



Raspberry Pi Hacks

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The history of the RasPi

- Early 2006 concept based on Atmel ATmega644
- Designed for educational use
- Intended for Python (but of course is friendly to all)

Pop quiz!





The BBC Microcomputer Is Here!

A WONDER FOR THE MONEY. Even before its introduction in the U.S., the BBC microcomputer was acclaimed as a "no-nonsense computer" (BYTE magazine); "a remarkably friendly machine" the "will set the standard for home computers for quite some time" (POPULAR COMPUTING); and "the most versatile, small general-purpose computer I've seen . . . a wonder for the money" (COMPUTERS & ELECTRONICS).

EDUCATIONAL USES. The BBC micro was designed as part of a national computer literacy project, one portion of which is "The Computer Programme" TV series being shown in the U.S. on more than 220 PBS stations. BBC micros now account for more than 75% of the computers being ordered by British schools under a government plan to put a computer into every primary and secondary school.

THE SYSTEM. The BBC micro is based on a 2MHz 6502 main microprocessor with a combined RAM/ROM address capability of 64K.

HIGH RESOLUTION GRAPHICS. The system features very high resolution color graphics in modes up to 640 x 256 (163,840 pixels). Text display can be 80, 40 or 20 characters by 32 or 25 lines.

EXPANDABILITY. The computer includes built-in serial and parallel interfaces, a floppy disc interface, a 1MHz expansion bus, analog-digital interfaces, econet interface which allows schools and businesses to link economically up to

254 computers in a low cost local area network, and a unique high-speed data channel called the Tube® for adding a second processor.

SECOND PROCESSORS. An additional 6502 microprocessor provides increased processing speed and an extra 64K of RAM. Alternatively, a Z-80B Second Processor can be joined to add 64K of RAM and allow running of CP/M programs*, which are extensively used for business applications. A third choice is a UNIX based 16032 16-bit processor with 32-bit architecture that provides 256K RAM.

