

SCHEDULE 13G

Amendment No. 1
Axcelis Technologies Incorporated
Common Stock
Cusip #054540109

Cusip #054540109
Item 1: Reporting Person - FMR Corp.
Item 4: Delaware
Item 5: 1,593,420
Item 6: 0
Item 7: 12,921,101
Item 8: 0
Item 9: 12,921,101
Item 11: 12.998%
Item 12: HC

Cusip #054540109
Item 1: Reporting Person - Edward C. Johnson 3d
Item 4: United States of America
Item 5: 0
Item 6: 0
Item 7: 12,921,101
Item 8: 0
Item 9: 12,921,101
Item 11: 12.998%
Item 12: IN

Cusip #054540109
Item 1: Reporting Person - Abigail P. Johnson
Item 4: United States of America
Item 5: 0
Item 6: 0
Item 7: 12,921,101
Item 8: 0
Item 9: 12,921,101
Item 11: 12.998%
Item 12: IN

SCHEDULE 13G - TO BE INCLUDED IN
STATEMENTS
FILED PURSUANT TO RULE 13d-1(b) or 13d-2(b)

Item 1(a). Name of Issuer:
Axcelis Technologies Incorporated

Item 1(b). Name of Issuer's Principal Executive Offices:
55 Cherry Hill Drive
Beverly, MA 01915

Item 2(a). Name of Person Filing:
FMR Corp.

Item 2(b). Address or Principal Business Office or, if None,
Residence:
82 Devonshire Street, Boston,
Massachusetts 02109

Item 2(c). Citizenship:
Not applicable

Item 2(d). Title of Class of Securities:
Common Stock

Item 2(e). CUSIP Number:

Item 3. This statement is filed pursuant to Rule 13d-1(b) or 13d-2(b) and the person filing, FMR Corp., is a parent holding company in accordance with Section 240.13d-1(b)(ii)(G). (Note: See Item 7).

Item 4. Ownership

(a) Amount Beneficially Owned: 12,921,101

(b) Percent of Class: 12.998%

(c) Number of shares as to which such person has:

(i) sole power to vote or to direct the vote: 1,593,420

(ii) shared power to vote or to direct the vote: 0

(iii) sole power to dispose or to direct the disposition of: 12,921,101

(iv) shared power to dispose or to direct the disposition of: 0

Item 5. Ownership of Five Percent or Less of a Class.

Not applicable.

Item 6. Ownership of More than Five Percent on Behalf of Another Person.

Various persons have the right to receive or the power to direct the receipt of dividends from, or the proceeds from the sale of, the Common Stock of Axcelis Technologies Incorporated. The interest of one person, Fidelity Mid Cap Stock Fund, an investment company registered under the Investment Company Act of 1940, in the Common Stock of Axcelis Technologies Incorporated, amounted to 6,849,081 shares or 6.890% of the total outstanding Common Stock at July 31, 2004.

Item 7. Identification and Classification of the Subsidiary Which Acquired the Security Being Reported on By the Parent Holding Company.

See attached Exhibit(s) A, B, and C.

Item 8. Identification and Classification of Members of the Group.

Not Applicable. See attached Exhibit A.

Item 9. Notice of Dissolution of Group.

Not applicable.

Item 10. Certification.

By signing below I certify that, to the best of my knowledge and belief, the securities referred to above were acquired in the ordinary course of business and were not acquired for the purpose of and do not have the effect of changing or influencing the control of the issuer of such securities and were not acquired in connection with or as a participant in any transaction having such purpose or effect.

Signature

After reasonable inquiry and to the best of my knowledge and belief, I certify that the information set forth in this Schedule 13G in connection with FMR Corp.'s beneficial ownership of the Common Stock of Axcelis Technologies Incorporated at July 31, 2004 is true, complete and correct.

