

ART OF EMBEDDED SYSTEM DESIGN

Bobby

February 8, 2018

In these book, I will summerize all I know about the embedded system, and give some practical electronic designs what I have done in my career. Also, I want to improve the ability of using \LaTeX by myself. This book is in the public domain. All the copyrights are under GPL 2.0. Thanks all for your attentions! All the materials are from books, internet, etc. I will list as much references as possible, but I am not sure that I can list all. For any improper or defects, your suggurestions are warmly welcomed.

Best Regards!

Contents

I	Physics	1
1	Solid state physics	3
2	Semiconductor physics	5
II	Circuit basics	7
3	Circuit	9
III	Analog circuit	11
IV	Analog VLSI design	13
4	Current source	15
5	Current mirror	17
6	Differential amplifier pair	19
7	OP AMP design	21
V	Digital circuit	23
8	Finite state machine	25

VI	Analog digital converter	27
VII	Verilog HDL	29
VIII	Digital VLSI	31
9	CPU design	33
IX	PCB design	35
X	PCB SI&PI	37
XI	C and C++ programming	39
XII	Data structure and algorithms	41
XIII	Computer orgnization	43
XIV	Computer architecture	45
XV	Operating system	47
XVI	Linux administration	49
XVII	Linux kernel	51
XVIII	Linux driver development	53
XIX	Linux system porting	55
10	Buildroot	57

CONTENTS	v
XX Computer Network	59
11 TCP/IP protocols	61
12 Socket programming	63
XXI Signal and system	65
XXII Ditial signal processing	67
XXIII Digital image processsing	69
XXIV Audio signal processing	71
XXV Modal analysis	73
XXVI Project Development	75
XXVII Appendix	77
13 Basic mathimatics	79
13.1 Formulas	79
XXVIII References	81
14 References	83

Part I

Physics

Chapter 1

Solid state physics

In this chapter, will discuss the solid state physics, mainly about the basic fundamentals.

$$a + b + c = b + c + a$$

Chapter 2

Semiconductor physics

Table 2.1:

11	1	12	4	6

Table2.1 indicate that

The universe is immense and it seems to be homogeneous, in a large scale, everywhere we look at.

furnished his toy with a romantic legend about a much larger "Tower of Brahma", which supposedly has 64 disks of pure gold Gold —wow.

Are our disks made of concrete? resting on three diamond needles. At the beginning of time, he said, "God" placed these golden disks on the first needle and ordained that a group of priests should transfer them to the third, according to the rules above. The priests reportedly work day and night at their task. When they finish, the Tower will crumble and the world will end.

resting on three diamond needles. At the beginning of time, he said, "God" placed these golden disks on the first needle and ordained that a group of priests should transfer them to the third, according to the rules above. The priests reportedly work day and night at their task. When they finish, the Tower will crumble and the world will end.

Table2.1 is stupid and in the coming

This is my key2. This is my second palace that has a key.

bibliography
greenwade93 [1]
greenwade93 [2]
carbon nanotube [3]
carbon [4]
transistors [5]

Part II

Circuit basics

Chapter 3

Circuit

A balanced circuit is circuitry for use with a balanced line or the balanced line itself. Balanced lines are a common method of transmitting many types of electrical communication signals between two points on two wires. In a balanced line the two signal lines are of a matched impedance to help ensure that interference induced in the line is common-mode and can be removed at the receiving end by circuitry with good common-mode rejection. To maintain the balance, circuit blocks which interface to the line, or are connected in the line, must also be balanced

Part III

Analog circuit

Part IV

Analog VLSI design

Chapter 4

Current source

$$\frac{d}{dx}(\text{int}_0^x f(u) \, du) = f(x)$$



Figure 4.1:

Chapter 5

Current mirror

Chapter 6

Differential amplifier pair

Chapter 7

OP AMP design

Part V

Digital circuit

Chapter 8

Finite state machine

Part VI

Analog digital converter

Part VII

Verilog HDL

Part VIII

Digital VLSI

Chapter 9

CPU design

Part IX

PCB design

Part X

PCB SI&PI

Part XI

C and C++ programming

Part XII

Data structure and algorithms

Part XIII

Computer organization

Part XIV

Computer architecture

Part XV

Operating system

Part XVI

Linux administration

Part XVII

Linux kernel

Part XVIII

Linux driver development

Part XIX

Linux system porting

Chapter 10

Buildroot

Part XX

Computer Network

Chapter 11

TCP/IP protocols

Chapter 12

Socket programming

Part XXI

Signal and system

Part XXII

Digital signal processing

Part XXIII

Digital image processing

Part XXIV

Audio signal processing

Part XXV

Modal analysis

Part XXVI

Project Development

Part XXVII

Appendix

Chapter 13

Basic mathematics

13.1 Formulas

$$a + b = b + a$$

appendix test

Part XXVIII

References

Chapter 14

References

`www.baidu.com`

`www.github.com`

`www.google.com`

Bing

This is my key. This is my second palace that has a key.

By default, where appropriate, citations are abbreviated automatically after the first reference when bibliographies are produced by BibT E X. Provision is also made for this feature to be accessed during manual coding

Index

appropriate, 84

common-mode, 9

feature, 84

impedance, 9

key, 84

 palace, 84

key2, 5

palace, 5

Bibliography

- [1] G. D. Greenwade, “The Comprehensive Tex Archive Network (CTAN),” TUGBoat, vol. 14, no. 3, pp. 342–351, 1993.
- [2] ba, “cc,” ef.
- [3] D. R. Dreyer, S. Park, C. W. Bielawski, and R. S. Ruoff, “The chemistry of graphene oxide,” Chemical Society Reviews, vol. 39, no. 1, pp. 228–240, 2010.
- [4] A. K. Geim and K. S. Novoselov, “The rise of graphene,” Nature Materials, vol. 6, no. 3, pp. 183–191, 2007.
- [5] K. S. Novoselov, A. K. Geim, S. V. Morozov, D. Jiang, M. I. Katsnelson, I. V. Grigorieva, S. V. Dubonos, and A. A. Firsov, “Two-dimensional gas of massless dirac fermions in graphene,” Nature, vol. 438, no. 7065, pp. 197–200, 2005.