

SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, DC 20549

SCHEDULE TO

(Rule 13e-4)

TENDER OFFER STATEMENT UNDER SECTION 14(d)(1) OR 13(e)(1)
OF THE SECURITIES EXCHANGE ACT OF 1934
(Amendment No. 4)

MERCURY COMPUTER SYSTEMS, INC.

(Name of Subject Company (Issuer) and Filing Person (Offeror))

Options to Purchase Common Stock, Par Value \$.01 Per Share,
of Mercury Computer Systems, Inc.
(Title of Class of Securities)

589378 10 8

(CUSIP Number of Class of Securities (Underlying Common Stock))

Craig Barrows, Esq.
Vice President and General Counsel
Mercury Computer Systems, Inc.
199 Riverneck Road
Chelmsford, Massachusetts 01824
(978) 256-1300

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

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

CALCULATION OF FILING FEE

Transaction Value*

\$15,311,708

Amount of Filing Fee**

\$1,638.36

* Calculated solely for purposes of determining the filing fee. This amount assumes that options to purchase 2,188,434 shares of common stock of Mercury Computer Systems,

Inc., which options have an approximate aggregate value of \$15,311,708, will be exchanged pursuant to this offer. The aggregate value of such options was calculated based on the Black-Scholes option pricing model, as of July 31, 2006.

** The amount of the filing fee, calculated in accordance with Rule 0-11 under the Securities Exchange Act of 1934, as amended, equals \$107.00 per million dollars of the value of the transaction. The filing fee was previously paid on August 11, 2006 in connection with the initial filing of this Schedule TO.

Check the box if any part of the fee is offset as provided in Rule 0-11(a)(2) and identify the filing with which the offsetting fee was previously paid. Identify the previous filing by registration statement number, or the Form or Schedule and the date of its filing.

Amount Previously Paid: Not applicable

Filing Party: Not applicable

Form or Registration No.: Not applicable

Date Filed: Not applicable

Check the box if the filing relates solely to preliminary communications made before the commencement of a tender offer.

Check the appropriate boxes below to designate any transactions to which the statement relates:

- third party tender offer subject to Rule 14d-1.
- issuer tender offer subject to Rule 13e-4.
- Going-private transaction subject to Rule 13e-3.
- amendment to Schedule 13D under Rule 13d-2.

Check the following box if the filing is a final amendment reporting the results of the tender offer:

Introductory Statement

This Amendment No. 4 to Schedule TO amends and supplements the Tender Offer Statement on Schedule TO filed by Mercury Computer Systems, Inc., a Massachusetts corporation ("Mercury"), with the Securities and Exchange Commission on August 11, 2006 (as amended by Amendment No. 1 thereto on August 11, 2006, Amendment No. 2 thereto on September 1, 2006 and Amendment No. 3 thereto on September 7, 2006) in connection with Mercury's offer to exchange certain outstanding eligible options to purchase shares of Mercury's common stock, par value \$.01 per share, that were originally granted under Mercury's 1997 Stock Option Plan for shares of restricted stock or phantom stock units that will be granted under Mercury's 2005 Stock Incentive Plan, upon the terms and subject to the conditions set forth in the amended Offer to Exchange that was filed as Exhibit (a)(1)(A)(ii) to the Schedule TO.

This Amendment No. 4 amends and supplements the Schedule TO in order to:

- (i) amend and supplement Item 4(a) of the Schedule TO to add the following:

"The Offer expired at 12:00 midnight, Eastern Time, on September 8, 2006. Pursuant to the Offer, Mercury accepted for exchange options to purchase an aggregate of 1,889,886 shares of Common Stock, representing approximately 89% of the shares subject to all options that were eligible for exchange on that date. Subject to the terms and conditions of the Offer, on September 11, 2006 Mercury granted Replacement Awards under the 2005 Plan for an aggregate of approximately 472,485 Restricted Stock Rights in exchange for such tendered options;" and

- (ii) file as Exhibit (a)(1)(R) an email notifying eligible employees of the completion of the exchange program.

ITEM 12. EXHIBITS.

The Exhibit Index included in this Amendment No. 4 to Schedule TO is incorporated herein by reference.

SIGNATURE

After due 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.

MERCURY COMPUTER SYSTEMS, INC.
(Registrant)

