PREFACE:
HIGH SPEED DESIGN TECHNIQUES

High speed integrated circuits, both analog, digital, and mixed-signal are used in all types of electronic equipment today. This book examines high speed *linear* ICs both from the theoretical and practical application point of view.

Figure P.1 shows some of the typical applications for high speed integrated circuits by market segment. Many applications can be filled using standard linear IC products, while others may be better served with specially designed chipsets (see Figure P.2).

All of these high speed linear ICs depend upon a broad base of high speed core competencies shown in Figure P.3. Analog Devices has been a leader in real-world signal processing for over 30 years and has the required expertise in each critical competency area. Regardless of how complex or highly integrated mixed-signal ICs may become, there is no escaping the requirement for these basic building blocks.

An understanding of these building blocks is required for the customer to successfully specify, select, and apply new high speed products at the system level. While a detailed knowledge of the internal circuits is not required, an overall understanding of the operation of the devices is critical to success.

This book is not intended to be a system design manual. Instead, it covers the theory and application of many high speed analog signal processing building blocks such as amplifiers, ADCs, DACs, etc. System applications are presented when they are of broad general interest or illustrate emerging market trends.

The proper application of high speed devices also requires a thorough knowledge of good hardware design techniques, such as simulation, prototyping, layout, decoupling, and grounding. The last section in the book focuses on these issues as well as EMI and RFI design considerations.

HIGH SPEED PRODUCTS: TYPICAL APPLICATIONS

VIDEO	IMAGING	COMMUNICATIONS	INSTRUMENTATION
◆ Cameras	◆ Medical	◆ Cellular: 　　Broadband 　　Narrowband	◆ Oscilloscopes
◆ Mixing	◆ Scanners	◆ Direct Broadcast 　　Satellite	◆ Spectrum 　　Analyzers
◆ Distribution	◆ Copiers	◆ Hybrid Fiber Coax 　　(HFC)	◆ Frequency 　　Synthesizers
◆ Video 　　Conferencing	◆ Lasers	◆ CATV	◆ Automatic Test 　　Equipment
◆ Displays	◆ CCD	◆ ADSL/HDSL	◆Data Acquisition
◆ MPEG Systems	◆Radar/Sonar	◆ Data Recovery and 　　Retiming	

ADI HIGH SPEED INTEGRATED / CHIPSET SOLUTIONS

■　Cellular Communications: GSM, DECT,
　AMPS, PCS, etc. (Handsets and Basestations)

■　ADSL/HDSL

■　CCD Imaging

■　Video Signal Processing (MPEG, etc.)

■　Fiber Optic and Disk Drive Data Recovery

■　Direct Broadcast Satellite Receivers

■　High Speed Modems

■　Multimedia Sound and Video Processing

CORE COMPETENCIES: "DC TO LIGHT"

- **Amplifiers:**
  Op Amps, VCAs, PGAs, Log Amps,
  Sample-and-Hold Amplifiers

- **Switches and Multiplexers**

- **Analog-to-Digital Converters (ADCs)**

- **Digital-to-Analog Converters (DACs)**

- **Analog Signal Processing**
  Multipliers, RMS-DC Converters, etc.

- **RF/IF Signal Processing**

- **DSP**

**ANALOG
DEVICES**

P.3