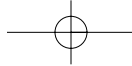


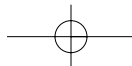
Contents

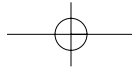
Foreword . . . . .	.xxi
Introduction 2.0 . . . . .	.xxvii
Introduction . . . . .	.xxix
Part I Introduction to Hardware Hacking . . . . .	.1
Chapter 1 Tools of the Warranty-Voiding Trade . . . . .	.3
Introduction . . . . .	.4
The Essential Tools . . . . .	.5
Basic Hardware Hacking . . . . .	.8
Advanced Projects and Reverse Engineering . . . . .	.13
Where to Obtain the Tools . . . . .	.16
Chapter 2 Case Modifications: Building an Atari 2600PC . . . . .	.19
Introduction . . . . .	.20
Choosing Your Features: Why the Atari 2600? . . . . .	.21
Preparing for the Hack . . . . .	.23
Performing the Hack . . . . .	.29
Opening the Case . . . . .	.29
Cleaning the Case . . . . .	.31
Mocking Up the Design . . . . .	.32
Configuring the BIOS . . . . .	.35
Installing Software . . . . .	.36
Preparing the Control Panel . . . . .	.38
Preparing the USB/FireWire Backplane . . . . .	.45
Preparing the Cordless Keyboard/Mouse Receiver . . . . .	.46
Preparing the Stelladaptor 2600 Controller-to-USB Interfaces . . . . .	.51
Preparing the Power Supply Connector . . . . .	.54
Preparing the Mini-ITX Motherboard . . . . .	.56
Preparing the Housing . . . . .	.59
Putting It All Together . . . . .	.67
The CD-ROM Drive . . . . .	.67



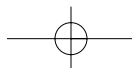
xii Contents

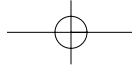
The Motherboard	70
The Hard Drive	71
The PW70 Power Supply Module	72
The USB Components	73
The Control Panel	75
Closing It Up: Completing the Atari 2600PC Case Modification	78
In Conclusion...	82
Resources and Other Hacks	82
Case Modifications on the Web	82
Stuffing PCs into Videogame System Consoles	83
Creating Your Own Portable Game System	83
Parts and Materials	83
Part II Modern Game Consoles	85
Chapter 3 The Xbox	87
Introduction	88
Xbox Hardware and Specifications	89
Xbox Versions	90
Opening the Xbox	92
Preparing for the Hack	92
Performing the Hack	92
Controller Hacks	95
Controller Versions	96
Getting Inside Your Controller	97
Preparing for the Hack	97
Performing the Hack	97
Illuminating the Controller Buttons with LEDs	99
Preparing for the Hack	99
Performing the Hack	99
Under the Hood: How the Hack Works	103
Testing and Troubleshooting	104
Optional Hack: Illuminating the Controller Logo	104
Adding a Remote Reset Switch	104
Adding a Remote Reset Switch to the Xbox Controller	104
Preparing for the Hack	104
Performing the Hack	105



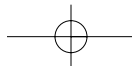


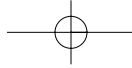
Adding a Remote Reset Switch to the Xbox Controller Memory Card or Xbox Live Communicator	107
Preparing for the Hack	107
Performing the Hack	108
Testing and Troubleshooting	110
Adding an Xbox Live Communicator to a Wireless Controller	111
Preparing for the Hack	111
Performing the Hack	112
Xbox Networking Hacks	112
Establishing a Network Link Using Standard Networking	113
Performing the Hack	114
Testing and Troubleshooting	115
Creating Your Own Crossover Cable	116
Preparing for the Hack	117
Performing the Hack	117
Testing and Troubleshooting	119
Extending the Network Status LEDs to the Front Panel	120
Preparing for the Hack	120
Performing the Hack	120
Testing and Troubleshooting	122
Wireless Networking Hacks	123
Adding a Wireless Networking Adapter to the Xbox	123
Adding a Removable Antenna to the Microsoft Xbox Wireless Adapter	125
Preparing for the Hack	126
Performing the Hack	126
Under the Hood: How the Hack Works	131
Installing a Modchip	131
A Brief Introduction to Modchips	131
Preparing for the Hack	135
Performing the Hack	135
Running Linux on an Unmodified Xbox	141
Preparing for the Hack	141
Performing the Hack	142
Other Hacks	144
Homebrew Game Development	144
Xbox Resources on the Web	146



