DEF CON 23 LAS VEGAS

This talk will is not about LTE vulnerabilities

GENIUS
Why isn’t it working?
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DEF CON 23 LAS VEGAS

Scared Poopless – LTE and *your* laptop

Disclaimer:
During the slides you will be exposed to hacker stock photos from the internet.

Thank you!

Goldy
aSmig

DEMO

DEF CON 23 LAS VEGAS

What did I just see?

Who are we?

BadUSBは序章にすぎない!?
USBに潜む真の危険性を2人組のセキュリティ研究者が指摘する!!

Background

- Internal LTE/3G modems and who uses them?

I like to use my own keyboard
shutterstock
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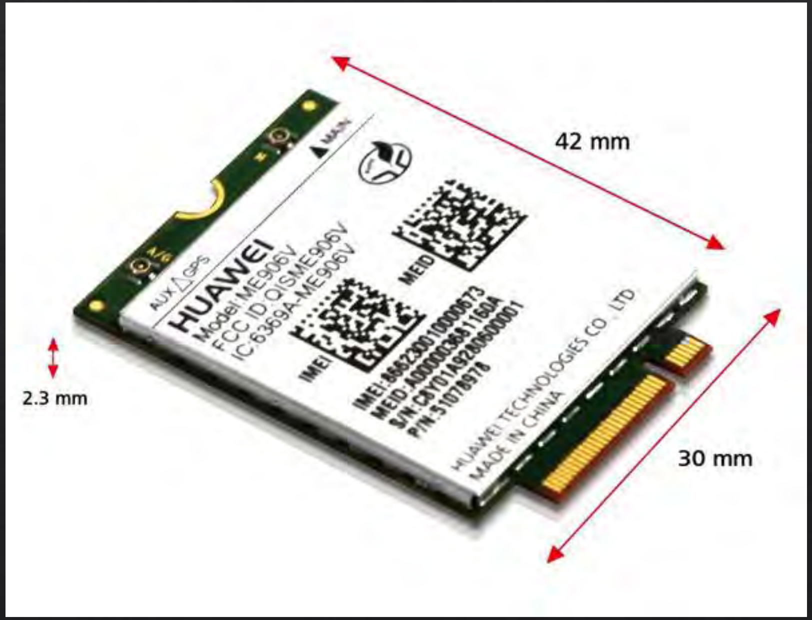
- Internal LTE/3G modems and who uses them?
  - Business class devices

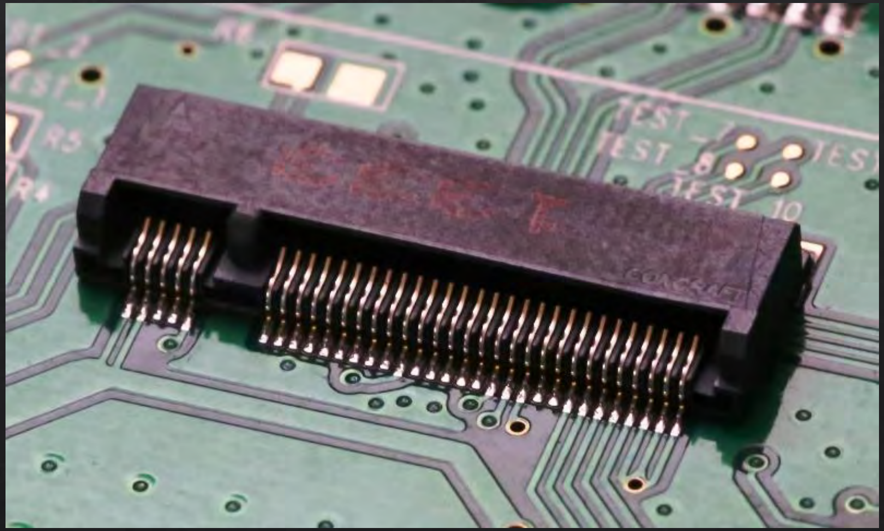


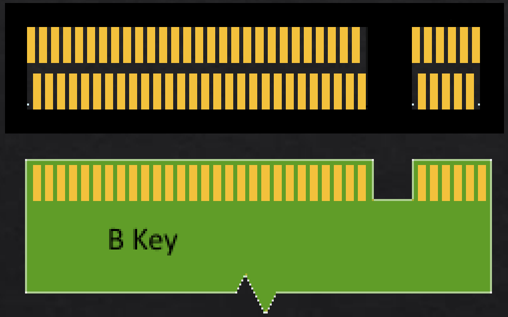
I think I have an idea!

