
**UNITED STATES
SECURITIES AND EXCHANGE
COMMISSION**

Washington, D.C. 20549

SCHEDULE 13D

Under the Securities Exchange Act of 1934
(Amendment No.)*

AtriCure, Inc.

(Name of Issuer)

Common Stock, \$0.001 par value per share

(Title of Class of Securities)

04963C209

(CUSIP Number)

**Michael R. Murphy
Discovery Group I, LLC
191 North Wacker Drive
Suite 1685
Chicago, Illinois 60606
Telephone Number: (312) 265-9600**

(Name, Address and Telephone Number of Person
Authorized to Receive Notices and Communications)

September 1, 2010

(Date of Event which Requires Filing of this Statement)

If the filing person has previously filed a statement on Schedule 13G to report the acquisition that is the subject of this Schedule 13D, and is filing this schedule because of §§240.13d-1(e), 240.13d-1(f) or 240.13d-1(g), check the following box.

Note: Schedules filed in paper format shall include a signed original and five copies of the schedule, including all exhibits. See §240.13d-7 for other parties to whom copies are to be sent.

*The remainder of this cover page shall be filled out for a reporting person's initial filing on this form with respect to the subject class of securities, and for any subsequent amendment containing information which would alter disclosures provided in a prior cover page.

The information required on the remainder of this cover page shall not be deemed to be "filed" for the purpose of Section 18 of the Securities Exchange Act of 1934 ("Act") or otherwise subject to the liabilities of that section of the Act but shall be subject to all other provisions of the Act (however, see the Notes).

1. Names of Reporting Persons.
Discovery Group I, LLC

2. Check the Appropriate Box if a Member of a Group (See Instructions)
(a)

- (b)

3. SEC Use Only

4. Source of Funds (See Instructions)
AF

5. Check if Disclosure of Legal Proceedings Is Required Pursuant to Items 2(d) or 2(e)

6. Citizenship or Place of Organization
Delaware

7. Sole Voting Power
None.

8. Shared Voting Power
894,015

9. Sole Dispositive Power
None.

10. Shared Dispositive Power
894,015

11. Aggregate Amount Beneficially Owned by Each Reporting Person
894,015

12. Check if the Aggregate Amount in Row (11) Excludes Certain Shares (See Instructions)

13. Percent of Class Represented by Amount in Row (11)
5.7%

14. Type of Reporting Person (See Instructions)
OO

Number of
Shares
Beneficially
Owned by
Each
Reporting
Person With

1. Names of Reporting Persons.
Daniel J. Donoghue

2. Check the Appropriate Box if a Member of a Group (See Instructions)
(a)

- (b)

3. SEC Use Only

4. Source of Funds (See Instructions)
AF

5. Check if Disclosure of Legal Proceedings Is Required Pursuant to Items 2(d) or 2(e)

6. Citizenship or Place of Organization
United States of America

7. Sole Voting Power
None.

8. Shared Voting Power
894,015

9. Sole Dispositive Power
None.

10. Shared Dispositive Power
894,015

11. Aggregate Amount Beneficially Owned by Each Reporting Person
894,015

12. Check if the Aggregate Amount in Row (11) Excludes Certain Shares (See Instructions)

13. Percent of Class Represented by Amount in Row (11)
5.7%

14. Type of Reporting Person (See Instructions)
IN

Number of
Shares
Beneficially
Owned by
Each
Reporting
Person With

1. Names of Reporting Persons.
Michael R. Murphy

2. Check the Appropriate Box if a Member of a Group (See Instructions)
(a)

- (b)

3. SEC Use Only

4. Source of Funds (See Instructions)
AF

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5.7%

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IN

Number of
Shares
Beneficially
Owned by
Each
Reporting
Person With

Item 1. Security and Issuer

This statement relates to the Common Stock, \$0.001 par value per share (the “**Common Stock**”), of AtriCure, Inc., a Delaware corporation (the “**Company**”), which has its principal executive offices at 6217 Centre Park Drive, West Chester, Ohio 45069.

Item 2. Identity and Background

This statement is being jointly filed by the following persons (the “**Reporting Persons**”):

Discovery Group I, LLC (“**Discovery Group**”) is a Delaware limited liability company primarily engaged in the business of investing in securities.