August 10, 2004
Date

/s/Eric D. Roiter
Signature

Eric D. Roiter
Duly authorized under Power of Attorney
dated December 30, 1997 by and on behalf
of FMR Corp. and its direct and indirect
subsidiaries

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Pursuant to the instructions in Item 7 of Schedule 13G, Fidelity Management & Research Company ("Fidelity"), 82 Devonshire Street, Boston, Massachusetts 02109, a wholly-owned subsidiary of FMR Corp. and an investment adviser registered under Section 203 of the Investment Advisers Act of 1940, is the beneficial owner of 11,327,681 shares or 11.395% of the Common Stock outstanding of Axcelis Technologies Incorporated ("the Company") as a result of acting as investment adviser to various investment companies registered under Section 8 of the Investment Company Act of 1940.

The ownership of one investment company, Fidelity Mid Cap Stock Fund, amounted to 6,849,081 shares or 6.890% of the Common Stock outstanding. Fidelity Mid Cap Stock Fund has its principal business office at 82 Devonshire Street, Boston, Massachusetts 02109.

Edward C. Johnson 3d, FMR Corp., through its control of Fidelity, and the funds each has sole power to dispose of the 11,327,681 shares owned by the Funds.

Neither FMR Corp. nor Edward C. Johnson 3d, Chairman of FMR Corp., has the sole power to vote or direct the voting of the shares owned directly by the Fidelity Funds, which power resides with the Funds' Boards of Trustees. Fidelity carries out the voting of the shares under written guidelines established by the Funds' Boards of Trustees.

Fidelity Management Trust Company, 82 Devonshire Street, Boston, Massachusetts 02109, a wholly-owned subsidiary of FMR Corp. and a bank as defined in Section 3(a)(6) of the Securities Exchange Act of 1934, is the beneficial owner of 1,261,200 shares or 1.269% of the Common Stock outstanding of the Company as a result of its serving as investment manager of the institutional account(s).

Edward C. Johnson 3d and FMR Corp., through its control of Fidelity Management Trust Company, each has sole dispositive power over 1,261,200 shares and sole power to vote or to direct the voting of 1,261,200 shares of Common Stock owned by the institutional account(s) as reported above.

Members of the Edward C. Johnson 3d family are the predominant owners of Class B shares of common stock of FMR Corp., representing approximately 49% of the voting power of FMR Corp. Mr. Johnson 3d owns 12.0% and Abigail Johnson owns 24.5% of the aggregate outstanding voting stock of FMR Corp. Mr. Johnson 3d is Chairman of FMR Corp. and Abigail P. Johnson is a Director of FMR Corp. The Johnson family group and all other Class B shareholders have entered into a shareholders' voting agreement under which all Class B shares will be voted in accordance with the majority vote of Class B shares. Accordingly, through their ownership of voting common stock and the execution of the shareholders' voting agreement, members of the Johnson family may be deemed, under the Investment Company Act of 1940, to form a controlling group with respect to FMR Corp.

Crowlane, Hamilton, Bermuda, and various foreign-based subsidiaries provide investment advisory and management services to a number of non-U.S. investment companies (the "International Funds") and certain institutional investors. Fidelity International Limited is the beneficial owner of 332,220 shares or 0.334% of the Common Stock outstanding of the Company. Additional information with respect to the beneficial ownership of Fidelity International Limited is shown on Exhibit B.

SCHEDULE 13G - TO BE INCLUDED IN
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FILED PURSUANT TO RULE 13d-1(b) or 13d-2(b)

Pursuant to instructions in Item 7 of Schedule 13G, this Exhibit has been prepared to identify Fidelity International Limited, Pembroke Hall, 42 Crow Lane, Hamilton, Bermuda, a Bermudan joint stock company incorporated for an unlimited duration by private act of the Bermuda Legislature (FIL) and an investment adviser to various investment companies (the "International Funds") and certain institutional investors, as a beneficial owner of the 332,220 shares or 0.334% of the Common Stock outstanding of Axcelis Technologies Incorporated.

