

Microchip Industry Strives to Perfect Its Timing

December 8 2004

Time is money, especially to the semiconductor industry. Electronics manufacturers use extremely sophisticated equipment to churn out the latest microchips, but they have a timing problem. It's very difficult to get all the fabrication tools in a manufacturing line to agree on the time. Components within a single tool can disagree on the time by as much as two minutes, because of a lack of synchronization.

According to a new report by the National Institute of Standards and Technology (NIST) and International SEMATECH,* the timing deficiencies will become important as device dimensions and tolerances continue to shrink. In particular, timing becomes critical as firms advance e-manufacturing concepts such as real-time automation and intelligent control.

Tools can be synchronized to about 100 millisecond (ms) accuracies today, but with significant variations. The problems are myriad, according to the report. For instance, subsystems made by suppliers may lack the interfaces needed to synchronize their clocks with host clocks made by original equipment manufacturers. Quality control software that relies on time stamps to diagnose processing errors may overload the computing resources of fabrication systems, therefore degrading the time stamp accuracy. There also is pressure to move forward: Methods are available to reach 1 ms accuracy in the near future, but sub-millisecond accuracies will be required eventually.

To help achieve that level of precision, NIST is leveraging its timekeeping expertise to support the industry's development of time

synchronization standards in collaboration with International SEMATECH's e-Manufacturing initiatives. A next-generation time synchronization protocol under development by the Institute of Electrical and Electronics Engineers should improve the outlook, and NIST has developed educational presentations and white papers to summarize the key issues and potential solutions. In addition, NIST plans to facilitate future standards development, possibly under a new Time Synchronization Working Group, chartered by Semiconductor Equipment Materials International.

*Ya-Shian Li and Brad Van Eck. 2004. Semiconductor Factory and Equipment Clock Synchronization for e-Manufacturing. International SEMATECH Manufacturing Initiative, NISTIR 7184.

Source: NIST

Citation: Microchip Industry Strives to Perfect Its Timing (2004, December 8) retrieved 25 April 2024 from <https://phys.org/news/2004-12-microchip-industry.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.