

Synchronization Design for Digital Systems

Synchronization is one of the important issues in digital system design. While other approaches have always been intriguing, up until now synchronous operation using a common clock has been the dominant design philosophy. However, we have reached the point, with advances in technology, where other options should be given serious consideration. This is because the clock periods are getting much smaller in relation to the interconnect propagation delays, even within a single chip and certainly at the board and backplane level. To a large extent, this problem can be overcome with careful clock distribution in synchronous design, and tools for computer-aided design of clock distribution. However, this places global constraints on the design, making it necessary, for example, to redesign the clock distribution each time any part of the system is changed. In this book, some alternative approaches to synchronization in digital system design are described and developed. We owe these techniques to a long history of effort in both digital system design and in digital communications, the latter field being relevant because large propagation delays have always been a dominant consideration in design. While synchronous design is discussed and contrasted to the other techniques in Chapter 6, the dominant theme of this book is alternative approaches.

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