Daniel J. Donoghue is a Managing Member of Discovery Group and of various related entities, which is his principal occupation.

Michael R. Murphy is a Managing Member of Discovery Group and of various related entities, which is his principal occupation.

Both Mr. Donoghue and Mr. Murphy are United States citizens.

The business address of each of the Reporting Persons is 191 North Wacker Drive, Suite 1685, Chicago, Illinois 60606.

During the past five years, none of the Reporting Persons have been (i) convicted in a criminal proceeding (excluding traffic violations or similar misdemeanors) or (ii) a party to a civil proceeding of a judicial or administrative body of competent jurisdiction and as a result of such proceeding was or is subject to a judgment, decree or final order enjoining future violations of, or prohibiting or mandating activities subject to, federal or state securities laws, or finding any violation with respect to such laws.

Item 3. Source and Amount of Funds or Other Consideration

The total purchase price for the 894,015 shares of Common Stock beneficially owned by Discovery Group and Messrs. Donoghue and Murphy as of September 9, 2010 was approximately \$5,268,168. The source of such funds was the assets of two private investment partnerships (collectively, the “**Partnerships**”) over which Discovery Group exercises discretionary investment management authority, and proceeds of margin loans under margin loan facilities maintained in the ordinary course of business by the Partnerships with a broker on customary terms and conditions. The Partnerships are the legal owner of all of the Common Stock beneficially owned by Discovery Group and Messrs. Donoghue and Murphy.

Item 4. Purpose of Transaction

The Reporting Persons acquired beneficial ownership of the shares of Common Stock reported herein as part of their investment activities on behalf of the Partnerships. The Reporting Persons acquired the shares of Common Stock reported herein because they believe that the trading prices of the Common Stock do not adequately reflect the potential value of the Company's underlying business and assets.

The Reporting Persons intend to review and evaluate their investment in the Common Stock on an ongoing basis and may, depending upon their evaluation of the business and prospects of the Company, or such other considerations as they may deem relevant, determine to increase, decrease, or dispose of their holdings of Common Stock. As a part of such review and evaluation, the Reporting Persons may hold discussions with the Company's management and directors, other shareholders and other interested parties.

Except as otherwise described in this Item 4, the Reporting Persons do not have present plans or proposals that relate to or would result in any of the following (although the Reporting Persons reserve the right to develop such plans or proposals or any other plans relating to the Company and to take action with respect thereto): (i) the acquisition by any person of additional securities of the Company, or the disposition of securities of the Company; (ii) an extraordinary corporate transaction, such as a merger, reorganization, or liquidation, involving the Company or any of its subsidiaries; (iii) a sale or transfer of a material amount of assets of the Company or any of its subsidiaries; (iv) any change in the present board of directors or management of the Company, including any plans or proposals to change the number or term of directors or to fill any existing vacancies on the board; (v) any material change in the present capitalization or dividend policy of the Company; (vi) any other material change in the Company's business or corporate structure; (vii) changes in the Company's certificate of incorporation, bylaws, or instruments corresponding thereto or other actions that may impede the acquisition of control of the Company by any person; (viii) causing a class of securities of the Company to be delisted from a national securities exchange or to cease to be authorized to be quoted in an inter-dealer quotation system of a registered national securities association; (ix) a class of equity securities of the Company becoming eligible for termination of registration pursuant to Section 12(g)(4) of the Securities Exchange Act of 1934, as amended; or (x) any action similar to any of those enumerated above.

Item 5. Interest in Securities of the Issuer

The information concerning percentages of ownership set forth below is based on 15,562,949 shares of Common Stock reported outstanding as of August 6, 2010 in the Company's most recent Quarterly Report on Form 10-Q, for the period ended June 30, 2010

Discovery Group beneficially owns 894,015 shares of Common Stock as of September 9, 2010, which represents 5.7% of the outstanding Common Stock.

Mr. Donoghue beneficially owns 894,015 shares of Common Stock as of September 9, 2010, which represents 5.7% of the outstanding Common Stock.

