the following box. []

The registrant hereby amends this registration statement on such date or dates as may be necessary to delay its effective date until the registrant shall file a further amendment which specifically states that this registration statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933 or until the registration statement shall become effective on such date as the Commission, acting pursuant to said Section 8(a), may determine.

The information in this prospectus is not complete and may be changed. A registration statement relating to these securities has been filed with the Securities and Exchange Commission. These securities may not be sold nor may offers to buy be accepted before the registration statement becomes effective. This prospectus is not an offer to sell securities and is not soliciting an offer to buy these securities in any state where the offer or sale is not permitted.

ZYGO CORPORATION

2,303,934 Shares of Common Stock

Zygo Corporation's common stock trades on the Nasdaq National Market under the ticker symbol "ZIGO." On September 26, 2000, the closing sale price of the common stock was \$79 13/16.

The stockholders of Zygo Corporation listed in this prospectus are offering and selling an aggregate of 2,303,934 shares of our common stock under this prospectus. We issued these selling stockholders their common stock on May 5, 2000 in connection with our acquisition of Firefly Technologies, Inc., which was owned by these stockholders.

The selling stockholders (and their donees and pledges) may offer their Zygo common stock through public or private transactions, on or off the United States exchanges, at prevailing market prices, or at privately negotiated prices.

SEE "RISK FACTORS" BEGINNING ON PAGE 6 FOR A DISCUSSION OF CERTAIN FACTORS THAT YOU SHOULD CONSIDERED BEFORE YOU INVEST IN THE SHARES BEING SOLD WITH THIS PROSPECTUS.

NEITHER THE SECURITIES AND EXCHANGE COMMISSION NOR ANY STATE SECURITIES COMMISSION HAS APPROVED OR DISAPPROVED OF THESE SECURITIES OR DETERMINED IF THIS PROSPECTUS IS TRUTHFUL OR COMPLETE. ANY REPRESENTATION TO THE CONTRARY IS A CRIMINAL OFFENSE.

The date of this Prospectus is September 29, 2000.

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WHERE YOU CAN FIND MORE INFORMATION

We file annual, quarterly and special reports, proxy statements and other information with the SEC. You may read and copy any document we file at the SEC's public reference rooms in Washington, D.C., New York, New York, and Chicago, Illinois. Please call the SEC at 1-800-SEC-0330 for further information on the public reference rooms. Our SEC filings are also available to the public at the SEC's website at <http://www.sec.gov>.

The SEC allows us to "incorporate by reference" the information we file with them, which means that we can disclose important information to you by referring you to those documents. The information incorporated by reference is considered to be part of this prospectus, and information that we file later with the SEC will automatically update and supersede this information. We incorporate by reference the documents listed below and any future filings we will make with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Securities Exchange Act of 1934 until the selling stockholders sell all their shares of Zygo stock. This prospectus is part of a registration statement we filed with the SEC (Registration No. 333-43780).

- (i) Our Annual Report on Form 10-K for the fiscal year ended June 30, 1999.
- (ii) The description of our common stock contained in Item 1 of our Registration Statement on Form 8-A/A, dated October 26, 1984.
- (iii) Our Quarterly Reports on Form 10-Q for the quarters ended September 30, 1999, December 31, 1999 and March 30, 2000.
- (iv) Our Current Report on Form 8-K/A, dated May 5, 2000, relating to our acquisition of Firefly Technologies, Inc.
- (v) Our Annual Report on Form 10-K for the fiscal year ended June 30, 2000.

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You may request a copy of these filings, at no cost, by writing or telephoning us at the following address

Zygo Corporation
Laurel Brook Road
Middlefield, Connecticut 06455
Attention: Michael J. Auth
Phone No. (860) 704-5180.

You should rely only on the information incorporated by reference or provided in this prospectus or any supplement. We have not authorized anyone else to provide you with different information. The selling stockholders will not make an offer of these shares in any state where the offer is not permitted. You should not assume that information in this prospectus or any supplement is accurate as of any date other than the date on the front of these documents.

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OUR COMPANY

This summary highlights selected information about us and may not contain all of the information that is important to you. You should carefully read this document with the documents we have incorporated by reference into this prospectus for information on us and our financial statements.

We design and market noncontact measuring instruments, automation systems, and optical components for high precision manufacturing industries. Our instruments, systems and components are used as parts of products offered by other companies and as key elements in our own products. Most of our instruments, systems and accessories employ either a laser or white light source to make noncontact measurements. We sell our products worldwide to leading manufacturers in the semiconductor, industrial manufacturing, and optics industries, including Cannon, Motorola, Texas Instruments, Seagate, Bausch &

Lomb, and Corning.

Our core business unit, Zygo Advanced Metrology Systems, located in Middlefield, Connecticut, is home to our optical components business and our interferometric based products. Zygo Advanced Metrology System's high performance optical components are used in many applications, including laser fusion research, semiconductor manufacturing equipment, and aerospace optical systems, and are also an integral part of our own precision noncontact measuring instruments. These noncontact measuring instruments and systems enable manufacturers in high technology industries, such as semiconductor and precision optics to become more efficient and increase production yields by identifying and collecting quantitative data on product defects, both during and after the manufacturing process. We produce these systems with proprietary laser and white light optical technology combined with advanced software and electronics.

Zygo Advanced Metrology Systems' interferometric measurement instruments are used by a variety of industries, such as the semiconductor industry, which uses these products for high precision distance measurement and motion control. Interferometry uses the optical path differences between a reference and a measurement beam to produce a pattern of bright and dark lines. Our products analyze the patterns and generate three-dimensional surface profiles, which are used to detect product defects by determining the conformity of a part to its specifications, and also to analyze and enhance manufacturing processes. Interferometry provides a noncontact, quantitative, full field of view and an ultra-high resolution surface analysis in three dimensions.

