

NANOMETRICS INC
Form S-4/A
June 19, 2006
Table of Contents

As Filed with the Securities and Exchange Commission on June 19, 2006

Reg. No. 333-133033

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

AMENDMENT NO. 3
TO
FORM S-4
REGISTRATION STATEMENT

Under

The Securities Act of 1933

NANOMETRICS INCORPORATED

(Exact name of registrant as specified in its charter)

California
(State or other jurisdiction of
incorporation or organization)

3829
(Primary Standard Industrial
Classification Code Number)
1550 Buckeye Drive

94-2276314
(I.R.S. Employer
Identification Number)

Milpitas, California 95035

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(408) 435-9600

(Address, including zip code, and telephone number, including area code, of registrant's principal executive offices)

Douglas J. McCutcheon

Chief Financial Officer

Nanometrics Incorporated

1550 Buckeye Drive

Milpitas, California 95035

(408) 435-9600

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

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Approximate date of commencement of proposed sale to the public: As soon as practicable after the effectiveness of this registration statement and the satisfaction or waiver of all other conditions under the merger agreement, as amended, described herein.

If the securities being registered on this form are being offered in connection with the formation of a holding company and there is compliance with General Instruction G, check the following box. "

If this form is filed to register additional securities for an offering pursuant to Rule 462(b) 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 this form is a post-effective amendment filed pursuant to Rule 462(d) 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. "

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 that 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 Securities and Exchange Commission, acting pursuant to said Section 8(a), may determine.

Table of Contents

The information in this joint proxy statement/prospectus is not complete and may be changed. Registrant may not sell these securities until the registration statement filed with the Securities and Exchange Commission, of which this document is a part, is declared effective. This joint proxy statement/prospectus is not an offer to sell these securities and it is not soliciting an offer to buy these securities in any jurisdiction where the offer, solicitation or sale is not permitted or would be unlawful prior to registration or qualification under the securities laws of any such jurisdiction. Any representation to the contrary is a criminal offense.

Subject to Completion

June 19, 2006

JOINT PROXY STATEMENT/PROSPECTUS

MERGER PROPOSED YOUR VOTE IS VERY IMPORTANT

The boards of directors of Nanometrics Incorporated and Accent Optical Technologies, Inc. have unanimously approved the merger of Alloy Merger Corporation, a wholly owned subsidiary of Nanometrics, with and into Accent Optical pursuant to the terms and conditions of an agreement and plan of merger and reorganization, dated as of January 25, 2006, by and among Nanometrics, Alloy Merger Corporation, Accent Optical and Sanford S. Wadler, as Stockholder Agent, as amended. The maximum number of shares that Nanometrics would issue in connection with the merger and reserve for issuance upon the exercise of assumed options is approximately 5,212,286 shares of common stock, assuming that the average closing price of Nanometrics common stock for the 10 trading days ending the two consecutive trading days prior to the consummation of the merger is \$15.63, which would result in the Accent Optical stockholders holding approximately 27% of the fully diluted shares of Nanometrics common stock immediately after the merger, and Nanometrics shareholders holding approximately 73% of the fully diluted shares of Nanometrics common stock immediately after the merger. The actual number of Nanometrics shares to be issued in the merger depends on several factors. See the sections of the attached joint proxy statement/prospectus captioned *Summary Overview of Merger Agreement and Related Agreements* *Merger Consideration* beginning on page 13 and *The Merger Agreement Treatment of Securities* beginning on page 86 for a description of how the final number of shares will be determined. Nanometrics common stock trades on the Nasdaq National Market under the symbol NANO.

Nanometrics and Accent Optical cannot complete the merger unless Nanometrics shareholders approve the issuance of shares of Nanometrics common stock in, and the other principal terms of, the merger and Accent Optical stockholders approve and adopt the merger agreement, as amended, and the merger and approve certain other matters described in the joint proxy statement/prospectus including the escrow agreement and the appointment of a stockholder agent. These matters, among others, are included in the proposals to be voted on at the special meetings of the Nanometrics shareholders and Accent Optical stockholders, to be held on July 21, 2006, as more fully described in this joint proxy statement/prospectus, which also includes more information about Nanometrics, Accent Optical and the merger. **You are encouraged to carefully read this joint proxy statement/prospectus in its entirety, including the section entitled Risk Factors beginning on page 30 before voting on the matters set forth in the attached joint proxy statement/prospectus.**

The Nanometrics board of directors unanimously recommends that Nanometrics shareholders vote FOR Nanometrics proposal to approve the issuance of shares of Nanometrics common stock in, and the other principal terms of, the merger.

The Accent Optical board of directors unanimously recommends that the Accent Optical stockholders vote FOR Accent Optical's proposal to approve and adopt the merger agreement, as amended, and approve the merger, as well as the other matters set forth in the joint proxy statement/prospectus for their consideration.

Your vote is very important. Whether or not you plan to attend your company's meeting, please take the time to vote by completing and mailing to us the enclosed proxy card or, if the option is available to you, by granting your proxy electronically over the internet or by telephone. If your shares are held in street name, you must instruct the record holder of your shares in order to vote.

Sincerely,

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John D. Heaton
President and Chief Executive Officer
Nanometrics Incorporated

Bruce C. Rhine
Chairman and Chief Executive Officer
Accent Optical Technologies, Inc.

None of the Securities and Exchange Commission, any state securities regulator or any regulatory authority has approved or disapproved of these transactions or the securities to be issued under this joint proxy statement/prospectus or determined if the disclosure in this joint proxy statement/prospectus is accurate or adequate. Any representation to the contrary is a criminal offense.

This joint proxy statement/prospectus is dated June 19, 2006, and is being mailed to shareholders of Nanometrics and stockholders of Accent Optical on or about June 21, 2006.

Table of Contents

ADDITIONAL INFORMATION

This joint proxy statement/prospectus incorporates by reference important business and financial information about Nanometrics from documents that are not included in or delivered with this joint proxy statement/prospectus but which Nanometrics has previously filed with the Securities and Exchange Commission (the "SEC"). For a more detailed description of the information incorporated by reference into this joint proxy statement/prospectus and how you may obtain it, see the section of this joint proxy statement/prospectus entitled *Additional Information Where You Can Find More Information* beginning on page 167.

You can obtain any of the documents incorporated by reference into this joint proxy statement/prospectus from Nanometrics at www.nanometrics.com/investors or from the SEC, through its website at www.sec.gov. Documents incorporated by reference are available from Nanometrics and Accent Optical without charge, excluding any exhibits to those documents. Nanometrics shareholders and Accent Optical stockholders may request a copy of such documents by contacting either Nanometrics or Accent Optical, as appropriate, at:

Nanometrics Incorporated
1550 Buckeye Drive
Milpitas, California 95035
Attn: Investor Relations

Accent Optical Technologies, Inc.
1320 SE Armour Drive, Suite B2
Bend, Oregon 97702
Attn: Chief Executive Officer

In addition, you may obtain copies of the information relating to Nanometrics, without charge, by sending an e-mail to investors@nanometrics.com or by calling Nanometrics at (408) 435-9600 or, Nanometrics proxy solicitors, The Altman Group, at (800) 884-4969 or (201) 806-7300.

We are not incorporating the contents of the websites of the SEC, Nanometrics, Accent Optical or any other person into this document. We are only providing the information about how you can obtain certain documents that are incorporated by reference into this joint proxy statement/prospectus at these websites for your convenience.

In order for you to receive timely delivery of the documents in advance of the special meetings, Nanometrics or Accent Optical, as applicable, must receive your request no later than July 14, 2006, five business days before the special meetings.

Table of Contents

NANOMETRICS INCORPORATED

NOTICE OF SPECIAL MEETING OF SHAREHOLDERS

TO THE SHAREHOLDERS OF NANOMETRICS INCORPORATED:

NOTICE IS HEREBY GIVEN that the special meeting of shareholders of Nanometrics Incorporated, a California corporation (Nanometrics), will be held on July 21, 2006 at 10:00 a.m., local time, at the principal offices of Nanometrics located at 1550 Buckeye Drive, Milpitas, California 95035. At the special meeting, Nanometrics shareholders will consider and vote upon the following:

1. The issuance of shares of Nanometrics common stock in connection with the merger of Alloy Merger Corporation, a wholly owned subsidiary of Nanometrics, with and into Accent Optical Technologies, Inc. pursuant to an Agreement and Plan of Merger and Reorganization, dated as of January 25, 2006, by and among Nanometrics, Alloy Merger Corporation, Accent Optical Technologies, Inc., and Sanford S. Wadler, as Stockholder Agent, as amended, and the other principal terms of the merger; and
2. Such other business as may properly come before the special meeting or any postponements or adjournments thereof.

The foregoing items of business are more fully described in the joint proxy statement/prospectus accompanying this notice of special meeting of shareholders.

Only Nanometrics shareholders of record at the close of business on May 24, 2006 are entitled to notice of and to vote at the special meeting and any postponements or adjournments thereof.

All Nanometrics shareholders are cordially invited to attend the special meeting in person. However, to ensure representation at the special meeting, Nanometrics shareholders are urged to mark, sign, date and return the enclosed proxy card as promptly as possible in the postage-prepaid envelope enclosed for that purpose. Any Nanometrics shareholder attending the special meeting may vote in person even if such shareholder previously returned a proxy card for the special meeting.

BY ORDER OF THE BOARD OF DIRECTORS,

/s/ VINCENT J. COATES
Vincent J. Coates
Chairman of the Board of Directors and Secretary

Milpitas, California

June 19, 2006

A FORM OF PROXY IS ENCLOSED. TO ASSURE THAT YOUR SHARES WILL BE VOTED AT THE MEETING, PLEASE COMPLETE AND SIGN THE ENCLOSED PROXY AND RETURN IT PROMPTLY IN THE ACCOMPANYING ENVELOPE. THE GIVING OF A PROXY WILL NOT AFFECT YOUR RIGHT TO VOTE IN PERSON IF YOU ATTEND THE MEETING. THE PROXY WHEN PROPERLY EXECUTED WILL BE VOTED IN THE MANNER DIRECTED BY THE SHAREHOLDER ON THE PROXY. IF NO CHOICE IS SPECIFIED, THE PROXY WILL BE VOTED FOR PROPOSAL 1, AND AS THE PROXYHOLDER(S) DETERMINE IN THEIR DISCRETION ON ANY OTHER ISSUES THAT COME BEFORE THE MEETING.

Table of Contents

ACCENT OPTICAL TECHNOLOGIES, INC.

