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UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

SCHEDULE 14A INFORMATION

Proxy Statement Pursuant to Section 14(a) of
the Securities Exchange Act of 1934 (Amendment No.)

Filed by the Registrant

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Check the appropriate box:

- Preliminary Proxy Statement
- Confidential, for Use of the Commission Only (as permitted by Rule 14a-6(e)(2))**
- Definitive Proxy Statement
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AXCELIS TECHNOLOGIES, INC.

(Name of Registrant as Specified In Its Charter)

(Name of Person(s) Filing Proxy Statement, if other than the Registrant)

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NOTICE OF ANNUAL MEETING OF STOCKHOLDERS

To Be Held April 29, 2004

The 2004 annual meeting of the stockholders of Axcelis Technologies, Inc., a Delaware corporation, will be held at the offices of Palmer & Dodge, LLP, 111 Huntington Avenue, Boston, Massachusetts, at 11:00 a.m. on Thursday, April 29, 2004 for the following purposes:

1. To elect three (3) directors to serve until the 2007 annual meeting of stockholders.
2. To ratify the appointment of independent auditors.
3. To transact such other business as may properly come before the meeting or any adjournment thereof.

Only stockholders of record at the close of business on March 8, 2004 will be entitled to vote at the annual meeting or at any adjournment.

It is important that your shares be represented at the meeting. Therefore, whether or not you plan to attend the meeting, please complete your proxy card and return it in the enclosed envelope, which requires no postage if mailed in the United States. If you attend the meeting and wish to vote in person, your proxy will not be used.

By order of the Board of Directors,

Lynnette C. Fallon
Secretary

Dated: March 19, 2004

Proxy Statement

The Board of Directors of Axcelis Technologies, Inc. ("Axcelis" or the "Company") is soliciting your proxy for use at the 2004 annual meeting of stockholders to be held on Thursday, April 29, 2004 and at any adjournment of the meeting. This proxy statement and the accompanying proxy card are first being sent or given to stockholders of Axcelis on or about March 19, 2004.

General Information About Voting

Who can vote. You may vote your shares of Axcelis common stock at the annual meeting if you were a stockholder of record at the close of business on March 8, 2004. On that date, there were 99,535,944 shares of common stock outstanding. You are entitled to one vote for each share of common stock that you held on the record date.

How to vote your shares. You may vote your shares either by proxy or by attending the meeting and voting in person. If you choose to vote by proxy, please complete, date, sign and return the proxy card in the enclosed postage prepaid envelope. The proxies named in the proxy card will vote your shares as you have instructed. If you sign and return the proxy card without indicating how your votes should be cast, the proxies will vote your shares in favor of each of the proposals contained in this proxy statement, as recommended by our Board of Directors. Even if you plan to attend the meeting, please complete and mail your proxy card to ensure that your shares are represented at the meeting. If you attend the meeting, you can still revoke your proxy by voting in person. If your shares are held in a brokerage or bank account, you must make arrangements with your broker or bank to vote your shares in person.

Proposals to be considered at the annual meeting. The principal business expected to be transacted at the meeting, as more fully described below, will be the reelection of three directors whose current terms end in 2004 and the ratification of the selection of independent auditors of the Company.

Quorum. A quorum of stockholders is required to transact business at the meeting. A majority of the outstanding shares of common stock entitled to vote, represented at the meeting in person or by proxy, constitutes a quorum for the transaction of business.

Number of votes required. The number of votes required to approve the proposals that are scheduled to be presented at the meeting is as follows:

Proposal	Required Vote
• Election of three nominees as directors	Each nominee must receive a plurality of the votes cast.
• Ratification of auditors	This requires the affirmative vote of a majority of the shares present or represented at the meeting and entitled to vote.

Abstentions. Abstaining from voting for a nominee in the election of directors will reduce the number of votes cast as well as the number of votes in favor of any nominee, so will have no impact on the results of voting. In voting on the proposal to ratify the appointment of our auditors, abstentions will be counted as

votes against the proposal.

Broker non-votes. A broker non-vote occurs when a broker cannot vote a customer's shares registered in the broker's name because the customer did not send the broker instructions on how to vote on the matter and the broker is barred by law or stock exchange regulations from exercising its discretionary voting authority in the particular matter. Brokers will have voting discretion for shares registered in their own name on both the election of directors and ratification of auditors.

Discretionary voting by proxies on other matters. Aside from the proposals for the election of directors and the ratification of our selection of auditors, we do not know of any other proposals that may be presented at the 2004 annual meeting. If another matter is properly presented for consideration at the meeting, the persons named in the accompanying proxy card will exercise their discretion in voting on the matter.

How you may revoke your proxy. You may revoke the authority granted by your executed proxy card at any time before we exercise it by filing with our Corporate Secretary, Lynnette C. Fallon, a written revocation or a duly executed proxy card bearing a later date, or by voting in person at the meeting. If your shares are held in a brokerage account, you must make arrangements with your broker or bank to revoke your proxy.

Expenses of solicitation. We will bear all costs of soliciting proxies. We will upon request reimburse brokers, custodians and fiduciaries for out-of-pocket expenses incurred in forwarding proxy solicitation materials to the beneficial owners of stock held in their names. In addition to solicitations by mail, our directors, officers and employees may solicit proxies from stockholders in person or by other means of communication, including telephone, facsimile and e-mail, without additional remuneration.

Householding of Annual Meeting Materials. Some banks, brokers and other nominee record holders may be "householding" our proxy statements and annual reports. This means that only one copy of our proxy statement and annual report to stockholders may have been sent to multiple stockholders in your household. We will promptly deliver a separate copy of either document to you if you call or write us at the following address or telephone number: Axcelis Technologies, Inc., 108 Cherry Hill Drive, Beverly, Massachusetts 01915, Attn: Corporate Secretary, telephone: (978) 787-4000. If you want to receive separate copies of the proxy statement or annual report to stockholders in the future, or if you are receiving multiple copies and would like to receive only one copy per household, you should contact your bank, broker, or other nominee record holder, or you may contact us at the above address and telephone number.

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SHARE OWNERSHIP OF 5% STOCKHOLDERS

The following table shows the amount of our common stock beneficially owned as of December 31, 2003 by persons known by us to own more than 5% of our common stock.

Beneficial Owner ⁽¹⁾	Shares Owned	Percent of Class
Wellington Management Company, LLP ⁽²⁾ 75 State St., Boston, MA 02109	6,454,144	6.5%
FMR Corp., Edward C. Johnson 3 rd and Abigail P. Johnson ⁽³⁾ 82 Devonshire Street, Boston, MA 02109	5,693,500	5.7%

- (1) Unless otherwise noted, the number of shares beneficially owned by each person listed includes any shares over which a person has sole or shared voting or investment power. As of December 31, 2003, none of the persons named in this table had the right to acquire shares by exercising a stock option or other right. The percentage ownership of each person listed in the table was calculated using the total number of shares outstanding on December 31, 2003.
- (2) Based on a Schedule 13G filed by Wellington Management Company, LLP with the Securities and Exchange Commission in February 2004, which states that such shares are held of record by Wellington's investment advisory clients and that Wellington shares the power to vote 4,507,044 of such shares and the power to dispose of all of such shares.
- (3) Based on a Schedule 13G filed by FMR Corp., Edward C. Johnson 3rd and Abigail P. Johnson with the Securities and Exchange Commission in February 2004, which states that such shares are owned by investment companies and institutional accounts managed by subsidiaries of FMR Corp. According to the Schedule 13G, FMR Corp. and, by virtue of their controlling interests in FMR Corp., Mr. Johnson and Ms. Johnson have sole voting power over 1,012,200 of such shares and the sole power to dispose of all of such shares.

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SHARE OWNERSHIP OF DIRECTORS AND EXECUTIVE OFFICERS

The following table shows the amount of our common stock beneficially owned as of March 1, 2004 by our directors, the executive officers, and all of our current executive officers and directors as a group.