Mr. Murphy beneficially owns 894,015 shares of Common Stock as of September 9, 2010, which represents 5.7% of the outstanding Common Stock.

Discovery Group is the sole general partner of one of the Partnerships and has sole discretionary investment authority with respect to the other Partnership's investment in the Common Stock. Messrs. Donoghue and Murphy are the sole managing members of Discovery Group. As a consequence, Discovery Group and Messrs. Donoghue and Murphy may be deemed to share beneficial ownership of all of the shares of Common Stock owned by both of the Partnerships.

The transactions in Common Stock effected by the Reporting Persons during the past 60 days are set out in [Exhibit 1](#) hereto.

No person other than the Partnerships is known to any Reporting Person to have the right to receive or the power to direct the receipt of dividends from, or the proceeds from the sale of, any of the shares of Common Stock reported herein.

Item 6. Contracts, Arrangements, Understandings or Relationships with Respect to Securities of the Issuer

There are no contracts, arrangements, understandings or relationships (legal or otherwise) between or among any of the Reporting Persons and any other person with respect to any securities of the Company other than the governing documents of Discovery Group and the Partnerships, the margin loan facilities referred to under Item 3 above, the Joint Filing Agreement of the Reporting Persons with respect to this Schedule 13D included as Exhibit 2 to this Schedule 13D, and the Powers of Attorney granted by Messrs Donoghue and Murphy with respect to reports under Section 13 of the Securities Exchange Act of 1934, as amended, which Powers of Attorney are included as Exhibit 3 and Exhibit 4, respectively, to this Schedule 13D.

Item 7. Material to Be Filed as Exhibits

Exhibit 1: List of transactions by Reporting Persons in the Company's Common Stock during the 60-day period preceding this filing.
Exhibit 2: Joint Filing Agreement dated as of September 10, 2010, by and among Discovery Group; Daniel J. Donoghue; and Michael R. Murphy.
Exhibit 3: Power of Attorney of Daniel J. Donoghue, dated as of April 28, 2008.
Exhibit 4: Power of Attorney of Michael R. Murphy, dated as of April 28, 2008.

Signature

After reasonable inquiry and to the best of my knowledge and belief, I certify that the information set forth in this statement is true, complete and correct.

September 10, 2010

Date

DISCOVERY GROUP I, LLC

By: Michael R. Murphy*

Signature

Michael R. Murphy, Managing
Member

Name/Title

Daniel J. Donoghue*

Signature

Daniel J. Donoghue

Name/Title

Michael R. Murphy*

Signature

Michael R. Murphy

Name/Title

*By: /s/ Mark Buckley

Mark Buckley

Attorney-in-Fact for Daniel J.
Donoghue
Attorney-in-Fact for Michael R.
Murphy

Exhibit Index

- Exhibit 1 List of transactions by Reporting Persons in the Company's Common Stock during the 60-day period preceding this filing.
- Exhibit 2 Joint Filing Agreement dated as of September 10, 2010, by and among Discovery Group; Daniel J. Donoghue; and Michael R. Murphy.
- Exhibit 3 Power of Attorney of Daniel J. Donoghue, dated as of April 28, 2008.
- Exhibit 4 Power of Attorney of Michael R. Murphy, dated as of April 28, 2008.

TRANSACTIONS DURING PAST 60 DAYS

The Reporting Persons engaged in the following transactions in shares of Common Stock of the Company during the past 60 days. Such transactions involved the purchase of shares on the Nasdaq National Market System. The prices reported below reflect the weighted average purchase price of the shares of Common Stock purchased on the relevant date. The Reporting Persons hereby undertake to provide upon request to the SEC staff full information regarding the number of shares and prices at which each transaction was effected.

