Creating a Smart BadUSB

Who am I?

My name is Brandon Hawkins, I am a senior majoring in Computer Science with a focus in Cyber Operations at UTSA.

I am an electronics tinkerer with a deep passion for cybersecurity and innovation.

I enjoy learning and interacting with both the hardware and software side of technology.

UTSA™ ROADRUNNERS

BadUSB Overview

- What is a BadUSB?
  - Definition: USB device mimicking a keyboard
  - Created using Raspberry Pi or Arduino
- Execution and Disguise
  - Often disguised as USB thumb drives
  - Executes malicious payload upon connection
  - Takes less than one second to complete
- Payload Execution
  - Utilizes Windows "Run" dialog (Windows Key + R)
  - Enables rapid PowerShell code execution
  - Potential consequences: Remote access, data theft

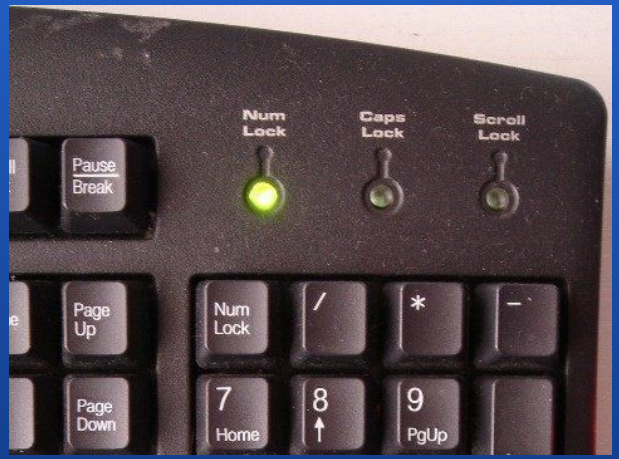
So why is a “smart” BadUSB needed?

- Obviousness of BadUSB
  - Run dialog pops up upon USB insertion
  - Limited time for attacker's actions
  - Risk of shutdown or removal of malicious script
- Execution Challenges
  - BadUSB behavior varies during computer startup, lock screen, or different OS (e.g., Mac or Linux)
  - Premature payload execution may reveal its presence
- "Smart" BadUSB - HID Approach
  - Embedded in a Human Interface Device (HID)
  - Example: Standard USB computer mouse
  - Explanation for choice to follow

What makes it “smart”

- Detection of Windows using the HID Protocol
  - Utilizes built in keyboard LEDs for status checks
  - These leds perform differently depending on OS, lockscreen, etc

- Checking For Mouse Activity
  - Use of a phototransistor to check mouse LED brightness
  - If dim, then mouse isn’t being used



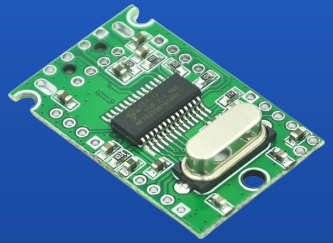
- Self Destructs After Successful Payload
  - The arduino disables itself and will not run again