Beneficial Owner ⁽¹⁾	Shares Owned	Options or Warrants Exercisable as of April 29, 2004	Total Shares Beneficially Owned	Percent of Class
Non-Executive Directors				

Alexander M. Cutler ⁽²⁾	28,178	85,000	113,178	*
R. John Fletcher	3,000	40,000	43,000	*
Stephen R. Hardis	70,735	85,000	155,735	*
William C. Jennings	5,000	40,000	45,000	*
Patrick H. Nettles	11,500	70,000	81,500	*
Naoki Takahashi	1,000	85,000	86,000	*
H. Brian Thompson	5,000	70,000	75,000	*
Gary L. Tooker ⁽³⁾	17,537	85,000	102,537	*

Named Executive Officers

Mary G. Puma ⁽⁴⁾	61,263	696,083	757,346	*
Michael J. Luttati	15,338	536,328	551,666	*
David W. Duff ⁽⁵⁾	12,459	61,570	74,029	*
Lynnette C. Fallon	5,533	42,000	47,533	*
Jan Paul van Maaren	3,965	60,220	64,185	*
Stephen G. Bassett	0	0	0	

All current Executive Officers and

Directors as a Group (14 persons)⁽⁶⁾	240,508	1,956,201	2,196,709	2.2%
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* Indicates less than 1%.

- (1) Unless otherwise noted, the number of shares beneficially owned by each person listed includes any shares over which a person has sole or shared voting or investment power. The shares shown in the table also include shares that the persons named in this table have the right to acquire on or before April 29, 2004 (60 days after March 1, 2004) by exercising a stock option or other right. Unless otherwise noted, each person has sole investment and voting power (or shares that power with his or her spouse) over the shares listed in the table. The percentage ownership of each person listed in the table was calculated using the total number of shares outstanding on March 1, 2004, plus any shares these persons could acquire upon the exercise of any options held by them on or before April 29, 2004.
- (2) Mr. Cutler's ownership includes an aggregate of 1,178 shares owned by his wife as trustee for Mr. Cutler's two minor children.
- (3) Mr. Tooker's ownership includes 17,537 shares owned by a trust for which Mr. Tooker has shared voting and investment power.
- (4) Ms. Puma's ownership includes 23,761 shares that are subject to forfeiture to the Company, which forfeiture provision will end on December 31, 2004 (assuming Ms. Puma is employed on that date), at which time such shares shall be fully vested.
- (5) Mr. Duff's ownership includes 7,656 shares that are subject to forfeiture to the Company. This forfeiture provision will end as to 1,914 shares on each of July 30, 2004, 2005, 2006 and 2007 (assuming Mr. Duff is employed on those dates), at which time such shares shall be fully vested.
- (6) Includes shares and exercisable options held by the directors and named executive officers.

PROPOSAL 1: ELECTION OF DIRECTORS

Our Board of Directors has fixed the number of directors at nine, which number is subject to increase by action of the Board. Under our charter, our Board is divided into three classes as nearly equal in number of directors as possible. The term of one class expires, and their successors are elected for a term of three years, at each annual stockholders' meeting. At the upcoming annual meeting, three directors will be elected to hold office for a term of three years until our annual meeting in 2007 and until their successors are elected and qualified. Each of the Board's nominees, Gary L. Tooker, Patrick H. Nettles and Alexander M. Cutler, has consented to serve if elected. However, if any nominee is unable to serve, proxies will be voted for any other candidate nominated by the Board.

The following table contains biographical information about the nominees for director and current directors whose term of office will continue after the meeting.

Name and Age	Business Experience and Other Directorships	Director Since	Present Term Expires
Gary L. Tooker* Age: 64	Mr. Tooker is retired Chairman of the Board of Motorola, Inc., a manufacturer of electronics equipment. Mr. Tooker served as Vice Chairman of Motorola from June to December 1999, and as Chairman from 1997. Prior to that, Mr. Tooker served as Motorola's Vice Chairman and Chief Executive Officer from 1993. Mr. Tooker is a director of Avnet, Inc. and Eaton Corporation.	2000	2004
Patrick H. Nettles* Age: 59	Mr. Nettles has served as Executive Chairman of the Board of Directors of CIENA Corporation, a manufacturer of optical networking equipment, since May 2001. Prior to that, Mr. Nettles served as Chairman of the Board of Directors and Chief Executive Officer of CIENA from October 2000, as its President, Chief Executive Officer and Director from April 1994, and as its Director and Chief Executive Officer from February 1994.	2001	2004
Alexander M. Cutler* Age: 52	Mr. Cutler is Chairman and Chief Executive Officer of Eaton Corporation, a global diversified industrial manufacturer. Prior to assuming this position in August 2000, Mr. Cutler was President and Chief Operating Officer of Eaton Corporation since 1995. Mr.	2000	2004

Cutler served as Eaton's Executive Vice President and Chief Operating Officer—Controls from 1993 to 1995, as its Executive Vice President—Operations from 1991 and President of its Industrial Group from 1986. He is also a director of KeyCorp.

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H. Brian Thompson Age: 64	Mr. Thompson is the Chairman of Comsat International, a privately-held independent telecommunications company operating throughout Latin America, a position he assumed in January 2003. He has also been the Chief Executive Officer of Universal Telecommunications, Inc., a private investment and advisory firm, since 2000. Mr. Thompson previously served as Chairman and Chief Executive Officer of Global Telesystems, Inc., a telecommunications company, from March 1999 through September 2000 and served as Chairman and Chief Executive Officer of LCI International, a telecommunications company, from 1991 until its sale to Qwest Communications International, Inc., a broadband internet communications company, in June 1998. At that time, Mr. Thompson became Vice Chairman of the Board of Qwest until his resignation in December 1998. Earlier, he was Executive Vice President of MCI Communications through its growth years in the 1980s. Mr. Thompson serves on the Boards of Directors of Bell Canada International, Inc., Comsat International, ArrayComm, Inc, United Auto Group and Sonus Networks, Inc.	2002	2005
Stephen R. Hardis Age: 68	Mr. Hardis is the Company's Chairman of the Board. He was Chairman and Chief Executive Officer of Eaton Corporation, until July 2000. Mr. Hardis became Eaton's Chairman in January 1996 and its Chief Executive Officer in September 1995. Prior to that, he served as Eaton's Vice Chairman from 1986 and its Executive Vice President—Finance and Administration from 1979. Mr. Hardis is a director of American Greetings Corporation, Lexmark International Group, Inc., Marsh & McLennan Companies, Inc., Nordson Corporation, Progressive Corporation, Apogent Technologies Inc. and Steris Corporation.	2000	2005
R. John Fletcher Age: 58	R. John Fletcher is Chief Executive Officer of Fletcher Spaght, Inc., a strategy consulting organization, which he founded in 1983, and Managing Director of Fletcher Spaght Ventures, a venture fund. Prior to founding Fletcher Spaght, Inc., Mr. Fletcher was a manager at the Boston Consulting Group. Mr. Fletcher is also a director of AutoImmune, Inc., NMT Medical, Inc., and Spectranetics Corporation.	2003	2005

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Mary G. Puma Age: 46	Ms. Puma has been the Company's Chief Executive Officer and President since January 2002 and President and Chief Operating Officer since May 2000. Prior to that, she served as General Manager and Vice President of the Semiconductor Equipment Operations of Eaton Corporation. In May 1996, she joined Eaton as General Manager of the Commercial Controls Division. Prior to joining Eaton, Ms. Puma spent 15 years in various marketing and general management positions for General Electric Company. Ms. Puma is a director of Nordson Corporation and Apogent Technologies Inc.	2000	2006
William C. Jennings Age: 64	Mr. Jennings is a retired partner of PricewaterhouseCoopers LLP, a global accounting and advisory firm, where he led the risk management and internal control consulting practice from 1992 until his retirement in 1999. Before that, Mr. Jennings served as a senior audit partner at Coopers & Lybrand, as a senior executive vice president at Shearson Lehman Brothers, responsible for quality assurance, internal audit and compliance, and as an executive vice president and chief financial officer of Bankers Trust. Since retiring from PricewaterhouseCoopers, Mr. Jennings provides independent consulting services to a number of companies. He is also a director of Silgan Holdings Inc. and Nyfix, Inc.	2003	2006
Naoki Takahashi Age: 58	Mr. Takahashi has been a director of Sumitomo Heavy Industries, Ltd., an integrated industrial product manufacturer, since June 1998. Mr. Takahashi is also an Executive Vice President and General Manager of Sumitomo's Power Transmission Controls Division since June 2003. Prior to that, he was Executive Vice President and General Manager of Sumitomo's Precision Products Division and Self- Defense Equipment Center from 2000 to 2003 and Executive Vice President and General Manager of its Corporate Technology Operations Group from 1998 to 2002.	2000	2006

* Indicates a nominee for election as director.