NOTICE OF SPECIAL MEETING OF STOCKHOLDERS

TO BE HELD JULY 21, 2006

NOTICE IS HEREBY GIVEN that a Special Meeting of the Stockholders of Accent Optical Technologies, Inc., a Delaware corporation (Accent Optical), will be held on July 21, 2006, at the principal offices of Accent Optical located at 1320 SE Armour Drive, Suite B2, Bend, Oregon 97702, at 9:00 a.m., local time, to:

1. Approve and adopt the Agreement and Plan of Merger and Reorganization, dated as of January 25, 2006, by and among Nanometrics Incorporated (Nanometrics), Alloy Merger Corporation, a wholly owned subsidiary of Nanometrics, Accent Optical Technologies, Inc., and Sanford S. Wadler, as Stockholder Agent, as amended; approve the merger of Alloy Merger Corporation with and into Accent Optical; approve the appointment of Mr. Wadler as Stockholder Agent; and approve the escrow agreement entered into in connection with the merger;

2. Approve payments to certain executive officers of Accent Optical in connection with the merger, in amounts set forth and as more fully described in the joint proxy statement/prospectus accompanying this notice of special meeting; and

3. Transact such other business as may properly come before the meeting or any adjournment or adjournments thereof.

Only stockholders of record at the close of business on June 16, 2006, will be entitled to notice of and to vote at the Special Meeting of Stockholders or any adjournments thereof.

BY ORDER OF THE BOARD OF DIRECTORS

/s/ BRUCE C. RHINE
Bruce C. Rhine
Chairman

June 19, 2006

A FORM OF PROXY IS ENCLOSED. TO ASSURE THAT YOUR SHARES WILL BE VOTED AT THE MEETING, PLEASE COMPLETE AND SIGN THE ENCLOSED PROXY AND RETURN IT PROMPTLY IN THE ACCOMPANYING ENVELOPE. THE GIVING OF A PROXY WILL NOT AFFECT YOUR RIGHT TO VOTE IN PERSON IF YOU ATTEND THE MEETING. THE PROXY WHEN PROPERLY EXECUTED WILL BE VOTED IN THE MANNER DIRECTED BY THE STOCKHOLDER ON THE PROXY. IF NO CHOICE IS SPECIFIED, THE PROXY WILL BE VOTED FOR PROPOSALS 1 AND 2, AND AS THE PROXYHOLDER(S) DETERMINE IN THEIR DISCRETION ON ANY OTHER ISSUES THAT COME BEFORE THE MEETING.

Table of Contents

TABLE OF CONTENTS

	Page
<u>Questions and Answers About the Merger</u>	1
<u>Summary</u>	12
<u>The Companies</u>	12
<u>Nanometrics Incorporated</u>	12
<u>Alloy Merger Corporation</u>	12
<u>Accent Optical Technologies</u>	12
<u>Overview of Merger Agreement and Related Agreements</u>	13
<u>The Merger Agreement</u>	13
<u>Merger Consideration</u>	13
<u>Allocation of Merger Consideration among Accent Optical Stockholders</u>	14
<u>Treatment of Accent Optical Stock Options</u>	15
<u>Non-Solicitation Restrictions</u>	16
<u>Conditions to Completion of Merger</u>	16
<u>Termination Rights and Fees</u>	17
<u>Accounting Treatment of the Merger</u>	17
<u>Voting Agreements</u>	17
<u>Nanometrics Voting Agreements</u>	17
<u>Accent Optical Voting Agreements</u>	18
<u>Escrow Agreement</u>	18
<u>Employment and Severance Agreements</u>	19
<u>Employment Agreement</u>	19
<u>Executive Officer Retention and Severance Arrangements</u>	19
<u>Proposal Two Payments to Executives</u>	19
<u>Opinion of Nanometrics Financial Advisor</u>	20
<u>Opinion of Accent Optical's Financial Advisor</u>	20
<u>Interests of Certain Directors, Officers and Affiliates of Accent Optical</u>	20
<u>Material U.S. Federal Income Tax Consequences of the Merger</u>	21
<u>Ability to Sell Nanometrics Common Stock</u>	21
<u>Listing of Nanometrics Common Stock</u>	21
<u>Restrictions on Sales of Certain Shares of Nanometrics Common Stock Received in the Merger</u>	21
<u>Regulatory Approval</u>	22
<u>Appraisal Rights</u>	22
<u>Comparison of Shareholder Rights</u>	22
<u>Summary Selected Historical Financial Data</u>	23
<u>Nanometrics</u>	23
<u>Accent Optical</u>	24
<u>Selected Unaudited Pro Forma Condensed Combined Financial Data</u>	26
<u>Comparative Per Share Information</u>	27
<u>Comparative Per Share Market Price Data</u>	28
<u>Recent Developments</u>	29
<u>Risk Factors</u>	30
<u>Risks Relating to the Merger</u>	30
<u>Risks Related to the Combined Company after the Merger</u>	33
<u>Risks Related to Nanometrics Business</u>	40
<u>Risks Related to Accent Optical's Business</u>	43
<u>Cautionary Statement Concerning Forward-Looking Statements</u>	46
<u>The Nanometrics Special Meeting</u>	47
<u>General</u>	47

Table of Contents

	Page
<u>Date, Time, and Place</u>	47
<u>Purpose; Other Matters</u>	47
<u>Recommendation of the Nanometrics Board of Directors</u>	47
<u>Record Date; Outstanding Shares; Voting Rights</u>	47
<u>Admission to the Special Meeting</u>	48
<u>Quorum and Vote Required</u>	48
<u>Voting Agreements</u>	48
<u>Voting</u>	48
<u>General</u>	48
<u>Voting by Proxy</u>	49
<u>Changing Your Vote</u>	49
<u>Abstentions and Broker Non-Votes</u>	49
<u>Proxy Solicitation</u>	50
<u>Postponements and Adjournments</u>	50
<u>Assistance</u>	50
<u>The Accent Optical Special Meeting</u>	51
<u>General</u>	51
<u>Date, Time, and Place</u>	51
<u>Purpose; Other Matters</u>	51
<u>Recommendation of the Accent Optical Board of Directors</u>	51
<u>Record Date; Outstanding Shares; Voting Rights</u>	52
<u>Admission to the Special Meeting</u>	52
<u>Quorum and Vote Required</u>	52
<u>Voting Agreements</u>	53
<u>Voting</u>	53
<u>General</u>	53
<u>Voting by Proxy</u>	53
<u>Changing Your Vote</u>	53
<u>Abstentions</u>	54
<u>Proxy Solicitation</u>	54
<u>Postponements and Adjournments</u>	54
<u>Assistance</u>	54
<u>Proposal One The Merger</u>	55
<u>Background of the Merger</u>	55
<u>Joint Reasons of Nanometrics and Accent Optical for the Merger</u>	60
<u>Nanometrics Reasons for the Merger</u>	61
<u>Accent Optical s Reasons for the Merger</u>	63
<u>Recommendation of the Nanometrics Board of Directors</u>	64
<u>Recommendation of the Accent Optical Board of Directors</u>	65
<u>Opinion of Nanometrics Financial Advisor</u>	65
<u>Opinion of Accent Optical s Financial Advisor</u>	70
<u>Interests of Nanometrics Directors and Executive Officers in the Merger</u>	76
<u>Nanometrics Board of Directors and Executive Officers after the Merger</u>	76
<u>Directors and Officers Insurance</u>	76
<u>Interests of Accent Optical Directors and Executive Officers in the Merger</u>	76
<u>Nanometrics Board of Directors after the Merger</u>	76
<u>Employment Agreement with Nanometrics</u>	77
<u>Executive Officer Retention and Severance Arrangements</u>	77
<u>Executive Officer Option Grants</u>	78
<u>Indemnification; Directors and Officers Insurance</u>	79
<u>Payments to Bio-Rad Corporation</u>	79

Table of Contents

	Page
<u>Stock and Options of Directors and Executive Officers</u>	79
<u>Material United States Federal Income Tax Consequences of the Merger</u>	80
<u>Accounting Treatment of the Merger</u>	82
<u>Regulatory Matters Relating to the Merger</u>	82
<u>Dissenters' or Appraisal Rights in Connection with the Merger</u>	82
<u>Appraisal Rights for the Accent Optical Stockholders</u>	82
<u>Listing of Nanometrics Common Stock</u>	84
<u>Restrictions on Sales of Certain Shares of Nanometrics Common Stock Received in the Merger; Shareholder Agreements with Nanometrics</u>	85
<u>The Merger Agreement</u>	86
<u>Structure of the Merger</u>	86
<u>Closing and Effective Time of the Merger</u>	86
<u>Treatment of Securities</u>	86
<u>Fractional Shares</u>	88
<u>Treatment of Accent Optical Stock Options and Stock Plan</u>	88
<u>Exchange Fund; Exchange of Stock Certificates</u>	89
<u>Distributions with Respect to Unexchanged Shares</u>	89
<u>Termination of Exchange Fund; No Liability</u>	90
<u>Lost, Stolen or Destroyed Certificates</u>	90
<u>Representations and Warranties</u>	90
<u>Conduct of Business Before Completion of the Merger</u>	91
<u>Accent Optical Prohibited from Soliciting Other Offers</u>	93
<u>Obligations of the Nanometrics Board of Directors and the Accent Optical Boards of Directors with Respect to their Recommendation and Holding a Meeting</u>	94
<u>Public Announcements</u>	94
<u>Indemnification and Insurance</u>	95
<u>Reasonable Best Efforts to Complete the Merger</u>	95
<u>Conditions to Obligations to Complete the Merger</u>	96
<u>Material Adverse Effect</u>	97
<u>Termination; Termination Fees and Expenses</u>	98
<u>Termination</u>	98
<u>Termination Fees and Expenses</u>	99
<u>Expenses Generally</u>	99
<u>The Voting Agreements</u>	99
<u>The Shareholder Agreements</u>	101
<u>Employment Agreement</u>	102
<u>Escrow Agreement</u>	102
<u>Unaudited Pro Forma Condensed Combined Financial Statements</u>	104
<u>Unaudited Pro Forma Condensed Combined Balance Sheet as of April 1, 2006</u>	106
<u>Unaudited Pro Forma Condensed Combined Statement of Operations for the Year Ended December 31, 2005</u>	107
<u>Unaudited Pro Forma Condensed Combined Statement of Operations for the Three Months Ended April 1, 2006</u>	108
<u>The Nanometrics Business</u>	117
<u>The Accent Optical Business</u>	119
<u>Industry Overview</u>	119
<u>The Semiconductor Device Manufacturing Process</u>	119
<u>Process Control and Metrology</u>	120
<u>Lattice Engineering</u>	120
<u>Accent Optical's Solutions</u>	121
<u>Photolithography Process Control and Metrology Solutions</u>	121