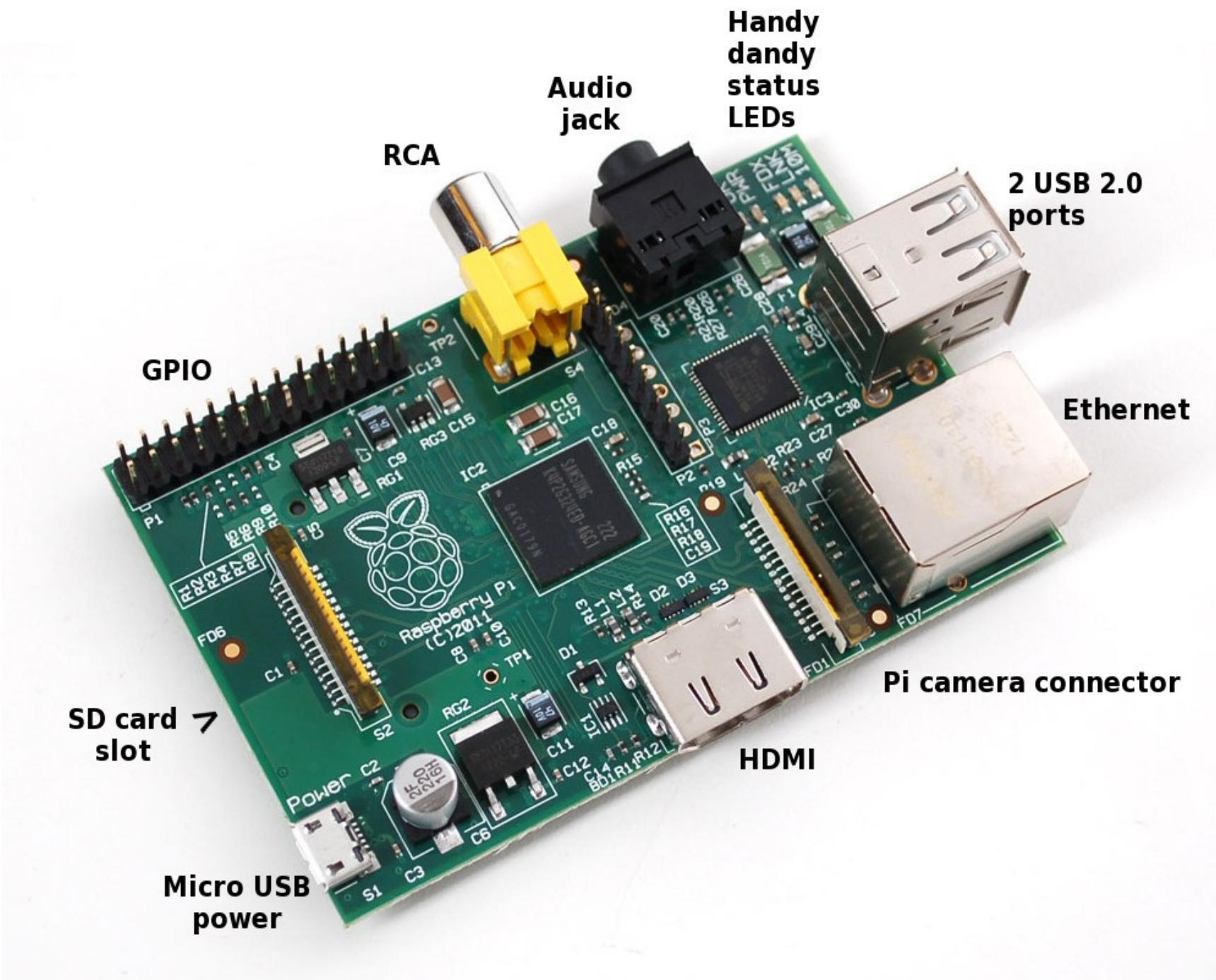


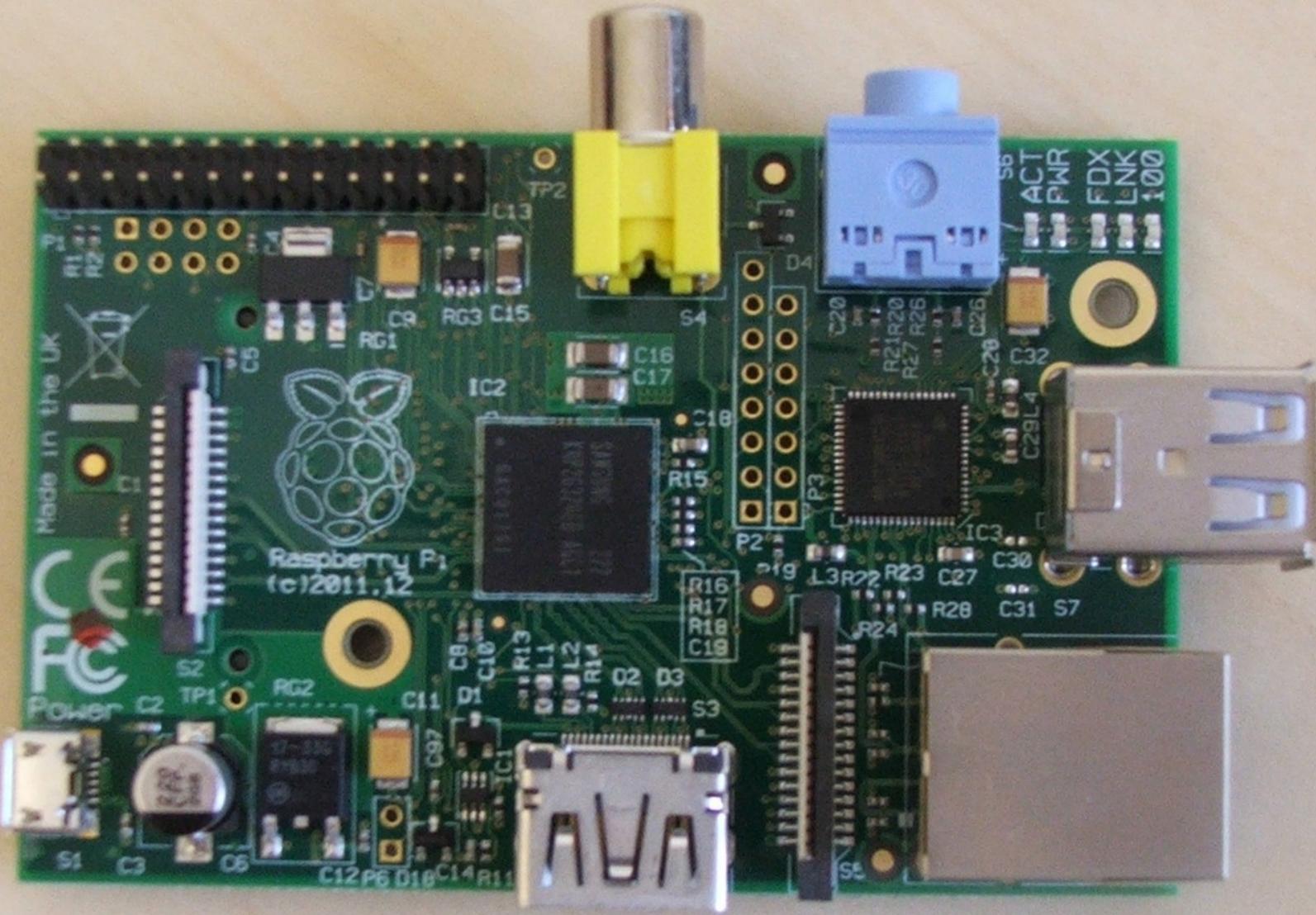
CONTACT
FOURTH DIMENSION SYSTEMS
for details and name of your local dealer.
Dealer inquiries invited.



1101 South Grand Ave., Suite A
Santa Ana, California 92705
(714) 835-6202

*Registered trademark of Digital Research, Inc.





