
**UNITED STATES SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, DC 20549**

**POST-EFFECTIVE AMENDMENT NO. 1
TO
FORM S-3
REGISTRATION STATEMENT
UNDER
THE SECURITIES ACT OF 1933**

MERCURY COMPUTER SYSTEMS, INC.

(Exact name of registrant as specified in its charter)

Massachusetts
(State or other jurisdiction of
incorporation or organization)

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

**199 Riverneck Road
Chelmsford, Massachusetts 01824
(978) 256-1300**

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

**James R. Bertelli
President and Chief Executive Officer
Mercury Computer Systems, Inc.
199 Riverneck Road
Chelmsford, Massachusetts 01824
(978) 256-1300**

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

Copies of all communications should be sent to:

**Anthony J. Medaglia, Jr., P.C.
Goodwin Procter LLP
Exchange Place
Boston, Massachusetts 02109
(617) 570-1000**

Approximate date of commencement of proposed sale to the public: August 19, 2004

If the only securities being registered on this Form are being offered pursuant to dividend or interest reinvestment plans, please check the following box.

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, other than securities offered only in connection with dividend or interest reinvestment plans, check the following box.

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, please check the following box and list the Securities Act registration number of the earlier effective registration statement for the same offering.

If this Form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration number of the earlier effective registration statement for the same offering.

If this Form is a registration statement pursuant to General Instruction I.D. or a post-effective amendment that shall become effective upon filing with the Commission pursuant to Rule 462(e) under the Securities Act, check the following box.

If this Form is a post-effective amendment to a registration statement filed pursuant to General Instruction I.D. filed to register additional securities or additional classes of securities pursuant to Rule 413(b) under the Securities Act, check the following box.

DEREGISTRATION OF SECURITIES

Mercury Computer Systems, Inc. (the "Company") filed a Registration Statement on Form S-3 (Registration No. 333-118015) (the "Registration Statement") relating to the registration of \$125,000,000 principal amount of the Company's 2.00% Convertible Senior Notes due 2024 (the "Notes") that were issued in a private placement on April 29, 2004. The Registration Statement also covers 4,134,962 shares of the Company's common stock, par value \$.01 per share (the "Shares," and together with the Notes, the "Securities"), issuable upon conversion of the Notes. Pursuant to a Registration Rights Agreement dated April 29, 2004 between the Company and the initial purchasers of the Notes, the Company agreed to register the resale of the Securities under the Securities Act of 1933, and to use its reasonable best efforts to cause the registration statement covering the Securities to remain effective until April 29, 2006. The Registration Statement covers the resale of the Securities by the selling securityholders named in the prospectus included as part of the Registration Statement, including any supplement thereto (the "Selling Securityholders").

This Post-Effective Amendment No. 1 to the Registration Statement is being filed for the purpose of terminating the offering by the Selling Securityholders under the Registration Statement in its entirety and removing from registration all of the Securities covered thereby that have not been resold by the Selling Securityholders, which consist of \$4,880,000 principal amount of the Notes and all 4,134,962 Shares. Termination of the Registration Statement has no effect on the other terms of the outstanding Notes.

EXHIBIT INDEX

<u>Exhibit No.</u>	<u>Description</u>
23.3	Consent of PricewaterhouseCoopers LLP

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in this Post-effective Amendment No. 1 to the Registration Statement on Form S-3 of our report dated September 13, 2005 relating to the financial statements, financial statement schedule, management's assessment of the effectiveness of internal control over financial reporting and the effectiveness of internal control over financial reporting, which appears in Mercury Computer Systems, Inc.'s Annual Report on Form 10-K for the year ended June 30, 2005.

/s/ PricewaterhouseCoopers LLP

Boston, Massachusetts

May 26, 2006