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The Board of Directors has determined that all directors, other than Ms. Puma and Mr. Takahashi, are independent under Nasdaq Rule 4200(a)(15), based on information known to the Company and on the annual questionnaire executed by each director. Independent directors have regularly scheduled meetings at which only independent directors are present.

Our Board of Directors held 8 meetings during 2003. Each of our directors attended at least 75% of the meetings of the Board and of the committees on which such director served. The average rate of attendance for all directors was 97%. All Board members are expected to attend the annual meeting of stockholders, subject to special circumstances. Seven of eight Board members attended the annual meeting in 2003.

Committees of the Board of Directors

Our Board has standing Audit, Compensation and Nominating and Governance Committees.

Audit Committee. The Audit Committee is responsible for assisting the Board of Directors in monitoring and oversight of (1) the integrity of the Company's financial statements and its systems of internal accounting and financial controls and (2) the independence and performance of the Company's internal and independent auditors. The Audit Committee operates under a written charter, a copy of which is available on our website at www.axcelis.com. The Audit Committee, which met 7 times during 2003, is composed of four directors. During 2003 and to date, the Audit Committee consists of Mr. Cutler (Chairman), Mr. Nettles, Mr. Thompson, and Mr. Jennings, who joined the Committee in June 2003.

In addition to the independence determination discussed above, the Board of Directors has determined that Mr. Nettles and Mr. Jennings are audit committee financial experts as defined in Item 401 of Regulation S-K promulgated by the Securities and Exchange Commission. The Board's conclusions regarding the qualifications of Mr. Nettles as an audit committee financial expert were based on his service as a chief financial officer of two public companies and service as chief executive officer of CIENA Corporation. The Board's conclusions regarding the qualifications of Mr. Jennings as an audit committee financial expert were based on his degrees in accounting and finance, certifications in accounting and service as a chief financial officer and as an audit partner and internal controls practice partner at a national accounting firm.

For a report on the Audit Committee's actions during 2003, see the "Audit Committee Report" below.

Compensation Committee. The Compensation Committee establishes the compensation philosophy for Axcelis and has all the authority of the Board of Directors to act or exercise corporate powers with respect to the compensation of the executive officers and the administration of Axcelis' equity compensation plans. The Compensation Committee is responsible to ensure that an annual review of executive officer performance and succession planning is presented to the Board. The Compensation Committee operates under a written charter, a copy of which is also available on our website at www.axcelis.com. The Compensation Committee is composed of Mr. Thompson, as Chairman, and Messrs. Hardis, Tooker and Cutler. The Compensation Committee held 6 meetings in 2003.

For a report on the Compensation Committee's actions during 2003, see the "Compensation Committee Report on Executive Compensation" below.

Nominating and Governance Committee. The Nominating and Governance Committee of the Board of Directors is responsible for identifying and nominating candidates for membership on the Board of Directors, making recommendations to the Board on non-employee director compensation and establishing governance policies for the Board and management. Its members are Mr. Nettles,

chairman, and Messrs. Hardis and Cutler. The Committee operates under a written charter and governance policies, copies of which are available on our website at www.axcelis.com. The Committee held 4 meetings in 2003.

The Nominating and Governance Committee seeks new nominees for election to the Board, when necessary, through a variety of channels, including the engagement of director search firms and less formal recommendations through business and personal contacts. Director search firms engaged by the Company are paid a retainer fee to identify and screen candidates meeting specifications established by the Committee for a particular Board nominee search. Such specifications will change from one search to another based on the Committee's determination of the needs of Board composition at the time a particular search is initiated.

The Nominating and Governance Committee will evaluate any candidate recommended for nomination as a director, whether proposed by a stockholder or identified through the Committee's own search processes, about whom it is provided appropriate information. In evaluating a candidate, the Committee must, at a minimum, determine that the candidate is capable of discharging his or her fiduciary duties to the stockholders of the Company. The Committee will determine whether the particular nomination would be consistent with Axcelis' governance policies. These policies provide in part that all new candidates for election to the Board and all Board members eligible for nomination for re-election to the Board shall be evaluated on the following criteria:

- (a) such candidate or Board member's current level of, and on-going commitment to, education regarding the responsibilities of a member of a Board of Directors under standards established by the Nominating and Governance Committee;
- (b) the adequacy of such candidate or Board member's time available to commit to responsibilities as a member of the Board;
- (c) the existence of any financial relationship with the Company other than that arising as an employee of the Company, as a Board member and/or as a stockholder; and
- (d) in the case of re-election, such member's compliance with our Director Stock Ownership Policy.

If a candidate is presented to the Nominating and Governance Committee at a time when it has established specifications for a particular Board search, the Committee will consider whether the candidate satisfies the established specifications. More generally, the Committee will consider a candidate's skills, character, leadership experience, business experience and judgment, and familiarity with relevant industry, national and international issues in light of the backgrounds, skills and characteristics of the current Board and the needs of the Company's business. Finally, the Committee must consider whether a nominee (in conjunction with the existing Board members) will assist the Company in meeting the requirements of the Sarbanes Oxley Act of 2002, the rules of the Securities and Exchange Commission, the Nasdaq listing standards, and the Internal Revenue Code regarding the independence, sophistication and skills of the members of the Board of Directors and the Audit, Compensation and Nominating and Governance Committees.

In order to recommend a candidate for consideration by the Nominating and Governance Committee, a stockholder must provide the Committee with the candidate's name, background and relationship with the proposing stockholder, a brief statement outlining the reasons the candidate would be an effective director of Axcelis and information relevant to the considerations described above. Such information should be sent to the Nominating and Governance Committee of Axcelis Technologies, Inc., 108 Cherry Hill Drive, Beverly, Massachusetts 01915, Attn: Corporate Secretary. The Committee may require further information.

Director Compensation

Director Fees. Mr. Hardis, the Chairman of the Board, receives an annual retainer of \$200,000, payable quarterly. Each director (other than Mr. Hardis and Ms. Puma) receives an annual retainer of \$20,000 payable quarterly. In addition, each director (other than Mr. Hardis or Ms. Puma) assuming responsibility as Chairman of a committee of the Board of Directors receives an annual retainer of \$7,500. Non-employee directors other than Mr. Hardis also receive cash fees for attendance at Board and committee meetings. During 2003, the meeting fees were: (1) \$2,000 for attendance in person at a meeting of the Board of Directors; (2) \$1,000 for attendance at a meeting of any committee of the Board of Directors; and (3) \$1,000 for participation in a telephonic meeting of the Board of Directors or committee of the Board of Directors. Fees are paid only to committee members with respect to attendance at a committee meeting.

Automatic Option Grants. All non-employee directors of Axcelis receive automatic initial and annual stock option grants under our 2000 Stock Plan. The initial option grant is for 40,000 shares and is granted upon initial election to the Board. Non-employee directors receive automatic annual grants for 15,000 shares beginning in the first calendar year after such director's first election to the Board. Annual grants are issued at the first meeting of the Board of Directors on or after July 1 of each year. All non-employee director options have an exercise price equal to the closing price of our common stock on the grant date and are fully exercisable on the 181 day after the date the option is granted, provided the optionee is still a director on that date. The options have a term of ten years from the date of grant.

AUDIT COMMITTEE REPORT

The Audit Committee is responsible for assisting the Board of Directors in monitoring and oversight of (1) the integrity of the Company's financial statements and its systems of internal accounting and financial controls and (2) the independence and performance of the Company's internal and independent auditors.

The Committee schedules meetings to occur after the preparation of quarterly and annual financial statements but prior to the public release of financial results for the period. The Committee met in April, July and October of 2003, prior to the release of the financial results for the first, second and third quarters of 2003, respectively and in January 2004 prior to the release of our 2003 year-end results. If appropriate, additional meetings may also be held during the year to address a variety of recurring and non-recurring topics, such as the Company's internal control systems, the scope and results of the Company's internal audit plans, changes to the Audit Committee charter and other matters. In addition, throughout 2003, the Audit Committee provided oversight of the Company's preparations for management's assessment of its internal controls over financial reporting as required by Section 404 of the Sarbanes Oxley Act of 2002. The Committee receives regular reports from management on this topic and confirmation of the processes and timing of preparation from the outside auditors. During 2003, the Audit Committee held a total of seven (7) meetings.