Confocal Scanning Optical Microscopy, known as CSOM, is the key base technology employed in Zygo Vision Systems' confocal systems, which are used for both inspection and metrology measurement. Microscopes using white light CSOM technology generate a high-intensity white light that illuminates a section of a spinning disk containing pinholes arranged in multiple spiral patterns. Acting as point illumination sources, the pinholes direct light to points on the sample. Only light from points on the sample near the focal plane will pass through the pinholes for imaging. The benefits of white light CSOM technology imaging systems include: submicron definition, "real time" high resolution images with no processing delay for image processing, transverse resolution and extremely shallow depth of field. These features provide

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precise imaging of sub-half micron structures and lower cost of ownership than other imaging systems. Our laser confocal systems employ a laser light source that causes a sample to fluoresce. Laser CSOM systems produce a high resolution image, and have ability to display many layers of translucent samples as a live overlay of bright, perfectly registered optical sections.

Our Zygo Automation Systems unit allows us to integrate our traditional metrology products into an automated system that can be placed directly into our customer's production line. Zygo Automation Systems designs, develops, manufactures, and markets comprehensive automated system solutions to enable manufacturers in a variety of high technology industries, including the data storage, semiconductor, and electronics industries, to enhance operation efficiencies and product yields. Our high-speed production solutions reduce downtimes, especially in manufacturing processes adaptable to the manufacture of multiple products differing in size, features, and functionality.

Our newly acquired Zygo TeraOptix unit manufactures metrology equipment, micro-optics, switches, and filters for the telecommunications industry. Its telecommunications components are used in wave division multiplexers to increase the capacity of optical fibers. Our automation, metrology, and precision optics processing and assembly capability, combined with TeraOptix's intellectual property and process knowledge of micro-optical components and assemblies for switches, lenses, and tunable filters, provide us with a unique capability to serve the rapidly expanding optical telecommunications marketplace. We expect TeraOptix to become a major supplier to this marketplace over the course of the next few years providing optical components, assemblies, automated test equipment, and automated assembly equipment and systems.

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RISK FACTORS

Before you invest in our common stock, you should carefully consider the following factors and cautionary statements, as well as the other information set forth herein. If any of the following risks actually occur, our business, financial condition or results of operations may suffer. As a result, the trading price of our common stock could decline, and you could lose a substantial portion of the money you paid to buy our common stock.

IF WE DO NOT SUCCESSFULLY MANAGE THE TRANSFORMATION OF OUR BUSINESS TO ONE WITH A FOCUS ON THE SALE OF COMPONENTS AND MODULES FOR THE TELECOMMUNICATIONS INDUSTRY, OUR REVENUES MAY DECREASE AND WE MAY INCUR SIGNIFICANT OPERATING LOSSES.

We may be unsuccessful in making the transition from a company primarily involved in the design and manufacture of on-line yield enhancement products and solutions, to a larger and more complex organization which will also focus on the design and manufacture of optical components and modules for the telecommunications industry. If we fail to make this transition successfully, our revenues may decrease and we may incur significant operating losses. This transition will require that we, among other things, make significant capital expenditures and incur expenses, expand and refocus our global sales and marketing force to sell optical components and modules for the telecommunications industry, enhance our financial and management controls and systems, and develop and market new products and services, and that we direct resources away from the existing on-line yield enhancement products and solutions business that generates our current revenues. We cannot provide any assurance that we will succeed in managing this transition. Therefore, we may fail to generate sufficient revenues from our sale of optical components and modules for the telecommunications industry to justify our diversion of resources to our optics unit and we may incur significant operating losses.

IF THE OPTICAL NETWORKING MARKET DOES NOT DEVELOP AND EXPAND AS WE ANTICIPATE, DEMAND FOR OUR OPTICAL COMMUNICATIONS COMPONENTS PRODUCTS MAY BE LESS THAN EXPECTED, WHICH WOULD NEGATIVELY IMPACT OUR NET SALES AND OPERATING RESULTS.

A significant portion of our business growth strategy is dependent on the deployment of our optical communications components and modules. Our future success in the optical communications market depends on the continued deployment of optical networks, continued growth of the Internet as a widespread communication and commerce medium, the continuing increase in the amount of data transmitted over communications networks, or bandwidth, and the growth of optical networks to meet the increased demand for bandwidth. Future demand for our optical communications products is uncertain and will depend to a great degree on the speed of the widespread adoption and upgrading of optical networks and the acceptance of fiber optics as the replacement for copper wire. If the transition to optical communications occurs too slowly, the market for our optical communications products and the growth of our business will be significantly limited.

The optical communications market is new and characterized by rapid technological change, frequent new product introductions, changes in customer requirements, unpredictable rates of product deployment and evolving industry standards. Because this market is new, it is difficult to predict its potential size or future growth rate. Our success in generating net sales in this emerging market will depend on:

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- o maintaining and enhancing our relationships with our customers;
- o the awareness of potential end-user customers and network service providers about the benefits of optical networks; and
- o our ability to accurately predict and develop our products to meet industry standards.

If we fail to address changing market conditions, the sales of our optical communications products may not materialize, which would harm our net sales. In addition, since we have and will continue to make an investment in the development of products for this market, the failure of optical networks to gain widespread acceptance may significantly negatively impact our operating results.

