Semiconductor Business Model:
Past Present and Future

10 October 1998

Introduction

- The Semiconductor business has changed over the years and continues to do so

- How do these changes affect doing business with or as a semiconductor company?

- How do these changes present business opportunities?

Overview

- I will be discussing the Semiconductor Business model as it has evolved. I will break the history into phases starting with Phase 0. The phase terminology only relates to the starting time in history. You can have a Phase 0 for all time.

- Then I will discuss some of the ways to play in Semiconductor business environment.

Semiconductor Business
Phase 0-The "do it all" model

- Marketing

- Design

- CAD

- FAB (custom processes)

- Package and Test

- Sales

Phase 0 Skill Set

- Marketing and sales
- System design (e.g., HDSL transceiver)
- Circuit design (e.g., A/D converter)
- CAD
- Device design (e.g., MOSFET)
- Device modeling/tracking
- FAB development and manufacturing
- Debugging skills and facilities (e.g., engr probe station)
- Packaging engineering
- Product engineering
- Test engineering

Intellectual Property

- Have
  - Marketing
  - System-level algorithms
  - Circuit design blocks and techniques
  - Manufacturing recipes
  - Packaging technology
- Need
  - Nothing

Phase 1 Skill Set

- Marketing and Sales

- System design

- Circuit design

- CAD

- Debugging skills and facilities (e.g., engr probe station)

- Test engineering

Intellectual Property

- Have
  - Marketing
  - System-level algorithms
  - Circuit design blocks and techniques
- Need
  - FAB (the IP imbedded in a FAB)

Semiconductor Business History Phase 2

- Marketing

- System Design (behavioral only)

- ~~FAB~~

- ~~Package and Test~~

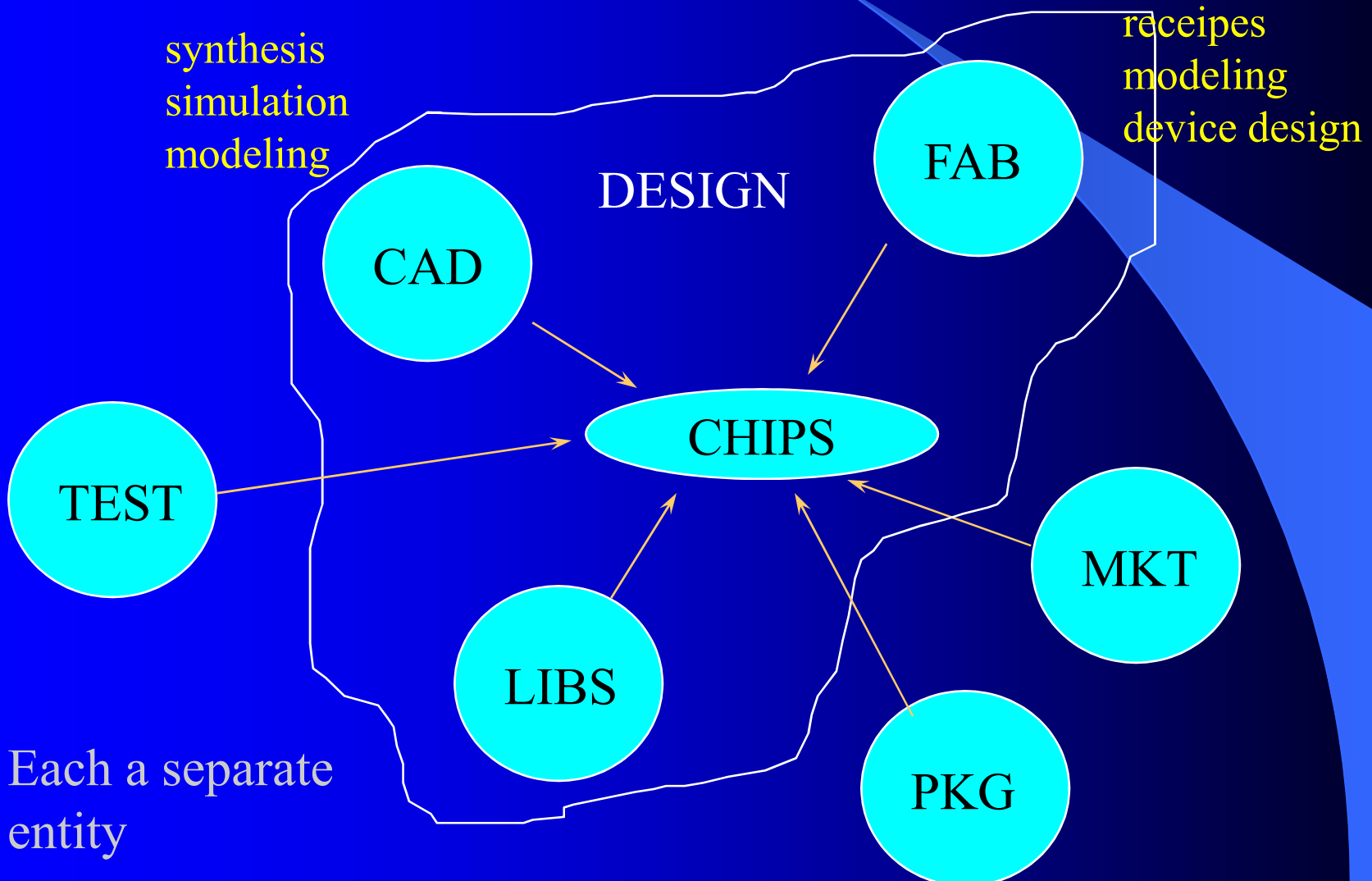- Sales

or perhaps a board-level design

Phase 2 Skill Set

- System design

- Board-level skills perhaps

- Behavioral design language (e.g. VHDL)

Intellectual Property

- Have
  - Market
  - System-level algorithms
- Need
  - Circuit blocks/libraries

Semiconductor Business Phase 3

synthesis
simulation
modeling

receipes
modeling
device design

DESIGN

FAB

CAD

CHIPS

TEST

MKT

LIBS

PKG

Each a separate entity

Phase 4??

- I believe that in the future, the way we design ICs will parallel the way we design PWBs today.

- As companies provide packaged functions today, they will provide unpackaged functions tomorrow.

When Phase 4?

- Phase 4 cannot happen in a large way until there is an agreed-upon methodology to apply cells/blocks/cores just as we do with packaged units today.

Making Money

- There is money to be made addressing any one of the functions illustrated.

- The function you choose to develop a business in depends, in part, what you think is interesting (fun?).