Find your Pi

- `cat /proc/cpuinfo`

```
Processor : ARMv6-compatible  
processor rev 7 (v6l)
```

```
CPU architecture: 7
```

```
[...]
```

```
Hardware : BCM2708
```

```
Revision : 000e
```

```
Serial : 0000000011185abc
```

Buying parts

- Element14 (newark.com)
- Adafruit.com
- MakerShed.com
- DX.com
- Sparkfun.com (for parts)
- Amazon
- And in a pinch... Radio Shack

Getting started

1. Get the right SD card
2. Get the right distro
3. Don't break off C6
4. ???
5. Profit!



1. Get the right SD card

- Most quality cards are OK
- Micro with adapter?
- elinux.org/RPi_SD_cards

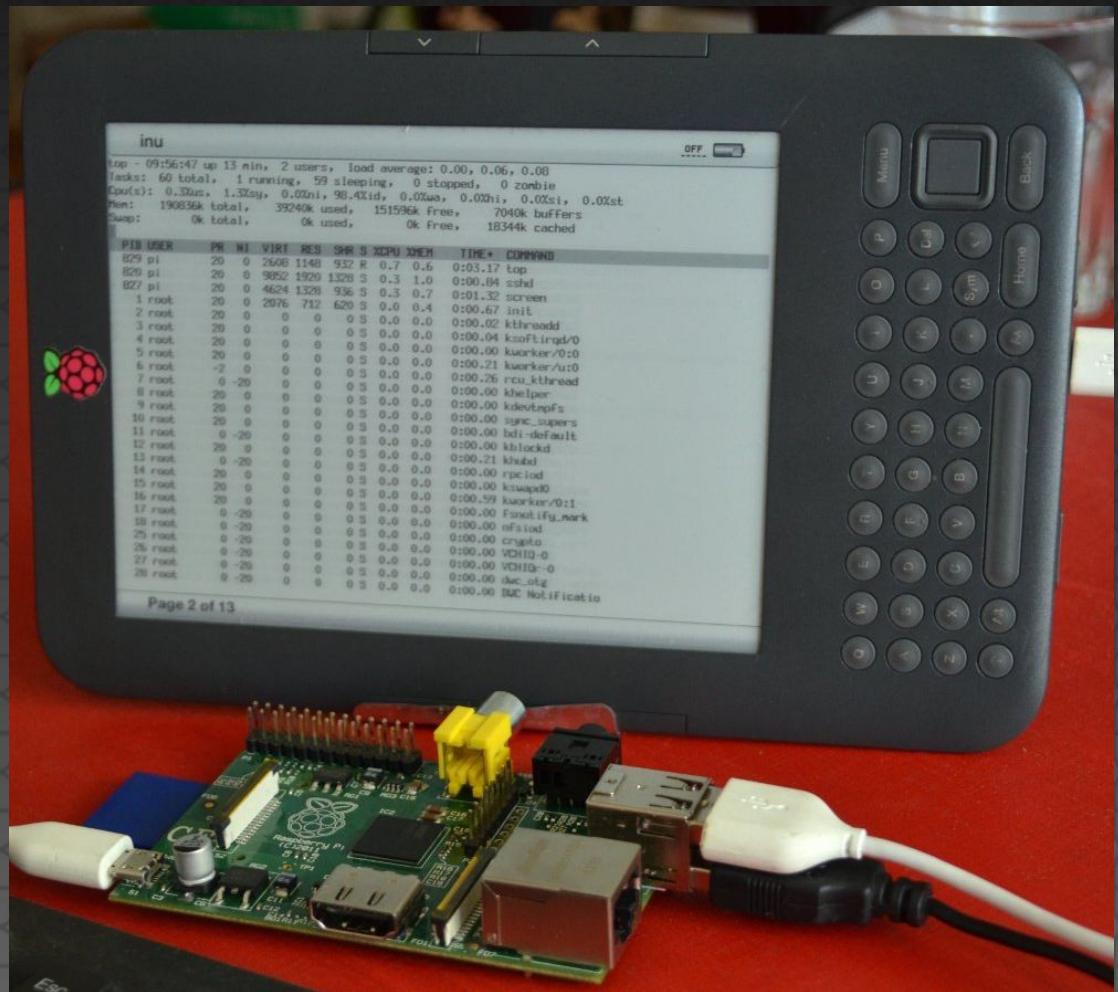
Display options

- HDMI 1.3 and 1.4 supported; audio and video output, does not support HDMI input
- PAL and NTSC supported through RCA with audio through 3.5 mm to red/white RCA connector
- DSI
- No VGA

Fun display alternatives

- Atrix Lapdock
- Kindleberry Pi

www.ponnuki.net
2012/09/
kindleberry-pi/



Touchscreens

- Ooh, look! DSI connector!
- Mimo 720
 - **USB DisplayLink Framebuffer Driver**
CONFIG_FB_UDL/udlfb.ko
 - USB DisplayLink Kernel Mode Setting (KMS) driver
CONFIG_DRM_UDL/udl.ko
- Won't work with OpenELEC without rebuilding the kernel

Couture kernel

- rpi-3.2.27
- rpi-3.6.y (.11)
- rpi-3.8.y, rpi-3.9.y, rpi-3.10.y, rpi-3.11.y

```
$ git clone  
git://github.com/raspberrypi/linux.git  
  
$ tar xvfz rpi-3.6.y.tar.gz  
  
$ make mrproper
```



