

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
III	Analog circuit	9
IV	Analog VLSI design	11
3	Current source	13
4	Current mirror	15
5	Differential amplifier pair	17
6	OP AMP design	19
V	Digital circuit	21
7	Finite state machine	23

VI	Analog digital converter	25
VII	Verilog HDL	27
VIII	Digital VLSI	29
8	CPU design	31
IX	PCB design	33
X	PCB SI&PI	35
XI	C and C++ programming	37
XII	Data structure and algorithms	39
XIII	Computer orgnization	41
XIV	Computer architecture	43
XV	Operating system	45
XVI	Linux administration	47
XVII	Linux kernel	49
XVIII	Linux driver development	51
XIX	Linux system porting	53
9	Buildroot	55

XX	Computer Network	57
10	TCP/IP protocols	59
11	Socket programming	61
XXI	Signal and system	63
XXII	Ditial signal processing	65
XXIII	Digital image processsing	67
XXIV	Audio signal processing	69
XXV	Modal analysis	71
XXVI	Project Development	73
XXVII	Appendix	75
12	Basic mathimatics	77
12.1	Formulas	77
XXVIII	References	79
13	References	81

Part I

Physics

Chapter 1

Solid state physics

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

Chapter 2

Semiconductor physics

Table 2.1:

11	1	12	4	6

Table 2.1 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.

Part II

Circuit basics

Part III

Analog circuit

Part IV

Analog VLSI design

Chapter 3

Current source

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



Figure 3.1:

Chapter 4

Current mirror

Chapter 5

Differential amplifier pair

Chapter 6

OP AMP design

Part V

Digital circuit

Chapter 7

Finite state machine

Part VI

Analog digital converter

Part VII

Verilog HDL

Part VIII

Digital VLSI

Chapter 8

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 9

Buildroot

Part XX

Computer Network

Chapter 10

TCP/IP protocols

Chapter 11

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 12

Basic mathematics

12.1 Formulas

$$a + b = b + a$$

appendix test

Part XXVIII

References

Chapter 13

References

`www.baidu.com`
`www.github.com`
`www.google.com`
Bing