- Internal LTE/3G modems and who uses them?
  - Business class devices
- How is it plugged in anyway?

Card against humanity 2015 world champion

- Internal LTE/3G modems and who uses them?
  - Business class devices
- How is it plugged in anyway?





- Internal LTE/3G modems and who uses them?
  - Business class devices
- How is it plugged in anyway?

PCIe ×2, SATA, USB 2.0 and 3.0, Audio, PCM, IUM, SSIC and I2C

I forgot mac's don't have a CD drive anymore

- Internal LTE/3G modems and who uses them?
  - Business class devices
- How is it plugged in anyway?
  - USB?!

- Internal LTE/3G modems and who uses them?
  - Business class devices
- How is it plugged in?
  - USB?!
- Why hack this device anyway?

Respect the gas/ski mask

Background

- Internal LTE/3G modems and who uses them?
  - Business class devices
- How is it plugged in?
  - USB?!
- Why hack this device anyway?
  - Module available worldwide
  - It’s plugged in [INSIDE] your laptop/tablet

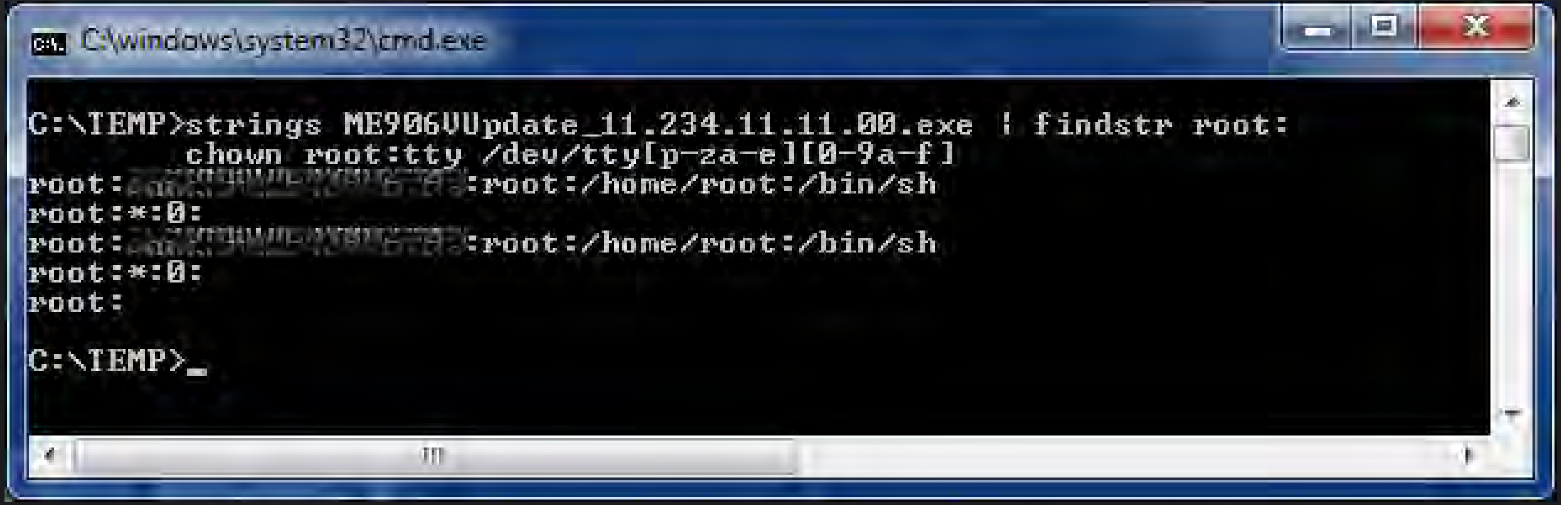
- Software
- Firmware
- Hardware

- Software
  - Windows utility for firmware updates
- Firmware
- Hardware

- Software
  - Windows utility for firmware updates
- Firmware
  - Packed in software utility
- Hardware