IF WE ARE UNABLE TO COMMIT TO DELIVER SUFFICIENT QUANTITIES OF OUR PRODUCTS TO SATISFY MAJOR CUSTOMERS' NEEDS, WE MAY NOT ATTRACT NEW ORDERS AND CUSTOMERS AND WE MAY LOSE CURRENT ORDERS AND CUSTOMERS.

Communications service providers and equipment manufacturers typically require that suppliers commit to provide specified quantities of products over a given period of time. If we are unable to commit to deliver sufficient quantities of our products to satisfy a customer's anticipated needs, we may lose the order and the opportunity for significant sales to that customer for a lengthy period of time. We would be unable to pursue many large orders if we do not have sufficient manufacturing capacity to enable us to commit to provide customers with specified quantities of products.

OUR LENGTHY AND VARIABLE QUALIFICATION AND SALES CYCLE MAKES IT DIFFICULT TO PREDICT THE TIMING OF A SALE OR WHETHER A SALE WILL BE MADE, WHICH MAY CAUSE

US TO HAVE EXCESS MANUFACTURING CAPACITY OR INVENTORY AND NEGATIVELY IMPACT OUR OPERATING RESULTS.

Customers typically expend significant efforts in evaluating and qualifying our products and manufacturing process. This evaluation and qualification process frequently results in a lengthy sales cycle. While our customers are evaluating our products and before they place an order with us, we may incur substantial sales and marketing and research and development expenses, expend significant management efforts, increase manufacturing capacity and order long-lead-time supplies prior to receiving an order. Even after this evaluation process, it is possible a potential customer will not purchase our products for deployment. In addition, product purchases are frequently subject to unplanned processing and other delays, particularly with respect to larger customers for which our products represent a very small percentage of their overall purchase activity.

If we increase capacity and order supplies in anticipation of an order that does not materialize, our gross margins will decline and we will have to carry or write off excess inventory. Even if we receive an order, the additional manufacturing capacity that we add to service the customer's requirements may be underutilized in a subsequent quarter. Either situation could cause our results of operations to be below the expectations of investors and public market analysts, which would, in turn, cause the price of our common stock to decline. Our long sales cycles, as well as the practice of companies in the telecommunications industry to sporadically place large orders with short lead times, may cause our revenues and operating results to vary significantly and unexpectedly from quarter to quarter.

INTEGRATION OF OUR BUSINESSES WITH BUSINESSES OF FIREFLY TECHNOLOGY MAY PROVE DIFFICULT.

On May 5, 2000, we purchased all of the capital stock and other outstanding securities of Firefly Technology for approximately 20% of our outstanding capital stock. We cannot give assurances that the integration of our businesses with the businesses of Firefly will be successful or that we will be able to achieve the synergies we anticipate.

BECAUSE WE ARE DEPENDENT ON A SMALL NUMBER OF SUPPLIERS FOR RAW MATERIALS, WE MAY SUFFER DELAYS AND INCREASED EXPENSES IF THESE SUPPLIERS DO NOT PERFORM THEIR OBLIGATIONS.

If any relationship with a key supplier is terminated or a supplier fails or is unable to provide reliable services or equipment and we are unable to reach suitable alternative arrangements quickly, we may experience significant delays and additional costs in the manufacture of our optical components and modules. We are dependent on suppliers for raw materials and various electrical and optical supplies, including fiber, which we use to manufacture our optical products. In particular, currently there are few companies that are capable of supplying optical fibers in the quantity and of the quality we require. If these companies were to cease manufacturing optical fibers, if their manufacturing operations were interrupted for any significant amount of time, or if they were unable or unwilling to supply us for any other reason, including capacity restraints, then we would be at least temporarily unable to obtain sufficient supplies of fiber, thus exposing us to significant delays and additional costs.

IF WE FAIL TO PREDICT OUR MANUFACTURING REQUIREMENTS ACCURATELY, WE COULD INCUR ADDITIONAL COSTS OR EXPERIENCE MANUFACTURING DELAYS, WHICH COULD CAUSE US TO LOSE ORDERS OR CUSTOMERS AND RESULT IN LOWER REVENUES.

We currently use a rolling 12-month forecast based primarily on our anticipated product orders and our limited product order history to determine our requirements for components and materials. It is very important that we accurately predict both the demand for our products and the lead time required to obtain the necessary components and raw materials. Lead times for materials and components that we order vary significantly and depend on factors such as the specific supplier, the size of the order, contract terms and demand for each component at a given time. If we underestimate our requirements, we may have inadequate manufacturing capacity or inventory, which could interrupt manufacturing of our products and result in delays in shipments and revenues. If we overestimate our requirements, we could have excess inventory of parts.

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We also may experience shortages of components from time to time, which also could delay the manufacturing of our products and could cause us to lose orders or customers.

BECAUSE WE HAVE ONLY RECENTLY BEGUN SELLING PRODUCTS TO THE OPTICAL NETWORKING

INDUSTRY, REVENUES FROM THESE PRODUCTS MAY BE DIFFICULT TO PREDICT, NET REVENUES AND RESULTS OF OPERATIONS MAY FLUCTUATE AND OUR STOCK PRICE MAY BE MORE VOLATILE.

We have only recently begun selling our fiber optic components, equipment and modules to the optical communications industry, and generating revenues from the sales of these products. We may be unable to accurately forecast our revenues from sales of these products, and we have limited meaningful historical financial data upon which to plan future operating expenses. In addition, many of our expenses are fixed in the short term, and we may not be able to quickly reduce spending if our revenue is lower than we project. Major new product introductions will also result in increased operating expenses in advance of generating revenues, if any. Therefore, net losses in a given quarter could be greater than expected. We may not be able to address the risks associated with our limited operating history in an emerging market and our business strategy in this market may not be sustainable. Resulting quarterly fluctuations in our net revenues could result in volatility or a decline in our stock price.