At all of these meetings, Axcelis' interim Chief Financial Officer was present, as was our General Counsel and our independent auditors. The Committee's agenda is established by the Committee's chairman, with input from the Company's Chief Financial Officer. Depending on the content of the meeting, the Committee holds private sessions with the Company's independent auditors, the Company's internal auditors, and, separately, with management, at which candid discussions of financial management, accounting and internal control issues can take place. In its executive sessions with representatives of the independent auditors, the Committee seeks to engage in a meaningful dialogue to address any questions or concerns identified by the Committee and to obtain an understanding of any questions or concerns of the auditors.

At the recommendation of the Audit Committee, the Board of Directors appointed Ernst & Young LLP as our independent auditors for 2004. The Audit Committee has discussed with our independent auditors and the Company's Chief Financial Officer overall audit scopes and plans, the results of external audit examinations, evaluations by the auditors of the Company's internal controls and the quality of the Company's financial reporting.

Management has reviewed with the Audit Committee the audited 2003 consolidated financial statements included in our Form 10-K Annual Report filed with the Securities and Exchange Commission and in the Annual Report to Stockholders which accompanies this proxy statement. The review included a discussion of the quality, not just the acceptability, of the accounting principles, the reasonableness of significant judgments, and the clarity of disclosures in the financial statements.

For the year ended December 31, 2003, the Committee received from the independent auditors (1) their annual written reports covering matters required to be discussed by the auditors with the Committee under Statement on Auditing Standards No. 61, *Communication with Audit Committees* and (2) their disclosures and the letter regarding independence from the Company and its management, which disclosures and letter are made under Independence Standards Board Standard No. 1, *Independence Discussions with Audit Committees*. Both items were discussed with the auditors and management at an Audit Committee meeting, including a discussion of any relationship that may impact the objectivity and independence of our auditors and whether the provision of any non-audit services by the auditors is compatible with maintaining their independence.

In performing all of these functions, the Audit Committee acts only in an oversight capacity. Necessarily, in its oversight role, the Committee relies on the work and assurances of the Company's management, which has the primary responsibility for financial statements and reports, and of the independent auditors, who in their report on the audited annual financial statements, express an opinion on the conformity of the Company's annual financial statements to accounting principles generally accepted in the United States.

In reliance on these reviews and discussions, and the report of the independent auditors, the Audit Committee has recommended to the Board of Directors, and the Board of Directors has approved, that the audited financial statements be included in the Company's 2003 Annual Report on Form 10-K for filing with the

Securities and Exchange Commission. The Committee and the Board have also recommended, subject to reconsideration in the absence of stockholder ratification, the selection of the Company's independent auditors for the current year.

By the Audit Committee,

Alexander M. Cutler
H. Brian Thompson
Patrick H. Nettles
William C. Jennings

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EXECUTIVE COMPENSATION

Compensation Committee Report on Executive Compensation

The Compensation Committee establishes and reviews the compensation philosophy for Axcelis and has all the authority of the Board of Directors to act or exercise corporate powers with respect to the compensation of the executive officers and the administration of Axcelis' equity compensation plans. This report is submitted by the Compensation Committee and addresses the compensation policies for 2003 as they affected Ms. Puma, as Chief Executive Officer, and the other five current executive officers named in the Summary Compensation Table below, referred to as the "named executive officers."

Compensation Philosophy

The Company's executive compensation program consists of base salary, an annual cash bonus opportunity and stock option awards and/or restricted stock grants. All of these components are designed with the objective of attracting and retaining executives and motivating management to meet and exceed Company growth and profitability goals.

In general, the Company seeks to provide base salaries, target bonus compensation and equity compensation within the 50 percentile of such categories of compensation paid by similar companies for comparable positions, based on market benchmarking data compiled by external consulting firms. In determining the total amount and mix of the compensation package for each executive officer, the Committee members subjectively consider the unique education, training and experience of the executive officer, his or her overall value to the Company in light of numerous factors such as contributions to the Company's competitive position in the marketplace, individual performance, and the past and expected contribution by the executive officer toward the achievement of the Company's performance objectives.

The Committee believes it is in the best interests of the Company and its stockholders to grant stock options and restricted stock as a long-term component of executive and key employee compensation program. Stock option and restricted stock grants to executive officers and other key employees are intended to keep employee financial interests in line with long-term stockholder value.

The Company maintains a single equity compensation plan, the 2000 Stock Plan (which was approved by stockholders in May 2002), which permits the issuance of stock options and restricted stock and other equity compensation. As of December 31, 2003, the 2000 Stock Plan had 33,173,367 shares of common stock reserved for issuance thereunder, 434,031 of which have been issued (on exercise of options and as restricted stock) and 14,171,006 of which are subject to outstanding options. The Committee annually reviews the number of shares available for issuance under the 2000 Stock Plan and makes a recommendation to the Board of Directors regarding the evergreen feature of the plan, which permits an increase in the number of shares available for issuance under the 2000 Stock Plan on each July 14 during the term of the plan. The increase is set at a number of shares equal to the lesser of (i) five (5%) percent of the then number of outstanding shares of Common Stock of the Company, (ii) 5,000,000 shares or (iii) such lesser amount determined by the Board. The 2000 Stock Plan will expire on May 1, 2012.

In general, option grants to executives are made upon hire and/or promotion and thereafter on an annual basis. All option grants under our 2000 Stock Plan have an exercise price equal to the closing price of the Company's common stock on the date of grant, vest over a period of four years and expire on the 10 anniversary of the date of grant. In 2003, options for 3,352,213 shares were granted to all employees and 97,000 shares of restricted stock were granted to eight employees.

Executives also participate in benefit plans available to all employees, including an Internal Revenue Code Section 401(k) plan, under which the Company made a matching contribution to each

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participant in 2003, and the Employee Stock Purchase Plan, an Internal Revenue Code Section 423 plan which allows employees to purchase Axcelis shares through salary deductions. Other than a tax and financial planning reimbursement program capped at \$5,500 per year, Axcelis offers no material executive perquisites.

During 2003, the Committee utilized on-going advice of an independent compensation consultant engaged by the Committee with respect to the competitiveness of the Company's executive compensation programs, as well as the programs' consistency with the Company's executive compensation philosophy. In 2003, the Committee took certain salary and option grant actions described below.

Non-CEO Executive Officer Compensation Actions in 2003

Base Salary. In 2003, the Compensation Committee approved increases to the base compensation of the other non-CEO executive officers (except Mr. Bassett) to ensure market competitiveness. Due to business conditions, these increases in base compensation were not implemented until January 2004. Mr. Bassett joined the Company as interim Chief Financial Officer in June 2003 on an independent contractor basis, and his base compensation was set at that

time. In December 2003, the Company entered into an employment agreement with Mr. Bassett through June 2004. Mr. Bassett's base compensation was not changed at that time.

Cash Bonuses. For 2003, the Committee approved an Axcelis Team Incentive annual bonus plan using a design in which the funding is based 60% on profitability goals and 40% on operational goals. Under this plan, each executive officer (other than Mr. Bassett) was assigned, as part of his or her compensation package, a percentage of base salary which can be earned through the Axcelis Team Incentive. During 2003, these percentages ranged from 40-50% for the participating non-CEO executive officers. The profitability goals under the plan were not met, but in February 2004, a 20% funding under the plan was approved by the Compensation Committee based upon the Company's achievement of operational goals. The payout for each executive officer participating in the plan is calculated by multiplying their target percent of salary by the percentage of funding and by an individual performance rating approved by the Compensation Committee, which ranges from 0% to 150%. The amounts paid to each executive under the 2003 Axcelis Team Incentive are set forth in the Summary Compensation Table below.

Stock Options and Restricted Stock Grants. As set forth in the Option Grants in Last Fiscal Year table in this proxy statement, in 2003 the executive officers (other than Mr. Bassett) received annual option grants, half of which were priced in May 2003 and half in November 2003. The Committee's practice of using two pricing dates for annual option grants, 6 months apart, is designed to reduce the arbitrariness of selecting a single pricing day each year, in light of the high volatility of the trading prices of Axcelis stock. Mr. Bassett received an option grant in December 2003. None of the named executive officers received restricted stock grants during 2003.