Low-cost anonymity

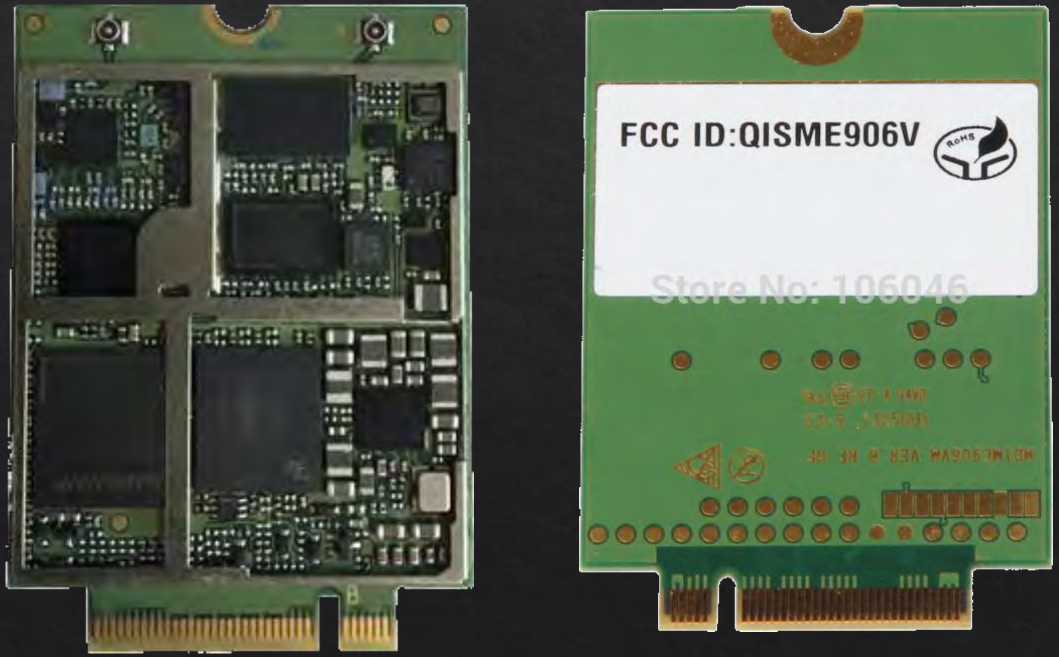
- Software
  - Windows utility for fi
- Firmware
  - Packed in software utility
- Hardware



```
C:\TEMP>strings ME906VUpdate_11.234.11.11.00.exe | findstr root:
        chown root:tty /dev/tty[p-za-e][0-9a-f]
root:[redacted]:root:/home/root:/bin/sh
root:*:0:
root:[redacted]:root:/home/root:/bin/sh
root:*:0:
root:

C:\TEMP>_
```

- Software
  - Windows utility for firmware updates
- Firmware
  - Strings is useful
- Hardware
  - Test pads?



- Software
  - Windows utility for firmware updates
- Firmware
  - Strings reveals too much
- Hardware
  - Test pads?

