Brad's First Connx Book

Collection Editor:
Brad Felix

Brad's First Connx Book

Collection Editor:
Brad Felix

Authors:

Elizabeth Bartmess
Connexions
Patrick Frantz
Debbie Gulick
Cheryl Matherly
Jana Mills
Bill Wilson

Online:
< http://cnx.org/content/col10511/1.1/ >

C O N N E X I O N S

Rice University, Houston, Texas

This selection and arrangement of content as a collection is copyrighted by Brad Felix. It is licensed under the Creative Commons Attribution 2.0 license (http://creativecommons.org/licenses/by/2.0/).
Collection structure revised: January 21, 2008
PDF generated: October 26, 2012
For copyright and attribution information for the modules contained in this collection, see p. 7.

Table of Contents

1 Chapter 1

1.1 1: Concepts of Information Technology . . . 1
1.2 Section 1 for Chap 1 . . . 1
1.3 The Technology Behind the Connexions Roadmap . . . 1

2 Introduction to IC Manufacturing Technology . . . 3
Index . . . 6
Attributions . . . 7

Chapter 1

Chapter 1

1.1 1: Concepts of Information Technology[1]

This module includes the basics and theories of ICT, including types of computer, networks, how, why and who people access informaiton using ICT. This module is the first under the ECDL (AKA ICDL) qualification, written for Windows XP and Office 2003.

1.2 Section 1 for Chap 1

1.2.1 Subsection Test

1.2.1.1 Sub-subsection Test

1.2.1.1.1 Sub-sub-sub section test with longer name

1.2.1.1.1.1 Leadership[2]

This is a module about leadership.

1.3 The Technology Behind the Connexions Roadmap[3]

NOTE: This module has been retired as it contained Connexions documentation which is no longer accurate and/or relevant. Please visit the help page[4] for up-to-date information about the Connexions website, including support for viewing and authoring content and the CNXML language. If you have any additional questions or cannot find the answer to your question, please contact techsupport@cnx.org[5] and we will be happy to assist in any way we can.

[1] This content is available online at <http://cnx.org/content/m13549/1.1/>.
[2] This content is available online at <http://cnx.org/content/m12430/1.3/>.
[3] This content is available online at <http://cnx.org/content/m10341/2.5/>.
[4] http://cnx.org/help
[5] techsupport@cnx.org

Chapter 2

Introduction to IC Manufacturing Technology[1]

It would probably be interesting to spend a little time seeing how integrated circuits are made. This chapter will be long on description, and rather short on equations (yay!). This is not to say that there is not a lot of analytical work in the IC fabrication process. It's just that things get **very** complicated in a hurry, and so we probably are better off just looking at most processes from a qualitative point of view.

Let's start out by taking a look at the state of the industry, and remark on a few trends. Figure 2.1 is a plot of IC sales in the United States over the past 30 years. This might not be a bad field to get into! Maybe there will be a job or two out there when you are ready to graduate.

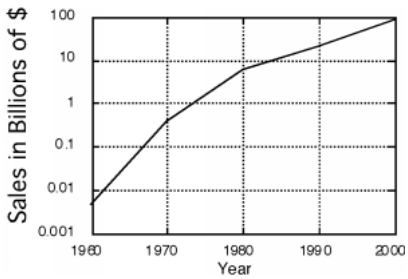

Figure 2.1: Growth of IC Business

There has been a steady shift away from bipolar technology to MOS as is shown in Figure 2.2. Currently, about 90% of the market is composed of MOS devices, and only about 10% of bipolar. This is likely to be the case for some time to come. The change in slope, where MOS starts taking over from bipolar at a more rapid rate about 1987 is when CMOS technology really started to come into heavy use. At that point, bipolar TTL logic essentially faded to zero.

[1] This content is available online at <http://cnx.org/content/m1032/2.9/>.

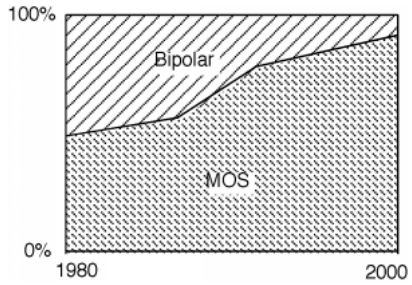

Figure 2.2: Percentage of Business

As you probably are aware, devices have been getting smaller and smaller, and chips have been getting bigger and bigger with time. A most impressive plot (Figure 2.3) is one which shows the number of components/chip as a function of time.