Chief Executive Officer Compensation Actions during 2003

Ms. Puma's minimum base compensation is set by her Employment Agreement. See "Executive Agreements" below. In June 2003, the Committee approved an increase in Ms. Puma's base compensation to \$475,000 to ensure market competitiveness. Due to business conditions, the increase in Ms. Puma's base compensation was not implemented until January 2004.

Ms. Puma participated in the 2003 Axcelis Team Incentive annual bonus plan described above with a target bonus of 100% of her base compensation. Based on the plan funding described above, and Ms. Puma's individual performance rating determined by the Compensation Committee, Ms. Puma received the payout for the 2003 Axcelis Team Incentive plan set forth in the Summary Compensation Table. In evaluating Ms. Puma's performance during 2003, the Committee noted (1) the cost reductions

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implemented during the year and (2) the successful consummation of the acquisition and integration of Matrix Integrated Systems, Inc.

Ms. Puma received a stock option grants totaling 250,000 shares, priced in two equal tranches, in May and November 2003, at market.

Compensation Deductibility

Section 162(m) of the Internal Revenue Code denies a tax deduction to a public corporation for annual compensation in excess of one million dollars paid to its Chief Executive Officer and its four other highest compensated officers. Certain types of "performance based compensation," (including options granted under the 2000 Stock Plan) are exempt from the limitation on deductibility. We reserve the authority to award compensation that is not fully deductible under the Internal Revenue Code if such an award is consistent with our compensation policies and, in our judgment, is in the best interests of the company and its stockholders.

By the Compensation Committee,

H. Brian Thompson, Chairman
 Stephen R. Hardis
 Gary L. Tooker
 Alexander M. Cutler

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Compensation Tables

The following tables contain information on compensation paid for 2003 to our Chief Executive Officer and the four other most highly paid executive officers as of the end of 2003, as well as Mr. Bassett, who joined the Company as interim Chief Financial Officer in June 2003.

Summary Compensation Table

Name and Position	Year	Annual Compensation			Long Term Compensation Awards		
		Salary (\$)	Bonus (\$)	Other Annual Compensation (\$) ⁽¹⁾	Restricted Stock Awards (\$)	Securities Underlying Options	All Other Compensation
Mary G. Puma <i>President and Chief Executive Officer</i>	2003	\$ 450,000	\$ 90,000	\$ 3,500		250,000	\$ 67,203 ⁽²⁾
	2002	\$ 415,002	0	\$ 3,500		200,000	\$ 67,729 ⁽³⁾
	2001	\$ 380,004	0	0		0	\$ 77,356 ⁽⁴⁾
Michael J. Luttati <i>Executive Vice President and Chief Operating Officer</i>	2003	\$ 350,000	\$ 42,000	\$ 4,700		100,000	\$ 6,000 ⁽⁵⁾
	2002	\$ 293,868	0	\$ 800		100,000	\$ 1,000 ⁽⁵⁾
	2001	\$ 263,207	0	0		0	\$ 5,100 ⁽⁵⁾

Lynnette C. Fallon	2003	\$	295,000	\$	23,600		0		60,000	\$	6,000 ⁽⁵⁾
<i>Senior Vice President</i>	2002	\$	295,000		0		0		73,500	\$	1,000 ⁽⁵⁾
<i>HR/Legal, General Counsel</i>	2001 ⁽⁶⁾	\$	215,577	\$	25,000		0		40,500	\$	4,419 ⁽⁵⁾
David W. Duff	2003	\$	230,000	\$	19,550	\$	2,000		40,000	\$	6,000 ⁽⁵⁾
<i>Vice President and General Manager, IIRTP</i>	2002	\$	194,588		0	\$	299		60,715	\$	1,000 ⁽⁵⁾
	2001	\$	161,264		0		0	\$	134,937 ⁽⁷⁾	\$	5,100 ⁽⁵⁾
Jan Paul van Maaren	2003	\$	200,000	\$	15,000	\$	315		25,000	\$	5,220 ⁽⁵⁾
<i>Vice President and General Manager, CCS</i>	2002	\$	186,539		0	\$	275		56,000	\$	1,000 ⁽⁵⁾
	2001	\$	140,297		0		0		56,000	\$	3,549 ⁽⁵⁾
Stephen G. Bassett											
<i>Interim Chief Financial Officer</i>	2003 ⁽⁸⁾	\$	172,500		0		0		20,000		0

- (1) Amounts in this column represent payments to, or on behalf of, the executive under the Executive Tax and Financial Planning Program.
- (2) Represents (a) \$6,000 paid in cash as a matching contribution to Axcelis' 401(k) plan in respect of contributions made during 2003 and (b) \$61,203 in principal and accrued interest forgiven by the Company on December 31, 2003 under a promissory note due from Ms. Puma.
- (3) Represents (a) \$1,000 paid in cash as a matching contribution to Axcelis' 401(k) plan in respect of contributions made during 2002 and (b) \$66,729 in principal and accrued interest forgiven by the Company on December 31, 2002 under a promissory note due from Ms. Puma.

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- (4) Represents (a) \$5,100 paid in cash as a matching contribution to Axcelis' 401(k) plan in respect of contributions made during 2001 and (b) \$72,256 in principal and accrued interest forgiven by the Company on December 31, 2001 under a promissory note due from Ms. Puma.
- (5) Represents the Company's cash matching contribution to Axcelis' 401(k) plan in respect of contributions made during the year by the executive.
- (6) Ms. Fallon commenced employment in April 2001.
- (7) Represents the value of 9,570 shares using the closing price on the date of grant, July 30, 2001 (\$14.10). Dr. Duff's restricted stock is subject to forfeiture to the Company if his employment terminates. This forfeiture provision expired as to 1,914 shares on July 30, 2003, and will expire as to an additional 1,914 shares on each of July 30, 2004, 2005, 2006 and 2007. Dr. Duff would be entitled to receive any dividends paid on these shares. At December 31, 2003, Dr. Duff's aggregate restricted stock holdings were the 7,656 shares of restricted stock (1,914 shares having vested in 2003), which had a value (based on the closing price on December 31, 2003 of \$10.27) of \$78,627.
- (8) Mr. Bassett commenced providing services to Axcelis in June 2003.

Option Grants in Last Fiscal Year

The following table provides information on stock options granted under our 2000 Stock Plan during fiscal year 2003 to the executive officers named in the Summary Compensation Table.

Name	Option Grants in Last Fiscal Year					Potential Realizable Value at Assumed Annual Rates of Stock Price Appreciation for Option Term ⁽⁴⁾	
	Number of Securities Underlying Options Granted	Percentage of Total Options Granted to Employees in Fiscal Year	Exercise Price per Share	Market Price on Date of Grant	Expiration Date	5%	10%
Mary G. Puma	125,000 ⁽¹⁾	4.0%	\$ 5.70	\$ 5.70	5/1/2013	\$ 448,087	\$ 1,135,542
	125,000 ⁽²⁾	4.0%	\$ 11.48	\$ 11.48	5/1/2013	\$ 902,464	\$ 2,287,020
Michael J. Luttati	50,000 ⁽¹⁾	1.6%	\$ 5.70	\$ 5.70	5/1/2013	\$ 179,235	\$ 454,217
	50,000 ⁽²⁾	1.6%	\$ 11.48	\$ 11.48	5/1/2013	\$ 360,986	\$ 914,808
Lynnette C. Fallon	30,000 ⁽¹⁾	1.0%	\$ 5.70	\$ 5.70	5/1/2013	\$ 107,541	\$ 272,520
	30,000 ⁽²⁾	1.0%	\$ 11.48	\$ 11.48	5/1/2013	\$ 216,591	\$ 548,885
David W. Duff	20,000 ⁽¹⁾	0.6%	\$ 5.70	\$ 5.70	5/1/2013	\$ 71,694	\$ 181,697
	20,000 ⁽²⁾	0.6%	\$ 11.48	\$ 11.48	5/1/2013	\$ 144,394	\$ 365,923
Jan Paul van Maaren	12,500 ⁽¹⁾	0.4%	\$ 5.70	\$ 5.70	5/1/2013	\$ 44,809	\$ 113,554
	12,500 ⁽²⁾	0.4%	\$ 11.48	\$ 11.48	5/1/2013	\$ 90,246	\$ 228,702
Stephen G. Bassett	20,000 ⁽³⁾	0.6%	\$ 9.90	\$ 9.90	12/18/2013	\$ 124,521	\$ 315,561

- (1) These options were granted on May 1, 2003 and become exercisable with respect to 25% of the shares on each of May 1, 2004, 2005, 2006 and 2007.
- (2) These options were granted on November 3, 2003 and become exercisable with respect to 25% of the shares on each of May 1, 2004, 2005, 2006 and 2007.