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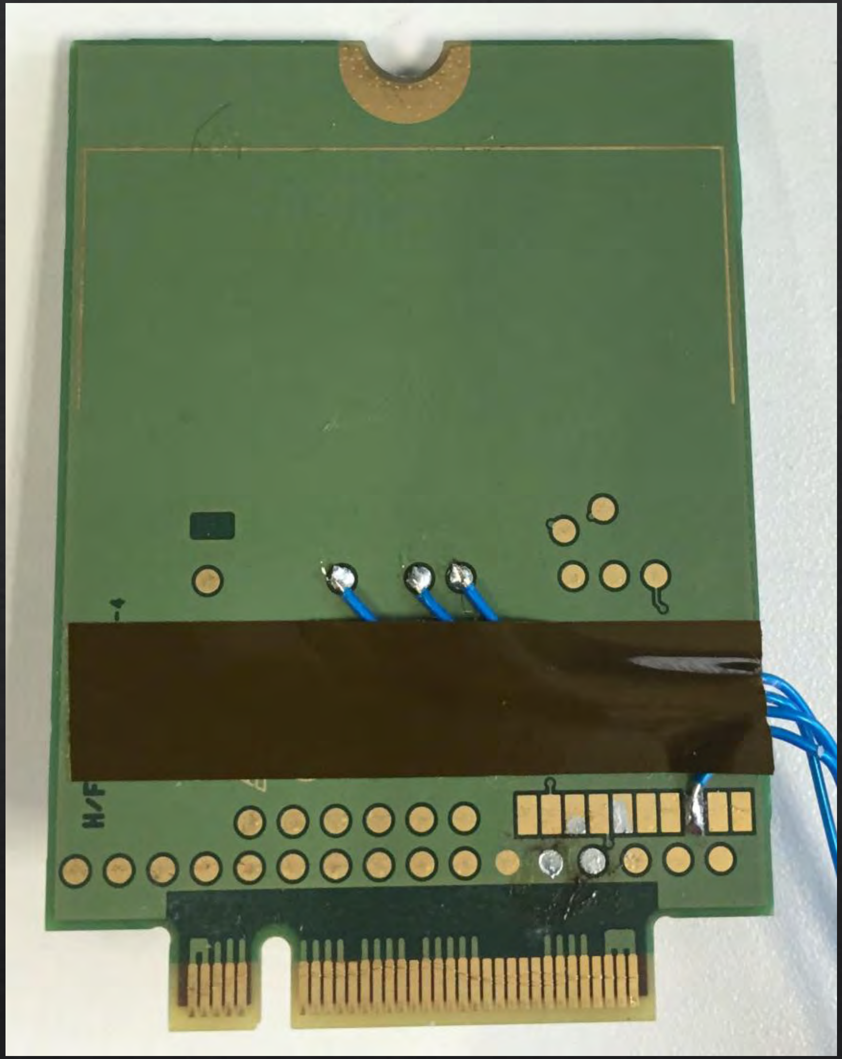