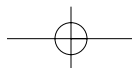


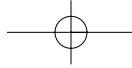
Chapter 4 PlayStation 2	147
Introduction	148
Commercial Hardware Hacking: Modchips	148
Getting Inside the PS2	150
Mainboard Revisions	150
Identifying Your Mainboard	151
Opening the PS2	152
Installing a Serial Port	156
Preparing for the Hack	157
Performing the Hack	158
Testing	164
Under the Hood: How the Hack Works	164
Booting Code from the Memory Card	164
Preparing for the Hack	165
Performing the Hack	165
Preparing TITLE.DB	165
Choosing BOOT.ELF	168
Saving TITLE.DB to the Memory Card	168
Independence!	169
Under the Hood: How the Hack Works	169
Other Hacks: Independent Hard Drives	171
PS2 Technical Details	171
Understanding the Emotion Engine	172
The Serial I/O Port	173
The I/O Processor	175
The Sub-CPU Interface	176
Homebrew Game Development	176
PS2 Resources on the Web	177
Part III Handheld Game Platforms	179
Chapter 5 Nintendo Game Boy Advance	181
Introduction	182
Game Boy, 1989	182
Game Boy Pocket, 1996	183
Game Boy Color, 1998	183
Game Boy Advance, 2001	184
Game Boy Advance SP, 2003	185



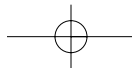


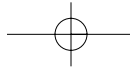
A Very Brief History of Nintendo	186
Opening the GBA Console	187
Preparing for the Hack	187
Performing the Hack	188
Replacing the Display Lens	193
Preparing for the Hack	194
Performing the Hack	194
Light Up Your LCD with the GBA Afterburner Mod	198
Preparing for the Hack	198
Performing the Hack	200
Removing the LCD	201
Preparing the GBA Housing	203
Preparing the LCD	206
Preparing the Afterburner Module	209
Installing the Afterburner Module	211
Adding the Brightness Control (Optional)	214
Under the Hood: How the Hack Works	216
Enhancing Your Afterburner with the GBA Stealth Dimmer Chip	217
Preparing for the Hack	218
Performing the Hack	219
Under the Hood: How the Hack Works	225
Nintendo GBA Technical Specifications	226
The Central Processor	226
CPU Registers	227
Memory Architecture	228
Internal Working RAM	229
External Working RAM	230
Graphics Memory	230
Game ROM and Game Save Memory	231
The Graphics System	231
Tile-Based Modes (0–2)	232
Bitmap-Based Modes (3–5)	232
The Sound System	233
Homebrew Game Development	233
Other Hacks	234
Nintendo GBA Resources on the Web	238



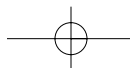


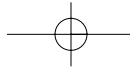
Chapter 6 Gamepark 32 (GP32)	.241
Introduction	.242
Out of the Box: Configuring Your GP32	.245
Opening the GP32 Console	.251
Preparing for the Hack	.251
Performing the Hack	.251
Replacing the GP32 Screen Cover	.257
Preparing for the Hack	.258
Performing the Hack	.258
Repairing Your Buttons	.262
Preparing for the Hack	.262
Performing the Hack	.263
Accelerating Your GP32 (CPU Core Voltage Increase)	.264
Preparing for the Hack	.265
Performing the Hack	.265
Under the Hood: How the Hack Works	.268
Creating a DC Power Adapter	.269
Preparing for the Hack	.269
Performing the Hack	.273
Under the Hood: How the Hack Works	.275
Installing the Multifirmware Loader	.275
Preparing for the Hack	.276
Performing the Hack	.276
Backing Up Your Firmware	.276
Reprogramming (Flashing) the New Firmware	.278
Homebrew Game Development	.280
Other Hacks	.284
GP32 Resources on the Web	.286
Part IV Retro and Classic Systems	.289
Chapter 7 Nintendo NES	.291
Introduction	.292
Opening the NES Console	.294
Preparing for the Hack	.294
Performing the Hack	.294
Replacing the 72-Pin Cartridge Connector	.299
Preparing for the Hack	.300



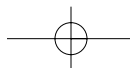


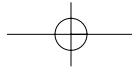
Performing the Hack	301
Blue Power LED Modification	302
Preparing for the Hack	303
Performing the Hack	304
Under the Hood: How the Hack Works	310
Disabling the NES “Lockout Chip”	311
Preparing for the Hack	312
Performing the Hack	312
Optional: Adding a Switch	315
Under the Hood: How the Hack Works	315
Opening an NES Game Cartridge	316
Preparing for the Hack	316
Performing the Hack	318
Replacing the Battery in Certain Game Cartridges	319
Preparing for the Hack	320
Performing the Hack	321
Creating an EPROM Cartridge for Homebrew Game Development	324
Preparing for the Hack	324
Performing the Hack	325
Under the Hood: How the Hack Works	330
Homebrew Game Development	330
Other Hacks	332
NES Resources on the Web	333
Chapter 8 Atari 2600	335
Introduction	336
Hacks in This Chapter	337
Atari 2600 Left-Handed Joystick Modification	337
Preparing for the Hack	338
Performing the Hack	338
Repair Your Atari 2600 Joysticks	342
Preparing for the Hack	342
Performing the Hack	343
Revitalize Your Atari 2600 Paddles	349
Preparing for the Hack	350
Performing the Hack	350
Use an NES Control Pad with your 2600	356