2. Get the right distro

- Pidora (of course)
- Raspbian
 - Moebius
- RaspBMC
- Occidentalis

2.14 Or get brave

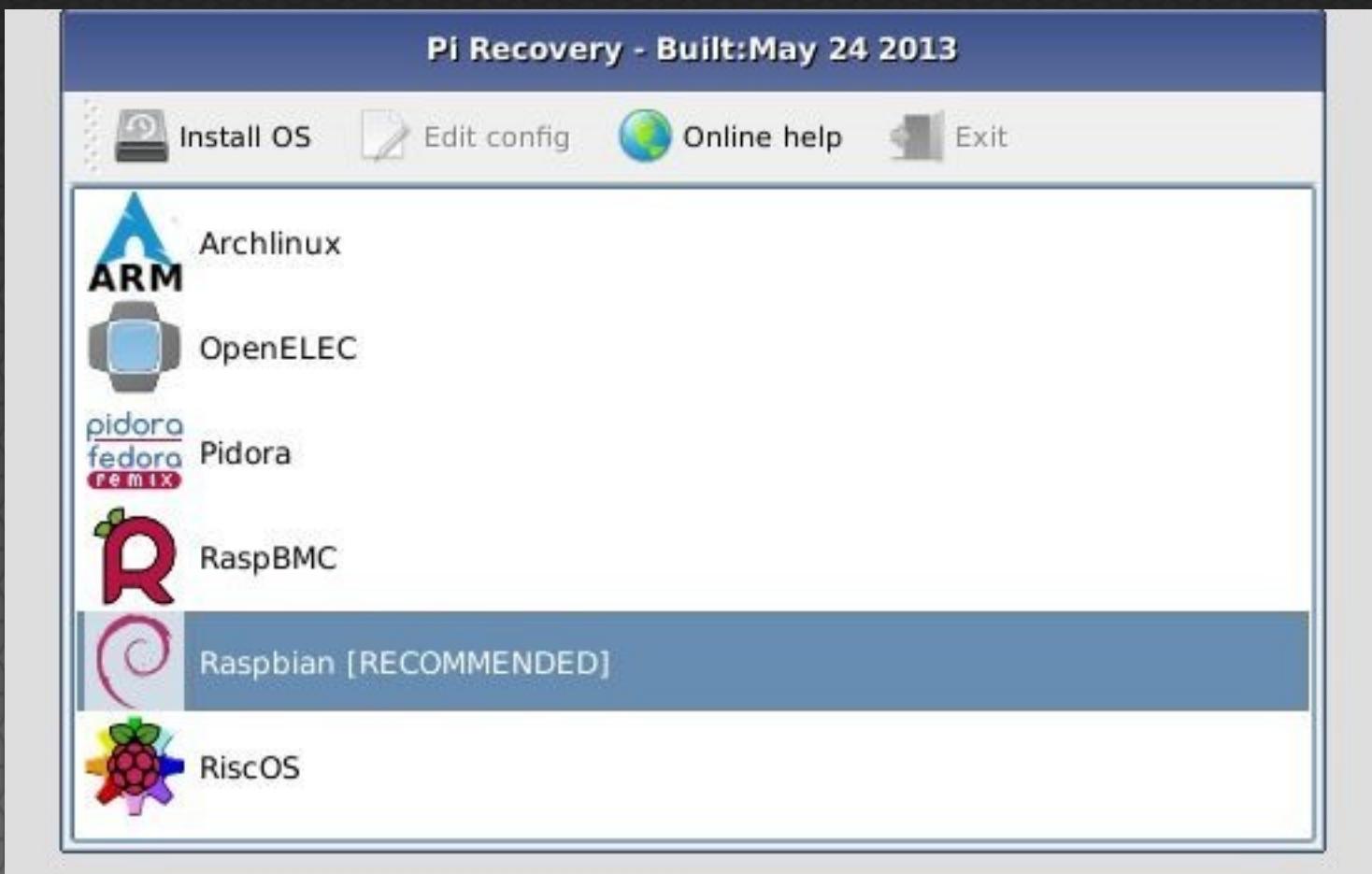
Android Arch ARM AROS
Chromium OS Debian Squeeze
Firefox OS FreeBSD Gentoo
Haiku IPFire NetBSD PiBang
Plan 9 from Bell Labs QtonPi
RISC Slackware ARM Squeezed
ARM Puppy WebOS

Pidora

- Graphical firstboot configuration (with additional modules specifically made for the Raspberry Pi)
- Compact initial image size (for fast downloads) and auto-resize (for max storage afterwards)
- Auto swap creation available to allow for larger memory usage
- C, Python, & Perl included in the SD card image
- Includes libraries capable of supporting external hardware such as motors and robotics (via GPIO, I2C, SPI)
- For graphical operation, Gedit text editor can be used with plugins (python console, file manager, syntax highlighting) to serve as a mini-graphical IDE

NOOBS

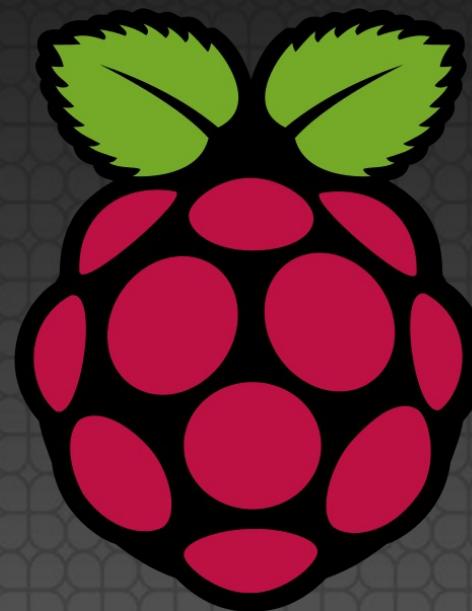
New Out Of Box Software



Android on your Pi



+



<http://androidpi.wikia.com>

Installing it

- Fedora ARM installer

- fedoraproject.org/wiki/Fedora_ARM_Installer
- `yum install fedora-arm-installer`



Installing it

- Fedora ARM installer
 - fedoraproject.org/wiki/Fedora_ARM_Installer
 - yum install fedora-arm-installer
- On a Mac, Rpi-sd card builder or RasPiWrite
 - Google “Rpi-sd builder”
 - github.com/exaviorn/RasPiWrite

$1 + 2 - \text{worrying} =$
Buy pre-loaded

Power



- 5V. 5V. 5V.
- Why you shouldn't use iPhones
- Your laptop's USB port is not the droid you're looking for
- Put a power brick on your shopping list
- Did I mention C6?