CYCLICALITY IN OUR BUSINESS HAS HISTORICALLY LED TO SUBSTANTIAL DECREASES IN DEMAND FOR OUR PRODUCTS AND MAY FROM TIME TO TIME CONTINUE TO DO SO.

Our business has historically been significantly dependent on capital expenditures by manufacturers of components for the computer disk drive industry and the semiconductor industry. These industries are cyclical and historically experienced periods of oversupply, which result in significantly reduced demand for capital equipment, including the products manufactured and marketed by us. For the foreseeable future, our operations will continue to be dependent on the capital expenditures in these industries, which, in turn, are largely dependent on the market demand for hard disk drives and products containing integrated circuits. Our net sales and results of operations may be materially adversely affected if downturns or slowdowns in the computer disk drive or semiconductor markets occur in the future.

OUR BACKLOG MAY NOT RESULT IN FUTURE SALES.

We schedule the production of our systems based in part upon order backlog. Due to possible customer changes in delivery schedules and cancellations of orders, our backlog at any particular date is not necessarily indicative of actual sales for any succeeding period. There can be no assurance that amounts included in backlog will ultimately result in future sales. A reduction in backlog during any particular period, or the failure of our backlog to result in future sales, could harm our business.

WE FACE RISKS RELATING TO OUR INTERNATIONAL SALES AND OUR FOREIGN OPERATIONS.

Our products are sold internationally, including to customers in Japan and throughout the Pacific Rim. Net sales to customers outside the United States accounted for 44%, 46%, and 44%

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of our net sales in each of the fiscal years ended June 30, 2000, 1999, and 1998, respectively, and are expected to continue to account for a substantial percentage of our net sales. International sales and foreign operations are subject to inherent risks. These risks include:

- o longer payment cycles;
- o greater difficulty in accounts receivable collection;
- o compliance with foreign laws;
- o changes in regulatory requirements;
- o tariffs or other barriers;
- o difficulties in obtaining export licenses;
- o difficulties in staffing and managing foreign operations;
- o exposure to currency exchange fluctuations;
- o reduced protection for intellectual property rights;
- o political and economic instability;
- o transportation delays; and
- o potentially adverse tax consequences.

Substantially all our sales and costs are negotiated for and paid in U.S. dollars. However, changes in the values of foreign currencies relative to the

value of the U.S. dollar can render our products comparatively more expensive to the extent locally produced alternative products are available. These exchange rate fluctuations could negatively impact international sales of our products and our foreign operations, as would changes in the general economic conditions in those markets. Any measures we take to protect us from exchange rate fluctuations may not adequately protect us from their potential harm.

WE RELY HEAVILY ON OUR MIDDLEFIELD, CONNECTICUT AND HOLLISTON, MASSACHUSETTS MANUFACTURING FACILITIES.

We manufacture substantially all of our metrology, bulk optics and instrumentation products at our facility in Middlefield, Connecticut and our microoptical components at our wafer lab in Holliston, Massachusetts. Any extended interruption of optical component production at the Middlefield or Holliston manufacturing facilities could have a material adverse effect on our business.

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OUR QUARTERLY AND ANNUAL OPERATING RESULTS MAY FLUCTUATE AND THE PRICE OF OUR COMMON STOCK MAY CHANGE IN RESPONSE TO THOSE FLUCTUATIONS.

Our quarterly and annual operating results have varied in the past and may in the future vary significantly depending on factors such as:

- o the effect of our acquisitions;
- o the size, timing and recognition of revenue from significant orders;
- o increased competition;
- o our ability to develop innovative products;
- o the timing of new product releases by us or our competitors;
- o market acceptance of our products;
- o changes in our and our competitors' pricing policies;
- o budgeting cycles of our customers;
- o changes in operating expenses and personnel changes;
- o changes in our business strategy; and
- o general economic factors.

Due to these and other factors we believe that quarter-to-quarter comparisons of our operating results may not be meaningful. You should not rely on our results for one quarter as any indication of our future performance. It is [likely] that in future periods our operating results may be below the expectations of public market analysts or investors. If this occurs, the price of our common stock would likely decrease.

WE MAY EXPAND OUR BUSINESS THROUGH NEW ACQUISITIONS THAT COULD DISRUPT OUR BUSINESS AND HARM OUR FINANCIAL CONDITION.

Our growth strategy includes expanding our products and services, and we may seek acquisitions to expand our business. We regularly review various acquisition prospects of businesses, technologies or products complementary to our business and periodically engage in discussions regarding such possible acquisitions. Acquisitions involve numerous risks, including some or all of the following:

- o substantial cash expenditures;
- o potentially dilutive issuance of equity securities;
- o incurrence of debt and contingent liabilities;

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- o amortization of expenses related to goodwill and other intangible assets;
- o difficulties in assimilating the operations and products of the acquired companies;
- o diverting our management's attention away from other business

concerns;

- o risks of entering markets in which we have limited or no direct experience; and
- o potential loss of key employees of the acquired companies in the process of integrating personnel with disparate business backgrounds and combining different corporate cultures.

We cannot assure you that any acquisition will result in long-term benefits to us or that our management will be able to effectively manage the acquired businesses. We may also incorrectly judge the value or worth of an acquired company or business. In addition, our future success will depend in part on our ability to manage the rapid growth associated with these acquisitions. We may not be able to make the combination of our business with the businesses of an acquired company's work or be successful. Furthermore, the development or expansion of our business or any acquired business may require a substantial capital investment by us. We may not have the necessary funds nor may they be readily available to us on acceptable terms or at all. We may also seek to raise funds by selling shares of our stock, which could dilute your ownership interest in our company.

