

Mercury Computer Systems, Inc.
199 Riverneck Road
Chelmsford, MA 01824

December 22, 2006

VIA EDGAR

Angela J. Crane
Accounting Branch Chief
Division of Corporation Finance
Securities and Exchange Commission
100 F Street, N.E.
Washington, D.C. 20549

Re: Mercury Computer Systems, Inc.
Form 10-K for the fiscal year ended June 30, 2006
Filed September 13, 2006
File No. 0-23599

Dear Ms. Crane:

This letter is submitted on behalf of Mercury Computer Systems, Inc. (the "Company" or "we") in response to the comments of the staff of the Division of Corporation Finance (the "Staff") as set forth in your letter to Robert E. Hult dated December 8, 2006 with respect to the Company's Form 10-K for the fiscal year ended June 30, 2006 and Form 8-K dated October 26, 2006 (the "Comment Letter"). For reference purposes, the text of your letter has been reproduced herein with responses below each numbered comment.

Form 10-K for the period ending June 30, 2006

Certifications

1. *We note that the identification of the certifying individual at the beginning of the certification required by the Exchange Act Rule 13a-14(a) also includes the title of the certifying individual. In future filings the identification of the certifying individual at the beginning of the certification should be revised so as not to include the individual title.*

Response 1:

We note the Staff's comment and will comply with its request in applicable future filings.

Form 8-K dated October 26, 2006

2. *We note that you present your non-GAAP measures and reconciliation in the form of non-GAAP statements of operations. This format may be confusing to investors as they also reflect several*

non-GAAP measures, including non-GAAP cost of revenue, non-GAAP gross profit, non-GAAP selling, general and administrative, non-GAAP research and development, non-GAAP operating expenses, non-GAAP (loss) income from operations, non-GAAP (loss) before income taxes, non-GAAP net (loss) income and non-GAAP basic and diluted income per share, which have not been described to investors. In fact, it appears that management does not use these non-GAAP measures but they are shown here as a result of the presentation format. Please note that Instruction 2 to Item 2.02 of Form 8-K requires that when furnishing information under this item you must provide all the disclosures required by paragraph (e)(1)(i) of Item 10 of Regulation S-K, including a reconciliation to the directly comparable GAAP measure for each non-GAAP measure presented and explain why you believe the measures provide useful information to investors.

- To eliminate investor confusion, in future filings please remove the non-GAAP statements of operations from all future filings and instead disclose only those non-GAAP measures used by management that you wish to highlight for investors, with the appropriate reconciliations.*
- Please note that in the event that your Form 8-K is incorporated by reference into a 33 Act registration statement, we may have additional questions relating to the appropriateness of this information being included in a document filed with, and not just furnished to, the Commission. At that time, we may request an amendment to the Form 8-K.*

Response 2:

We note the Staff's comment and will comply with its request in applicable future filings. Specifically, the Company will remove the non-GAAP statements of operations from all future filings (including all earnings releases furnished pursuant to Item 2.02 of Form 8-K), and will instead disclose only those non-GAAP measures used by management that it wishes to highlight for investors, with the appropriate reconciliations and other disclosures required by paragraph (e)(1)(i) of Item 10 of Regulation S-K.

As requested in the Comment Letter, the Company acknowledges that:

- the Company is responsible for the adequacy and accuracy of the disclosure in the filings;
- Staff comments or changes to disclosure in response to Staff comments do not foreclose the Commission from taking any action with respect to the filing; and
- the Company may not assert Staff comments as a defense in any proceeding initiated by the Commission or any person under the federal securities laws of the United States.

Angela J. Crane
Securities and Exchange Commission
December 22, 2006
Page 3 of 3

If you should have any questions concerning the enclosed matters, please contact the undersigned at (978) 256-1300.

Sincerely,

/s/ Robert E. Hult

Robert E. Hult
Senior Vice President and
Chief Financial Officer