Table of Contents

	Page
<u>Lattice Engineering Metrology Solutions</u>	122
<u>Accent Optical's Products</u>	123
<u>Photolithography Process Control and Metrology Systems</u>	123
<u>Lattice Engineering Metrology Systems</u>	123
<u>Accent Optical Customers</u>	124
<u>Sales, Marketing and Service</u>	124
<u>Manufacturing</u>	125
<u>Accent Optical Competition</u>	125
<u>Accent Optical Research and Development</u>	125
<u>Intellectual Property and Other Proprietary Rights</u>	126
<u>Employees</u>	126
<u>Facilities</u>	126
<u>Accent Optical Management's Discussion and Analysis of Financial Condition and Results of Operations</u>	127
<u>Overview</u>	127
<u>Results of Operations</u>	129
<u>Consolidated Statements of Operations</u>	131
<u>Quarters ended April 1, 2006 and April 2, 2005</u>	132
<u>Years Ended December 31, 2005 and 2004</u>	132
<u>Years Ended December 31, 2004 and 2003</u>	133
<u>Quarterly Results of Operations</u>	135
<u>Liquidity and Capital Resources</u>	136
<u>Off-Balance Sheet Arrangements</u>	138
<u>Critical Accounting Policies and Estimates</u>	138
<u>Qualitative and Quantitative Disclosures About Market Risks</u>	141
<u>Recently Issued Accounting Pronouncements</u>	141
<u>Legal Proceedings</u>	142
<u>Nanometrics' Principal Shareholders</u>	143
<u>Accent Optical's Principal Stockholders</u>	144
<u>Description of Nanometrics Capital Stock</u>	146
<u>General</u>	146
<u>Common Stock</u>	146
<u>Transfer Agent</u>	146
<u>Comparison of Rights of Holders</u>	147
<u>Size of Board of Directors</u>	147
<u>Cumulative Voting</u>	147
<u>Removal of Directors</u>	147
<u>Vacancies on the Board of Directors</u>	148
<u>Loans to Officers and Employees</u>	148
<u>Power to Call Special Shareholders' Meeting</u>	149
<u>Indemnification and Limitation of Liability</u>	149
<u>Inspection of Shareholders' List</u>	149
<u>Dividends and Repurchases of Shares</u>	150
<u>Shareholder Approval of Mergers and Other Business Combinations</u>	150
<u>Amendment of the Articles or Certificate of Incorporation</u>	151
<u>Amendment of Bylaws</u>	152
<u>Shareholder Consent in Lieu of Meeting</u>	152
<u>Dissenters' Rights</u>	153
<u>Dissolution</u>	153
<u>Antitakeover Legislation</u>	154
<u>Interested Director Transactions</u>	154

Table of Contents

	Page
<u>Derivative Suits</u>	155
<u>Fair Price Provisions</u>	155
<u>Management</u>	156
<u>Executive Officers of Nanometrics following the Merger</u>	156
<u>Compensation/Stock Option Committee Interlocks and Insider Participation</u>	157
<u>Compensation of Directors</u>	157
<u>Compensation of Executive Officers</u>	158
<u>Summary Compensation Table</u>	158
<u>Stock Options Granted in the Fiscal Year Ended December 31, 2005</u>	159
<u>Option Grants in Last Fiscal Year</u>	159
<u>Aggregated Option Exercises in Last Fiscal Year and Fiscal Year-End Option Values</u>	160
<u>Employment Contracts and Termination of Employment and Change-in-Control Arrangements</u>	160
<u>Proposal Two Payments to Executives</u>	161
<u>Background</u>	161
<u>Description of Potential Parachute Payments</u>	162
<u>Payments Subject To Accent Optical Stockholder Approval</u>	164
<u>Vote Required</u>	165
<u>Additional Information</u>	166
<u>Shareholder Proposals</u>	166
<u>Nanometrics</u>	166
<u>Accent Optical</u>	166
<u>Legal Matters</u>	166
<u>Experts</u>	166
<u>Where You Can Find More Information</u>	167
<u>Index to Consolidated Financial Statements</u>	F-1
Annexes	

Annex A	<u>Agreement and Plan of Merger and Reorganization</u>
Annex B-1	<u>Form of Nanometrics Shareholder Voting Agreement</u>
Annex B-2	<u>Form of Accent Optical Stockholder Voting Agreement</u>
Annex C	<u>Opinion of Cowen & Co., LLC (formerly SG Cowen & Co., LLC)</u>
Annex D	<u>Opinion of Merrill Lynch, Pierce, Fenner & Smith Incorporated</u>
Annex E-1	<u>Form of Shareholder Agreement</u>
Annex E-2	<u>Form of Shareholder Agreement</u>
Annex F	<u>Escrow Agreement</u>
Annex G-1	<u>B. Rhine Employment Agreement</u>
Annex G-2	<u>B. Crawford Employment Agreement</u>
Annex G-3	<u>R. Langrill Employment Agreement</u>
Annex H	<u>Section 262 of the Delaware General Corporation Law</u>

Table of Contents

QUESTIONS AND ANSWERS ABOUT THE MERGER

The following are some questions that shareholders of Nanometrics Incorporated and stockholders of Accent Optical Technologies, Inc. may have regarding the matters being considered at the special meeting of the Nanometrics shareholders and the special meeting of the Accent Optical stockholders, as well as brief answers to those questions. Nanometrics and Accent Optical urge you to read the remainder of this joint proxy statement/prospectus carefully and in its entirety because the information below does not provide all of the information that might be important to you.

Q: What are the material terms of the proposed transaction? (See page 86)

A: The respective boards of directors of Nanometrics and Accent Optical have unanimously approved the merger of a wholly owned subsidiary of Nanometrics, Alloy Merger Corporation, with and into Accent Optical in accordance with the terms and conditions of an agreement and plan of merger and reorganization, dated as of January 25, 2006, between Nanometrics, Accent Optical, Alloy Merger Corporation and Sanford S. Wadler as Stockholder Agent, as amended. A summary term sheet describing the material terms of the proposed transaction follows.

Summary of Terms

Nanometrics wholly-owned subsidiary, Alloy Merger Corporation, will merge with and into Accent Optical resulting in Accent Optical becoming a wholly owned subsidiary of Nanometrics.

Nanometrics will issue approximately 4,900,000 shares of its common stock to the holders of Accent Optical capital stock and the holders of certain Accent Optical stock options.

Nanometrics will also issue (or reserve for issuance) an additional number of shares of its common stock equal to the quotient of (i) the aggregate exercise price of all Accent Optical stock options that are assumed pursuant to the merger agreement (other than options issued on or after January 23, 2006), divided by (ii) the average closing price of Nanometrics common stock for the ten trading days ending two days prior to the closing of the merger, which price is referred to herein as the Average Closing Price. See page 88 for more information regarding the treatment of Accent Optical stock options in the merger.

Nanometrics will assume all Accent Optical stock options that are in-the-money or that were granted on or after January 23, 2006.

Current Nanometrics shareholders and Accent Optical stockholders are expected to hold 73% and 27%, respectively, of the combined company following the merger. See page 87 for more information regarding the expected composition of the stockholders of the combined company following the merger.

Accent Optical has agreed to indemnify Nanometrics for losses suffered by Nanometrics as a result of breaches by Accent Optical of its representations and warranties in the merger agreement. See page 102 for more information regarding Accent Optical's indemnification obligations.

Nanometrics will withhold approximately 490,000 of the shares of its common stock to be distributed to the Accent Optical stockholders at the closing and will place such shares in an escrow account to compensate Nanometrics if it is entitled to indemnification under the merger agreement. Based on the average closing price of Nanometrics common stock for the ten trading days ended on June 6, 2006, which was \$10.84, the 490,000 shares of Nanometrics common stock are valued at \$5,311,600. See page 102 for more information regarding the escrow arrangement.

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The Chief Executive Officer of Accent Optical, who is also one of its directors, has accepted an offer to join Nanometrics as an executive officer and director following the merger.

Table of Contents

Certain other executive officers of Accent Optical may receive severance payments in connection with the proposed transaction.

Certain stockholders of Accent Optical, who hold more than the requisite majorities of each class of Accent Optical capital stock needed to approve the merger, entered into voting agreements concurrently with the execution of the merger agreement, and agreed to vote their shares in favor of the merger.

Q: How many shares of Nanometrics common stock will be issued and reserved for issuance in the merger?

A: There are three components of the consideration that will be issued to Accent Optical stockholders and optionees in the merger: (i) the base consideration of 4,900,000 of Nanometrics common stock including shares reserved for in-the-money options issued prior to January 23, 2006; (ii) an additional number of shares of Nanometrics common stock with an aggregate value equal to the aggregate exercise price of all Accent Optical stock options assumed in the merger, which shares are referred to as the Option Adjustment Amount; and (iii) a number of shares of Nanometrics common stock that will be reserved for issuance upon exercise of certain Accent Optical stock options granted on or after January 23, 2006.

The Option Adjustment Amount and the number of shares of Nanometrics common stock required to be reserved for issuance upon exercise of stock options are each a function of the Average Closing Price. For example, if the Average Closing Price is \$15.63, then the Option Adjustment Amount and the number of shares of Nanometrics common stock reserved for issuance upon exercise of Accent Optical stock options granted on or after January 23, 2006, will be 148,738 and 163,548, respectively. At such price, the aggregate number of shares of Nanometrics common stock to be issued and reserved for issuance in connection with the merger will be at its maximum, 5,212,286.

If the Average Closing Price is higher than \$15.63, then the Option Adjustment Amount will consist of fewer shares of Nanometrics common stock. For example, at an Average Closing Price of \$16.00, the Option Adjustment Amount and the number of shares of Nanometrics common stock reserved for issuance upon exercise of Accent Optical stock options granted after January 23, 2006, will be 145,298 and 164,540, respectively. At such price, the number of shares of Nanometrics common stock to be issued and reserved for issuance in connection with the merger will be 5,209,838.

If the Average Closing Price is less than 15.63, then fewer Accent Optical shares will be assumed in the merger resulting in a lower Option Adjustment Amount and, consequently, fewer Nanometrics shares be issued and reserved for issuance in the merger. For example, at an Average Closing Price of \$15.00, the Option Adjustment Amount and the number of shares of Nanometrics common stock reserved for issuance upon exercise of Accent Optical stock options granted after January 23, 2006, will be 73,362 and 161,568, respectively. At such price, the aggregate number of shares of Nanometrics common stock to be issued and reserved for issuance in connection with the merger will be 5,134,930.

The average closing price for Nanometrics common stock during the ten trading days ending on June 6, 2006 was \$10.84, which, if it were the Average Closing Price, would result in an Option Adjustment Amount and number of shares of Nanometrics common stock reserved for issuance upon exercise of Accent Optical stock options granted after January 23, 2006 of 95,630 and 142,652, respectively. At such price, the aggregate number of shares of Nanometrics common stock to be issued and reserved for issuance in connection with the merger will be 5,138,282.

Table of Contents

Q: Why am I receiving this joint proxy statement/prospectus?

