



DIVISION OF
CORPORATION FINANCE

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

August 19, 2010

By US Mail and Facsimile to (952) 937-4515

Michael Hoff
Director of Legal Services
MTS Systems Corporation
14000 Technology Drive
Eden Prairie, MN 55344

**Re: MTS Systems Corporation
Form 10-K for the Fiscal Year Ended October 3, 2009
Filed December 2, 2009
File No. 000-02382**

Dear Mr. Hoff:

We have reviewed your filing and have the following comments. In some of our comments, we may ask you to provide us with information so we may better understand your disclosure.

Please respond to this letter within ten business days by amending your filing, by providing the requested information, or by advising us when you will provide the requested response. If you do not believe our comments apply to your facts and circumstances or do not believe an amendment is appropriate, please tell us why in your response.

After reviewing any amendment to your filing and the information you provide in response to these comments, we may have additional comments.

Item 11. Executive Compensation, page 40

1. We note from your disclosure under "Analysis of Data" that you have incorporated by reference from page 15 of your proxy statement that you target each component of total compensation for your named executive officers at or around the 50th percentile. Given that you target these elements of your compensation packages, in future filings, please include an analysis of where actual payments under each element of compensation actually fell within the targeted range. If any of your named executive officers are compensated at levels that are materially different from the targeted levels of compensation, please also provide discussion and analysis as to why.
2. We note from your disclosure under "Base Salary" that you have incorporated by reference from page 16 of your proxy statement that the Compensation Committee

assesses the individual executive's level of performance in setting the base salary levels of the named executive officers. In future filings, please describe the specific items of individual performance that are taken into account in setting base salary and the how base salary is structured and implemented to reflect each named executive officer's individual performance. Please see Item 402(b)(2)(vii) of Regulation S-K.

3. We refer to your disclosure under "Short-Term Incentives" that you have incorporated by reference from page 16 of your proxy statement. It is unclear from your current disclosure how the corporate goals were used to determine the amounts of the bonuses awarded to the named executive officers. For example, we note that, other than for the EPS performance goal, you have not disclosed the percentages of the short-term incentive payments that were assigned to each of the other corporate goals listed in your table. In future filings, please clarify how the corporate goals are used to determine the amounts of the bonuses awarded to each named executive officer.
4. We refer to your disclosure under "Long-Term Incentives" that you have incorporated by reference from page 17 of your proxy statement. We note minimal discussion and analysis as to how the actual amount of stock option grants and restricted stock unit awards were determined for each named executive officer and how your compensation committee chooses between each of these forms of compensation. In your future filings, as applicable, please include substantive analysis and insight into how your compensation committee made its stock option grant and restricted stock unit award determinations with respect to each named executive officer. Refer to subparagraphs (b)(1)(v) and (b)(2)(iii) of Item 402 of Regulation S-K. For example, please discuss and analyze how the compensation committee determined the allocation between stock option grants and restricted stock unit awards and the actual number of shares underlying those awards made to each of your named executive officers, and how and why those awards varied among the named executive officers.

We urge all persons who are responsible for the accuracy and adequacy of the disclosure in the filing to be certain that the filing includes the information the Securities Exchange Act of 1934 and all applicable Exchange Act rules require. Since the company and its management are in possession of all facts relating to a company's disclosure, they are responsible for the accuracy and adequacy of the disclosures they have made.

In responding to our comments, please provide a written statement from the company acknowledging that:

- the company is responsible for the adequacy and accuracy of the disclosure in the filing;
- 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

Michael Hoff
MTS Systems Corporation
August 19, 2010
Page 3

- 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.

Please contact Allicia Lam at (202) 551-3316 or Timothy Buchmiller, Senior Attorney, at (202) 551-3635 with any questions.

Sincerely,

Russell Mancuso
Branch Chief