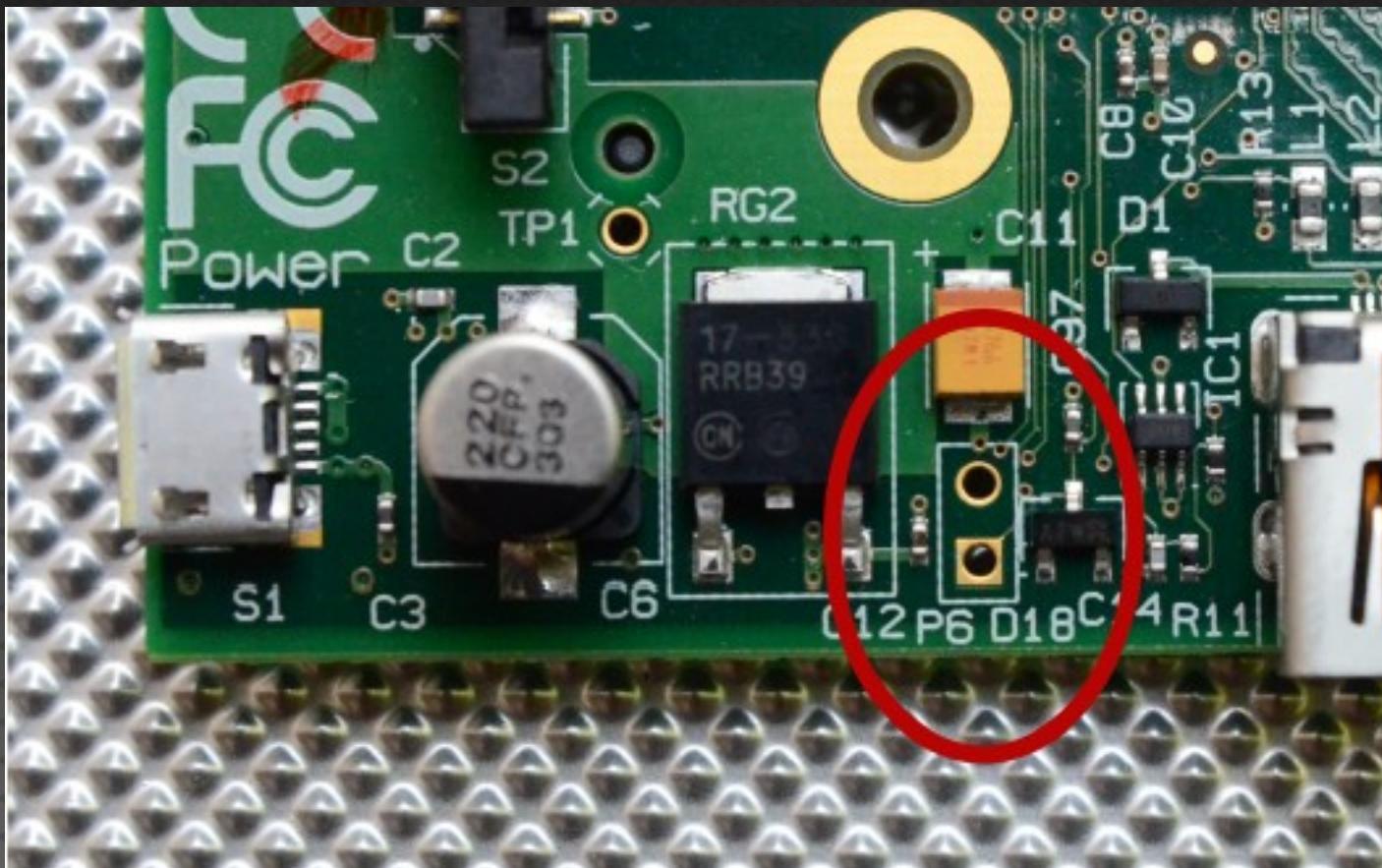
Write down these words



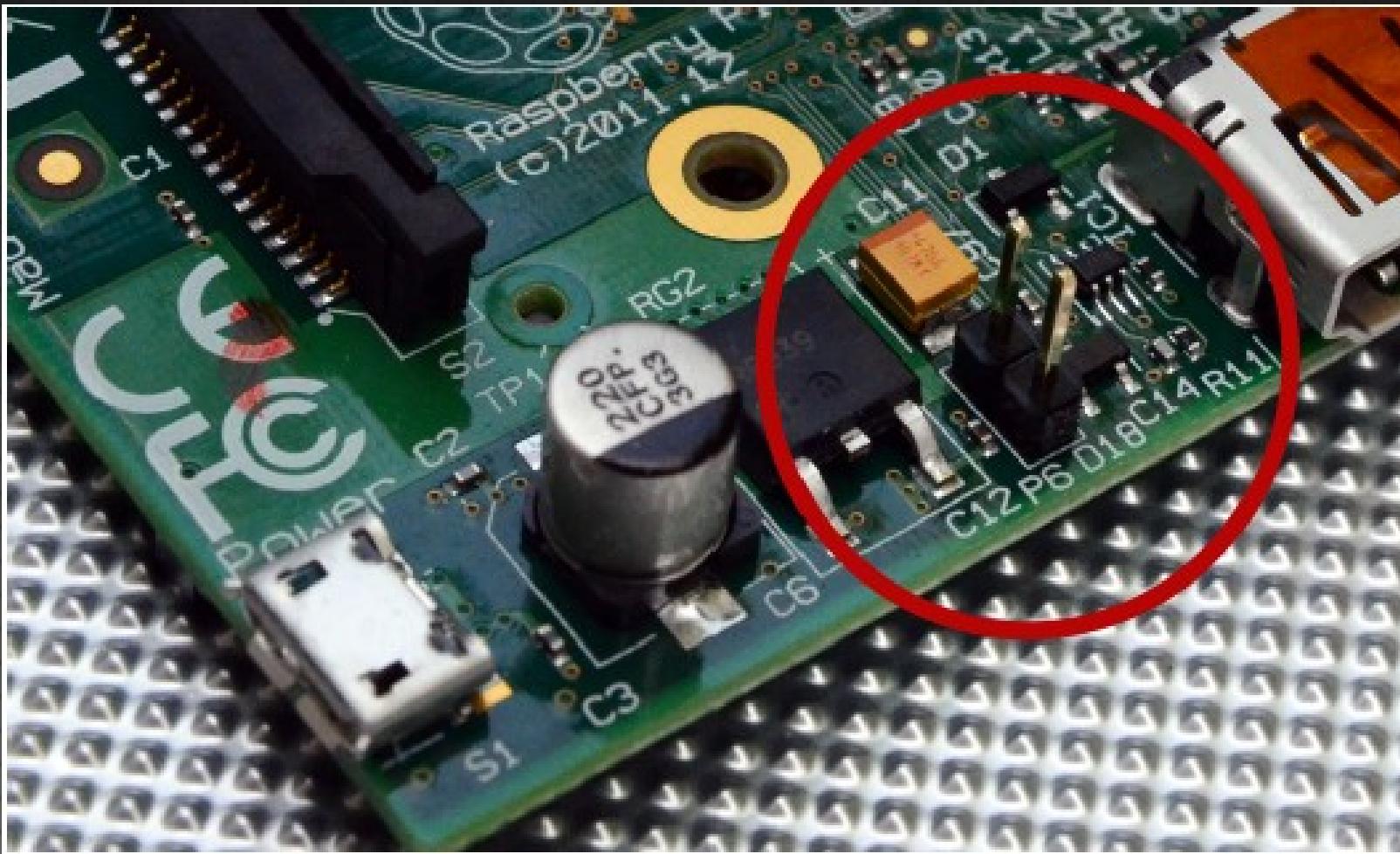