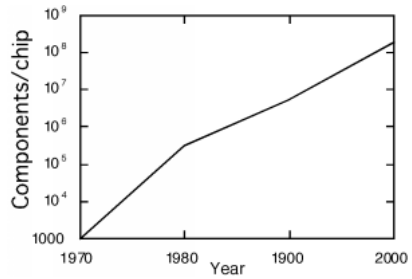

Figure 2.3: Number of transistors/chip

One of the main drivers for this has been feature size, which shows the same nearly exponential behavior as components/chip. This is plotted in Figure 2.4 for your education. What is interesting to note about this is that certain "doom sayers" have been predicting an abrupt halt to this curve for some time now. It stands to reason that you can not image something which is finer than λ, the wavelength of the light you use to project it with. However, by going to the ultraviolet, and using a variety of image enhancing techniques, lithographic engineers continue to be able to make finer and finer structures.

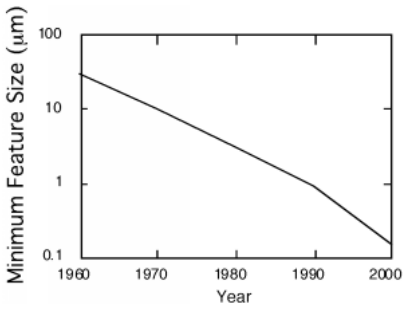

Figure 2.4: Feature size with time

Index of Keywords and Terms

Keywords are listed by the section with that keyword (page numbers are in parentheses). Keywords do not necessarily appear in the text of the page. They are merely associated with that section. *Ex.* apples, § 1.1 (1) **Terms** are referenced by the page they appear on. *Ex.* apples, 1

B basics, § 1.1(1)

C concepts, § 1.1(1)

I IC, § 2(3)
integrated circuits, § 2(3)

L Leadership, § 1.2.1.1.1.1(1)

M mozilla, § 1.3(1)

R roadmap, § 1.3(1)

X xul, § 1.3(1)

Attributions

Collection: *Brad's First Connx Book*
Edited by: Brad Felix
URL: http://cnx.org/content/col10511/1.1/
License: http://creativecommons.org/licenses/by/2.0/

Module: "1: Concepts of Information Technology"
By: Jana Mills
URL: http://cnx.org/content/m13549/1.1/
Page: 1
Copyright: Jana Mills
License: http://creativecommons.org/licenses/by/2.0/

Module: "Leadership"
By: Debbie Gulick, Patrick Frantz, Cheryl Matherly
URL: http://cnx.org/content/m12430/1.3/
Page: 1
Copyright: Debbie Gulick, Patrick Frantz, Cheryl Matherly
License: http://creativecommons.org/licenses/by/1.0

Module: "The Technology Behind the Connexions Roadmap"
By: Elizabeth Bartmess, Connexions
URL: http://cnx.org/content/m10341/2.5/
Page: 1
Copyright: Elizabeth Bartmess
License: http://creativecommons.org/licenses/by/1.0

Module: "Introduction to IC Manufacturing Technology"
By: Bill Wilson
URL: http://cnx.org/content/m1032/2.9/
Pages: 3-5
Copyright: Bill Wilson
License: http://creativecommons.org/licenses/by/1.0

Brad's First Connx Book
This is the summary of my first book published within Rhaptos

About Connexions
Since 1999, Connexions has been pioneering a global system where anyone can create course materials and make them fully accessible and easily reusable free of charge. We are a Web-based authoring, teaching and learning environment open to anyone interested in education, including students, teachers, professors and lifelong learners. We connect ideas and facilitate educational communities.

Connexions's modular, interactive courses are in use worldwide by universities, community colleges, K-12 schools, distance learners, and lifelong learners. Connexions materials are in many languages, including English, Spanish, Chinese, Japanese, Italian, Vietnamese, French, Portuguese, and Thai. Connexions is part of an exciting new information distribution system that allows for **Print on Demand Books**. Connexions has partnered with innovative on-demand publisher QOOP to accelerate the delivery of printed course materials and textbooks into classrooms worldwide at lower prices than traditional academic publishers.