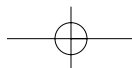
**xviii Contents**

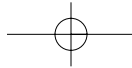
Preparing for the Hack	.357
Performing the Hack	.358
Atari 2600 S-Video/Audio Mod	.364
Preparing for the Hack	.364
Performing the Hack	.366
Optional: Commodore 1702 Hack	.380
Optional: Do-It-Yourself 2600 A/V Mod	.381
Technical Information	.381
Atari 2600 Stereo Audio Output	.382
Preparing for the Hack	.384
Performing the Hack	.384
Under the Hood: How the Hack Works	.391
Homebrew Game Development	.391
Atari 2600 Resources on the Web	.396
Chapter 9 Atari 5200	.399
Introduction	.400
Opening the Atari 5200	.401
Preparing for the Hack	.401
Performing the Hack	.401
Reassembly	.408
Atari 5200 Blue LED Modification	.408
Preparing for the Hack	.409
Performing the Hack	.410
Under the Hood: How the Hack Works	.413
Atari 5200 Two-Port BIOS Replacement	.413
Preparing for the Hack	.414
Performing the Hack	.414
Creating an Atari 5200 Paddle Controller	.419
Preparing for the Hack	.421
Performing the Hack	.421
Disassembling the Atari 2600 Paddle Controller	.422
Building the 5200 Paddle Controller	.424
Adding a Weighted Dial	.432
Under the Hood: How the Hack Works	.433
Freeing Yourself from the 5200 Four-Port Switchbox	.434
Preparing for the Hack	.435





Performing the Hack	436
Under the Hood: How the Hack Works	445
Atari 5200 Video and Audio Upgrade Modification	446
Preparing for the Hack	447
Performing the Hack	449
Other Hacks	467
Rebuilding Atari 5200 Controllers	467
Atari 5200 Four-Port VCS Cartridge Adapter Fix	470
Homebrew Game Development	470
Atari Resources on the Web	474
Chapter 10 Atari 7800	477
Introduction	478
Hacks in This Chapter	479
Blue LED Modification	479
Preparing for the Hack	480
Performing the Hack	481
Under the Hood: How the Hack Works	485
Game Compatibility Hack to Play Certain Atari 2600 Games	486
Preparing for the Hack	487
Performing the Hack	487
Under the Hood: How the Hack Works	489
Voltage Regulator Replacement	490
Preparing for the Hack	490
Performing the Hack	491
Under the Hood: How the Hack Works	494
Power Supply Plug Retrofit	495
Preparing for the Hack	496
Performing the Hack	497
Other Hacks	501
Atari 7800 Composite and S-Video Output	501
Sega Genesis to Atari 7800 Controller Modification	501
NES Control Pad to Atari 7800 Controller Modification	502
Atari 7800 DevOS Modification and Cable Creation	502
Homebrew Game Development	502
Atari 7800 Resources on the Web	506





Appendix A Electrical Engineering Basics	.509
Introduction	.510
Fundamentals	.510
Bits, Bytes, and Nibbles	.510
Reading Schematics	.514
Voltage, Current, and Resistance	.516
Direct Current and Alternating Current	.517
Resistance	.518
Ohm's Law	.518
Basic Device Theory	.519
Resistors	.519
Capacitors	.521
Diodes	.524
Transistors	.526
Integrated Circuits	.528
Microprocessors and Embedded Systems	.530
Soldering Techniques	.531
Hands-On Example: Soldering a Resistor to a Circuit Board	.531
Desoldering Tips	.533
Hands-On Example: SMD Removal Using ChipQuik	.534
Common Engineering Mistakes	.537
Web Links and Other Resources	.538
General Electrical Engineering Books	.538
Electrical Engineering Web Sites	.539
Data Sheets and Component Information	.539
Major Electronic Component and Parts Distributors	.540
Obsolete and Hard-to-Find Component Distributors	.540
Appendix B: Coding 101 and Appendix C: Operating Systems Overview are available via the companion website at www.syngress.com/solutions.	
Index	541