Things you'll need

Any USB Mouse

Soldering Iron & Solder

Arduino IDE



USB 2.0 Expansion Module

Arduino Pro Micro

26 awg (or similar) wire

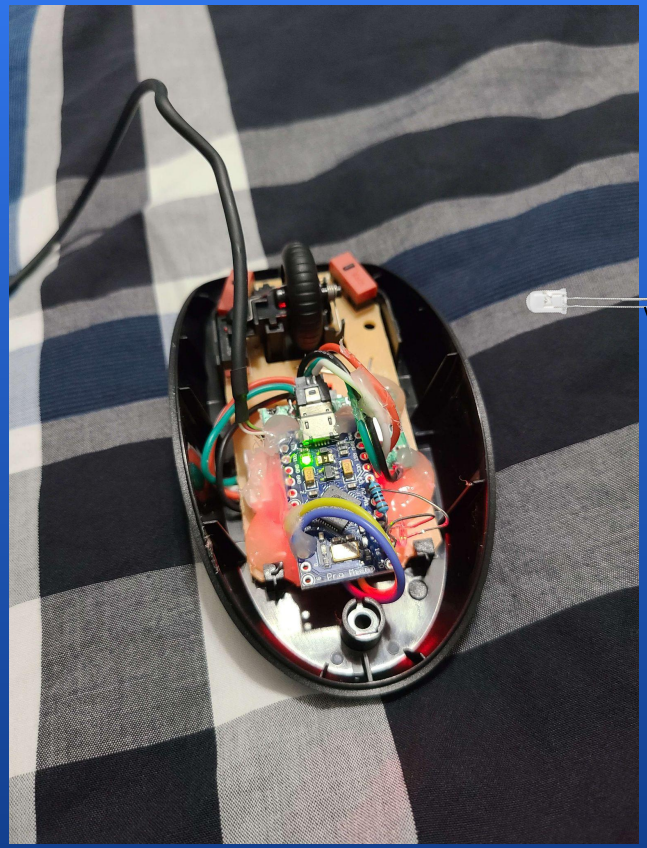
120 Ohm Resistor (or similar resistance)

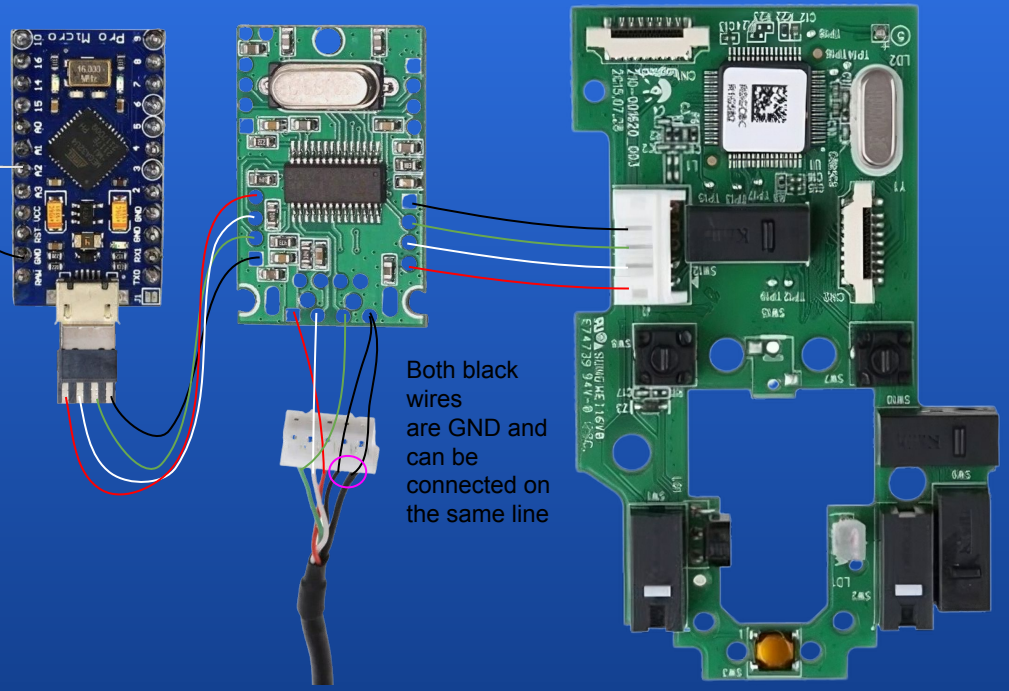
5mm Phototransistor

Micro USB Solderable Plug (or spliced phone cable)

Along with basic soldering skills and some patience!

Wiring





Both black wires are GND and can be connected on the same line

Want to try it yourself? Check it out on my Github!

https://github.com/BhawksGit/SmartBadUSB

Thanks for listening!