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

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POST-EFFECTIVE AMENDMENT NO. 2 TO

**FORM S-8**

REGISTRATION STATEMENT  
UNDER  
THE SECURITIES ACT OF 1933

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**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.  
1997 STOCK OPTION PLAN**  
(Full Title of the Plan)

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

## EXPLANATORY NOTE

Mercury Computer Systems, Inc. (the "Company") is filing this post-effective amendment to deregister certain of the securities originally registered pursuant to the Registration Statement on Form S-8 (File No. 333-112990), filed with the Securities and Exchange Commission on February 20, 2004 (the "Registration Statement") with respect to shares of the Company's common stock, par value \$0.01 per share ("Common Stock"), thereby registered for issuance under the Company's 1997 Stock Option Plan, as amended (the "1997 Plan"). An aggregate of 1,000,000 shares of Common Stock were registered for issuance under the 1997 Plan pursuant to the Registration Statement.

On November 14, 2005, the Company's shareholders approved the Company's 2005 Stock Incentive Plan (the "2005 Plan"), which replaced the 1997 Plan as of the date of approval. Following the approval of the 2005 Plan, no future awards may be made under the 1997 Plan. The maximum number of shares of Common Stock reserved and available for issuance under the 2005 Plan includes the shares available for grant under the 1997 Plan as of the effective date of the 2005 Plan, plus the number of shares underlying any grants previously made under the 1997 Plan that are forfeited, canceled or terminated (other than by exercise) from and after the effective date of the 2005 Plan. The total number of shares available for grant under the 1997 Plan as of the effective date of the 2005 Plan was 1,942,264 shares (the "Original Carried Forward Shares"). The Original Carried Forward Shares included 942,264 shares registered under the Registration Statement, which were deregistered pursuant to Post-Effective Amendment No. 1 to the Registration Statement filed on November 23, 2005. An aggregate of 2,449,981 additional shares (the "Additional Carried Forward 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 previously-made grants under the 1997 Plan during the period between the effective date of the 2005 Plan and October 31, 2006. The Additional Carried Forward Shares include the remaining 57,736 shares registered under the Registration Statement, which are hereby deregistered.

Contemporaneously with the filing of this Post-Effective Amendment No. 2 to the Registration Statement, the Company is filing a Registration Statement on Form S-8 to register the Additional Carried Forward Shares for issuance pursuant to the 2005 Plan.

**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 Post-Effective Amendment No. 2 to the 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 30th day of November, 2006.

**MERCURY COMPUTER SYSTEMS, INC.**

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

Pursuant to the requirements of the Securities Act of 1933, this Post-Effective Amendment No. 2 to the 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	President, Chief Executive Officer and Director (Principal Executive Officer)	November 30, 2006
<u>/s/ Robert E. Hult</u> Robert E. Hult	Senior Vice President and Chief Financial Officer (Principal Financial Officer)	November 30, 2006
<u>/s/ Alex N. Braverman</u> Alex N. Braverman	Vice President, Controller and Chief Accounting Officer (Principal Accounting Officer)	November 30, 2006
<u>/s/ Gordon B. Baty</u> Gordon B. Baty	Director	November 30, 2006
<u>/s/ Albert P. Belle Isle</u> Albert P. Belle Isle	Director	November 30, 2006
<u>/s/ George W. Chamillard</u> George W. Chamillard	Director	November 30, 2006
<u>/s/ Russell K. Johnsen</u> Russell K. Johnsen	Director	November 30, 2006
<u>/s/ Sherman N. Mullin</u> Sherman N. Mullin	Director	November 30, 2006
<u>/s/ Lee C. Steele</u> Lee C. Steele	Director	November 30, 2006
<u>/s/ Vincent Vitto</u> Vincent Vitto	Director	November 30, 2006
<u>/s/ Richard P. Wishner</u> Richard P. Wishner	Director	November 30, 2006