Prior to June 30, 1980, FIL was a majority-owned subsidiary of Fidelity Management & Research Company (Fidelity), a wholly-owned subsidiary of FMR Corp. On that date, the shares of FIL held by Fidelity were distributed, as a dividend, to the shareholders of FMR Corp. FIL currently operates as an entity independent of FMR Corp. and Fidelity. The International Funds and FIL's other clients, with the exception of Fidelity and an affiliated company of Fidelity, are non-U.S. entities.

A partnership controlled by Edward C. Johnson 3d and members of his family owns shares of FIL voting stock with the right to cast approximately 39.89% of the total votes which may be cast by all holders of FIL voting stock. Mr. Johnson 3d is Chairman of FMR Corp. and FIL. FMR Corp. and FIL are separate and independent corporate entities, and their Boards of Directors are generally composed of different individuals. Other than when one serves as a sub adviser to the other, their investment decisions are made independently, and their clients are generally different organizations.

FMR Corp. and FIL are of the view that they are not acting as a "group" for purposes of Section 13(d) under the Securities Exchange Act of 1934 (the "1934" Act) and that they are not otherwise required to attribute to each other the "beneficial ownership" of securities "beneficially owned" by the other corporation within the meaning of Rule 13d-3 promulgated under the 1934 Act. Therefore, they are of the view that the shares held by the other corporation need not be aggregated for purposes of Section 13(d). However, FMR Corp. is making this filing on a voluntary basis as if all of the shares are beneficially owned by FMR Corp. and FIL on a joint basis.

FIL may continue to have the International Funds or other accounts purchase shares subject to a number of factors, including, among others, the availability of shares for sale at what FIL considers to be reasonable prices and other investment opportunities that may be available to the International Funds.

FIL intends to review continuously the equity position of the International Funds and other accounts in the Company. Depending upon its future evaluations of the business and prospects of the Company and upon other developments, including, but not limited to, general economic and business conditions and money market and stock market conditions, FIL may determine to cease making additional purchases of shares or to increase or decrease the equity interest in the Company by acquiring additional shares, or by disposing of all or a portion of the shares.

FIL does not have a present plan or proposal which

relates to or would result in (i) an extraordinary corporate transaction, such as a merger, reorganization, liquidation, or sale or transfer of a material amount of assets involving the Company or any of its subsidiaries, (ii) any change in the Company's present Board of Directors or management, (iii) any material changes in the Company's present capitalization or dividend policy or any other material change in the Company's business or corporate structure, (iv) any change in the Company's charter or by-laws, or (v) the Company's common stock becoming eligible for termination of its registration pursuant to Section 12(g)(4) of the 1934 Act.

FIL has sole power to vote and the sole power to dispose of 332,220 shares.

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STATEMENTS

FILED PURSUANT TO RULE 13d-1(b) or 13d-2(b)
RULE 13d-1(f)(1) AGREEMENT

The undersigned persons, on August 10, 2004, agree and consent to the joint filing on their behalf of this Schedule 13G in connection with their beneficial ownership of the Common Stock of Axcelis Technologies Incorporated at July 31, 2004.

FMR Corp.

By /s/ Eric D. Roiter
Eric D. Roiter
Duly authorized under Power of Attorney
dated December 30, 1997, by and on behalf
of FMR Corp. and its direct and indirect
subsidiaries

Edward C. Johnson 3d

By /s/ Eric D. Roiter
Eric D. Roiter
Duly authorized under Power of Attorney
dated December 30, 1997, by and on behalf
of Edward C. Johnson 3d

Abigail P. Johnson

By /s/ Eric D. Roiter
Eric D. Roiter
Duly authorized under Power of Attorney
dated December 30, 1997, by and on behalf
of Abigail P. Johnson

Fidelity Management & Research Company

By /s/ Eric D. Roiter
Eric D. Roiter
Senior V.P. and General Counsel

Fidelity Mid Cap Stock Fund

By /s/ Eric D. Roiter
Eric D. Roiter
Secretary