Joe Grand's Hardware Hacking Basics
Training Course Agenda

Last updated: May 16, 2020

This two-day comprehensive course teaches fundamental hardware hacking concepts and techniques used to reverse engineer and defeat the security of electronic devices. Combining lecture and hands-on exercises, it provides students with the skills, resources, and confidence needed to explore, manipulate, and exploit electronic systems. No prior hardware experience is required.

Additional information is available at www.grandideastudio.com/portfolio/hardware-hacking-training/

A. Hardware Hacking Overview

B. Information Gathering

C. Product Teardown

1. Opening housings
    1.1. Product assembly/disassembly methods
    1.2. Anti-tamper mechanisms
    1.3. Hands-on exercise: Defeat epoxy encapsulation
2. Component identification
    2.1. Discrete components
    2.2. Integrated circuits
    2.3. Finding and reading data sheets
    2.4. Hands-on exercise: Identify target components

D. Schematics and PCBs (Printed Circuit Boards)

1. Creating/reading schematics
2. PCB construction/fabrication methods
3. Hands-on exercise: Modify target PCB

E. Soldering and Desoldering

1. Tips/techniques
2. Hands-on exercise: Soldering
3. Hands-on exercise: Desoldering

F. Buses and Interfaces

1. Identifying interfaces
2. Determining pin function
   2.1. Hands-on exercise: Measurements w/ multimeter
   2.2. Hands-on exercise: Create block diagram/schematic
3. Signal monitoring and analysis
   3.1. Tools/techniques
   3.2. Serial communications interfaces (UART, I2C, SPI)
   3.3. Hands-on exercise: Signal monitoring w/ logic analyzer
   3.4. Hands-on exercise: Digital decoding w/ logic analyzer
   3.5. Hands-on exercise: Interactive console via UART

G. Signal/Data Manipulation

1. Tools/techniques/examples
2. Debug interfaces (vendor-specific, JTAG)
3. Fault injection/glitching overview

H. Memory and Firmware

1. Memory types
2. Hands-on exercise: Extract/modify data from EEPROM
3. Security/code protection bypass examples
4. Firmware analysis tools/techniques

I. Hardware Hacking Challenge

Apply the knowledge and skills learned in the course to defeat the security mechanism of a custom electronic device.