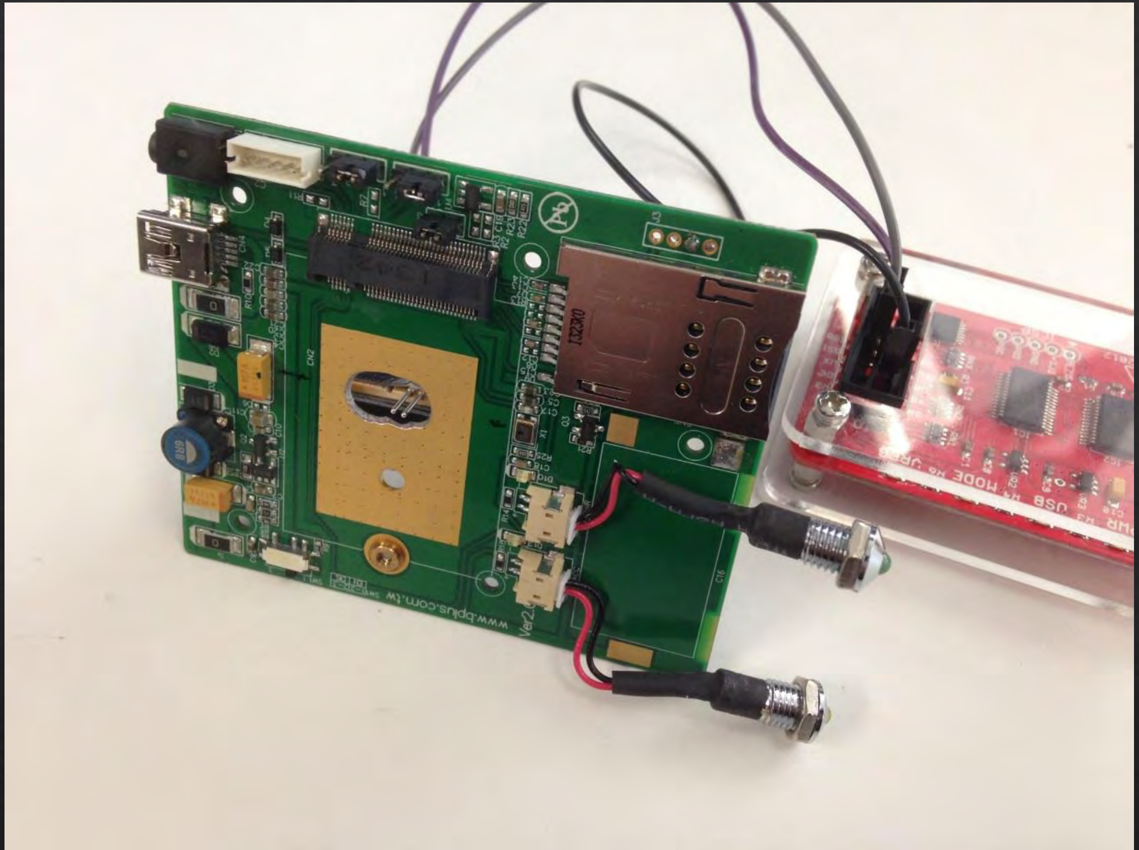
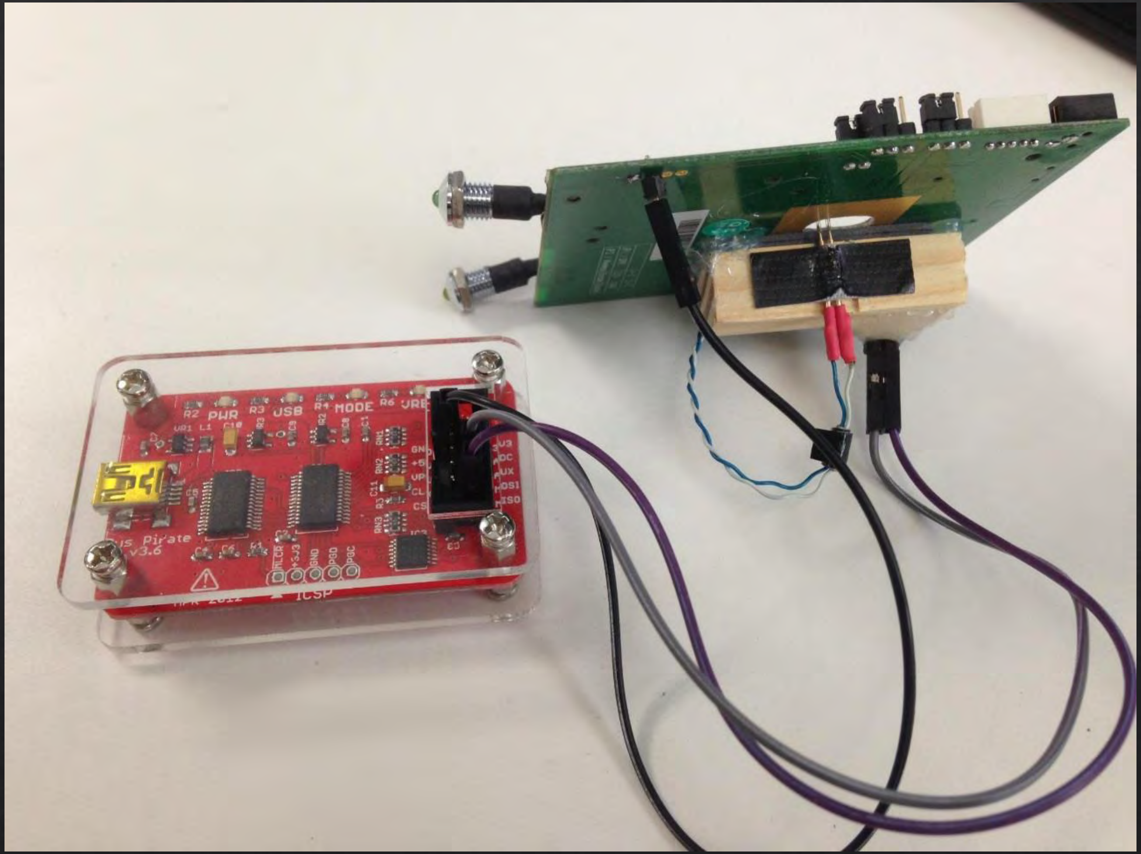
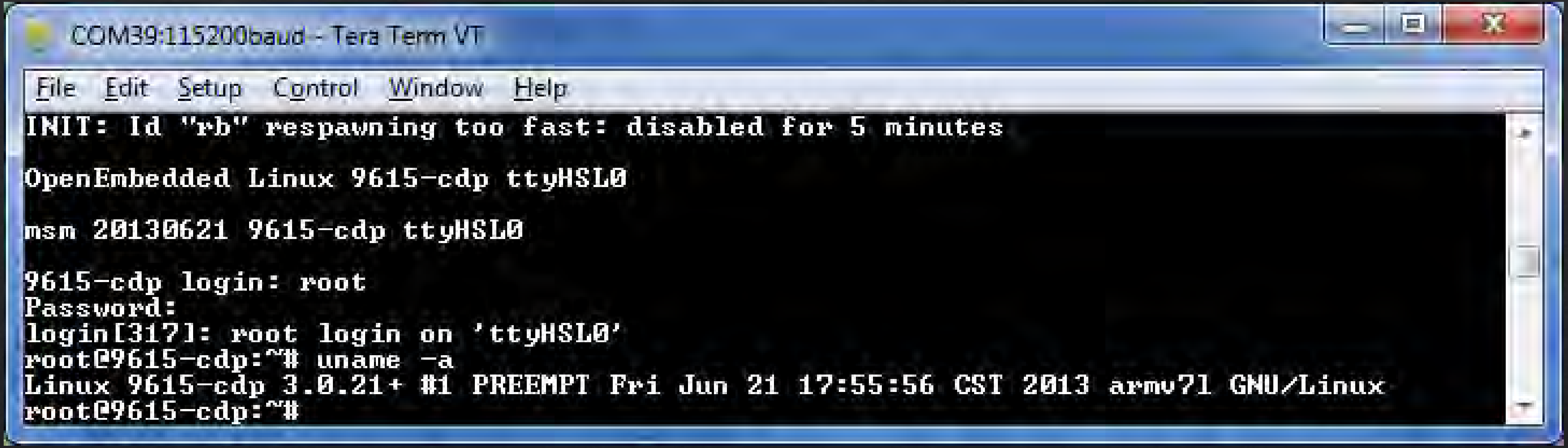



