

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

**FORM S-8**

REGISTRATION STATEMENT  
UNDER  
THE SECURITIES ACT OF 1933

**MERCURY COMPUTER SYSTEMS, INC.**

(Exact Name of Registrant as Specified in its Charter)

Massachusetts  
(State of Incorporation)

04-2741391  
(I.R.S. Employer Identification Number)

199 Riverneck Road  
Chelmsford, Massachusetts 01824  
(978) 256-1300  
(Address of Principal Executive Offices)

MERCURY COMPUTER SYSTEMS, INC.  
2005 Stock Incentive Plan  
(Full Title of the Plan)

Anthony J. Medaglia, Jr.  
Goodwin Procter LLP  
Exchange Place  
Boston, Massachusetts 02109  
(617) 570-1000  
(Name, Address and Telephone Number, Including Area Code, of Agent for Service)

**CALCULATION OF REGISTRATION FEE**

Title of Securities to be Registered	Amount to be Registered (1)(2)(3)	Proposed Maximum Offering Price Per Share (4)	Proposed Maximum Aggregate Offering Price (4)	Amount of Registration Fee (5)
Common Stock	229,978	\$8.53	\$1,961,712.34	\$0

- (1) All of the 229,978 shares of the registrant's common stock listed were part of the shares previously registered by the registrant on Form S-8 (File No. 333-101993 filed on December 19, 2002) in connection with the registrant's 1997 Stock Option Plan, as amended (the "Original Registration Statement").
- (2) This registration statement also covers preferred stock purchase rights (the "Rights") which are presently attached to and trade with the registrant's common stock. Any value attributable to the Rights is reflected in the market price of the common stock.

- (3) In addition, pursuant to Rule 416(a) under the Securities Act of 1933, as amended (the "Securities Act"), this registration statement also covers an indeterminate number of additional shares of common stock to be offered or sold as a result of the anti-dilution provisions of the employee benefit plan described herein, including to prevent dilution resulting from any reorganization, recapitalization, reclassification, stock dividend, stock split or other similar change.
- (4) Calculated in accordance with Rule 457(c) and (h) under the Securities Act solely for the purpose of determining the amount of the registration fee, based on the average of the high and low prices on the NASDAQ Global Select Market on February 1, 2008.
- (5) The total registration fee for the shares being registered hereby is \$0. An aggregate filing fee of \$625.77 previously paid by the registrant in connection with the registration of the shares being carried forward from the Original Registration Statement is offset against the filing fee for this registration statement.

## EXPLANATORY NOTE

This registration statement is being filed solely for the purpose of registering 229,978 additional shares of common stock, par value \$0.01 per share ("Common Stock"), of Mercury Computer Systems, Inc. (the "Company") to be offered to participants under the Company's 2005 Stock Incentive Plan, as amended (the "2005 Plan"), originally adopted in 2005. The maximum number of shares of Common Stock reserved and available for issuance under the 2005 Plan includes 4,392,245 shares, which were previously registered with the Securities and Exchange Commission (the "Commission") on Form S-8 (File Nos. 333-129929 filed on November 23, 2005 and 333-139019 filed on November 30, 2006) (together, the "2005 Registration Statement"), plus the number of shares underlying any grants previously made under the Company's 1997 Stock Option Plan (the "1997 Plan") that are forfeited, canceled or are terminated (other than by exercise) from and after the effective date of the 2005 Plan. An aggregate of 229,978 additional shares have been included in the shares reserved for issuance under the 2005 Plan as a result of the forfeiture, cancellation or termination (other than by exercise) of grants previously made under the 1997 Plan.

Pursuant to General Instruction E of Form S-8, the contents of the 2005 Registration Statement are incorporated herein by reference, except as otherwise noted below.

### PART II INFORMATION REQUIRED IN THE REGISTRATION STATEMENT

#### ITEM 3. INCORPORATION OF DOCUMENTS BY REFERENCE.

The following documents are incorporated herein by reference:

- (a) The Company's annual report on Form 10-K for the fiscal year ended June 30, 2007, as filed with the Commission on September 7, 2007;
- (b) The Company's quarterly report on Form 10-Q for the fiscal quarter ended September 30, 2007, as filed with the Commission on November 9, 2007;
- (c) The Company's current reports on Form 8-K filed with the Commission on July 6, 2007, July 26, 2007 (excluding the information and exhibit furnished pursuant to Item 2.02), August 2, 2007, September 28, 2007, November 14, 2007, November 20, 2007, December 20, 2007, and January 24, 2008;
- (d) The description of the Company's common stock contained in the Company's registration statement on Form 8-A dated January 7, 1998, as filed with the Commission pursuant to Section 12 of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), including any amendment thereto or report filed for the purpose of updating such description; and
- (e) The description of the Company's preferred stock purchase rights contained in the Company's registration statement on Form 8-A dated December 15, 2005, as filed with the Commission pursuant to Section 12 of the Exchange Act, including any amendment thereto or report filed for the purpose of updating such description.