- (3) These options were granted on December 18, 2003 and become exercisable in full on June 30, 2004, subject to acceleration in accordance with an Executive Employment Agreement with Mr. Bassett.
- (4) The dollar amounts in this column represent hypothetical values of options granted to the named executives during 2003 and outstanding at December 31, 2003. The amounts shown assume the fair market value of the underlying common stock will appreciate from the date of grant at a 5% or 10% compounded rate for the full 10 year term of the option. The assumed 5% and 10% annual compounded rates of stock price appreciation are mandated by the rules of the SEC and do not represent our estimate or projection of future prices of our common stock. Actual gains, if any, on stock option exercises will depend upon the future performance of our common stock's price, which will benefit all stockholders proportionately.

Aggregated Option Exercises in Last Fiscal Year and Fiscal Year-End Option Values

The following table provides information on options exercised during 2003 by the named executive officers and the total number of exercisable and unexercisable stock options held at December 31, 2003 by those officers.

Name	Shares Acquired on Exercise (#)	Value Realized ⁽¹⁾	Number of Securities Underlying Unexercised Options at Fiscal Year-End Exercisable/Unexercisable	Value of Unexercised in-the-Money Options at Fiscal Year-End Exercisable/ Unexercisable ⁽²⁾
Mary G. Puma	0	—	696,083/703,050	\$ 802,832/\$902,750
Michael J. Luttati	0	—	536,328/228,275	\$ 742,247/\$394,250
Lynnette C. Fallon	0	—	42,000/132,000	\$ 33,150/\$236,550
David W. Duff	0	—	59,453/80,832	\$ 20,770/\$95,295
Jan Paul van Maaren	0	—	57,679/98,791	\$ 27,625/\$144,675
Stephen G. Bassett	0	—	0/20,000	\$ 0/\$7,400

- (1) Calculated by subtracting the option exercise price from the closing price of the stock on the date of exercise as reported by Nasdaq, then multiplying that number by the number of shares exercised. The amounts in this column may not represent amounts actually realized by the officer.
- (2) Based on the difference between the option's exercise price and the closing price of \$10.27 of the underlying common stock on December 31, 2003, as reported by Nasdaq.

Executive Agreements

Agreements with Ms. Puma. We entered into an Employment Agreement with Ms. Puma effective in July 2000. Her agreement provided for an initial three-year term of employment at a minimum annual base salary of \$380,000 and an annual target incentive compensation opportunity of 45% of base salary. Actual incentive compensation for any year may be greater or less if actual performance is greater or less than the target. Ms. Puma's base salary and incentive opportunities were increased by our Board of Directors in 2003, and may be subject to future adjustment by the Board, but not to less than the minimum levels in her Employment Agreement. See "Compensation Committee Report on Executive Compensation." The term of Ms. Puma's agreement automatically renews on a year-to-year basis unless one party notifies the other that the agreement will not be extended. Such termination notice must be sent between January 14 and March 14 of each year. If no termination notice is sent prior to March 14, 2004, the agreement will continue until July 14, 2005, subject to further renewal. The Company does not intend to terminate Ms. Puma's agreement, nor does the Company expect Ms. Puma to terminate it during 2004. The agreement also provides that Ms. Puma will participate in the 2000 Stock Plan, the 401(k) savings plan and the welfare benefit plans that we sponsor.

In the event Ms. Puma's employment is terminated prior to the end of the term for reasons other than cause, death, disability or voluntary resignation, she is entitled to receive all compensation accrued to date, acceleration of vesting of options and other equity rights and base compensation and target bonus for two years from the date of termination of employment. In her agreement, Ms. Puma has agreed not to compete with us for a period of 12 months after termination of her active employment or the remaining term of her agreement, whichever is longer, and not to reveal confidential information for a specified period of time.

In connection with our separation from Eaton Corporation in 2000, Eaton assigned to us a note payable by Ms. Puma in the original principal amount of \$175,000, which bears interest at the rate of 9% per annum. As contemplated by the original terms of the note, principal in the amount of \$58,334 and accrued interest on the note was forgiven on each of December 31, 2001, 2002 and 2003, as shown in the Summary Compensation Table above.

Executive Agreement with Mr. Bassett. In December 2003, we entered into an Executive Officer Agreement with Mr. Bassett. The agreement provides for a term of employment through June 30, 2004 at a minimum annual base salary of \$276,000. See "Compensation Committee Report on Executive Compensation." Upon termination of Mr. Bassett's employment on June 30, 2004 or earlier termination by the Company, Mr. Bassett will receive a bonus equal to one month's base compensation and any unvested options will become exercisable and expire 90 days after his termination of employment.

Change of Control Agreements. We also have entered into Change of Control Agreements with each of our executive officers, including Ms. Puma (but excluding Mr. Bassett). These Change of Control Agreements provide that in the event there is both a change in control and a termination of employment within three years of that change in control for reasons other than voluntary resignation, cause, death or disability, the officer would be entitled to severance compensation. Under the Change of Control Agreement, a resignation by an officer for reasons of a demotion or reduction in compensation, benefits or position is

a termination by us and is not a voluntary resignation. If severance compensation is payable, it would consist of (i) a cash payment equal to the sum of (a) incentive compensation for the completed portion of the incentive period and (b) the amount determined by multiplying the employee's then salary and average bonus by three, and (ii) continuation of our medical, life and other welfare benefits for up to three years. In the event such severance is payable, all unvested options held by the executive will become exercisable until termination or expiration in accordance with their terms. We will also reimburse the employee for the effects, including federal, state and local income tax consequences, of any excise tax due on severance compensation.

Code of Ethics

Axcelis has set forth its policy on ethical behavior in a document called "Ethical Business Conduct at Axcelis." This policy applies to the members of our Board of Directors and all employees, including (but not limited to) our principal executive officer, principal financial officer, principal accounting officer or controller and persons performing similar functions. This policy comprises written standards that are reasonably designed to deter wrongdoing and to promote the behavior described in Item 406 of Regulation S-K promulgated by the Securities and Exchange Commission. The text of this code of ethics is posted on our internet site at www.axcelis.com, where we may also disclose any amendments to and waivers of the code.

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Equity Plan Reserves Disclosure

The number of shares issuable upon exercise of outstanding options granted to employees and non-employee directors, as well as the number of shares remaining available for future issuance, under the company's equity compensation plans as of December 31, 2003 are summarized in the following table:

Plan Category	(A) Number of shares to be issued upon exercise of outstanding options	(B) Weighted- average exercise price of outstanding options	(C) Number of shares remaining available for future issuance under equity compensation plans (excluding shares reflected in column (A))
Equity compensation plans approved by stockholders	14,171,006	\$ 12.10	22,382,594(1)
Equity compensation plans not approved by Stockholders	0	NA	0
Total	14,171,006		22,382,594

(1) Represents the total shares available for issuance under our 2000 Stock Plan and our Employee Stock Purchase Plan, as of December 31, 2003, as follows:

- (A) 18,568,330 shares were available for future issuance under the 2000 Stock Plan. Such amount represents the total number of shares reserved for issuance under the 2000 Stock Plan, less 174,631 outstanding shares issued under the plan as restricted stock, 259,400 shares issued upon option exercises, and the outstanding options shown in column (A), all as of December 31, 2003. This plan is generally used for grants to employees and directors and was approved by our stockholders at our 2002 annual meeting. The number of shares available for issuance under the 2000 Stock Plan may increase on each July 14 during the term of the plan. The increase is set at the a number of shares equal to the lesser of (i) five (5%) percent of the then outstanding shares of Common Stock of the Company, (ii) 5,000,000 shares or (iii) such lesser amount determined by the Board.
- (B) 3,814,264 shares were available under the Company's Employee Stock Purchase Plan, which represents the total number of shares reserved for issuance under the plan less 1,978,628 shares issued through December 31, 2003. This availability number has not been reduced for the 349,078 shares issued in January 2004 in respect of the December 31, 2003 purchase date under the plan. The Employee Stock Purchase Plan was approved by Eaton Corporation, as our sole stockholder prior to our initial public offering, in compliance with Internal Revenue Code Section 423. The number of shares available for issuance under the Employee Stock Purchase Plan increases by the number of shares equal to 1% of the outstanding common stock on each December 31, up to a maximum of 7,500,000 shares.

