

Embedded Test and Measurement Critical for Deep Submicron Technology

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The embedded test and measurement (ETM) technology has been known in the past by its various other names such as Built-In Test Equipment (BITE), Built-In Test (BIT), Built-In Self-Test (BIST), and Self-Test. However, with deep submicron technology, the comprehensive nature and completeness with which the ETM technology can be implemented goes far beyond the scope that its predecessor had planned considered. It is becoming clear that the ETM technology will be a “must have” technology that will be required to enable the continued growth of the electronics industry.

The basic idea of embedding a test or measurement functionality within the device that is being tested or measured is very simple and borrows, in fact, from nature itself. Practically all life forms are equipped with self-testing, self-measuring and even self-diagnosis and self-repairing capabilities. It is obvious that the evolution process was not based on the availability of external equipment. On the other hand, from day one the entire electronics industry has evolved with the assumption that the only way to do cost effective testing and measurement is to use external equipment. While the assumption made complete sense until very recently, the complexity and opportunities offered by the deep submicron technology not only dictate that the external equipment is too expensive and cumbersome, but also that adequate and cost-effective testing and measurement is impossible without some form of ETM.

Some of the key factors responsible for driving the shift to ETM and away from external test and measurement are: at-speed testing, the emerging silicon-on-a-chip methodology, time-to-market, the wide use of embedded memories, better defect coverage for higher quality parts and cost. Also critical are issues such as vertical disintegration of the electronics industry, increased consumerism of electronic products, and increased dependence on reliability of telecommunication, control and computers in the our daily lives.

Basic research in the ETM technology in the last twenty years has created solutions that are robust and cost effective. This symposium is a prime example of how far the ETM technology has come. The emerging industry to commercialize the ETM technology will create great opportunities for all researchers in this area.