220 uF 16v electrolytic capacitor



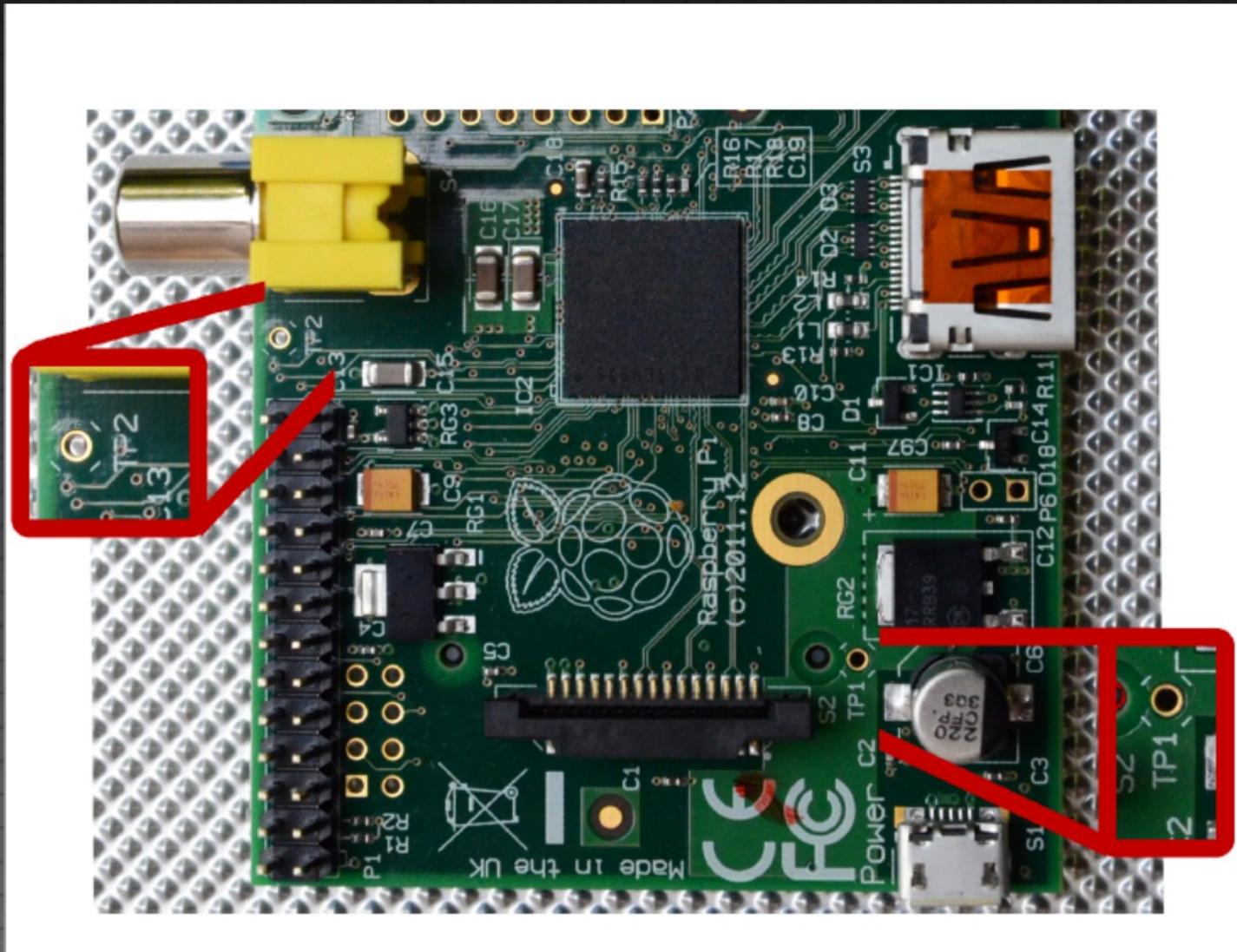