www.bplus.com.tw
Ver2
USB
MODE
PWR


PWR
USB
MODE
Bus Pirate v3.6
ICSP

Got root shell!



COM39:115200baud - Tera Term VT
File Edit Setup Control Window Help

```
INIT: Id "rb" respawning too fast: disabled for 5 minutes

OpenEmbedded Linux 9615-cdp ttyHSL0

msm 20130621 9615-cdp ttyHSL0

9615-cdp login: root
Password:
login[317]: root login on 'ttyHSL0'
root@9615-cdp:~# uname -a
Linux 9615-cdp 3.0.21+ #1 PREEMPT Fri Jun 21 17:55:56 CST 2013 armv7l GNU/Linux
root@9615-cdp:~#
```

Happy shell dance

Obligatory success meme

- We have root shell on a linux run, independent device inside the physical platform.

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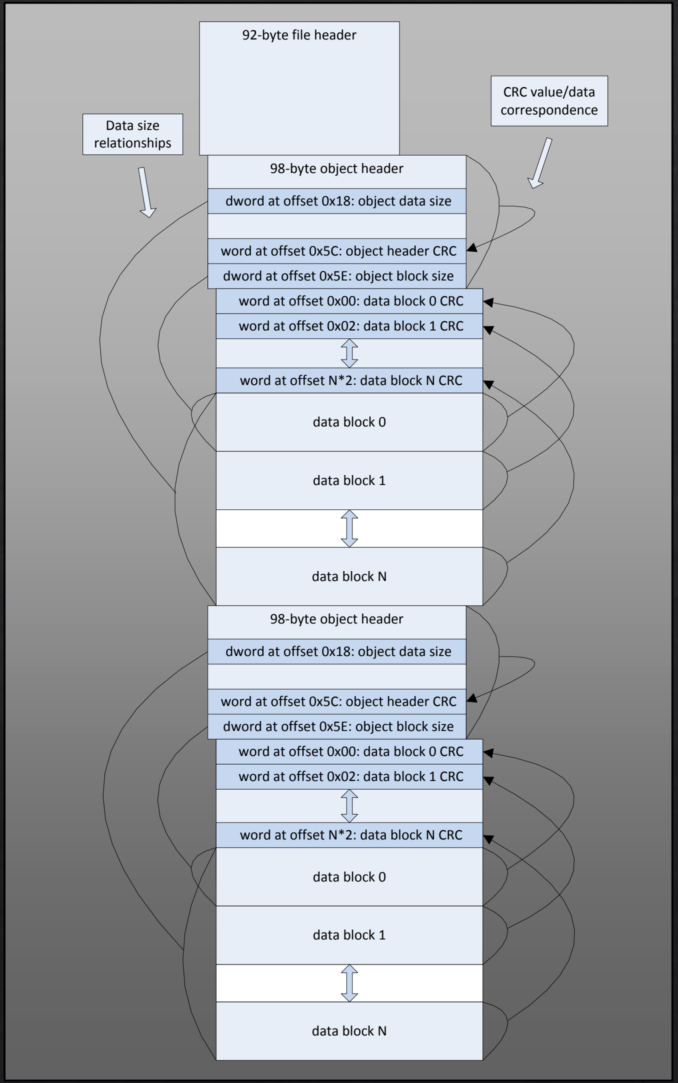
- CVE-2015-5367: Insecure Linux Image in Firmware
- CVE-2015-5368: Insecure Firmware Update Authentication