A: Nanometrics and Accent Optical cannot complete the merger unless the shareholders of Nanometrics approve the issuance of shares of Nanometrics common stock in, and the other principal terms of, the merger and the stockholders of Accent Optical adopt and approve the merger agreement, as amended, and approve the merger, as well as the escrow agreement and the appointment of the stockholder agent as set forth in the Accent Optical Notice of Special Meeting. In addition, Accent Optical is seeking stockholder approval for certain payments to its executive officers in connection with the merger.

The Nanometrics board of directors is soliciting the proxy of its shareholders to vote FOR Nanometrics proposal to approve the issuance of shares of Nanometrics common stock in, and the other principal terms of, the merger. The Accent Optical board of directors is soliciting the proxy of its stockholders to vote FOR Accent Optical's proposal to adopt and approve the merger agreement, as amended, and approve the merger, as well as the other matters set forth in the Accent Optical Notice of Special Meeting.

Members of Accent Optical's board of directors, officers and other investors holding 87% of Accent Optical's Common Stock and Preferred Stock, 89% of Accent Optical's Series A Preferred Stock, 65% of Accent Optical's Convertible Preferred Stock and 88% of Accent Optical's Common Stock have entered into voting agreements that obligate them to vote their shares to approve and adopt the merger agreement, as amended, approve the merger, approve the appointment of the stockholder agent and approve the escrow agreement. Nanometrics has waived the provisions of the voting agreements relating to the approval certain payments to Accent Optical's executive officers in connection with the merger. Accordingly, Accent Optical's stockholders are free to vote for or against the approval of such payments.

The board of directors of Accent Optical has also unanimously approved payments to certain executive officers, Bruce C. Rhine, its Chief Executive Officer, Bruce Crawford, its President and Chief Operating Officer and Reid Langrill, its Chief Financial Officer in connection with the merger. Because these payments could be deemed parachute payments under Section 280G of the Internal Revenue Code of 1986, as amended, (the Internal Revenue Code), which would result in adverse tax consequences to Accent Optical and the executives, Messrs. Rhine, Crawford and Langrill have agreed to waive their respective rights to these payments unless Accent Optical obtains the requisite stockholder approval to avoid the adverse tax consequences. Holders of more than 75% of Accent Optical Common Stock and Accent Optical Convertible Preferred Stock, voting together as a single class on an as-converted basis, not including shares owned or constructively owned by executive officers receiving payments in connection with the merger, must approve such payments in order to avoid the adverse tax consequences. Accordingly, Accent Optical is soliciting the proxy of its stockholders to vote FOR the proposal to approve the payments to these executive officers.

This joint proxy statement/prospectus describes Nanometrics, Accent Optical and the merger so that you may make an informed decision with respect to the matters under consideration. A copy of the merger agreement and the amendment thereto dated June 9, 2006 is attached to this joint proxy statement as Annex A.

Q: Why are Nanometrics and Accent Optical proposing to merge? (See page 60)

A: Nanometrics and Accent Optical believe that by combining their product lines and technologies, they can generate improved long-term operating and financial results, improving their competitive position in the industry. The boards of directors of Nanometrics and Accent Optical also believe that the merger of Nanometrics and Accent Optical will create one of the largest independent metrology companies in the semiconductor industry and allow the combined company to expand its market position in each of its primary stand-alone metrology segments after the merger. The merger is expected to create a strong platform for the combined company to deliver metrology systems to both new and existing customers. The Nanometrics and Accent Optical boards of

Table of Contents

directors believe that the merger will create an opportunity for the holders of both companies' capital stock to participate in the growth of the combined company after the merger.

Q: What are the risks of the merger?

A: The merger involves numerous risks and uncertainties, including, but not limited to, the following:

the expense, time and disruption of Nanometrics' business related to integrating the operations of Nanometrics and Accent Optical;

the anticipated benefits and synergies of the merger may not be realized;

the trading price of Nanometrics common stock may decline if the cost benefits of the merger are not realized; and

customers, distributors, resellers or others may delay or defer decisions concerning Nanometrics and/or Accent Optical during the pendency, or as a result, of the merger.

You are encouraged to read this joint proxy statement/prospectus carefully, including the section entitled "Risk Factors" beginning on page 30, for a discussion of risks associated with the merger, the combined company and the businesses of each of Nanometrics and Accent Optical.

Q: What will Accent Optical stockholders receive in the merger? (See page 86)

A: Accent Optical has three classes of capital stock outstanding. Each class of Accent Optical capital stock will receive a portion of the total merger consideration, which will consist solely of a specified number of shares of Nanometrics common stock and cash in lieu of fractional shares, if any. Each class of Accent Optical capital stock will be converted into Nanometrics common stock at a different exchange ratio in the merger.

Issuance of the merger consideration will be made to holders of Accent Optical Series A Preferred Stock and Convertible Preferred Stock (collectively, the "Accent Optical Preferred Stock") on a *pari passu* basis. If the value of the shares of Nanometrics common stock issuable in the merger is insufficient to provide \$1,000 of Nanometrics common stock for each share of Accent Optical Series A Preferred Stock and \$1.13 of Nanometrics common stock for each share of Accent Optical Convertible Preferred Stock, then the available merger consideration will be prorated, and holders of Accent Optical Common Stock and options will receive no consideration in the merger.

Q: Will Accent Optical's stockholders receive the full amount of their preferences and accrued dividends as set forth on Accent Optical's certificate of incorporation? (See page 86)

A: No. The holders of Series A Preferred Stock will receive Nanometrics common stock valued at \$1,000 for each share of Series A Preferred Stock, which is the amount that such stockholders originally paid for their Series A Preferred Stock. The holders of Series A Preferred Stock will forego the 13.5% cumulative dividend that Accent Optical has been accruing since 2000 (which dividends totaled approximately \$1,027 per share as of December 31, 2005).

The holders of Convertible Preferred Stock will receive Nanometrics common stock valued at \$1.13 for each share of Convertible Preferred Stock, which is approximately 55% of the \$2.05 liquidation preference on such shares. In addition, the holders of Convertible Preferred Stock will forego the 8% cumulative dividend that Accent Optical has been accruing since such shares were issued (which dividends totaled approximately \$0.83 per share as of December 31, 2005).

Table of Contents

Similarly, Bio-Rad Laboratories, Inc. (Bio-Rad), in addition to its rights as a holder of Accent Optical Common Stock, had a contractual right to receive a \$13 million change of control payment from Accent Optical as a result of the change of control contemplated by the merger agreement. The provision governing this change of control payment is contained in the agreement between Bio-Rad and Accent Optical pursuant to which Accent Optical purchased the assets of the former Semiconductor Measurements Division of Bio-Rad (the Bio-Rad SMD). Bio-Rad has agreed that, if the merger is consummated, it will forego all but \$2.5 million of the change of control payment to which it otherwise would have been entitled.

The allocation of the consideration was structured so that the merger would provide benefit to all Accent Optical stockholders, and to provide incentive for the holders of Accent Optical Common Stock to approve the merger. If the merger and merger agreement, as amended, are approved by the necessary vote of the Accent Optical stockholders, the allocation of the merger consideration set forth in the merger agreement will supersede the rights of stockholders to the preferences and accrued dividends described in Accent Optical's certificate of incorporation.

Q: What is the escrow and how does it work?

A: Upon completion of the merger, Nanometrics will withhold approximately 490,000 shares of Nanometrics common stock from the shares to be distributed to the Accent Optical stockholders at closing of the merger and deposit those shares into an escrow account. The size of escrow was arrived at after negotiations between Accent Optical and Nanometrics and was determined as a percentage of the overall transaction size. These escrowed shares will be available to compensate Nanometrics if it is entitled to indemnification under the merger agreement, as amended. Additionally, upon closing of the merger, Nanometrics will have an immediate claim on the escrow account for a number of shares equal to the Accent Optical transaction costs that exceed \$4.2 million, which excess is currently anticipated to be approximately \$950,000, divided by the Average Closing Price. Any portion of the remaining escrowed amount that, within 12 months following the completion of the merger, has not been withdrawn or earmarked to satisfy a claim for loss by Nanometrics, will be distributed to the Accent Optical stockholders promptly (but in no event more than 20 days), after expiration of the 12-month escrow period. The value of the escrowed shares will fluctuate with the market price of Nanometrics' common stock. Based upon the Average Closing Price on June 6, 2006, the value of the shares in escrow would be equal to \$5,311,600.

Q: What will holders of options to purchase Accent Optical Common Stock receive in the merger? (See page 88)

A: At the closing of the merger, Nanometrics will assume each outstanding option to acquire shares of Accent Optical Common Stock that is in-the-money or that was granted on or after January 23, 2006, regardless of whether such option is in-the-money. An option will be in-the-money if the per share exercise price for the option is less than the value of Nanometrics common stock that the holder of one share of Accent Optical Common Stock would be entitled to receive in the merger.

Each assumed option will be converted into an option to purchase the number of Nanometrics shares that would have been issuable in exchange for the number of Accent Optical shares subject to the assumed option, had such shares been outstanding at the closing of the merger. The exercise price of such assumed options will be adjusted such that the aggregate exercise price for the option remains constant.

Q: Do the Accent Optical stockholders have obligations relating to Accent Optical's transaction expenses? (See page 99)

A: The merger agreement, as amended, provides that Accent Optical stockholders will indemnify Nanometrics with respect to any transaction expenses of Accent Optical in excess of \$4.2 million. Transaction

Table of Contents

expenses are broadly defined within the merger agreement to include the \$2.5 million fee owed to Bio-Rad, as well as fees owed to Accent Optical's investment banker, lawyers and accountants. Accent Optical currently estimates its transaction expenses at \$5.15 million. Accordingly, upon closing of the merger, Nanometrics would have an immediate claim on the escrow in the amount of approximately \$950,000.

Q: What are the United States federal income tax consequences of the merger? (See page 80)

A: Nanometrics and Accent Optical each expect the merger to qualify as a reorganization pursuant to Section 368(a) of the Internal Revenue Code for U.S. federal income tax purposes. Assuming that the merger so qualifies, Accent Optical stockholders will not recognize gain or loss for United States federal income tax purposes as a result of the merger, other than gain or loss attributable to cash received by Accent Optical stockholders instead of fractional shares.

Q: When do Nanometrics and Accent Optical expect to complete the merger? (See page 95)

A: Nanometrics and Accent Optical are working to complete the merger as quickly as possible. Nanometrics and Accent Optical currently expect to complete the merger in the third quarter of 2006. Nanometrics and Accent Optical cannot predict the exact timing of the completion of the merger.