All documents subsequently filed by the Company pursuant to Sections 13(a), 13(c), 14 and 15(d) of the Exchange Act, prior to the filing of a post-effective amendment which indicates that all securities offered hereby have been sold or that deregisters all securities then remaining unsold, shall be deemed to be incorporated by reference herein and to be a part hereof from the date of the filing of such documents.

#### ITEM 5. INTERESTS OF NAMED EXPERTS AND COUNSEL.

The validity of the Common Stock offered under this registration statement will be passed upon for the Company by Goodwin Procter LLP, Boston, Massachusetts. Anthony J. Medaglia, Jr., who is Of Counsel at Goodwin Procter LLP, is Secretary of the Company and owns 28,950 shares of Common Stock and options to purchase an additional 1,010 shares of Common Stock.

**ITEM 8. EXHIBITS.**

<u>Exhibit</u>	<u>Description</u>
4.1	Articles of Organization (incorporated herein by reference to Exhibit 3.1 of the Company's annual report on Form 10-K/A for the fiscal year ended June 30, 2002, as filed with the Commission on September 27, 2002).
4.2	Articles of Amendment (incorporated herein by reference to Exhibit 3.2 of the Company's quarterly report on Form 10-Q for the fiscal quarter ended December 31, 2004, as filed with the Commission on February 8, 2005).
4.3	Articles of Amendment (incorporated herein by reference to Exhibit 1 of the Company's registration statement on Form 8-A, as filed with the Commission on December 15, 2005).
4.4	By-laws, as amended through September 22, 2004 (incorporated herein by reference to Exhibit 3.2 of the Company's quarterly report on Form 10-Q for the fiscal quarter ended September 30, 2004, as filed with the Commission on November 1, 2004).
4.5	Amendment to By-laws dated December 17, 2007 (incorporated herein by reference to Exhibit 3.1 to the Company's current report on Form 8-K, as filed with the Commission on December 20, 2007).
4.6	Amendment to By-laws dated January 21, 2008 (incorporated herein by reference to Exhibit 3.1 to the Company's current report on Form 8-K, as filed with the Commission on January 24, 2008).
4.7	Shareholder Rights Agreement, dated as of December 14, 2005, between the Company and Computershare Trust Company, N.A. (formerly known as EquiServe Trust Company, N.A.) (incorporated herein by reference to Exhibit 2 of the Company's registration statement on Form 8-A, as filed with the Commission on December 15, 2005).
4.8	Mercury Computer Systems, Inc. 2005 Stock Incentive Plan, as amended and restated (incorporated herein by reference to Exhibit 10.1 of the Company's current report on Form 8-K, as filed with the Commission on August 8, 2006).
5.1*	Opinion of Goodwin Procter LLP.
23.1*	Consent of KPMG LLP.
23.2*	Consent of PricewaterhouseCoopers LLP.
23.3	Consent of Goodwin Procter LLP (contained in the opinion filed as Exhibit 5.1 to this registration statement).
24.1	Power of Attorney (included in signature page to this registration statement).
99.1	Form of Stock Option Agreement under the 2005 Stock Incentive Plan (incorporated herein by reference to Exhibit 10.1 of the Company's current report on Form 8-K, as filed with the Commission on August 21, 2006).
99.2	Form of Restricted Stock Award Agreement under the 2005 Stock Incentive Plan (incorporated herein by reference to Exhibit 10.3 of the Company's current report on Form 8-K, as filed with the Commission on November 16, 2005).
99.3	Form of Restricted Stock Award Agreement with James R. Bertelli under the 2005 Stock Incentive Plan (incorporated herein by reference to Exhibit 10.4 of the Company's current report on Form 8-K, as filed with the Commission on November 16, 2005).
99.4	Form of Deferred Stock Award Agreement under the 2005 Stock Incentive Plan (incorporated herein by reference to Exhibit 10.1 of the Company's quarterly report on Form 10-Q for the fiscal quarter ended March 31, 2006, as filed with the Commission on May 9, 2006).

\* Filed herewith

**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 the town of Chelmsford, the Commonwealth of Massachusetts on this 4th day of February, 2008.