Firmware structure


92-byte file header
Data size relationships
CRC value/data correspondence
98-byte object header
dword at offset 0x18: object data size
word at offset 0x5C: object header CRC
dword at offset 0x5E: object block size
word at offset 0x00: data block 0 CRC
word at offset 0x02: data block 1 CRC
word at offset N*2: data block N CRC
data block 0
data block 1
data block N
98-byte object header
dword at offset 0x18: object data size
word at offset 0x5C: object header CRC
dword at offset 0x5E: object block size
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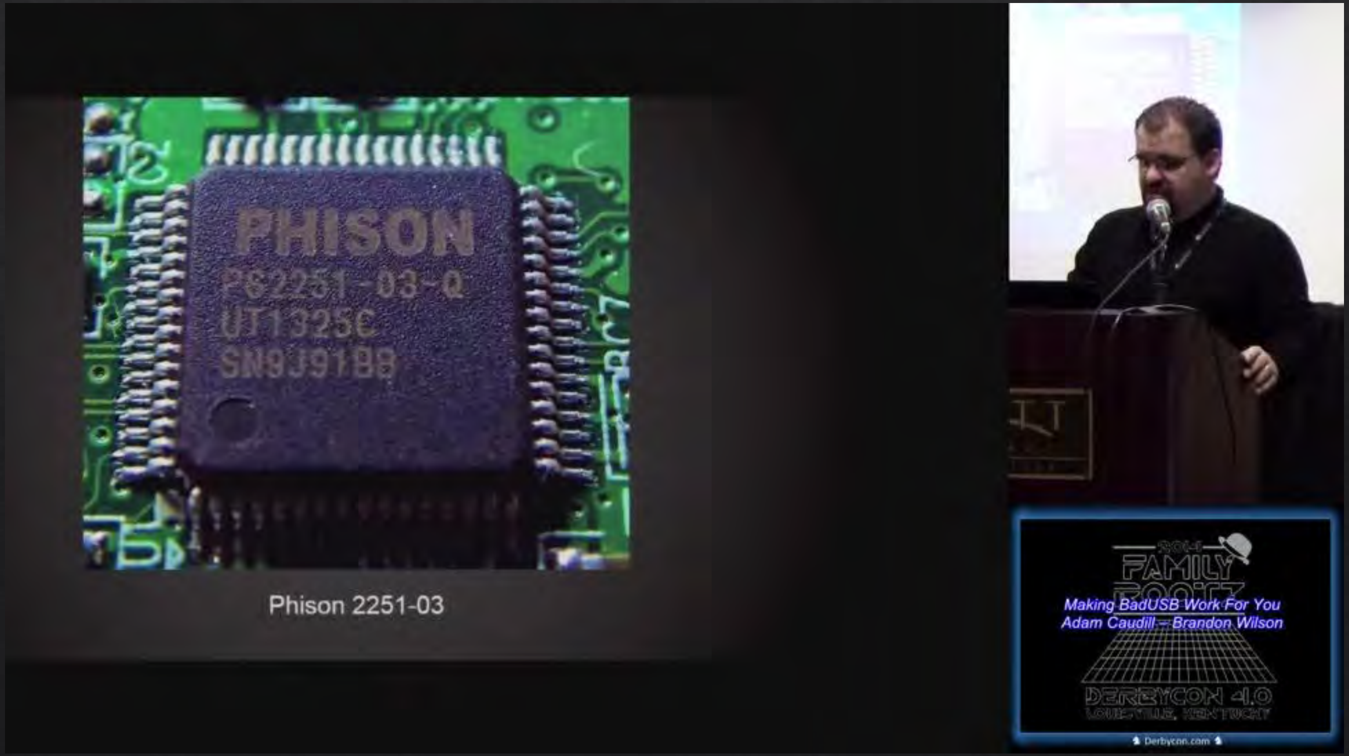
word at offset N*2: data block N CRC
data block 0
data block 1
data block N

Updater patch

- Updater checks CRC
- Updater calculates the correct CRC and compares to the one in the firmware image
- Modify updater code to save correct CRC in image instead of comparing it

Remember kids!
This is why you should do secure firmware updates

NEVER FORGET



Phison 2251-03

What next?

Questions?