Q: What vote is required by Nanometrics shareholders to proceed with the merger? (See page 48)

A: Under the applicable rules of the Nasdaq Stock Market and the California Corporations Code, Nanometrics cannot complete the merger unless the issuance of shares of Nanometrics common stock in, and the other principal terms of, the merger are approved by the affirmative vote of the holders of a majority of the outstanding shares of Nanometrics common stock. Members of Nanometrics board of directors and officers holding approximately 30.9% of Nanometrics outstanding common stock as of January 25, 2006 have entered into voting agreements, which obligate them to approve the share issuance.

Q: How does the Nanometrics board of directors recommend that the Nanometrics shareholders vote on the share issuance? (See page 64)

A: The Nanometrics board of directors unanimously recommends that its shareholders vote FOR Nanometrics' proposal to approve the issuance of shares of Nanometrics common stock in, and the other principal terms of, the merger.

Q: Did the Nanometrics board of directors obtain a fairness opinion in connection with its determination to proceed with the merger? (See page 65)

A: Yes. On January 25, 2006, Cowen & Co., LLC, (formerly SG Cowen & Co., LLC) (Cowen) financial advisor to Nanometrics, provided to the Nanometrics board of directors its opinion, that, as of the date of such opinion, the consideration provided for in the merger agreement was fair, from a financial point of view, to Nanometrics. The full text of the Cowen opinion is attached to this joint proxy statement/prospectus as Annex C. Nanometrics encourages its shareholders to read this opinion carefully in its entirety for a description of the procedures followed, assumptions made, matters considered and limitations on the review undertaken. The Cowen opinion is directed to the Nanometrics board of directors and addresses only the fairness from a financial point of view of the consideration provided for in the merger agreement as of the date of the opinion. Nanometrics paid Cowen a fee upon the delivery of the Cowen fairness opinion.

Q: What vote is required by Accent Optical stockholders to proceed with the merger? (See page 52)

A: Holders of a majority of the outstanding shares of Accent Optical Common Stock and Convertible Preferred Stock, voting together on an as-converted basis, must approve the merger agreement, as amended, and

Table of Contents

the merger. In addition, a majority of each of the Accent Optical Series A Preferred Stock, the Accent Optical Convertible Preferred Stock and the Accent Optical Common Stock, voting as separate classes, must approve the merger.

Members of Accent Optical's board of directors, officers and other investors holding 87% of Accent Optical's Common Stock and Preferred Stock, 89% of Accent Optical's Series A Preferred Stock, 65% of Accent Optical's Convertible Preferred Stock and 88% of Accent Optical's Common Stock have entered into voting agreements that obligate them to vote their shares to approve and adopt the merger agreement, as amended, approve the merger, approve the appointment of the stockholder agent and approve the escrow agreement.

Q: How does the Accent Optical board of directors recommend that the Accent Optical stockholders vote on the matters set forth in the Accent Optical Notice of Special Meeting? (See page 51)

A: The Accent Optical board of directors unanimously recommends that the Accent Optical stockholders vote FOR Accent Optical's proposal to adopt and approve the merger agreement, as amended, approve the merger, approve the appointment of Mr. Wadler as Stockholder Agent, approve the escrow agreement and FOR Accent Optical's proposal to approve payments to certain executive officers.

Q: Did the Accent Optical board of directors obtain a fairness opinion in connection with its determination to proceed with the merger? (See page 70)

A: Yes. On January 24, 2006, Merrill Lynch, Pierce, Fenner & Smith Incorporated (Merrill Lynch), financial advisor to Accent Optical, provided to the Accent Optical board of directors its opinion, that, as of such date and based upon the assumptions made, matters considered and limits of such review, the aggregate consideration provided for in the merger agreement was fair, from a financial point of view, to the holders of Accent Optical capital stock. The full text of the Merrill Lynch opinion is attached to this joint proxy statement/prospectus as Annex D. Accent Optical encourages its stockholders to read this opinion carefully in its entirety for a description of the procedures followed, assumptions made, matters considered and limitations on the review undertaken. The Merrill Lynch opinion is addressed to the Accent Optical board of directors and addresses only the fairness, from a financial point of view, of the aggregate consideration provided for in the merger agreement as of January 24, 2006. Accent Optical will pay Merrill Lynch a customary fee for the Merrill Lynch fairness opinion upon the closing of the merger.

Q: Do any of the directors and executive officers of Accent Optical have any special interests in the merger? (See page 76)

A: Yes. In considering the recommendation of the board of directors of Accent Optical with respect to the adoption and approval of the merger agreement, as amended, approval of the merger and the other matters described in the Notice of Special Meeting of Accent Optical Stockholders, the stockholders of Accent Optical should be aware that members of the Accent Optical board of directors and Accent Optical executive officers have interests in the merger that may be different than, or in addition to, the interests of the Accent Optical stockholders generally. These interests include:

the appointment of Bruce C. Rhine, a director and the current Chief Executive Officer of Accent Optical, as a director and Chief Strategy Officer of Nanometrics following the merger, for which he will receive a base salary of \$250,000 per year, standard Nanometrics employee benefits and paid vacation;

an agreement between Accent Optical and Reid Langrill, its Chief Financial Officer, which provides for Mr. Langrill's continued employment at his regular salary with Accent Optical or its successors through the completion of the merger and up to 30 days thereafter; receipt of a severance payment, upon his termination, equal to the greater of either \$185,000 or the difference between \$500,000 and the value of Mr. Langrill's options that are in-the-money as of the completion of the merger, subject to withholding;

Table of Contents

and, following Mr. Langrill's termination as Chief Financial Officer of Accent Optical, for Mr. Langrill to provide consulting services to Nanometrics through March 15, 2007, subject to earlier termination, at a rate of \$105 per hour and reimbursement of expenses;

the potential receipt of severance benefits by Bruce Crawford, Accent Optical's President and Chief Operating Officer, if Accent Optical terminates Mr. Crawford's employment without good cause or Mr. Crawford terminates his employment for good reason during the five-year term of his employment agreement, including a lump-sum payment in the amount of his annual salary (currently \$213,000), continued group health or other group benefits as allowed under the Consolidated Omnibus Budget Reconciliation Act of 1985 (COBRA) for a period of 12 months with a potential gross-up for taxes arising and reimbursement of relocation expenses up to \$50,000;

the receipt of option grants in connection with the merger by Accent Optical officers, for an aggregate of 5,522,000 shares of Accent Optical Common Stock, which will be assumed by Nanometrics;

the acceleration of vesting of assumed options of officers and directors if their employment is terminated in connection with the merger (options to purchase 8,281,596 shares of Accent Optical Common Stock held by Accent Optical officers and directors are expected to be assumed, based on the Average Closing Price as of June 6, 2006, of which options to purchase 1,997,723 shares of Accent Optical Common Stock are unvested as of June 6, 2006);

the continued indemnification following the merger of the current Accent Optical directors and officers for acts or omissions occurring prior to the closing of the merger;

the receipt by Bio-Rad, a company affiliated with Accent Optical director David Schwartz, of approximately \$12.0 million as repayment of a loan and a contractual fee of \$2.5 million (related to the 2000 asset purchase from Bio-Rad to form Accent Optical), each in connection with the closing of the merger; and

the re-allocation of the merger consideration so that holders of Accent Optical Common Stock can receive more of the merger consideration than they originally would have been entitled to, which benefits the directors and officers who hold Accent Optical Common Stock.

The Accent Optical board of directors was aware of these interests and considered them, among other matters, in making its recommendation that Accent Optical stockholders approve the merger agreement, as amended, the merger and the related transactions and certain payment to executive officers.

Q: What vote is required by Accent Optical stockholders to approve the payments to certain Accent Optical executive officers? (See page 161)

A: Accent Optical stockholders are being asked to approve certain payments to executive officers, which will or may be made to such executive officers in connection with the merger, and which might otherwise be deemed "excess parachute payments" for purposes of Section 280G of the Internal Revenue Code and the Treasury Regulations promulgated thereunder (collectively, "Section 280G"). These payments consist of severance payments, option grants and the value of options that could be accelerated due to the executive officer's termination in connection with the merger. Excess parachute payments are not deductible as a business expense by a corporation, and subject the recipient of such payments to a 20% excise tax (in addition to applicable federal and state income and employment taxes), unless such payments are approved by more than 75% of the outstanding shares of Accent Optical's Convertible Preferred Stock and Common Stock, voting together as a single class on an as-converted basis, not including shares owned or constructively owned by executive officers whose payments in connection with the merger would otherwise be excess parachute payments.

Table of Contents

Q: What should the shareholders of Nanometrics and the stockholders of Accent Optical do now? (For Nanometrics Shareholders, see page 48; for Accent Optical Stockholders, see page 53)

A: After reading and considering the information contained in this joint proxy statement/prospectus carefully, Nanometrics shareholders and Accent Optical stockholders should then vote their respective shares of capital stock in accordance with the instructions in this joint proxy statement/prospectus.

Nanometrics and Accent Optical encourage their respective shareholders to vote as soon as possible so that there is a quorum present at the special meetings.

Q: How can Nanometrics shareholders vote or submit voting instructions? (See page 48)

A: Holders of record of shares of Nanometrics common stock may vote by proxy by completing, signing, dating and returning the enclosed proxy card for the special meeting and returning it in the enclosed pre-paid envelope or may vote in person at the Nanometrics special meeting.

Nanometrics common stock held through a broker, bank or other nominee (*i.e.*, in street name), may be voted by providing the record holder of the shares with instructions on how to vote such shares at the Nanometrics special meeting. The broker, bank or other nominee has delivered a voting instruction card with this joint proxy statement/prospectus that contains instructions on how to direct the record holder of the Nanometrics shares to vote at the Nanometrics special meeting. Shares of Nanometrics common stock held in street name, can only be voted in person by the shareholders thereof by obtaining a legal proxy from the record holder of such shares in order to attend the Nanometrics special meeting.

Regardless of whether a Nanometrics shareholder intends to attend the Nanometrics special meeting in person, the Nanometrics board of directors requests that all shareholders submit a proxy prior to the meeting.

Q: If my shares of Nanometrics common stock are held in street name, will my broker, bank, or nominee vote my shares for me on the merger proposal? (See page 48)

A: No. The broker, bank, or other nominee that holds your shares of Nanometrics common stock cannot vote your shares of Nanometrics common stock at the Nanometrics special meeting unless you provide them with instructions on how to vote your shares in accordance with the information and procedures they provided to you.

Q: Can Nanometrics shareholders change their vote after they have mailed their signed proxy or instruction form? (See page 49)

A: Yes. Record holders of Nanometrics common stock can change their vote at any time before their proxy is voted at the Nanometrics special meeting by:

delivering to the Nanometrics corporate secretary a signed notice of revocation;

submitting the Nanometrics proxy holders a new, later-dated proxy, which must be signed and delivered to the Nanometrics corporate secretary in advance of the vote at the Nanometrics special meeting; or

attending the Nanometrics special meeting and voting in person. Attendance alone, however, will not revoke a previously granted proxy.