Add an off switch



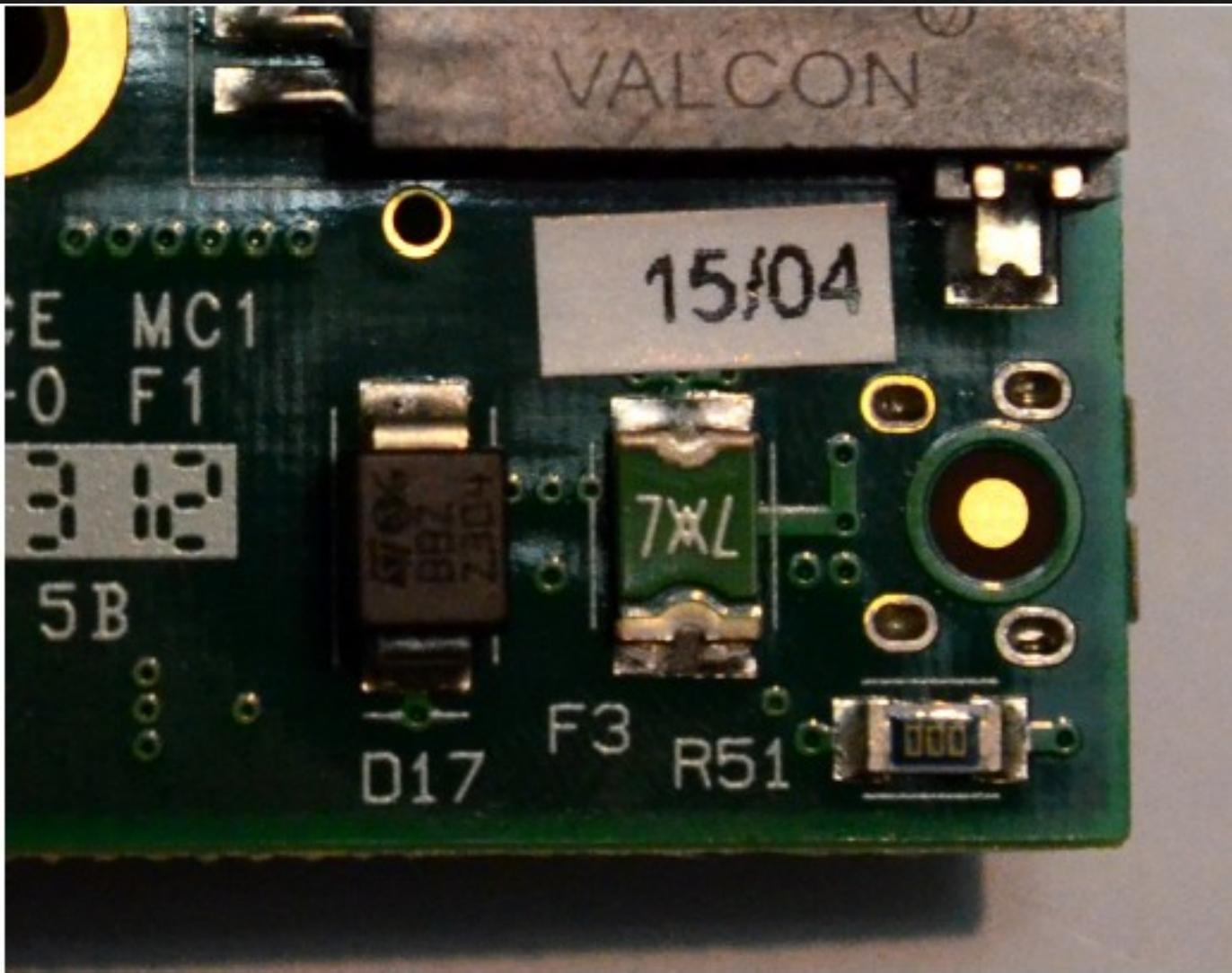
Johnny Five alive!