Compensation Committee Interlocks and Insider Participation

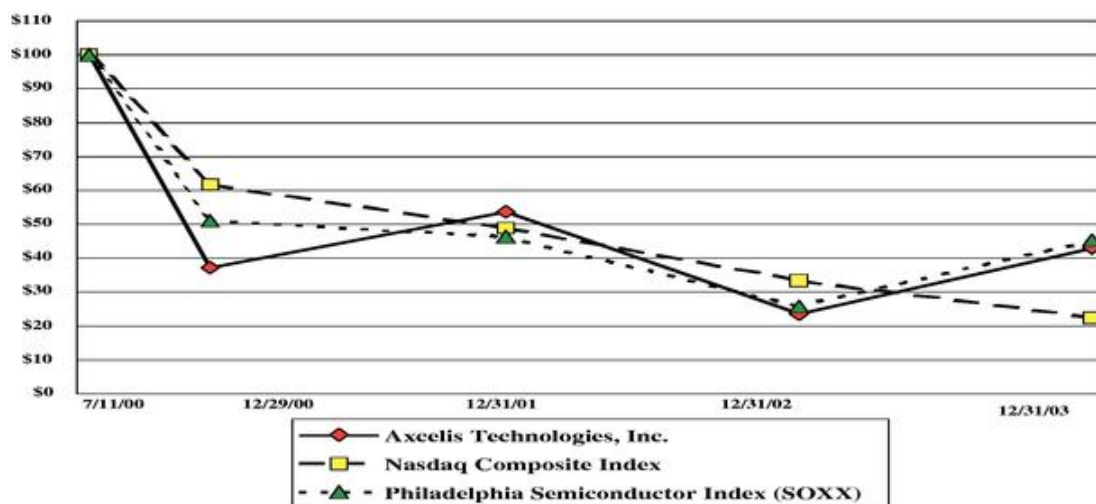
During 2003, the Compensation Committee of the Board of Directors consisted of Mr. Hardis, Mr. Cutler, Mr. Tooker and Mr. Thompson, as Chairman, none of who has been an officer or employee of Axcelis or had a relationship during 2003 requiring disclosure under Item 404 of Regulation S-K.

Stock Performance Graph

The following graph compares the cumulative total return for our Common Stock to that of the Philadelphia Semiconductor Index (known as "SOXX") and the Nasdaq Composite Index at each fiscal

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year end following July 11, 2000, the date the Company's Common Stock first traded on the Nasdaq National Market. The comparison assumes an investment of \$100 on July 11, 2000 at the closing price in each of our Common Stock and the two indices and assumes reinvestment of dividends, if any. The stock performance shown on the graph below is not necessarily indicative of future price performance.



Company/Index Name	July 11, 2000	December 29, 2000	December 31, 2001	December 31, 2002	December 31, 2003
Axcelis Technologies, Inc.	\$ 100.00	\$ 37.07	\$ 53.84	\$ 23.43	\$ 42.90
NASDAQ Composite Index	\$ 100.00	\$ 61.76	\$ 48.76	\$ 33.39	\$ 22.61
SOXX Index	\$ 100.00	\$ 51.32	\$ 46.47	\$ 25.74	\$ 45.22

CERTAIN TRANSACTIONS

Mr. Takahashi, one of our directors, is a director and officer of Sumitomo Heavy Industries, Ltd. Each of Sumitomo and Axcelis owns 50% of the equity of a Japanese corporation known as Sumitomo Eaton Nova, or SEN. We have granted SEN an exclusive royalty-bearing license in Japan to use our current and future ion implantation technology and to manufacture, use and sell products. We have also granted SEN a non-exclusive license to sell ion implantation products outside of Japan, subject to the terms of an Export Sales Agreement under which we are exclusive marketing agent. The license agreement expires on December 31, 2004 and is automatically renewable for successive five-year periods unless either party has provided one year's prior notice of termination. We also have a trademark license agreement with SEN which will terminate on December 31, 2004 and which obligates SEN to pay us an additional 0.5% royalty on net sales. In 2003, we recognized royalty income from SEN under these license agreements of approximately \$5.87 million. From time to time, we sell ion implantation equipment and other products to SEN. In 2003, our net sales of products to SEN amounted to \$3.18 million.

During 2003, we held a promissory note from Ms. Puma, which is discussed under "Executive Agreements—Agreements with Ms. Puma" above. Also during 2003, Ms. Puma's husband engaged in business transactions of less than \$5,000 facilitated by a consultant, Albert Chang, who has not received any direct compensation from Ms. Puma's husband to date. Mr. Chang is the former owner of Tritex Technologies, which business was acquired by Axcelis in 2002. In connection with that acquisition, Axcelis agreed to pay Mr. Chang some deferred commissions on product sales and performance-based consulting payments over a 5 year period after the closing. Under these 2002 commitments, Mr. Chang received \$351,500 in compensation from Axcelis during 2003. Mr. Chang's work for Ms. Puma's husband is entirely unrelated to the services provided to Axcelis.

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Mr. Jennings temporarily served as chief executive officer of U.S. Interactive, Inc. from September 2000 until November 2000. U.S. Interactive, Inc. filed for bankruptcy protection in January 2000.

SECTION 16(a) BENEFICIAL OWNERSHIP REPORTING COMPLIANCE

Section 16(a) of the Exchange Act requires our directors, executive officers and persons owning more than 10% of our registered equity securities, to file with the SEC reports of their initial ownership and of changes in their ownership of our common stock and to provide us with copies of all Section 16(a) reports they file.

To our knowledge, based solely on our review of copies of reports furnished to us and written representations that no other reports were required during the fiscal year ended December 31, 2003, we believe that during the 2003 fiscal year, our directors, officers, and 10% stockholders complied with all Section 16(a) filing requirements, other than one Form 4 report disclosing a market purchase by H. Brian Thompson on January 29, 2003, which was due on January 31, 2003 and filed late on February 5, 2003.

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PROPOSAL 2: RATIFICATION OF THE APPOINTMENT OF INDEPENDENT AUDITORS

Upon the recommendation of its Audit Committee, the Board of Directors has appointed the accounting firm of Ernst & Young LLP as independent auditors to conduct the annual audit of our financial statements for 2004 and is seeking stockholder ratification of the appointment. Ernst & Young LLP is an internationally recognized public accounting firm that audited the Company's financial statements in 2003 and which the Audit Committee believes is well qualified to continue.

Representatives of Ernst & Young are expected to attend the annual meeting and be available to respond to appropriate questions. They will also have the opportunity to make a statement if they desire.

The aggregate fees billed for each of the last two fiscal years for professional services rendered by Ernst & Young LLP as follows:

	2002	2003
Audit Fees	\$ 415,800	\$ 457,912
Audit Related Fees	\$ 127,610	\$ 94,000
Tax Fees		
Tax compliance and preparation	\$ 87,000	\$ 201,019
Transfer pricing advice	\$ 22,000	\$ 177,000
General tax planning and other tax	\$ 64,000	\$ 47,992
Total Tax Fees	\$ 173,000	\$ 426,011
All Other Fees		
Expatriate employee tax services	\$ 174,000	\$ 98,575
Human Resources consulting and other services	\$ 53,000	
Acquisition due diligence		\$ 20,268
Total All Other Fees	\$ 227,000	\$ 118,843
Total Fees	\$ 943,410	\$ 1,096,766

Audit fees include a GAAP audit of Sumitomo Eaton Nova Corporation and statutory audits for subsidiaries and branches operating in countries outside of the United States. Audit related fees include audits for the Company's 401(k) plan required under ERISA and, in 2003, assistance in preparation for Sarbanes Oxley Act Section 404 compliance. Transfer pricing advice relates to the setting of fair compensation for services provided to us by our foreign subsidiaries to ensure appropriate revenue levels are reported for taxation in those foreign countries. Expatriate employee tax services involve advice relating to, and administration of, tax equalization agreements between the Company and U.S. employees temporarily located in non-U.S. tax jurisdictions. As part of an on-going effort to reduce the non-audit services purchased from Ernst & Young, LLP, the Company terminated its purchase of human resources consulting and other services in 2002 and expatriate employee tax services in 2003.

