

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

**FORM S-8  
REGISTRATION STATEMENT**

UNDER  
THE SECURITIES ACT OF 1933

**ATRICURE, INC.**

(Exact name of Registrant as Specified in its Charter)

**Delaware**  
(State Or Other Jurisdiction Of  
Incorporation Or Organization)

**34-1940305**  
(IRS Employer  
Identification Number)

**6217 Centre Park Drive  
West Chester, OH 45069  
(513) 755-4100**

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

**2005 EQUITY INCENTIVE PLAN**  
(Full title of the Plan)

**David J. Drachman**  
President and Chief Executive Officer  
AtriCure, Inc.  
**6217 Centre Park Drive  
West Chester, OH 45069  
(513) 755-4100**

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

*Copy to:*  
**Mark A. Weiss, Esq.**  
Keating Muething & Klekamp PLL  
One East Fourth Street, Suite 1400  
Cincinnati, Ohio 45202  
(513) 579-6599

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company. See the definitions of "large accelerated filer," "accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer  Accelerated filer   
Non-accelerated filer  (Do not check if a smaller reporting company) Smaller reporting company

**CALCULATION OF REGISTRATION FEE**

Title of Class of Securities To Be Registered	Amount To Be Registered <sup>(1)</sup>	Proposed Maximum Offering Price Per Share	Proposed Maximum Aggregate Offering Price	Amount of Registration Fee
Common Stock, \$0.001 par value	498,982 <sup>(2)</sup>	\$5.505 <sup>(3)</sup>	\$2,746,896 <sup>(3)</sup>	\$195.86

<sup>(1)</sup> Includes such additional shares as may become issuable by reason of stock splits, stock dividends or similar transactions pursuant to Rule 416(a) under the Securities Act of 1933, as amended (the "Securities Act").

<sup>(2)</sup> This Registration Statement registers an additional 498,982 shares issuable under our 2005 Equity Incentive Plan (the "Plan"). We have previously registered 3,651,303 shares issuable under the Plan (Registration Statement Nos. 333-130983, 333-152014 and 333-157972).

<sup>(3)</sup> Estimated solely for the purpose of calculating the registration fee in accordance with Rules 457(c) and (h) under the Securities Act and based upon the average of the high and low sales prices reported on The Nasdaq Global Market on March 25, 2010.

## EXPLANATORY NOTE

Pursuant to General Instruction E of Form S-8, this registration statement on Form S-8 (the "Registration Statement") is being filed in order to register an additional 498,982 shares of the Registrant's Common Stock, par value \$0.001 per share, which are securities of the same class and relate to the same employee benefit plan, the AtriCure, Inc. 2005 Equity Incentive Plan (the "Plan"), as those shares registered on the Registrant's registration statements on Form S-8 previously filed with the Commission on January 12, 2006 (Registration No. 333-130983), June 30, 2008 (Registration No. 333-152014) and March 16, 2009 (Registration No. 333-157972), each of which is hereby incorporated by reference. After giving effect to shares registered under this Registration Statement, the Registrant has registered 4,150,285 shares under the Plan.

### Item 8. Exhibits.

<u>Exhibit No.</u>	<u>Description of Documents</u>
5.1	Opinion of Keating Muething & Klekamp PLL
23.1	Consent of Deloitte & Touche LLP
23.2	Consent of Keating Muething & Klekamp PLL (included in Exhibit 5.1)
24.1	Power of Attorney (included on the signature pages)

## SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, the Registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-8 and has duly caused this Registration Statement to be signed on its behalf by the undersigned, thereunto duly authorized in West Chester, Ohio, as of the 29th day of March, 2010.

ATRICURE, INC.

By: /s/ Julie A. Piton  
Julie A. Piton  
Vice President, Finance and Administration and  
Chief Financial Officer

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

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

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/ David J. Drachman</u> David J. Drachman	President, Chief Executive Officer and Director (Principal Executive Officer)	March 29, 2010
<u>/s/ Julie A. Piton</u> Julie A. Piton	Vice President, Finance and Administration and Chief Financial Officer (Principal Financial and Accounting Officer)	March 29, 2010
<u>/s/ Richard M. Johnston</u> Richard M. Johnston	Chairman of the Board of Directors	March 29, 2010
<u>/s/ Mark A. Collar</u> Mark A. Collar	Director	March 29, 2010

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<u>/s/ Donald C. Harrison</u> Donald C. Harrison	Director	March 29, 2010
<u>/s/ Michael D. Hooven</u> Michael D. Hooven	Director	March 29, 2010
<u>/s/ Elizabeth D. Krell</u> Elizabeth D. Krell	Director	March 29, 2010
<u>/s/ Mark R. Lanning</u> Mark R. Lanning	Director	March 29, 2010
<u>/s/ Karen P. Robards</u> Karen P. Robards	Director	March 29, 2010

**MARK A. WEISS**

DIRECT DIAL: (513) 579-6599

FACSIMILE: (513) 579-6457

E-MAIL: MWEISS@KMKLAW.COM

March 29, 2010

AtriCure, Inc.  
6217 Centre Park Drive  
West Chester, Ohio 45069

Ladies and Gentlemen:

Reference is made to a registration statement on Form S-8 of AtriCure, Inc. (the "Company") which is being filed with the Securities and Exchange Commission (the "Registration Statement"). Capitalized terms not otherwise defined herein shall have the meanings ascribed to them in the Registration Statement.

The Registration Statement relates to 498,982 shares of Common Stock, par value \$0.001, of the Company (the "Shares") which may be issued by the Company pursuant to the AtriCure, Inc. 2005 Equity Incentive Plan (the "Plan").

In connection with our representation of the Company, as a basis for our opinions hereinafter set forth, we have examined the Registration Statement, including the exhibits thereto, the Company's Certificate of Incorporation, as amended, the Company's By-laws, as amended, the Plan and such other documents as we have deemed appropriate in rendering this opinion. As to matters of fact, we have relied on representations of officers of the Company. In our examination, we have assumed the genuineness of all signatures, the authenticity of all documents submitted to us as originals and the authenticity of all documents submitted to us as copies of originals.

Based on the foregoing, we are of the opinion that the Shares, when issued in accordance with the terms of the Plan, will be validly issued, fully paid and non-assessable. This opinion is being furnished to you solely for submission to the Securities and Exchange Commission as an exhibit to the Registration Statement and, accordingly, may not be relied upon, quoted in any manner to, or delivered to any other person or entity, without in each instance our prior written consent.

The foregoing opinions are subject to the qualification that we express no opinion with respect to the laws of any jurisdiction other than the State of Delaware. We assume no obligation to supplement this opinion if any applicable law changes after the date hereof or if we become aware of any fact that might change the opinion expressed herein after the date hereof.

We hereby consent to the filing of this opinion as an exhibit to the Registration Statement. In giving such consent, we do not thereby admit that we come within the category of persons whose consent is required under Section 7 of the Securities Act of 1933 or the rules or regulations of the Securities and Exchange Commission thereunder.

Sincerely yours,

KEATING MUETHING & KLEKAMP PLL

By: \_\_\_\_\_ /s/ MARK A. WEISS  
Mark A. Weiss

**CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM**

We consent to the incorporation by reference in this Registration Statement on Form S-8 of our report dated March 29, 2010, relating to the consolidated financial statements and financial statement schedule of AtriCure, Inc. and subsidiary appearing in the Annual Report on Form 10-K of AtriCure, Inc. and subsidiary for the year ended December 31, 2009.

Cincinnati, Ohio  
March 30, 2010