**MERCURY COMPUTER SYSTEMS, INC.**

By: /s/ Robert E. Hult  
Robert E. Hult  
Senior Vice President and  
Chief Financial Officer

**Power of Attorney**

KNOW ALL MEN BY THESE PRESENTS that each person whose signature appears below constitutes and appoints James R. Bertelli, Mark Aslett and Robert E. Hult his true and lawful attorneys-in-fact and agents, each acting alone, with full powers of substitution and resubstitution, for him or in his name, place and stead, in any and all capacities to sign any and all amendments or post-effective amendments to this registration statement (or any registration statement for the same offering that is to be effective upon filing pursuant to Rule 462(b) under the Securities Act of 1933), and to file the same, with all exhibits thereto, and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, each acting alone, full power and authority to do and perform each and every act and thing requisite or necessary to be done in and about the premises, as fully to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents, each acting alone, or his 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/ James R. Bertelli</u> James R. Bertelli	Chairman of the Board of Directors	February 4, 2008
<u>/s/ Mark Aslett</u> Mark Aslett	President, Chief Executive Officer and Director (Principal Executive Officer)	February 4, 2008
<u>/s/ Robert E. Hult</u> Robert E. Hult	Senior Vice President and Chief Financial Officer (Principal Financial and Principal Accounting Officer)	February 4, 2008
<u>/s/ Gordon B. Baty</u> Gordon B. Baty	Director	February 4, 2008

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/ Albert P. Belle Isle</u> Albert P. Belle Isle	Director	February 4, 2008
<u>/s/ George W. Chamillard</u> George W. Chamillard	Director	February 4, 2008
<u>/s/ Russell K. Johnsen</u> Russell K. Johnsen	Director	February 4, 2008
<u>/s/ Sherman N. Mullin</u> Sherman N. Mullin	Director	February 4, 2008
<u>/s/ Lee C. Steele</u> Lee C. Steele	Director	February 4, 2008
<u>/s/ Vincent Vitto</u> Vincent Vitto	Director	February 4, 2008
<u>/s/ Richard P. Wishner</u> Richard P. Wishner	Director	February 4, 2008

## EXHIBIT INDEX

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\* Filed herewith

[Goodwin Procter LLP Letterhead]

February 4, 2008

Mercury Computer Systems, Inc.  
199 Riverneck Road  
Chelmsford, Massachusetts 01824-2820

**Re:        Registration Statement on Form S-8 for Additional Shares**

Ladies and Gentlemen:

This opinion letter is furnished to you in connection with your filing of a Registration Statement on Form S-8 (the "Registration Statement") pursuant to the Securities Act of 1933, as amended (the "Securities Act"), on the date hereof relating to an aggregate of 229,978 shares (the "Shares") of Common Stock, \$0.01 par value per share ("Common Stock"), of Mercury Computer Systems, Inc., a Massachusetts corporation (the "Company"), that may be issued pursuant to the Company's 2005 Stock Incentive Plan (the "Plan").

We have reviewed such documents and made such examination of law as we have deemed appropriate to give the opinions expressed below. We have relied, without independent verification, on certificates of public officials and, as to matters of fact material to the opinion set forth below, on certificates of officers of the Company.

The opinion expressed below is limited to Massachusetts law.

For purposes of the opinion expressed below, we have assumed that a sufficient number of authorized but unissued shares of the Company's Common Stock will be available for issuance when the Shares are issued.

Based on the foregoing, we are of the opinion that the Shares have been duly authorized and, upon issuance and delivery against payment therefor in accordance with the terms of the Plan, will be validly issued, fully paid and nonassessable.

We hereby consent to the inclusion of this opinion as Exhibit 5.1 to the Registration Statement. In giving our consent, we do not admit that we are in the category of persons whose consent is required under Section 7 of the Securities Act or the rules and regulations thereunder.

Very truly yours,

/s/ Goodwin Procter LLP

GOODWIN PROCTER LLP



**CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM**

The Board of Directors  
Mercury Computer Systems, Inc.:

We consent to the use of our reports dated September 7, 2007, with respect to the consolidated balance sheets of Mercury Computer Systems, Inc. and subsidiaries as of June 30, 2007 and 2006, and the related consolidated statements of operations, shareholders' equity and comprehensive (loss) income, and cash flows for each of the years in the two-year period ended June 30, 2007, and the related consolidated financial statement schedule, and the effectiveness of internal control over financial reporting as of June 30, 2007, which reports appear in the annual report on Form 10-K of Mercury Computer Systems, Inc. dated September 7, 2007. Both reports are incorporated herein by reference.

Our report dated September 7, 2007 on the effectiveness of internal control over financial reporting as of June 30, 2007, expresses our opinion that Mercury Computer Systems, Inc. did not maintain effective internal control over financial reporting as of June 30, 2007 because of the effect of a material weakness on the achievement of the objectives of the control criteria and contains an explanatory paragraph that states: A material weakness related to accounting for income taxes has been identified and included in management's assessment.

/s/ KPMG LLP

Boston, Massachusetts

February 4, 2008

**CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM**

We hereby consent to the incorporation by reference in this Registration Statement on Form S-8 of our report dated September 13, 2005 relating to the financial statements and financial statement schedule, which appears in Mercury Computer Systems, Inc.'s Annual Report on Form 10-K for the year ended June 30, 2007.

/s/ PricewaterhouseCoopers LLP

Boston, Massachusetts  
February 4, 2008