## Index

### A
- acquisition 30
- alternating current (AC) 157
- Amplitude Modulated (AM) 158
- analog circuits 169
- analog, limiting factor 92
- analog-to-digital converter (ADC) 170
- Apollo spacecraft computer 172
- Application Service Provider (ASP) 30
- architecture 25
- ASIC 11
- ASIC Architectures 27
- ASIC engineer 10
- atoms and electrons 154
- Automatic Test Pattern Generation (ATPG) 135
- Avant! 34

### B
- backward compatibility 51
- big numbers 103
- binary 169
- block diagram description 105
- block-based 75
- bottom-up 75
- boundary scan 114
- buffer circuit 128
- buffers 130
- Built-in Self Test (BIST) 114
- buying EDA tools 52

### C
- CAD, CAM, CAE, and EDA 4
- capacitance 157
- capacitors 158
- catastrophic error 96
- central processing unit (CPU) 172
- Chip-to-Chip Differences 146
- circuit design 100
| clocks | 112 |
| Complementary MOS (CMOS) | 159 |
| computer network | 42 |
| computer networks | 43 |
| conductors | 155 |
| control logic | 103 |
| coordinating design groups | 41 |
| cost/performance | 47 |
| co-verification | 94 |
| crosstalk | 158 |
| designing | 74 |
| device modeling | 100 |
| DFM trends | 146 |
| diagnostic testing | 134 |
| Did You Know? |
| “lint” checker | 107 |
| analog, limiting factor | 92 |
| Apollo spacecraft computer | 172 |
| big numbers | 103 |
| catastrophic error | 96 |
| clocks | 112 |
| coordinating design groups | 41 |
| delay | 128 |
| dis-integration | 191 |
| EDA industry | 18 |
| EDA research support | 23 |
| EDA workstations | 47 |
| go/no-go tests | 135 |
| hardware description language (HDL) | 104 |
| IC error | 14 |
| integrated/dis-integrated differences | 192 |
| Intellectual Property (IP) | 88, 193 |
| IP theft | 45 |
| laptop security | 44 |
| layout plots | 126 |
| leading product company | 28 |
| learning process | 50 |
| licenses, universities | 59 |
| manhattan routing | 125 |
| Moore’s Law | 19 |
| platform | 199 |
| Printed Circuit | 2 |
| programming language | 144 |
| silicon | 3 |
| Simulation Program for Integrated Circuits Emphasis (SPICE) | 111 |
Index

SoC definition 198
  testing 114
  validation 74, 91
  verification 74, 91
VHDL 104
digital circuits 169
digital-to-analog converter (DAC) 170
direct current (DC) 157
dis-integration 191
distributed design 143
dynamic timing analysis (DTA) 111

E
EDA industry 18
EDA research 23
EDA staff 58
EDA tool use, overall sequence 66
EDA user 21
EDA vendor 22
EDA workstations 47
EDIF (Electronic Design Interchange Format) 55
electrical current 156
Electrical Rule Checking (ERC) 127
electromagnetic compatibility (EMC) 131
electromagnetic waves 158
Electronic Product Development 6
electronic product hierarchy and EDA 190
embedded system 95
EMI noise 131
ESD 133
ESL design tools 66
executable specification 143
extraction tools 128

F
Field Programmable Gate Arrays (FPGAs) 26
floorplanning 122, 123
Formal Verification 145
Formal Verification tools 108, 110
framework 56
Frequency Modulation (FM) 158
front-end IC design tools 67

G
gate arrays 25
go/no-go tests 135

H
hardware description language 103–105
hardware emulation 94
hardware simulation 94
hardware/software co-design 94
hardware/software Integration 93
hierarchy example 73

I
IC architectures 77
IC error 14
IC layout designers 5
IC logic designers 5
IC test machines 165
IC wiring 13
inductance 157
inductors 158
insulators 155
Integrated Circuit 4
integrated circuit fabrication 163
integrated/dis-integrated differences 192
Intellectual Property (IP) 44, 88, 193
IP business models 194
IP theft 45
IT department 46

L
lack of tool interface standards 54
laptops 44
layout 12
layout plots 126
layout styles 124
Layout versus Schematic (LVS) 127
leading product 28
learning curve 29
learning process 50
licenses, universities 59
licensing model 29
licensing options 48
“lint” checker 107
logic 9
logic design 102
logic gates 171
Low-Power Design Tools 115
metal migration 131
microcomputers 172
middle-out 75
migration to System-on-Chip 197
mixed signal 169
modeling 86
Moore’s Law 19, 165
MOS transistor 159

N
N-channel MOS transistor 159
netlist 106
new materials and lithography 150
noise margin 130
number abbreviations 177

P
packages 165
partitions 74
P-channel MOS transistor 159
performance design issues 149
photolithography 164
physical design issues 150
physical design tools 68
placement tools 123
platform 199
point tools 79
porting 136
power and thermal design issues 150
power buses 126
Power Estimation Tools 115
Printed Circuit (PC) 2
Printed Circuit Board 3
process shrinks 136
product engineer 135
Index

product engineering tools 135
production tool 23
productivity gap 20
program language vs. hardware description 144
propagation delay 172

R

rapid prototyping 94
real-time 96
Register Transfer Level (RTL) design 103
relative industry revenues 33
reliability 96
requirements specification 84
resistance 157
resistors 158
re-spins 136
re-use issues 195
ROI (Return on Investment) 21, 22
routing styles 125
routing tools 123
run-time control tools 142

S

schematic examples 102
security 44
semiconductor related sizes 179
semiconductors 155
signal 156
Signal Integrity 129
silicon 3
simulation accelerators 110
simulation tools 108
simulator 108
SoC definition 198
SoC Issues 198
Simulation Program for Integrated Circuits Emphasis (SPICE) 111
standard cells 26
standards 55
static and dynamic timing analyzers 91
static electricity 158
Static Timing Analysis (STA) 111, 128
stuck-at faults 134
switching noise 131
synthesis 115
system engineers 5
system-level design languages 86
system-on-chip and IP trends 148

test bench 90
test patterns 107
test vectors 107
testing 114
thermal analysis tools 132
Timing Closure 129
timing closure 113
tool suites 79
top-down 75
total revenue 18
trade-off factors 87
trade-offs 74
transistor circuits 168
troubleshooting 90

U

universities 59
V

validation 74
verification 74, 107
verification and validation 91
verify 74
VHDL 104
virtual prototype 95
voltage 156
Voltage Sensitivity 130

Z

zapped 133