SALES TO OUR LARGEST CUSTOMER ACCOUNT FOR A SIGNIFICANT PORTION OF OUR NET SALES.

During fiscal 2000, 1999 and 1998, sales to Canon Inc. and Canon Sales Co., Inc. (collectively, "Canon"), our largest customer in those periods, accounted for approximately 19%, 21% and 18%, respectively, of our net sales. We expect that sales to Canon, which owns approximately 8.5% of our outstanding shares of Common Stock and is a distributor of some of our products in the Japanese market, will continue to represent a significant percentage of our net sales for the foreseeable future. Our customers generally, including Canon, do not enter into long-term agreements obligating them to purchase our products. A reduction or delay in orders from this customer, including reductions or delays due to market, economic, or competitive conditions in the semiconductor or computer disk drive industries, could have a material adverse effect upon our results of operations.

WE MAY BE UNABLE TO EFFECTIVELY RESPOND TO TECHNOLOGICAL CHANGE.

The market for our products is characterized by rapidly changing technology. Our future success will depend upon our ability to enhance our current products and to develop and introduce new products that keep pace with technological developments and evolving industry standards, respond to changes in customer requirements and achieve market acceptance. If we fail to anticipate or respond adequately to technological developments and customer requirements, or experience significant delays in product development or introduction, our business, results of operations, financial condition and liquidity will be negatively affected.

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In order to develop new products successfully, we depend on close relationships with our customers and their willingness to share proprietary information about their requirements and participate in collaborative efforts with us. We cannot assure you that our customers will continue to provide us with timely access to such information. We may also fail to successfully develop and market new products and services or product and service enhancements on a timely basis, including in the optical communications market where we have very limited experience, and we may not respond effectively to technological changes or new product announcements by others.

IF WE FAIL TO MANAGE OUR GROWTH EFFECTIVELY, OUR BUSINESS MAY NOT SUCCEED.

We are experiencing a period of rapid growth and expansion due to both acquisitions and internal growth. Our growth and expansion has placed, and could continue to place, a significant strain on our management, personnel and other resources.

To accommodate our recent growth and to compete effectively and manage future growth we will be required to continue to implement and improve our operational, financial and management information systems, procedures and controls on a timely basis and to expand, train, motivate and manage our workforce. Our inability to satisfy increased customer orders in a timely fashion, or at all, could result in termination of customer relationships or cause customers to seek alternative sources for their products. In addition, our financial control systems and infrastructure may not be adequate to maintain and effectively monitor our future growth. We cannot assure you that our personnel, systems, procedures and controls will be adequate to support our existing and future operations.

ENVIRONMENTAL REGULATIONS APPLICABLE TO OUR MANUFACTURING OPERATIONS COULD LIMIT OUR ABILITY TO EXPAND OR SUBJECT US TO SUBSTANTIAL COSTS.

We are subject to a variety of environmental regulations relating to the use, storage, discharge and disposal of hazardous chemicals used during our manufacturing processes. Any failure by us to comply with present and future regulations could subject us to future liabilities or the suspension of production. In addition, such regulations could restrict our ability to expand our facilities or could require us to acquire costly equipment or to incur other significant expenses to comply with environmental regulations.

WE MAY NOT BE ABLE TO CONTINUE TO ATTRACT AND RETAIN QUALIFIED EMPLOYEES.

Our future success depends on our ability to attract and retain qualified personnel in the following areas:

- o engineering;
- o management;
- o manufacturing;

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- o research and development;
- o sales and marketing; and
- o support.

Competition for these individuals is intense and many qualified individuals are attracted to Internet businesses on the West Coast, and we cannot assure you that we will be able to retain our existing personnel or attract and retain additional personnel.

OUR PRODUCTS ARE DEPLOYED IN LARGE AND COMPLEX SYSTEMS AND MAY CONTAIN DEFECTS THAT ARE NOT DETECTED UNTIL AFTER OUR PRODUCTS HAVE BEEN INSTALLED, WHICH COULD DAMAGE OUR REPUTATION AND CAUSE US TO LOSE CUSTOMERS.

We design some of our products for deployment in large and complex optical networks. Because of the nature of these products, they can only be fully tested for reliability when deployed in networks for long periods of time. Our fiber optic products may contain undetected defects when first introduced or as new versions are released, and our customers may discover defects in our products only after they have been fully deployed and operated under peak stress conditions. In addition, our products are combined with products from other vendors. As a result, should problems occur, it may be difficult to identify the source of the problem. If we are unable to fix defects or other problems, we could experience, among other things:

- o loss of customers;
- o damage to our brand reputation;
- o failure to attract new customers or achieve market acceptance;
- o diversion of development and engineering resources; and
- o legal actions by our customers.

The occurrence of any one or more of the foregoing factors could cause us to experience losses, incur liabilities and cause our net sales to decline.

WE FACE INTENSE COMPETITION, AND IF WE ARE UNABLE TO COMPETE SUCCESSFULLY, WE WILL LOSE MARKET SHARE AND OUR BUSINESS WILL SUFFER.

We face competition from a number of companies in all of our markets, some of which have greater manufacturing and marketing capabilities, and greater financial, technological and personnel resources. We also compete with current and prospective customers' attempts to become vertically integrated. Although we believe that we have certain technical and other advantages over some of our competitors, maintaining these advantages will require us to continue to invest in research and development, sales, marketing and service. We cannot assure

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you that we will have sufficient resources to continue to make these investments or that we will be able to make the technological advances necessary to maintain any competitive advantages.