Our Audit Committee has adopted a policy and procedures requiring its pre-approval of all non-audit (including tax) services performed by the independent auditor in order to assure that these services do not impair the auditor's independence. The policy approves the performance of specific services subject to cost limits for each service. Such general approvals are to be reviewed and, if necessary, modified at least annually. The policy also prohibits the independent auditor's performance of certain types of services as inconsistent with independence. Management must obtain the specific prior approval of the Audit Committee for each engagement of the independent auditor to perform other audit-related or other non-audit services.

Any approval required under the policy must be given by the Audit Committee or by any member or members to whom the Committee has delegated that authority. The Audit Committee does not delegate its responsibility to approve services performed by the independent auditor to any member of management.

The standard applied by the Audit Committee in determining whether to grant approval of any type of non-audit service, or of any specific engagement to perform a non-audit service, is whether the services to be performed, the compensation to be paid therefor and other related factors are consistent with the independent auditor's independence under guidelines of the Securities and Exchange Commission and applicable professional standards. Relevant considerations include whether the work product is likely to be subject to, or implicated in, audit procedures during the audit of our financial statements, whether the

independent auditor would be functioning in the role of management or in an advocacy role, whether the independent auditor's performance of the service would enhance our ability to manage or control risk or improve audit quality, whether such performance would increase efficiency because of the independent auditor's familiarity with our business, personnel, culture, systems, risk profile and other factors, and whether the amount of fees involved, or the proportion of the total fees payable to the independent auditor in the period that is for non-audit services, would tend to reduce the independent auditor's ability to exercise independent judgment in performing the audit.

All of the non-audit services rendered by Ernst & Young LLP in respect of the 2003 fiscal year were pre-approved by the Audit Committee in accordance with this policy.

After reporting on these fees and services, Ernst & Young LLP informed the company that they are not aware of any relationship with the Company that, in their professional judgement, may reasonably be thought to bear on the independence of Ernst & Young LLP.

Ratification of the appointment of Ernst & Young LLP by the stockholders is not required by law or by our bylaws. The Board of Directors is nevertheless submitting it to the stockholders to ascertain their views. If this proposal is not approved at the annual meeting by the affirmative vote of holders of a majority of the shares present or represented at the meeting, the Audit Committee intends to reconsider its recommendation of Ernst & Young LLP as independent auditors. The Company may retain the firm for 2004 notwithstanding a negative stockholder vote.

The Board of Directors recommends a vote for ratification of the appointment of Ernst & Young LLP.

Assuming the 2005 annual meeting is not more than 30 days before or 30 days after April 29, 2005, if you wish to bring business before or propose director nominations at the 2005 annual meeting, you must give written notice to Axcelis by January 29, 2005 (the date 90 days before the anniversary of the 2004 annual meeting).

If you intend to bring proposed business to the 2005 annual meeting, and you would like us to consider the inclusion of your proposal in our proxy statement for the meeting, you must provide written notice to Axcelis of such proposal prior to November 14, 2004 (120 days before the anniversary date of the mailing of this proxy statement), assuming the 2005 annual meeting is not more than 30 days before or 30 days after April 29, 2005.

Notices of stockholder proposals and nominations shall be given in writing to Axcelis Technologies, Inc., 108 Cherry Hill Drive, Beverly, Massachusetts 01915, Attn: Corporate Secretary.

COMMUNICATIONS TO THE BOARD

Security holders may communicate with the Axcelis Board of Directors by mailing a communication to the entire Board or to one or more individual directors, in care of the Corporate Secretary, Axcelis Technologies, Inc., 108 Cherry Hill Drive, Beverly, Massachusetts 01915. All communications from security holders to Board members (other than communications soliciting the purchase of products and services) will be promptly relayed to the Board members to whom the communication is addressed.



C/O EQUISERVE TRUST COMPANY N.A.
P.O. Box 8649
Edison, NJ 08818-8649

DETACH HERE IF YOU ARE RETURNING YOUR PROXY CARD BY MAIL

Please Mark votes as in this example 8938

This proxy when properly executed will be voted in the manner directed herein. If no direction is made, this proxy will be voted FOR Proposals 1 and 2.

The Board of Directors recommends a vote FOR Company Proposals 1 and 2.

<p>1. Election of Directors. (See reverse)</p> <p style="text-align: center;">FOR ALL NOMINEES</p>	FOR o	WITHHELD o	WITHHELD FROM ALL NOMINEES	FOR o	AGAINST o	ABSTAIN o
<p>For all nominees except as written above</p>						

All as more particularly described in the Proxy Statement relating to such meeting, receipt of which is hereby acknowledged.

Change of Address/Comments on Reverse Side.

Please sign this proxy exactly as name appears hereon. When shares are held by joint tenants, both should sign. When signing as attorney, administrator, trustee or guardian, please give full title as such.

Signature: _____ Date: _____ Signature: _____ Date: _____

AXCELIS TECHNOLOGIES, INC.

THIS IS YOUR PROXY.
YOUR VOTE IS IMPORTANT.

DO YOU NEED ASSISTANCE IN ANY OF THE FOLLOWING AREAS?

- **ADDRESS CHANGES—LEGAL TRANSFERS**
- **CONSOLIDATION OF ACCOUNTS—ELIMINATE MULTIPLE ACCOUNTS FOR ONE HOLDER AND CERTAIN DUPLICATE SHAREHOLDER MAILINGS GOING TO ONE ADDRESS.**

JUST CALL OUR TRANSFER AGENT'S TELEPHONE RESPONSE CENTER:

(781) 575-2725

OR WRITE TO:

EQUISERVE TRUST CO., N.A.

P.O. BOX 43069

PROVIDENCE, RI 02940-3069

**Proxy Solicited on Behalf of the Board of Directors of
Axcelis Technologies, Inc. for Annual Meeting on April 29, 2004.**

The undersigned hereby appoints Mary G. Puma, Stephen G. Bassett or Lynnette C. Fallon, or any of them, and any substitute or substitutes, to be the attorneys and proxies of the undersigned at the Annual Meeting of Stockholders of Axcelis Technologies, Inc. ("Axcelis") to be held at 11:00 a.m. EST on Thursday, April 29, 2004 at the offices of Palmer & Dodge, LLP, 111 Huntington Avenue, Boston, Massachusetts, or at any adjournment thereof, and to vote at such meeting the shares of common stock of Axcelis the undersigned held of record on the books of Axcelis on the record date for the meeting for the election of the nominees listed below and on Proposal 2 referred to on the reverse side and described in the Proxy Statement, and on any other business before the meeting, with all powers the undersigned would possess if personally present.

PROXY

Election of Directors, Nominees:
Gary L. Tooker
Patrick H. Nettles
Alexander M. Cutler

Independent Auditors:
Ernst & Young LLP

You are encouraged to specify your choices by marking the appropriate boxes, SEE REVERSE SIDE, but you need not mark any boxes if you wish to vote in accordance with the Board of Directors' recommendations. The proxies cannot vote your shares unless you sign and return this card.

PLEASE VOTE, DATE AND SIGN THIS PROXY ON THE OTHER SIDE AND RETURN PROMPTLY IN THE ENCLOSED ENVELOPE.

HAS YOUR ADDRESS CHANGED?

DO YOU HAVE ANY COMMENTS?

(If you have written in the above space, please mark the corresponding box on the reverse side of this card.)

QuickLinks

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- [Proxy Statement](#)
- [SHARE OWNERSHIP OF 5% STOCKHOLDERS](#)
- [SHARE OWNERSHIP OF DIRECTORS AND EXECUTIVE OFFICERS](#)
- [PROPOSAL 1: ELECTION OF DIRECTORS](#)
- [AUDIT COMMITTEE REPORT](#)
- [EXECUTIVE COMPENSATION](#)
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