Date: September 11, 2006

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

EXHIBIT INDEX

<u>Exhibit Number</u>	<u>Exhibit Description</u>	<u>Incorporated by Reference</u>				<u>Filed Herewith</u>
		<u>Form</u>	<u>File No.</u>	<u>Exhibit</u>	<u>Filing Date</u>	
(a)(1)(A)(i)	Offer to Exchange, dated August 11, 2006, including Transmittal Letter, form of Election to Participate and form of Notice of Withdrawal.	TO-I	005-52823	(a)(1)(A)	August 11, 2006	
(a)(1)(A)(ii)	Amended Offer to Exchange, dated September 1, 2006, including form of Election to Participate and form of Notice of Withdrawal.	TO-I/A	005-52823	(a)(1)(A)(ii)	September 1, 2006	
(a)(1)(B)	Form of Personnel Grant Status.	TO-I	005-52823	(a)(1)(B)	August 11, 2006	
(a)(1)(C)	Email dated August 11, 2006 announcing the commencement of the election period for the exchange program.	TO-I	005-52823	(a)(1)(C)	August 11, 2006	
(a)(1)(D)	Form of email reminder of option exchange program expiration date.	TO-I	005-52823	(a)(1)(D)	August 11, 2006	
(a)(1)(E)	Preliminary Proxy Statement.	14A	000-23599	N/A	June 27, 2006	
(a)(1)(F)	Definitive Proxy Statement.	14A	000-23599	N/A	July 10, 2006	
(a)(1)(G)	Mercury's 2005 Stock Incentive Plan, amended and restated through August 7, 2006.	8-K	000-23599	10.1	August 8, 2006	
(a)(1)(H)	Form of Restricted Stock Award Agreement under Mercury's 2005 Stock Incentive Plan.	8-K	000-23599	10.3	November 16, 2005	
(a)(1)(I)	Form of Deferred Stock Award Agreement under Mercury's 2005 Stock Incentive Plan.	10-Q	000-23599	10.1	May 9, 2006	
(a)(1)(J)	French Guidelines for Stock Free Awards to employees and corporate officers of Mercury's French subsidiaries.	TO-I	005-52823	(a)(1)(J)	August 11, 2006	
(a)(1)(K)	Mercury's Annual Report on Form 10-K for the fiscal year ended June 30, 2005.	10-K	000-23599	N/A	September 13, 2005	
(a)(1)(L)	Mercury's Quarterly Report on Form 10-Q for the quarter ended September 30, 2005.	10-Q	000-23599	N/A	November 9, 2005	
(a)(1)(M)	Mercury's Quarterly Report on Form 10-Q for the quarter ended December 31, 2005.	10-Q	000-23599	N/A	February 9, 2006	
(a)(1)(N)	Mercury's Quarterly Report on Form 10-Q for the quarter ended March 31, 2006.	10-Q	000-23599	N/A	May 9, 2006	
(a)(1)(O)	PowerPoint Presentation Regarding the Exchange Program.	TO-I/A	005-52823	(a)(1)(O)	August 11, 2006	
(a)(1)(P)	Email notifying eligible employees of the availability of the amended Offer to Exchange on Mercury's intranet.	TO-I/A	005-52823	(a)(1)(P)	September 1, 2006	

<u>Exhibit Number</u>	<u>Exhibit Description</u>	<u>Form</u>	<u>File No.</u>	<u>Exhibit</u>	<u>Filing Date</u>	<u>Filed Herewith</u>
(a)(1)(Q)	Form of email notification of receipt of Elections to Participate.	TO-I/A	005-52823	(a)(1)(Q)	September 7, 2006	
(a)(1)(R)	Email notifying eligible employees of the completion of the exchange program.					X
(b)	Not applicable.					
(d)(1)	Mercury's 1997 Stock Option Plan, as amended and restated.	8-K	000-23599	10.1	November 18, 2004	
(d)(2)	Form of Option Agreement under Mercury's 1997 Stock Option Plan.	10-Q	000-23599	10.1	November 1, 2004	
(d)(3)	Form of Restricted Stock Award Agreement under Mercury's 1997 Stock Option Plan.	8-K	000-23599	10.1	August 17, 2005	
(d)(4)	Form of Restricted Stock Award Agreement with James R. Bertelli under Mercury's 1997 Stock Option Plan.	10-K	000-23599	10.2.4	September 13, 2005	
(d)(5)	Form of Stock Option Agreement under Mercury's 2005 Stock Incentive Plan.	8-K	000-23599	10.2	November 16, 2005	
(d)(6)	Form of Restricted Stock Award Agreement under Mercury's 2005 Stock Incentive Plan.	8-K	000-23599	10.3	November 16, 2005	
(d)(7)	Form of Restricted Stock Award Agreement with James R. Bertelli under Mercury's 2005 Stock Incentive Plan.	8-K	000-23599	10.4	November 16, 2005	
(d)(8)	Form of Stock Option Agreement under Mercury's 2005 Stock Incentive Plan.	8-K	000-23599	10.1	June 2, 2006	
(d)(10)	Form of Change in Control Severance Agreement.	8-K	000-23599	10.1	February 23, 2006	
(d)(11)	Form of Stock Option Agreement under Mercury's 2005 Stock Incentive Plan.	8-K	000-23599	10.1	August 21, 2006	
(g)	Not applicable.					
(h)	Not applicable.					

Subject: Completion of Option Exchange Program

The election period for the option exchange program expired on Friday, September 8, 2006 at 12:00 midnight, Eastern Time. Pursuant to the exchange program, Mercury accepted for exchange options to purchase an aggregate of 1,889,886 shares of our common stock, representing approximately 89% of the shares subject to all options that were eligible for exchange as of that date. Subject to the terms and conditions of the exchange program, on September 11, 2006 we granted replacement awards for an aggregate of approximately 472,485 restricted stock rights in exchange for such tendered options.

Eligible associates who participated in the exchange program and who are domiciled in the United States, the United Kingdom or Japan are receiving restricted stock awards in exchange for their tendered options, and eligible associates who participated in the exchange program who are domiciled in France and Germany are receiving deferred stock awards in exchange for their tendered options.

You do not need to return your existing stock option agreements with respect to options that were tendered and accepted as they will be automatically cancelled upon the granting of your replacement award.

Replacement awards are subject to the terms of our 2005 Stock Incentive Plan and an award agreement between you and Mercury. Beginning shortly and continuing over the next several weeks, we will be sending you a replacement award package containing, among other information, your award agreement, which you will be required to sign and return to us in accordance with the instructions that will be provided.

Please send your questions by email to MCSStockOptionExchange@mc.com.