NECESSARY LICENSES OF THIRD-PARTY TECHNOLOGY MAY NOT BE AVAILABLE TO US OR MAY BE VERY EXPENSIVE, WHICH COULD ADVERSELY AFFECT OUR ABILITY TO MANUFACTURE AND SELL OUR PRODUCTS.

From time to time we may be required to license technology from third parties to develop new products or product enhancements. We cannot assure you that third-party licenses will be available to us on commercially reasonable terms, or at all. The inability to obtain any third-party license required to develop new products and product enhancements could require us to obtain substitute technology of lower quality or performance standards or at greater cost, either of which could seriously harm our ability to manufacture and sell our products.

IF WE FAIL TO ADEQUATELY PROTECT OUR INTELLECTUAL PROPERTY, WE MAY NOT BE ABLE TO COMPETE.

Our success is heavily dependent upon our proprietary technology. We cannot assure you that the steps we have taken to protect our proprietary technology will be adequate to prevent misappropriation of our technology by third parties or will be adequate under the laws of some foreign countries, which may not protect our proprietary rights to the same extent as do laws of the United States. Also, we cannot assure you that others will not "reverse engineer" our products in order to determine their method of operation and introduce competing products or that others will not develop competing technology independently. We cannot assure you that our existing or future patents will not be challenged, invalidated or circumvented. Any such adverse circumstances could have a material adverse effect on our results of operations.

We rely on trade secret protection for our technology, in part through confidentiality agreements with our employees, consultants and third parties. However, employees may breach these agreements, and we may not have adequate remedies for any breach. In any case, others may come to know about or determine our trade secrets through a variety of methods.

IF OUR PRODUCTS INFRINGE ON THE INTELLECTUAL PROPERTY RIGHTS OF THIRD PARTIES, OUR BUSINESS MAY SUFFER IF WE ARE SUED FOR INFRINGEMENT OR CANNOT OBTAIN LICENSES TO THESE RIGHTS ON COMMERCIALY ACCEPTABLE TERMS.

We are subject to the risk of adverse claims and litigation alleging infringement by us of the intellectual property rights of others. Although we believe our services and products do not infringe the intellectual property rights of others, it is possible that claims could be asserted against us in the future. Many participants in the technology industry have an increasing number of patents and patent applications and have frequently demonstrated a readiness to take legal action based on allegations of patent and other intellectual property infringement. Further, as the number of our products increase, the markets in which our products are sold expand and the functionality of our products grows and overlaps with products offered by our competitors, we believe that we may become increasingly subject to infringement claims. If we become the subject of a claim for infringement we would have to expend potentially significant funds and

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resources to defend the claim and, if we were to be deemed to infringe the intellectual property rights of others, we could be forced to pay significant license fees or damages for infringement.

OUR NEWLY ACQUIRED SUBSIDIARY'S NAME WAS CHANGED FROM FIREFLY TECHNOLOGIES, INC. TO ZYGO TERAOPTIX AND THE NEW NAME IS NOT YET RECOGNIZED AS A BRAND NAME IN THE MARKETPLACE, AS A RESULT OF WHICH PRODUCT SALES FROM OUR ZYGO TERAOPTIX UNIT COULD SUFFER.

The loss of the brand name Firefly Technologies, Inc. may hinder our ability to establish new relationships. When we acquired Firefly, we changed its brand name and most of the trademarks and trade names under which it conducted its business. The new name is not yet recognized in the marketplace and as a result the product sales from our Zygo TeraOptix unit could suffer.

OUR EXECUTIVE OFFICERS AND DIRECTORS, TOGETHER WITH THEIR AFFILIATES, BENEFICIALLY OWN APPROXIMATELY 18% OF OUR COMMON STOCK AND THEY MAY BE IN A POSITION TO CONTROL AND DIRECT OUR AFFAIRS AND BUSINESS, INCLUDING THE ELECTION OF ALL THE DIRECTORS.

Our executive officers and directors, through their affiliation with certain stockholders and their stock option holdings, may be deemed to beneficially own approximately 18% of our outstanding shares of common stock. As

a result, these individuals may have the ability to control us and direct our affairs and business, including the election of all the directors.

WE EXPECT TO EXPERIENCE VOLATILITY IN OUR SHARE PRICE, WHICH COULD NEGATIVELY AFFECT YOUR INVESTMENT, AND YOU MAY NOT BE ABLE TO RESELL YOUR SHARES AT OR ABOVE THE OFFERING PRICE.

This offering price may vary from the market price of our common stock after the offering. If you purchase shares of common stock, you may not be able to resell those shares at or above the offering price. The market price of our common stock has fluctuated significantly since our initial public offering and we expect that our common stock price will fluctuate significantly in the future due to:

- o any deviations in our net revenues, gross margins or net losses from levels expected by securities analysts;
- o changes in financial estimates by securities analysts;
- o changes in market valuations of other companies in the same or similar markets; and
- o future sales of common stock or other securities.

In addition, the Nasdaq National Market's National Market has experienced extreme volatility that has often been unrelated to the performance of particular companies. Future market fluctuations may cause our stock price to fall regardless of our performance.

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USE OF PROCEEDS

We will not receive any proceeds from the sale of common stock by the selling stockholders.

DIVIDEND POLICY

We have never declared or paid any dividends on our stock. We currently anticipate that we will retain all future earnings to support our growth strategy. Accordingly, we do not anticipate paying cash dividends on our stock in the foreseeable future. The payment of any future dividends will be at the discretion of our board of directors and will depend upon, among other things, future earnings, operations, capital requirements, our general financial condition, and general business conditions.

