# Digital System Implementation
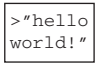
A

## A.1   INTRODUCTION

This appendix introduces practical issues in the design of digital systems. The material is not necessary for understanding the rest of the book, however, it seeks to demystify the process of building real digital systems. Moreover, we believe that the best way to understand digital systems is to build and debug them yourself in the laboratory.

Digital systems are usually built using one or more chips. One strategy is to connect together chips containing individual logic gates or larger elements such as arithmetic/logical units (ALUs) or memories. Another is to use programmable logic, which contains generic arrays of circuitry that can be programmed to perform specific logic functions. Yet a third is to design a custom integrated circuit containing the specific logic necessary for the system. These three strategies offer trade-offs in cost, speed, power consumption, and design time that are explored in the following sections. This appendix also examines the physical packaging and assembly of circuits, the transmission lines that connect the chips, and the economics of digital systems.

*The rest of this chapter is available online as a downloadable PDF from the book's companion site: http://booksite.elsevier.com/9780128000564.*



533