If you hold your shares in street name and you have provided voting instructions to the broker, bank or other nominee that holds your shares of Nanometrics common stock for use at the Nanometrics special meeting, you must follow the instructions of your broker, bank or other nominee in order to change your vote or revoke your proxy for the Nanometrics special meeting.

Table of Contents

Q: How can Accent Optical stockholders vote or submit voting instructions? (See page 53)

A: Holders of record of shares of Accent Optical capital stock, may vote in person or by proxy at the Accent Optical special meeting. Accent Optical stockholders electing to vote by proxy must complete, sign, date and return the enclosed proxy card for the special meeting and returning it in the enclosed pre-paid envelope. Regardless of whether an Accent Optical stockholder intends to attend the Accent Optical special meeting, the Accent Optical board of directors requests that all stockholders submit a proxy prior to the meeting.

Q: Can Accent Optical stockholders change their vote after they have mailed their signed proxy? (See page 53)

A: Yes. Record holders of Accent Optical capital stock can change their vote at any time before their proxy is voted at the Accent Optical special meeting by:

delivering to the Accent Optical corporate secretary a signed notice of revocation;

submitting to the Accent Optical proxy holders a new, later-dated proxy, which must be signed and delivered to the Accent Optical corporate secretary in advance of the vote at the Accent Optical special meeting; or

attending the Accent Optical special meeting and voting in person. Attendance alone, however, will not revoke a previously granted proxy.

Q: Should Accent Optical stockholders send in their stock certificates now? (See page 89)

A: No. Accent Optical stockholders should not send in their stock certificates now. They will receive specific instructions from the exchange agent after the merger has been completed on how to exchange their stock certificates.

Q: Will the shareholders of Nanometrics and the stockholders of Accent Optical have dissenters or appraisal rights in connection with the merger? (See page 82)

A: Under applicable law, Nanometrics shareholders will not have dissenters or appraisal rights in connection with the merger.

Accent Optical stockholders are entitled to appraisal rights in connection with the merger under the Delaware General Corporation Law if such stockholders meet certain conditions. Failure to vote against the merger in and of itself will not constitute a waiver of appraisal rights. However, a vote in favor of the merger will constitute a waiver of appraisal rights. Furthermore, a vote against the merger in and of itself will not be deemed to satisfy any notice requirements under state law with respect to appraisal rights. Please see Dissenters or Appraisal Rights in Connection with the Merger, beginning on page 82 and Annex H for more information.

Q: Whom should I call with questions? (See page 167)

A: If Nanometrics shareholders have any questions about the merger or any other matters described in this joint proxy statement/prospectus, or need to obtain additional copies of this joint proxy statement/prospectus or a proxy card for the Nanometrics special meeting, they should contact:

Nanometrics Incorporated

1550 Buckeye Drive

Milpitas, California 95035

Attention: Investor Relations

Tel: (408) 435-9600

Table of Contents

If Accent Optical stockholders have any questions about the merger or any other matters described in this joint proxy statement/prospectus, or need to obtain additional copies of this joint proxy statement/prospectus or a proxy card for the Accent Optical special meeting, they should contact:

Accent Optical Technologies, Inc.

1320 SE Armour Drive, Suite B2

Bend, Oregon 97702

Attention: Chief Executive Officer

Facsimile No.: (541) 318-1966

Telephone No.: (541) 322-2500

If any Nanometrics shareholder or Accent Optical stockholder has any questions about how to submit their proxy, the enclosed proxy cards, or voting instructions, or needs to request additional copies of this joint proxy statement/prospectus, such persons should contact Nanometrics proxy solicitors, The Altman Group, Inc. at 1200 Wall Street West, 3rd Floor, Lyndhurst, NJ 07071, or call them at (800) 884-4969.

Table of Contents

SUMMARY

*The following is a summary of information contained in this joint proxy statement/prospectus. This summary may not contain all of the information that may be important to you. You are encouraged to read the entire joint proxy statement/prospectus carefully. In addition, you are encouraged to read the information incorporated by reference into this joint proxy statement/prospectus, which includes important business and financial information about Nanometrics that has been filed with the SEC. You may obtain the information incorporated by reference into this joint proxy statement/prospectus without charge by following the instructions in the section of this joint proxy statement/prospectus entitled *Additional Information Where You Can Find More Information* beginning on page 167.*

The Companies

Nanometrics Incorporated (See page 117)

1550 Buckeye Drive

Milpitas, California 95035

(408) 435-9600

Nanometrics is a leader in the design, manufacture, and marketing of high-performance process control metrology systems used in the manufacture of semiconductors and integrated circuits. Nanometrics' metrology systems (i) measure various thin film properties, critical circuit dimensions and layer-to-layer circuit alignment (overlay) and (ii) inspect for surface defects during various steps of the manufacturing process, enabling semiconductor and integrated circuit manufacturers to improve yields, increase productivity and lower their manufacturing costs. The relative alignment of sequentially patterned thin film layers is critical to device production.

Nanometrics has been a pioneer and innovator in the field of metrology for nearly three decades. It has been selling metrology systems since 1977 and has an extensive installed base with industry leading customers worldwide.

Alloy Merger Corporation

Alloy Merger Corporation is an acquisition subsidiary that Nanometrics formed solely to effect the merger. Alloy Merger Corporation has not conducted any other business.

Accent Optical Technologies, Inc. (See page 119)

1320 SE Armour Drive, Suite B2

Bend, Oregon 97702

(541) 322-2500

Accent Optical designs, manufactures, sells and services a broad suite of process control and metrology systems used by manufacturers of semiconductor wafers and compound and silicon semiconductor devices for the advanced computing, communications and consumer electronics markets. Its systems measure optical, electrical and material properties, including the structural composition of compound and silicon semiconductor devices and wafers, the amount of impurities or contaminants in semiconductor devices, electron mobility and the wavelength and intensity of light emitted by light emitting diodes (LEDs) and laser diodes. Its systems also measure the degree of alignment and dimensions of semiconductor device features. Customers use Accent Optical's process control and metrology systems to lower their costs by enhancing their manufacturing efficiency and increasing their production yields, and to improve their product performance and quality. Accent Optical sells its systems globally to leading semiconductor device and wafer manufacturers.

Table of Contents

Overview of Merger Agreement and Related Agreements

The Merger Agreement (See page 86)

On January 25, 2006, Nanometrics, Alloy Merger Corporation, Accent Optical and, solely with respect to Article IX, Sanford S. Wadler entered into the merger agreement. On June 9, 2006, the parties entered into an amendment to the merger agreement for the purpose of extending the date by which the merger is required to be completed before either Nanometrics or Accent Optical can terminate the agreement and to provide for Nanometrics to fund an additional \$1,611,238 in working capital loans to Accent Optical to satisfy an interest payment due to Bio-Rad on July 9, 2006. Pursuant to the terms and subject to the conditions set forth in the merger agreement, as amended, Alloy Merger Corporation will merge with and into Accent Optical, and Accent Optical will continue as the surviving corporation in the merger as a wholly owned subsidiary of Nanometrics. The merger agreement and the amendment are attached to this joint proxy statement/prospectus as Annex A. You are encouraged to read the merger agreement, as amended, carefully and in its entirety because it is the legal document that governs the merger.

Merger Consideration (See page 86)

Upon completion of the merger, shares of outstanding Accent Optical capital stock and in-the-money options to acquire Accent Optical Common Stock (as well as all Accent Optical stock options granted on or after January 23, 2006 regardless of their exercise price) will be converted into the right to receive Nanometrics common stock and options to acquire Nanometrics common stock. The total number of shares of Nanometrics common stock that will be issued in the merger will be: (i) 4,900,000, plus (ii) a number of shares equal to the aggregate exercise price of the outstanding in-the-money Accent Optical stock options prior to closing (other than options granted after January 23, 2006), divided by the Average Closing Price, plus (iii) shares of Nanometrics common stock issuable upon exercise of the Accent Optical stock options granted on or after January 23, 2006 (at the same conversion ratio as the Accent Optical in-the-money options). Of the total shares issued to Accent Optical stockholders at closing, Nanometrics will deposit approximately 490,000 shares of common stock into an escrow account that will be available to compensate Nanometrics if it is entitled to indemnification under the merger agreement. Based upon the Average Closing Price of Nanometrics common stock as of June 6, 2006, the value of the 490,000 escrow shares is \$5,311,600. Upon closing, Nanometrics will have an immediate claim on the escrow for a number of shares equal to (x) the Accent Optical transaction costs that exceed \$4.2 million, which excess is currently estimated to be approximately \$950,000, divided by (y) the Average Closing Price.

The maximum number of shares of common stock Nanometrics would issue and reserve for issuance upon the exercise of assumed options is approximately 5,212,286 shares, assuming that the Average Closing Price is equal to \$15.63, which would result in the Accent Optical stockholders holding approximately 27% of the fully diluted shares of Nanometrics common stock immediately after the merger, and the Nanometrics shareholders holding approximately 73% of the fully diluted shares of Nanometrics common stock immediately after the merger. For comparison purposes, the Average Closing Price for the 10 trading days ending on June 6, 2006 was \$10.84 per share, which would have resulted in the issuance, or reservation for issuance upon the exercise of assumed options, of approximately 5,138,282 shares of Nanometrics common stock had the merger closed two days following June 6, 2006.

Nanometrics will not issue fractional shares of its common stock in the merger. As a result, each Accent Optical stockholder will receive cash in lieu of any fractional share of Nanometrics common stock the stockholder would otherwise be entitled to receive in the merger.

Table of Contents*Allocation of Merger Consideration among Accent Optical Stockholders (See page 86)*

Accent Optical has three classes of capital stock outstanding. Each class of Accent Optical capital stock will receive a portion of the total merger consideration, which will consist solely of a specified number of shares of Nanometrics common stock and cash in lieu of fractional shares, if any. Each class of Accent Optical capital stock will be converted into Nanometrics common stock at a different exchange ratio in the merger. The following table shows the calculation of the per share exchange ratios for each class of Accent Optical capital stock subject to the escrow:

Class	Per Share Exchange Ratio	Estimate if	Estimated Value
		Average Closing Price is	
Series A Preferred	\$1,000.00 / Average Closing Price	\$10.84 92.250923	Per Share \$ 1,000.00
Convertible Preferred Stock	\$1.13 / Average Closing Price	0.1042	\$ 1.13
Common Stock	((4,900,000 shares (as adjusted for additional shares issued for in-the-money options) minus shares issued to Accent Optical Series A Preferred Stock minus shares issued to Accent Optical Convertible Preferred Stock)) divided by (total outstanding Accent Optical Common Stock plus in-the-money options (other than options issued on or after January 23, 2006))	0.02233	\$ 0.2421

The amounts receivable by the holders of Accent Optical Series A Preferred Stock and Convertible Preferred Stock are less than the preferences and accrued dividends payable to such holders under Accent Optical's certificate of incorporation. The allocation of consideration was structured so that the merger would provide benefit to all Accent Optical stockholders and to provide incentive for the holders of Accent Optical Common Stock to approve the merger.

