

Contents

Preface **ix**

Part I: Basic Hacks, Tools, and Techniques

A Tour of My Toolbox	2
The Basics	3
1. How to Build a Portable Laptop Power Supply	15
Project Overview	16
Hardware Assembly Instructions	16
Project Demo	21
Extensions	21
Exhibit A: Bill of Materials	22
Exhibit B: Power Pack Schematic	22
2. How to Build an Aquarium Inside a Macintosh	25
Project Overview	26
Hardware Assembly Instructions	26
Project Demo	43
Extensions	43
Exhibit A: Bill of Materials	46
3. How to Hack 802.11b Antennas	49
Project Overview	50
Hardware Assembly Instructions for Recycled Can 802.11b Antenna	50
Hardware Assembly Instructions for Primestar Dish 802.11b Antenna	53
Exhibit A: Bill of Materials for Recycled Can	57
Exhibit B: Bill of Materials for Primestar Dish	57
4. How to Build a PC Water-Cooling System	59
Project Overview	60
Before You Start	60
Hardware Assembly Instructions	61
Project Demo	71
Extensions	71
Resources	73
Exhibit A: Bill of Materials	74

5. How to Hack a Furby(and Other Talking Toys)	75
Project Overview	75
Hardware Assembly Instructions	76
Software Setup Instructions	90
A Quick Overview of Assembly Language and C for the Hacked Furby	92
Project Demo	97
Extensions	97
How to Hack a Generic Talking Toy	98
Project Overview	98
Hardware Assembly Instructions	98
Project Demo	101
Extensions	101
Exhibit A: Furby Bill of Materials	102
Exhibit B: Talking Toy Bill of Materials	103
Exhibit C: Schematic for Building Your Own Board	104
6. How to Hack a Video Periscope for Your Car	107
Project Overview	108
Hardware Assembly Instructions	108
Extensions	116
Exhibit A: Bill of Materials	118
Exhibit B: Schematic Diagram for Power Supply	119
Exhibit C: Schematic Diagram for RC Servo Driver	120

Part II: Advanced Hacks, Tools, and Techniques

How to Identify Resistor Values	122
How to Identify Capacitor Values	123
How to Identify Transistors	126
How to Identify Integrated Circuit and Component Packages	126
How to Identify Connectors	127
How to Read a Manufacturer's Data Sheet	128
How to Use a Plug Board to Create a Simple Circuit	129
Summary	131
7. How To Build a Digital Video Recorder	133
Project Overview	134
Hardware Assembly Instructions	134
Software Setup Instructions	135
Project Demo	138
Extensions	139
Exhibit A: Bill of Materials	141
Exhibit B: Dedicated IR Remote Control Support Files	142
8. How to Hack a Building-Size Display	149
Project Overview	150
Small-Scale Hardware Assembly Instructions	150
Large-Scale Hardware Assembly Instructions	157
Software Setup Instructions	165
Project Demo	167

Wireless Extensions	167
Exhibit A: Small-Scale Bill of Materials	169
Exhibit B: Large-Scale Bill of Materials	170
Exhibit C: Large-Scale Eight-Port Relay Driver	171
Exhibit D: Large-Scale Digital Interface to Relay Driver	172
Exhibit E: Small-Scale LED Driver Schematic, Page 1	173
Exhibit F: Small-Scale LED Driver Schematic, Page 2	174
Exhibit G: Small-Scale LED Driver Schematic, Page 3	175
Exhibit H: Small-Scale LED Driver Schematic, Page 4	176
Exhibit I: Small-Scale LED Driver Schematic, Page 5	177
Exhibit J: Small-Scale LED Driver Schematic, Page 6	178
Exhibit K: Small-Scale Shift Register Schematic	179
Exhibit L: Small-Scale Connectors	180
Exhibit M: Small-Scale LED Wiring	181
9. How to Build a Cubicle Intrusion Detection System	183
Project Overview	184
Hardware Assembly Instructions	185
Project Demo	191
Extensions	191
Exhibit A: Bill of Materials for Laser-Based System	193
Exhibit B: Bill of Materials for Entry Alert-Based System	194
Exhibit C: BasicStamp2 Software	195
Exhibit C: Schematic Diagram for Laser-Based System	197
Exhibit D: Schematic Diagram for Entry Alert-Based System	198
10. How to Build an Internet Toaster	199
Project Overview	200
Some Background First	200
Hardware Assembly Instructions	202
Software Setup Instructions	210
Project Demo	211
Extensions	211
Exhibit A: Bill of Materials	212
Exhibit B: TCU Firmware Code	213
Exhibit C: Schematic Diagram for TCU	216
11. How to Build a Home Arcade Machine	217
Project Overview	218
Hardware Assembly Instructions	218
Troubleshooting	228
Software Instructions	229
Project Demo	230
Extensions	230
Web Links	230
Exhibit A: Bill of Materials	231
Exhibit B: Cabinet Plans	233
Exhibit C: Control Panel Plans	234
Exhibit D: Controls Schematic Diagram	235
12. How to Build a Remote Object Tracker	247

Project Overview	248
Hardware Assembly Instructions	248
Project Demo	256
Extensions	256
Exhibit A: Bill of Materials	258
Exhibit B: Connection Cable Schematic Diagram	259
Exhibit C: Trimate Adapter Schematic Diagram	260
Exhibit D: Gender Changer and Null Modem Schematic	261
13. How to Make RC Cars Play Laser Tag	263
Project Overview	264
Hardware Assembly Instructions	264
Software Setup Instructions	268
Project Demo	272
Extensions	272
Exhibit A: Bill of Materials	276
Exhibit B: RC Car Hack Software Code	277
Exhibit C: RC Car Controller Schematic Diagram	281
Exhibit D: RC Car Radio Transmitter Schematic Diagram	282
14. How to Build a Wearable Computer	279
Project Overview	280
Hardware Assembly Instructions	280
Software Instructions	296
Project Demo	298
Wearable System Examples	299
Exhibit A: Bill of Materials	301
15. How to Build an Internet Coffeemaker	301
Project Overview	302
Hardware Assembly Instructions	302
Software Setup Instructions	308
Project Demo	310
Extensions	311
Exhibit B: Schematic Diagrams	311
Exhibit C: SitePlayer Code	314
A. Schematic Capture Software	321
B. Communication	323
C. Easy-to-Use Microcontroller Boards	327
D. Power Sources	329
E. Resources	335