Date	Type	Price	Shares
7/12/2010 ¹	Purchase	\$6.2938	11878
7/13/2010 ²	Purchase	6.217	925
7/14/2010	Purchase	6.14	2100
7/15/2010 ³	Purchase	6.0951	2950
7/16/2010	Purchase	6.05	100
7/19/2010 ⁴	Purchase	6.0397	2150
7/20/2010 ⁵	Purchase	6.2418	2000
7/21/2010	Purchase	6.25	2400
7/22/2010 ⁶	Purchase	6.2682	4219
7/23/2010 ⁷	Purchase	6.1771	1811
7/26/2010 ⁸	Purchase	6.323	10026
7/27/2010 ⁹	Purchase	6.3123	2883
7/29/2010	Purchase	6.38	2100
7/30/2010 ¹⁰	Purchase	6.301	2450
8/2/2010 ¹¹	Purchase	6.4754	10000
8/3/2010	Purchase	6.40	4901
8/4/2010 ¹²	Purchase	6.4946	2993

¹ This transaction was executed in multiple trades at prices ranging from \$6.21 - 6.30

² This transaction was executed in multiple trades at prices ranging from \$6.20 - 6.27

³ Due to incomplete data available to the Reporting Persons, the Reporting Persons are reporting the average price of transactions effected on this date.

⁴ This transaction was executed in multiple trades at prices ranging from \$6.03 - 6.05.

⁵ This transaction was executed in multiple trades at prices ranging from \$6.19 - 6.25.

⁶ This transaction was executed in multiple trades at prices ranging from \$6.25 - 6.30.

⁷ This transaction was executed in multiple trades at prices ranging from \$6.10 - 6.20.

⁸ This transaction was executed in multiple trades at prices ranging from \$6.30 - 6.35.

⁹ This transaction was executed in multiple trades at prices ranging from \$6.30 - 6.32.

¹⁰ This transaction was executed in multiple trades at prices ranging from \$6.30 - 6.35.

¹¹ Due to incomplete data available to the Reporting Persons, the Reporting Persons are reporting the average price of transactions effected on this date..

¹² This transaction was executed in multiple trades at prices ranging from \$6.49 - 6.50.

Date	Type	Price	Shares
8/5/2010 ¹³	Purchase	\$6.4835	6932
8/6/2010	Purchase	6.50	600
8/9/2010	Purchase	6.75	300
8/11/2010	Purchase	6.75	800
8/12/2010	Purchase	6.75	340
8/13/2010	Purchase	6.75	200
8/16/2010 ¹⁴	Purchase	6.8056	5202
8/17/2010 ¹⁵	Purchase	6.7996	9377
8/18/2010 ¹⁶	Purchase	6.7998	1111
8/19/2010 ¹⁷	Purchase	6.9983	3510
8/20/2010	Purchase	7.00	100
8/23/2010 ¹⁸	Purchase	7.1893	16600
8/24/2010 ¹⁹	Purchase	7.1696	10499
8/25/2010	Purchase	7.25	200
8/26/2010 ²⁰	Purchase	7.3919	10683
8/30/2010 ²¹	Purchase	7.7342	1015
8/31/2010 ²²	Purchase	7.7492	2630
9/1/2010 ²³	Purchase	7.7402	20324
9/2/2010 ²⁴	Purchase	7.7872	8500
9/3/2010	Purchase	7.75	550
9/7/2010 ²⁵	Purchase	7.7928	14014
9/8/2010 ²⁶	Purchase	7.7966	22000
9/9/2010 ²⁷	Purchase	7.868	69850

¹³ This transaction was executed in multiple trades at prices ranging from \$6.38 - 6.50.

¹⁴ This transaction was executed in multiple trades at prices ranging from \$6.80 - 6.81.

¹⁵ This transaction was executed in multiple trades at prices ranging from \$6.79 - 6.80.

¹⁶ This transaction was executed in multiple trades at prices ranging from \$6.78 - 6.80.

¹⁷ This transaction was executed in multiple trades at prices ranging from \$6.94 - 7.00.

¹⁸ This transaction was executed in multiple trades at prices ranging from \$7.15 - 7.25.

¹⁹ This transaction was executed in multiple trades at prices ranging from \$7.11 - 7.25.

²⁰ This transaction was executed in multiple trades at prices ranging from \$7.34 - 7.42.

²¹ This transaction was executed in multiple trades at prices ranging from \$7.65 - 7.75.

²² This transaction was executed in multiple trades at prices ranging from \$7.73 - 7.75.

²³ This transaction was executed in multiple trades at prices ranging from \$7.68 - 7.80.