Because the final exchange ratios are based on the Average Closing Price for the ten days ending two days prior to closing, they cannot be determined until immediately prior to the closing date of the merger.

Issuance of the merger consideration will be made to holders of Accent Optical Series A Preferred Stock and Convertible Preferred Stock (collectively, the Accent Optical Preferred Stock) on a *pari passu* basis. If the value of the shares of Nanometrics common stock issuable in the merger is insufficient to provide \$1,000 of Nanometrics common stock for each share of Series A Preferred Stock and \$1.13 of Nanometrics common stock for each share of Convertible Preferred Stock, then the available merger consideration will be prorated, and holders of Accent Optical Common Stock and options will receive no consideration in the merger.

Table of Contents

The following table shows the approximate dollar value that will be received for one share of Accent Optical Common Stock, one share of Series A Preferred Stock and one share of Convertible Preferred Stock based on varying average closing prices for Nanometrics stock. The amounts shown take into account the reduction in the purchase price resulting from the amount that Accent Optical transaction expenses exceed the limit provided for in the merger agreement of \$4.2 million. Transaction expenses are currently expected to be approximately \$5.15 million resulting in an immediate claim against the escrow of \$950,000.

Average Closing Price	Value Received for One		
	Share of Accent Optical	Share of Accent Optical Series A Preferred	Share of Accent Optical Convertible Preferred
	Common Stock	Stock	Stock
\$ 3.00	\$ 0.000	\$ 753.629	\$ 0.851
\$ 5.00	\$ 0.037	\$ 1,000.000	\$ 1.130
\$ 7.00	\$ 0.105	\$ 1,000.000	\$ 1.130
\$ 9.00	\$ 0.174	\$ 1,000.000	\$ 1.130
\$11.00	\$ 0.241	\$ 1,000.000	\$ 1.130
\$13.00	\$ 0.307	\$ 1,000.000	\$ 1.130
\$15.00	\$ 0.373	\$ 1,000.000	\$ 1.130
\$17.00	\$ 0.438	\$ 1,000.000	\$ 1.130
\$19.00	\$ 0.503	\$ 1,000.000	\$ 1.130

Treatment of Accent Optical Stock Options (See page 88)

At the closing of the merger, Nanometrics will assume each outstanding option to acquire shares of Accent Optical Common Stock that is in-the-money or that was granted on or after January 23, 2006, regardless of whether such option is in-the-money. An option will be in-the-money if the per share exercise price for the option is less than the value of Nanometrics common stock that the holder of one share of Accent Optical Common Stock would be entitled to receive in the merger.

Each assumed option will be converted into an option to purchase the number of Nanometrics shares that would have been issuable in exchange for the number of Accent Optical shares subject to the assumed option, had such shares been outstanding at the closing of the merger. The exercise price of such assumed options will be adjusted such that the aggregate exercise price for the option remains constant.

In addition, if the employment or service relationship of the holder of any assumed options or Accent Optical Common Stock that is subject to vesting is terminated within six months following the completion of the merger, other than by Accent Optical or its successor for cause or by the holder without good reason, the vesting of the options or shares held by such holder will accelerate in full. Each assumed option will be subject to all other terms and conditions set forth in the applicable documents evidencing the option immediately prior to the closing of the merger.

As of June 6, 2006, options to purchase approximately 13,259,343 shares of Accent Optical Common Stock were outstanding and either in-the-money (based upon the Average Closing Price, had the merger closed two days following June 6, 2006), or granted on or after January 23, 2006.

Nanometrics has agreed to file, within 15 business days after completion of the merger, a registration statement on Form S-8 with the SEC covering shares of Nanometrics common stock issuable in connection with the assumed options. As a result, all shares of Nanometrics common stock issuable upon exercise of assumed options will be freely transferable as long as the registration statement remains effective.

Table of Contents

All Accent Optical options that are not in-the-money (and which were not granted on or after January 23, 2006) will be out-of-the-money at the closing of the merger and will terminate if not exercised prior to the closing. The options that are not assumed by Nanometrics will vest in full as of the closing date of the merger in full, pursuant to the terms of the Accent Optical stock incentive plan, immediately prior to their termination. As of June 6, 2006, options to purchase approximately 3,268,874 shares of Accent Optical Common Stock were outstanding and out-of-the-money (based upon the Average Closing Price, had the merger closed two days following June 6, 2006). If the Average Closing Price is equal to or greater than \$15.63, then all outstanding stock options of Accent Optical will be assumed in the merger.

Non-Solicitation Restrictions (See page 93)

The merger agreement, as amended, contains detailed provisions that prohibit Accent Optical and its subsidiaries, as well as its officers, directors and representatives, from taking any action to solicit or engage in discussions or negotiations with any person or group with respect to certain types of alternative acquisition proposals.

Conditions to Completion of Merger (See page 96)

Under the terms of the merger agreement, as amended, Nanometrics and Accent Optical are not required to complete the merger until the following conditions have been satisfied:

the registration statement filed with the Securities and Exchange Commission (the SEC) with respect to the shares of Nanometrics common stock to be issued in connection with the merger has been declared effective by the SEC;

the Nanometrics shareholders have approved the issuance of shares of Nanometrics common stock in the merger, and the Accent Optical stockholders have approved the merger agreement, as amended, and the merger as well as certain other items included in the Notice of the Accent Optical Special Meeting of Stockholders including the escrow agreement and appointment of the stockholder agent;

any applicable waiting periods have expired or the parties have received all clearances, consents and approvals necessary for completion of the merger under United States and foreign antitrust laws;

the absence of any legal restraints or prohibitions preventing the completion of the merger;

the authorization for listing on the Nasdaq National Market of the shares of Nanometrics common stock to be issued in the merger;

the delivery to each party of tax opinions of legal counsel to the effect that the merger will qualify as a reorganization within the meaning of Section 368(a) of the Internal Revenue Code;

the representations and warranties of each party contained in the merger agreement, as amended, are true and correct, except to the extent that breaches of these representations and warranties would not result in a material adverse effect on the representing party;

each party has performed or complied in all material respects with all agreements and covenants contained in the merger agreement at the completion of the merger; and

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the absence of events or developments since the date of the merger agreement that would reasonably be expected to have a material adverse effect with respect to either party.

Either Nanometrics or Accent Optical may waive the conditions to the performance of its respective obligations under the merger agreement, as amended, and complete the merger even though one or more of these conditions has not been met.

Table of Contents

Termination Rights and Fees (See page 98)

Under circumstances specified in the merger agreement, as amended, either Nanometrics or Accent Optical may terminate the merger agreement, as amended, subject to the limitations set forth in the merger agreement, if:

the Boards of Directors of both Nanometrics and Accent Optical mutually consent in writing;

the merger is not completed by July 31, 2006;

a non-appealable final order of a court or other action of any governmental authority has the effect of permanently prohibiting completion of the merger;

the required approval of the shareholders of Nanometrics and the stockholders of Accent Optical has not been obtained at their respective special meetings; or

the other party breaches its representations, warranties or covenants in the merger agreement, as amended, such that its conditions to completion of the merger regarding representations, warranties or covenants would not be satisfied.

If the merger is not completed under because the Nanometrics shareholders have not approved the issuance of Nanometrics common stock or the Accent Optical stockholders have not approved the matters set forth in the Notice of Special Meeting of Accent Optical Stockholders, then Nanometrics or Accent Optical, respectively, will be required to pay the other \$5 million, plus expenses.

Accounting Treatment of the Merger (See page 82)

Nanometrics will account for the merger as a purchase business combination under United States generally accepted accounting principles.

Voting Agreements

Nanometrics Voting Agreements (See page 99)

Each of the directors and officers of Nanometrics has entered into a voting agreement with Accent Optical, agreeing to vote all of his respective shares of Nanometrics common stock, including shares of Nanometrics common stock acquired after the date of the voting agreements, in favor of the Nanometrics proposal related to the merger, including approval of the merger agreement, as amended, and any action required to further the merger.

Each of these shareholders has also granted to Accent Optical an irrevocable proxy to vote the shares of Nanometrics common stock subject to the voting agreements in accordance with its terms. The voting agreements and irrevocable proxies terminate upon the earlier of the termination of the merger agreement, as amended, or the effective time of the merger.

At the close of business on January 25, 2006, the parties to the Nanometrics voting agreements and their affiliates owned and were entitled to vote 4,024,815 shares of Nanometrics common stock, collectively representing approximately 30.9% of the shares of Nanometrics common stock outstanding on that date. As of the record date for the Nanometrics special meeting, the parties to the Nanometrics voting agreement and their affiliates owned and were entitled to vote 4,046,141 shares of Nanometrics common stock, collectively representing approximately 31% of the shares of Nanometrics common stock outstanding on that date.

The voting agreements prohibit the signing shareholders from selling or disposing of any shares or options of Nanometrics common stock beneficially owned by the signing shareholders, unless the transferee agrees to be bound by the terms and conditions of the voting agreement. A form of the Nanometrics voting agreement is attached to this joint proxy statement/prospectus as Annex B-1.

Table of Contents

Accent Optical Voting Agreements (See page 100)

Certain Accent Optical directors, officers and their affiliated entities and certain other affiliates of Accent Optical have entered into a voting agreement with Nanometrics and Alloy Merger Corporation, agreeing to vote all of their respective shares of Accent Optical capital stock, including shares of Accent Optical capital stock acquired after the date of the voting agreements, in favor of the Accent Optical merger-related proposals including the adoption and approval of the merger agreement, as amended. Some of the voting agreements included certain conditions on the holder's obligation to vote the holder's shares related to the terms of the merger agreement, as amended.

Each of these stockholders has also granted to Nanometrics an irrevocable proxy to vote the shares of Accent Optical capital stock subject to the voting agreements in accordance with its terms. The voting agreements and irrevocable proxies terminate upon the earlier of the termination of the merger agreement, as amended, the closing of the merger or 12 months after the date of the agreement. The voting agreements originally contained the agreement of each of these stockholders to vote the holder's shares in favor of the approval of certain payments to Accent Optical executive officers pursuant to Section 280G of the Internal Revenue Code. Nanometrics and Alloy Merger Corporation subsequently waived this requirement.

