

Comprehensive treatment of communication, synchronization,
and scheduling for embedded multiprocessors in...

Embedded Multiprocessors

Scheduling and Synchronization

(Signal Processing and Communications Series/3)*

Sundararajan Sriram,
Texas Instruments, Inc., Dallas, Texas

Shuvra S. Bhattacharyya,
University of Maryland at College Park

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From the Foreword...

"...The intellectual content in this book is high. While some of the methods it describes are relatively simple, most are quite sophisticated. Yet examples are given that concretely demonstrate how these concepts can be applied in practical hardware architectures. Moreover, there is very little overlap with other books on parallel processing. The focus on application-specific processors and their use in embedded systems leads to a rather different set of techniques. **I believe that this book defines a new discipline.** It gives a systematic approach to problems that engineers have been able to face only in an ad hoc way before."

—Edward A. Lee

Department of Electrical Engineering and Computer Sciences,
University of California at Berkeley

Application specific, embedded multiprocessors are increasingly found today in high-performance communications and multimedia systems such as cellular phones and base stations, high-speed modems, set-top boxes, and switches in high-speed networks. Systematic design and analysis of such embedded multiprocessors is becoming a very important research area in industry and academia.

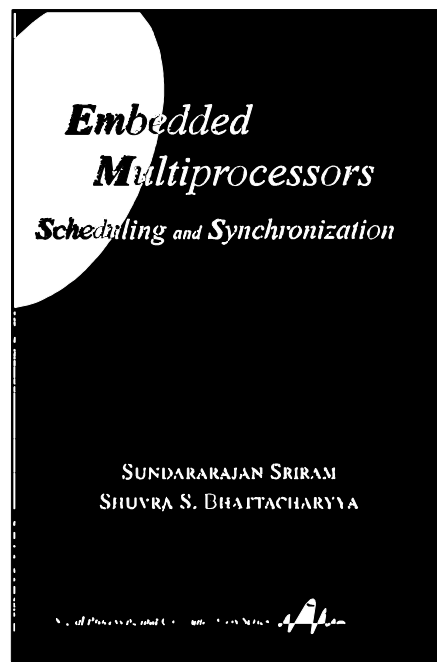
This book focuses on the incorporation of **interprocessor communication costs** into multiprocessor **scheduling** decisions, **modeling and analysis** of multiprocessor system performance, and the application of the *synchronization graph* model to the **development of hardware and software** that can significantly reduce interprocessor communication overhead.

Works out details of associated algorithms with practical examples!

Reviewing important research in key areas related to multiprocessor implementation for embedded systems, *Embedded Multiprocessors*

- ❖ tackles traditional problems by proposing **solutions** that incorporate **cost models** of embedded multiprocessor systems
- ❖ highlights a variety of useful techniques employed in multiprocessor **scheduling strategies**
- ❖ examines **parallel software** from the perspective of signals
- ❖ identifies abstractions that work well for the **joint design** of embedded hardware and software
- ❖ analyzes research from related fields, including **theoretical computer science, compiler design, digital communications, and VLSI signal processing**
- ❖ and more!

Embedded Multiprocessors is a one-of-a-kind single-source **reference** indispensable for electrical and electronics, computer, communications, signal processing, and microprocessing engineers, and upper-level undergraduate and graduate students in these disciplines.



C O N T E N T S

Introduction
Application-Specific Multiprocessors
Background Terminology and Notation
Multiprocessor Scheduling Models
IPC-Conscious Scheduling Algorithms
The Ordered-Transactions Strategy
Analysis of the Ordered Transactions Strategy
Extending the OMA Architecture
Synchronization in Self-Timed Systems
Resynchronization
Latency-Constrained Resynchronization
Integrated Synchronization Optimization
Future Research Directions
Bibliography

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[Sundararajan Sriram](#), *Texas Instruments, Inc., Dallas, Texas*, and [Shuvra S. Bhattacharyya](#), *University of Maryland, College Park*

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description:

Reviews research in **three key areas** related to handling interprocessor communications in multiprocessor multimedia systems: the incorporation of interprocessor communication costs into multiprocessor scheduling decisions; a modeling methodology called the "synchronization graph," for multiprocessor system performance analysis; and the application of the synchronization graph model to the development of hardware and software optimizations that can reduce the interprocessor communication overhead of a given schedule. With a foreword by **Prof. Edward A. Lee**, University of California, Berkeley.

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