PRICE RANGE OF COMMON STOCK

Our common stock is quoted on the Nasdaq National Market under the symbol "ZIGO." The following table sets forth, for the periods indicated, the high and low reported sale prices per share for our common stock as reported by the Nasdaq National Market.

	HIGH	LOW
	-----	-----
YEAR ENDED JUNE 30, 1999:		
First quarter.....	\$15 3/8	\$ 6 3/8
Second quarter.....	\$12 3/4	\$ 5
Third quarter.....	\$15 3/4	\$ 8 1/2
Fourth quarter.	\$13 1/8	\$ 7 1/4
YEAR ENDED JUNE 30, 2000:		
First quarter.....	\$14 5/8	\$ 9 1/4
Second quarter	\$25 1/16	\$13
Third Quarter.....	\$74 5/16	\$19 3/8
Fourth Quarter.....	\$94	\$20 3/4
YEAR ENDING JUNE 30, 2001:		
First quarter (through September 27, 2000).....	\$98 3/8	\$50 1/2

The number of stockholders of record of our common stock on September 27, 2000 was approximately 463. The last reported sale price of our common stock on the Nasdaq National Market on September 26, 2000 was \$79 13/16.

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SELLING STOCKHOLDERS

The following table sets forth information regarding the selling stockholders' beneficial ownership of our common stock as of August 31, 2000.

<TABLE>
<CAPTION>

SELLING STOCKHOLDER (1)	NUMBER OF SHARES OF COMMON STOCK BENEFICIALLY OWNED PRIOR TO THIS OFFERING	NUMBER OF SHARES OF COMMON STOCK REGISTERED HEREIN	NUMBER OF SHARES OF COMMON STOCK BENEFICIALLY OWNED AFTER THIS OFFERING	PERCENT OF SHARES OF COMMON STOCK BENEFICIALLY OWNED AFTER THIS OFFERING
<S>	<C>	<C>	<C>	<C>
John Berg (3)	532,984	532,934	50	*
Patrick Tan (4)	336,363	336,363	0	*
TeraStor Corporation	86,775	86,775	0	*
David Kindler	106,618	106,618	0	*
David Buswell	91,290	91,290	0	*
Mark Wilder	69,350	69,350	0	*
Thomas Killoren	103,753	103,753	0	*
Digital Papyrus Corporation	43,387	43,387	0	*
Easen Ho	43,387	43,387	0	*
David Kent	94,568	94,568	0	*
Phillip Malyak	94,568	94,568	0	*
Michael Harrington	81,581	81,581	0	*
Don Clausing	13,073	13,073	0	*
John Howard	25,536	25,536	0	*
Michael Terrio	14,566	14,566	0	*
Jeffrey Murzycki	6,580	6,580	0	*
Borislav Naidenov	15,356	15,356	0	*
Robert Natale	8,042	8,042	0	*
Lydia Heckman	8,803	8,803	0	*
Barry Mitchel	4,416	4,416	0	*
Deborah O'Connor	8,833	8,833	0	*
Kenneth Mueller	2,251	2,251	0	*
John Ritter	117,010	117,010	0	*
Lori Duncan	58,505	58,505	0	*
Scott Friends	50,648	50,648	0	*
Chongwon Byun	49,729	49,729	0	*
Hae Kwon Chung	49,729	49,729	0	*
John Watson	29,252	29,252	0	*
Mark Steinback	24,702	24,702	0	*
Leonard Croteau	21,521	21,521	0	*
Guy Messier	21,939	21,939	0	*
Wayne Smith	15,439	15,439	0	*
Joseph DeWolfe	12,788	12,788	0	*
Diane Briggs	8,441	8,441	0	*
Gary Potwin	8,692	8,692	0	*
Marjorie Swenson	7,763	7,763	0	*
Leonid Tesmenitsky	7,243	7,243	0	*
Robert Kusy	5,822	5,822	0	*
Carol Dana Berg	6,457	6,457	0	*
Robert Shillinsky II	5,823	5,823	0	*
Scot Barrows	6,519	6,519	0	*
Robert Cudmore	3,882	3,882	0	*

</TABLE>

* Less than one percent.

- (1) The selling stockholders received their shares of common stock in connection with our acquisition of Firefly Technologies, Inc. on May 5, 2000.
- (2) Assumes that all shares offered by each selling stockholder are sold in this offering.
- (3) Mr. Berg serves as a director of Zygo Corporation.
- (4) Mr. Tan serves as a director of Zygo Corporation.

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PLAN OF DISTRIBUTION

The selling stockholders (and their donees and pledgees) may offer their shares at various times in one or more transactions on the Nasdaq National Market, in special offerings, exchange distributions, secondary distributions, negotiated transactions or a combination of these. They may sell at market

prices at the time of sale, at prices related to the market price or at negotiated prices. The selling stockholders may use broker-dealers to sell their shares. If this happens, broker-dealers will either receive discounts or commissions from the selling stockholder, or they will receive commissions from purchasers of shares for whom they acted as agents.

LEGAL MATTERS

For the purpose of this offering, our outside counsel, Fulbright & Jaworski L.L.P., New York, New York 10103, is giving its opinion on the validity of the shares. Paul Jacobs, a partner in Fulbright & Jaworski L.L.P., is our Secretary and, as of September 27, 2000, beneficially owned 4,000 shares of our common stock.

EXPERTS

The consolidated financial statements and schedules of Zygo Corporation included in this prospectus and in the registration statement have been audited by KPMG LLP, independent certified public accountants, to the extent and for the periods set forth in their reports appearing elsewhere in this prospectus and in the registration statement, and are included in reliance upon such reports given upon the authority of that firm as experts in auditing and accounting.