At the close of business on January 25, 2006, and as of the record date for the Accent Optical special meeting, June 16, 2006, these stockholders and their affiliates beneficially owned and were entitled to vote 124,193,172 shares of Accent Optical Common Stock, collectively representing approximately 87.9% of the shares of Accent Optical Common Stock outstanding on that date; 8,396.77 shares of Accent Optical Series A Preferred Stock, collectively representing approximately 88.9% of the shares of Accent Optical Series A Preferred Stock outstanding on that date; and 5,036,584 shares of Accent Optical Convertible Preferred Stock, collectively representing approximately 64.7% of the shares of Accent Optical Convertible Preferred Stock outstanding on that date.

The voting agreements prohibit the signing stockholders from selling or disposing of any shares or options of Accent Optical capital stock beneficially owned by the signing stockholders without the prior written consent of Nanometrics. A form of the Accent Optical voting agreement is attached to this joint proxy statement/prospectus as Annex B-2.

Escrow Agreement (See page 102)

Pursuant to the merger agreement, as amended, approximately 490,000 shares of Nanometrics common stock deliverable as consideration in the merger will be withheld and deposited with U.S. Stock Transfer Corporation to hold in an escrow fund in order to secure Accent Optical's and its former stockholders' performance of indemnification obligations under Article IX of the merger agreement, as amended.

Upon closing, Nanometrics will have an immediate claim on the escrow for a number of shares equal to the Accent Optical transaction costs that exceed \$4.2 million, which excess is currently anticipated to be approximately \$950,000, divided by the Average Closing Price. Based on the Average Closing Price for the ten trading days ending on June 6, 2006, \$10.84, the value of the shares to be placed in escrow would be \$5,311,600.

In connection with the execution of the merger agreement, Nanometrics, Alloy Merger Corporation, Sanford S. Wadler, as Stockholder Agent, and U.S. Stock Transfer, as Depositary Agent, entered into an escrow agreement setting forth additional terms and conditions relating to the operation of the escrow fund and the indemnification claim procedures. The full text of the escrow agreement is attached as Annex F.

Table of Contents

Employment and Severance Agreements

Employment Agreement (See page 102)

Bruce C. Rhine, Accent Optical's Chairman and Chief Executive Officer, has entered into an employment agreement with Nanometrics, pursuant to which Mr. Rhine will become the Chief Strategy Officer of Nanometrics following the merger. He will receive a base salary of \$250,000, standard Nanometrics employee benefits and paid vacation. In connection with his employment, Mr. Rhine has agreed to certain non-competition and non-solicitation provisions, described under *Agreements Related to the Merger Employment Agreement*.

Executive Officer Retention and Severance Arrangements (See page 77)

Reid Langrill. In connection with the merger, Accent Optical entered into an agreement with Reid Langrill, its Chief Financial Officer, which provides for Mr. Langrill's continued employment with Accent Optical or its successors through the completion of the merger and up to 30 days thereafter. During his period of employment, he will continue to earn his regular salary. Upon his termination, he will receive a severance payment equal to the greater of either \$185,000 or the difference between \$500,000 and the value of Mr. Langrill's options that are in-the-money as of the completion of the merger, subject to withholding. Following his termination, Mr. Langrill has agreed to provide consulting services to Nanometrics through March 31, 2007, subject to earlier termination, for an hourly rate and reimbursement of expenses.

Bruce Crawford. Accent Optical entered into an employment agreement with Bruce Crawford, upon commencement of his role as President and Chief Operating Officer, which provides for certain severance benefits if Accent Optical terminates Mr. Crawford's employment without good cause or Mr. Crawford terminates his employment for good reason during the five-year term of the agreement. Upon such termination, Mr. Crawford is entitled to receive a lump-sum payment of his annual salary (currently \$213,000), continued group health or other group benefits as allowed under the Consolidated Omnibus Budget Reconciliation Act of 1985 (COBRA) for a period of 12 months (with a potential gross-up for taxes arising from the provision of such benefits) and reimbursement of relocation expenses up to \$50,000. See *The Merger Interests of Accent Optical Directors and Executive Officers in the Merger Executive Officer Retention and Severance Arrangements*.

Proposal Two Payments to Executives (See page 161)

The merger will constitute a change in the ownership or effective control of Accent Optical for purposes of Section 280G. Pursuant to Section 280G, payments of compensation made to a disqualified individual that are contingent on a change in the ownership or effective control of a corporation and that exceed a threshold amount applicable to that particular disqualified individual may be characterized as excess parachute payments. Excess parachute payments are not deductible as a business expense by a corporation, and subject the recipient of such payments to a 20% excise tax (in addition to applicable federal and state income and employment taxes), unless such payments are approved by the requisite approval of the stockholders of the corporation.

Accent Optical has determined that Bruce C. Rhine, its Chairman and Chief Executive Officer, Bruce Crawford, its President and Chief Operating Officer, and Reid Langrill, its Chief Financial Officer, may be treated as disqualified individuals for purposes of Section 280G and that a portion of the potential parachute payments may be treated as excess parachute payments. The board of directors of Accent Optical has unanimously approved the potential excess parachute payments to Messrs. Rhine, Crawford and Langrill. These payments consist of severance payments, option grants and the value of options that could be accelerated due to the executive officer's termination in connection with the merger. All holders of shares of outstanding capital stock of Accent Optical as of June 16, 2006 (other than shares held directly or indirectly by Messrs. Rhine, Crawford and Langrill) are being asked to approve the potential parachute payments. Messrs. Rhine, Crawford

Table of Contents

and Langrill have agreed to waive that portion of their respective potential parachute payments in excess of the threshold that would cause such payments to be characterized as excess parachute payments in the event shareholder approval is not obtained. If approval is obtained by a vote of the Accent Optical stockholders holding more than 75% of the voting power of all outstanding capital stock of Accent Optical entitled to vote, then Messrs. Rhine, Crawford and Langrill will each be entitled to receive the full amount of their respective potential parachute payments estimated to be \$415,000, \$382,000 and \$395,000, respectively, at an average closing price of Nanometrics common stock of \$10.84. At an average closing price of Nanometrics common stock of \$10.84, only Mr. Langrill would have potential parachute payments exceeding the threshold and if shareholder approval is obtained, Mr. Langrill will be entitled to receive approximately \$49,000 which he would otherwise have forfeited in the absence of shareholder approval. No Accent Optical stockholder is obligated to vote in any manner with respect to the potential parachute payments, thus, approval of the potential parachute payments is not assured.

Opinion of Nanometrics Financial Advisor *(See page 65)*

Cowen delivered its opinion to the board of directors of Nanometrics that, as of January 25, 2006, the consideration to be paid in the merger was fair, from a financial point of view, to Nanometrics.

The full text of the Cowen opinion is attached hereto as Annex C. You are urged to read the opinion carefully in its entirety.

Opinion of Accent Optical Financial Advisor *(See page 70)*

Merrill Lynch delivered its opinion to the board of directors of Accent Optical that, as of January 24, 2006, the aggregate consideration to be paid in the merger was fair, from a financial point of view, to the holders of Accent Optical capital stock.

The full text of the Merrill Lynch opinion is attached hereto as Annex D. You are urged to read the opinion carefully in its entirety.

Interests of Certain Directors, Officers and Affiliates of Accent Optical *(See page 76)*

Members of the Accent Optical board of directors and Accent Optical executive officers have interests in the merger that may be different than, or in addition to, the interests of Accent Optical stockholders generally. These interests include:

the appointment of Bruce C. Rhine, a director and the current Chief Executive Officer of Accent Optical, as a director and Chief Strategy Officer of Nanometrics following the merger, for which he will receive a base salary of \$250,000 per year, standard Nanometrics employee benefits and paid vacation;

an agreement between Accent Optical and Reid Langrill, its Chief Financial Officer, which provides for Mr. Langrill's continued employment at his regular salary with Accent Optical or its successors through the completion of the merger and up to 30 days thereafter; receipt of a severance payment, upon his termination, equal to the greater of either \$185,000 or the difference between \$500,000 and the value of Mr. Langrill's options that are in-the-money as of the completion of the merger, subject to withholding; and, following Mr. Langrill's termination as Chief Financial Officer of Accent Optical, for Mr. Langrill to provide consulting services to Nanometrics through March 15, 2007, subject to earlier termination, at a rate of \$105 per hour and reimbursement of expenses;

the potential receipt of severance benefits by Bruce Crawford, Accent Optical's President and Chief Operating Officer, if Accent Optical terminates Mr. Crawford's employment without good cause or Mr. Crawford terminates his employment for good reason during the five-year term of his employment agreement, including a lump-sum payment in the amount of his annual salary (currently \$213,000),

Table of Contents

continued group health or other group benefits as allowed under the Consolidated Omnibus Budget Reconciliation Act of 1985 (COBRA) for a period of 12 months with a potential gross-up for taxes arising and reimbursement of relocation expenses up to \$50,000;

the receipt of option grants in connection with the merger by Accent Optical officers, for an aggregate of 5,522,000 shares of Accent Optical Common Stock, which will be assumed by Nanometrics;

the acceleration of vesting of assumed options of officers and directors if their employment is terminated in connection with the merger (options to purchase 8,281,596 shares of Accent Optical Common Stock held by Accent Optical officers and directors are expected to be assumed, based on the Average Closing Price as of June 6, 2006, of which options to purchase 1,997,723 shares of Accent Optical Common Stock are unvested as of June 6, 2006);

the continued indemnification following the merger of the current Accent Optical directors and officers for acts or omissions occurring prior to the closing of the merger;

the receipt by Bio-Rad, a company affiliated with Accent Optical director David Schwartz, of approximately \$12.0 million as repayment of a loan and a contractual fee of \$2.5 million (related to the 2000 asset purchase from Bio-Rad to form Accent Optical), each in connection with the closing of the merger; and

the re-allocation of the merger consideration so that holders of Accent Optical Common Stock can receive more of the merger consideration than they originally would have been entitled to, which benefits the directors and officers who hold Accent Optical Common Stock.

The Accent Optical board of directors was aware of these interests and considered them, among other matters, in making its recommendation that Accent Optical stockholders approve the merger agreement, as amended, the merger and the related transactions and certain payments to executive officers.

Material U.S. Federal Income Tax Consequences of the Merger

Nanometrics and Accent Optical each expect the merger to qualify as a reorganization pursuant to Section 368(a) of the Internal Revenue Code for U.S. federal income tax purposes. Assuming that the merger so qualifies, Accent Optical stockholders will not recognize gain or loss for United States federal income tax purposes as a result of the merger, other than gain or loss attributable to cash received by Accent Optical stockholders instead of fractional shares. It is a condition to the merger that each of Nanometrics and Accent Optical receive a legal opinion to the effect that the merger will constitute a reorganization within the meaning of Section 368(a) of the Internal Revenue Code. The tax consequences of the merger to Accent Optical stockholders may vary depending upon each such stockholder's situation. Each Accent Optical stockholder is urged to consult its own tax advisors with respect to the tax consequences of the merger. Please see *Material United States Federal Income Tax Consequences of the Merger*,&#