

Banquet Speech



Moore's Law is Unconstitutional

Walden C. Rhines

Chief Executive Officer

and

Chairman of the Board of Directors

Mentor Graphics

Abstract

Moore's Law is the empirical observation that component density and performance of integrated circuits approximately doubles every eighteen months. It is not a 'law' in the sense that basic principals of physics and thermodynamics constitute the rules of nature. But there is a 'law' that serves as the basis for Moore's Law; it is the general principle that governs learning curves, i.e. that efficiencies improve a fixed percentage with increases in the total accumulated volume of production, when analyzed on a logarithmic scale. Analyzing current trends in integrated circuit technology reveals the potential left to achieve performance, reliability and cost improvements via the traditional means of shrinking design rules and increasing die and wafer size. It also suggests where non-traditional innovation is likely to have its greatest impact. Dr. Rhines will explore these projections for future technology and suggest where the discontinuities are most likely to occur.

Prior to joining Mentor Graphics in October 1993, Walden Rhines was executive vice president of Texas Instruments' (TI) Semiconductor Group, sharing responsibility for TI's component, consumer products and materials, and controls businesses. He was directly responsible for TI's worldwide semiconductor business. Rhines joined TI in 1972 and held a variety of technical and business management positions, primarily in the Semiconductor Group, but also in the Consumer Products Division, Central Research Laboratories and Data Systems Group. From 1985 to 1987, he was president of the Data Systems Group. During his career at TI, Rhines was responsible for development of products including TI's first speech synthesis devices (used in "Speak & Spell") and the TMS 320 family of digital signal processors. He managed TI's microprocessor and application specific integrated circuit (ASIC) business from less than \$10 million in annual revenue to nearly \$2 billion. He served as chairman of the Semiconductor Technical Advisory

Committee of the Department of Commerce, as an executive committee member of the board of directors of the Corporation for Open Systems, as a board member of the Computer and Business Equipment Manufacturers' Association (CBEMA), and a board member of Sematech. He serves on the board of directors of the Electronic Design Automation Consortium (EDAC), and is a board member of both the Oregon Independent College Foundation and Lewis and Clark College. Rhines holds a bachelor of science degree in metallurgical engineering from the University of Michigan, a master of science and Ph.D. in materials science and engineering from Stanford University, and a master's of business administration from Southern Methodist University. He has also been awarded an Honorary Doctor of Technology degree from Nottingham Trent University.