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PART II

INFORMATION NOT REQUIRED IN PROSPECTUS

Item 14. OTHER EXPENSES OF ISSUANCE AND DISTRIBUTION.

The expenses payable by the Registrant in connection with the issuance and distribution of the securities being registered (other than underwriting accounts and commissions) are estimated to be as follows:

SEC Registration Fee.....	\$38,857.24
Accountants' Fees and Expenses.....	13,000.00
Legal Fees and Expenses.....	15,000.00
Printing Fees.....	10,000.00
Miscellaneous.....	1,142.76

Total.....	\$78,000.00
	=====

Item 15. INDEMNIFICATION OF DIRECTORS AND OFFICERS.

Section 145 of the General Corporation Law of Delaware permits indemnification of directors, officers and employees of a corporation under certain conditions and subject to certain limitations. Article VI of the By-Laws of the Registrant contains provision for the indemnification of directors, officers and employees within the limitations permitted by Section 145. In addition, the Company has entered into Indemnity Agreements with its directors and officers which provide the maximum indemnification allowed by Section 145. The Company's officers and directors are insured against losses arising from any claim against them as such for wrongful acts or omissions, subject to certain limitations.

Item 16. EXHIBITS

NO.	DESCRIPTION
*5	Opinion of Fulbright & Jaworski L.L.P. regarding legality.
*23	(a) Consent of Fulbright & Jaworski L.L.P. (to be filed as part of Exhibit 5.1).
	(b) Consent of KPMG LLP
24	Power of Attorney (included on signature page).

* Previously filed.

Item 17. Undertakings.

(a) The undersigned Registrant hereby undertakes:

(1) To file, during any period in which offers or sales are being made, a post-effective amendment to this registration statement to include

respect to the plan of distribution not previously disclosed in the registration statement or any material change to such information in the registration statement;

(2) That, for the purpose of determining any liability under the Securities Act of 1933, each such post-effective amendment shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof;

(3) To remove from registration by means of a post-effective amendment any of the securities being registered which remain unsold at the termination of the offering.

(b) The undersigned Registrant hereby undertakes that, for purposes of determining any liability under the Securities Act of 1933, each filing of the Registrant's annual report pursuant to section 13(a) or section 15(d) of the Securities Exchange Act of 1934 (and, where applicable, each filing of an employee benefit plan's annual report pursuant to section 15(d) of the Securities Exchange Act of 1934) that is incorporated by reference in the registration statement shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

(c) Insofar as indemnification for liabilities arising under the Securities Act of 1933 may be permitted to directors, officers and controlling persons of the Registrant pursuant to the foregoing provisions, or otherwise, the Registrant has been advised that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in the Act and is, therefore, unenforceable. In the event a claim for indemnification against such liabilities (other than the payment by the Registrant of expenses incurred or paid by a director, officer, or controlling person of the registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer, or controlling person of the Registrant in connection with the securities being registered, the Registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Act and will be governed by the final adjudication of such issue.

SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, the Registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-3 and has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Middlefield, State of Connecticut, on September 29, 2000.

ZYGO CORPORATION

By: /s/ J. Bruce Robinson

(J. Bruce Robinson, President and CEO)

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS, that each individual whose signature appears below constitutes and appoints J. Bruce Robinson and Michael J. Auth, or either of them, his true and lawful attorney-in-fact and agent with full power of substitution and resubstitution, for him and in his name, place and stead, in any and all capacities, to sign any and all amendments (including post-effective amendments) to this Registration Statement and to file the same with all exhibits thereto and all documents in connection therewith, with the Securities and Exchange Commission, granting said attorney-in-fact and agent and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in and about the premises, as fully to all intents and purposes as he or she might or could do in person, hereby ratifying and confirming all that said attorney-in-fact and agent or any of them, or their or his substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Act of 1933, this registration statement has been signed below by the following persons in the capacities and on the dates indicated:

Signature	Title	Date
<S>	<C>	<C>
By: /s/ J. Bruce Robinson	President, Chief Executive Officer, and Director (Principal Executive Officer)	September 29, 2000
----- *By: J. Bruce Robinson As Attorney-in-fact		
----- * Michael J. Auth	Vice President, Finance, Treasurer and Chief Financial Officer (Principal Financial and Accounting Officer)	September 29, 2000
----- * Gary K. Willis	Chairman of the Board	September 29, 2000
----- * John Berg	Director	September 29, 2000
----- * Paul F. Forman	Director	September 29, 2000
----- * Seymour E. Liebman	Director	September 29, 2000
----- * Robert G. McKelvey	Director	September 29, 2000
----- * Patrick Tan	Director	September 29, 2000
----- * Robert B. Taylor	Director	September 29, 2000
----- * Carl A. Zanoni	Director	September 29, 2000

</TABLE>

[KPMG Letterhead]

EXHIBIT 23 (b)

CONSENT OF INDEPENDENT AUDITORS

To the Board of Directors and Stockholders of
Zygo Corporation:

We consent to incorporation by reference in this Registration Statement on Form S-3 of Zygo Corporation of our report dated August 12, 2000, relating to the consolidated balance sheets of Zygo Corporation as of June 30, 2000, and 1999, and the related consolidated statements of earnings, stockholders' equity and cash flows for each of the years in the three-year period ended June 30, 2000, which report is included in the annual report of Zygo Corporation on Form 10-K for the fiscal year ended June 30, 2000.

/s/ KPMG LLP

Hartford, CT
September 25, 2000