²⁴ This transaction was executed in multiple trades at prices ranging from \$7.70 - 7.80.

²⁵ This transaction was executed in multiple trades at prices ranging from \$7.69 - 7.80.

²⁶ This transaction was executed in multiple trades at prices ranging from \$7.75 - 7.82.

²⁷ This transaction was executed in multiple trades at prices ranging from \$7.67 - 7.90.

JOINT FILING AGREEMENT

The undersigned hereby agree to the joint filing of the Schedule 13D to which this Agreement is attached.

Dated: September 10, 2010

DISCOVERY GROUP I, LLC

By Michael R. Murphy*
Michael R. Murphy
Managing Member

Daniel J. Donoghue*
Daniel J. Donoghue

Michael R. Murphy*
Michael R. Murphy

*By: /s/ Mark Buckley
Mark Buckley
Attorney-in-Fact for Daniel J. Donoghue
Attorney-in-Fact for Michael R. Murphy

POWER OF ATTORNEY

The undersigned, Daniel J. Donoghue, hereby appoints Mark Buckley his true and lawful attorney-in-fact and agent, with full power to execute and file with the United States Securities and Exchange Commission and any stock exchange or similar authority, for and on his behalf in any and all capacities, any and all reports required to be filed pursuant to Section 13 of the Securities Exchange Act of 1934 and the rules thereunder on Schedule 13D or 13G, any and all amendments to such reports, with all exhibits, and any other forms or documents as may be necessary in connection with the filing of such reports with the United States Securities and Exchange Commission and any stock exchange or similar authority, granting unto said attorney full power and authority to do and perform any and all acts for and on behalf of the undersigned which may be necessary or desirable to complete, as fully as the undersigned might or could do in person.

This Power of Attorney shall remain in full force and effect until revoked by the undersigned in a signed writing delivered to the foregoing attorney-in-fact and agent.

IN WITNESS WHEREOF the undersigned has caused this Power of Attorney to be executed this 28th day of April, 2008.

/s/ Daniel J. Donoghue
Daniel J. Donoghue

STATE OF ILLINOIS)
) SS.
COUNTY OF COOK)

I, Kareema M. Cruz, a Notary Public in and for the County of Cook, State of Illinois, DO HEREBY CERTIFY that Daniel J. Donoghue, who is personally known to me to be the same person whose name is subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that he signed and delivered the said instrument as his own free and voluntary act, for the uses and purposes therein set forth.

Given under my hand and notarial seal, this 28th day of April, 2008.

/s/ Kareema M. Cruz
Notary Public

POWER OF ATTORNEY

The undersigned, Michael R. Murphy, hereby appoints Mark Buckley his true and lawful attorney-in-fact and agent, with full power to execute and file with the United States Securities and Exchange Commission and any stock exchange or similar authority, for and on his behalf in any and all capacities, any and all reports required to be filed pursuant to Section 13 of the Securities Exchange Act of 1934 and the rules thereunder on Schedule 13D or 13G, any and all amendments to such reports, with all exhibits, and any other forms or documents as may be necessary in connection with the filing of such reports with the United States Securities and Exchange Commission and any stock exchange or similar authority, granting unto said attorney full power and authority to do and perform any and all acts for and on behalf of the undersigned which may be necessary or desirable to complete, as fully as the undersigned might or could do in person.

This Power of Attorney shall remain in full force and effect until revoked by the undersigned in a signed writing delivered to the foregoing attorney-in-fact and agent.

IN WITNESS WHEREOF the undersigned has caused this Power of Attorney to be executed this 28th day of April, 2008.

/s/ Michael R. Murphy
Michael R. Murphy

STATE OF ILLINOIS)
) SS.
COUNTY OF COOK)

I, Kareema M. Cruz, a Notary Public in and for the County of Cook, State of Illinois, DO HEREBY CERTIFY that Michael R. Murphy, who is personally known to me to be the same person whose name is subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that he signed and delivered the said instrument as his own free and voluntary act, for the uses and purposes therein set forth.

Given under my hand and notarial seal, this 28th day of April, 2008.

/s/ Kareema M. Cruz
Notary Public