Test your might! (In volts)



Test your might! (In volts)



Decode the LEDs

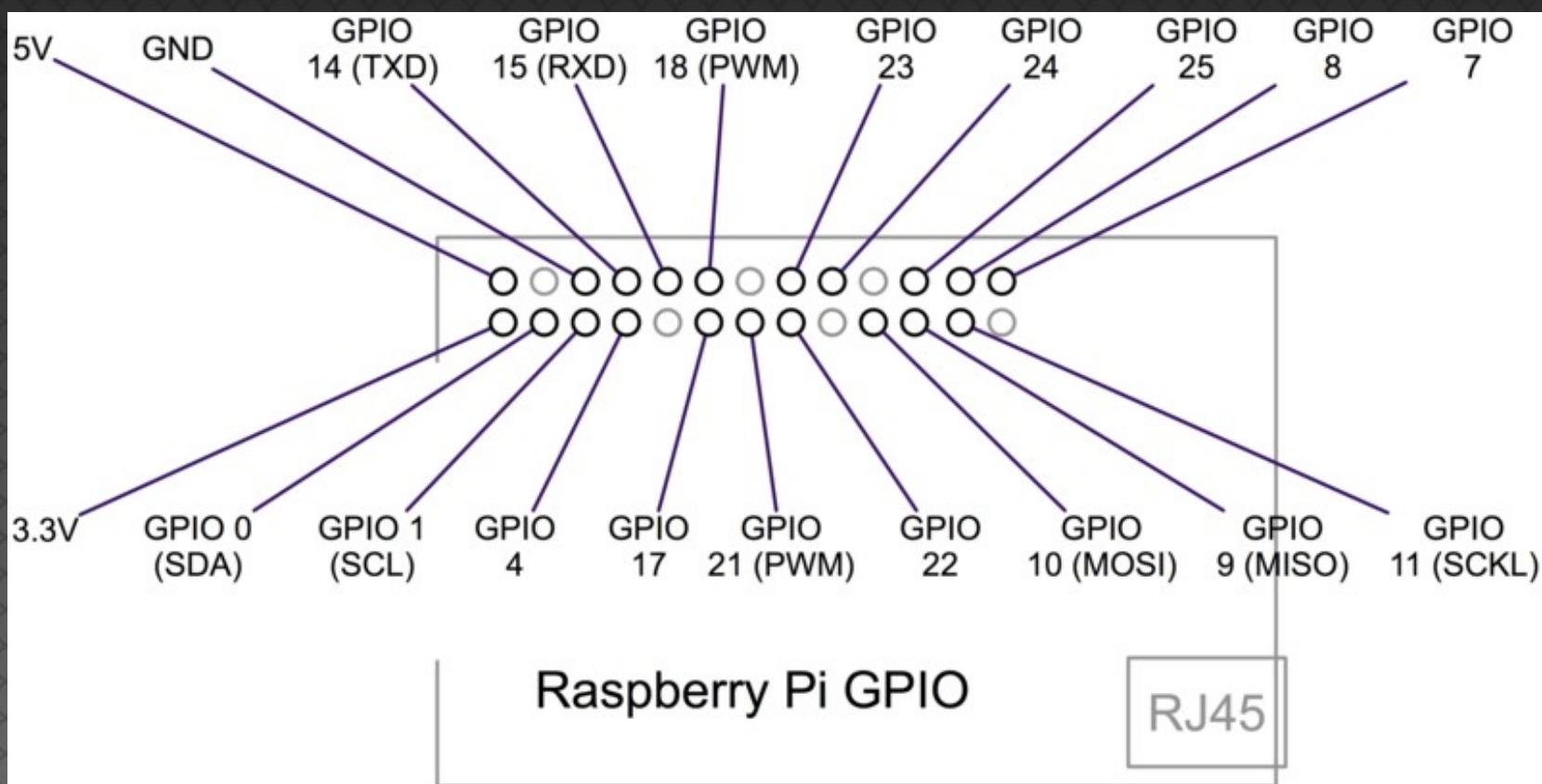
- D5 OK (Rev 1.0) ACT (Rev 2.0) Green SD card access, connected to GPIO 16
- D6 PWR Red 3.3 V Power, connected to 3V3
- D7 FDX Green Full Duplex LAN
- D8 LNK Green Link/Activity LAN
- D9 10M (Rev 1.0) 100 (Rev 2.0) Yellow 10/100Mbit LAN

Why didn't it start?

- Red light off = No power
- Red light on, green light off = The Pi can't read the image on the card. The voltage is below 5V.
- Green light blinks 3 times = start.elf was not found
- Green light blinks 4 times = start.elf did not launch
- Green light blinks 7 times = kernel.img was not found

GPIO

- http://elinux.org/RPi_Low-level_peripherals



Raspberry Leaf



<http://www.doctormonk.com/2013/02/raspberry-pi-and-breadboard-raspberry.html>

Building a cross-compiler

- You *could* use an existing one... or you could DIY with crosstool-ng (crosstool-ng.org)
- Get kernel source:
github.com/raspberrypi/linux

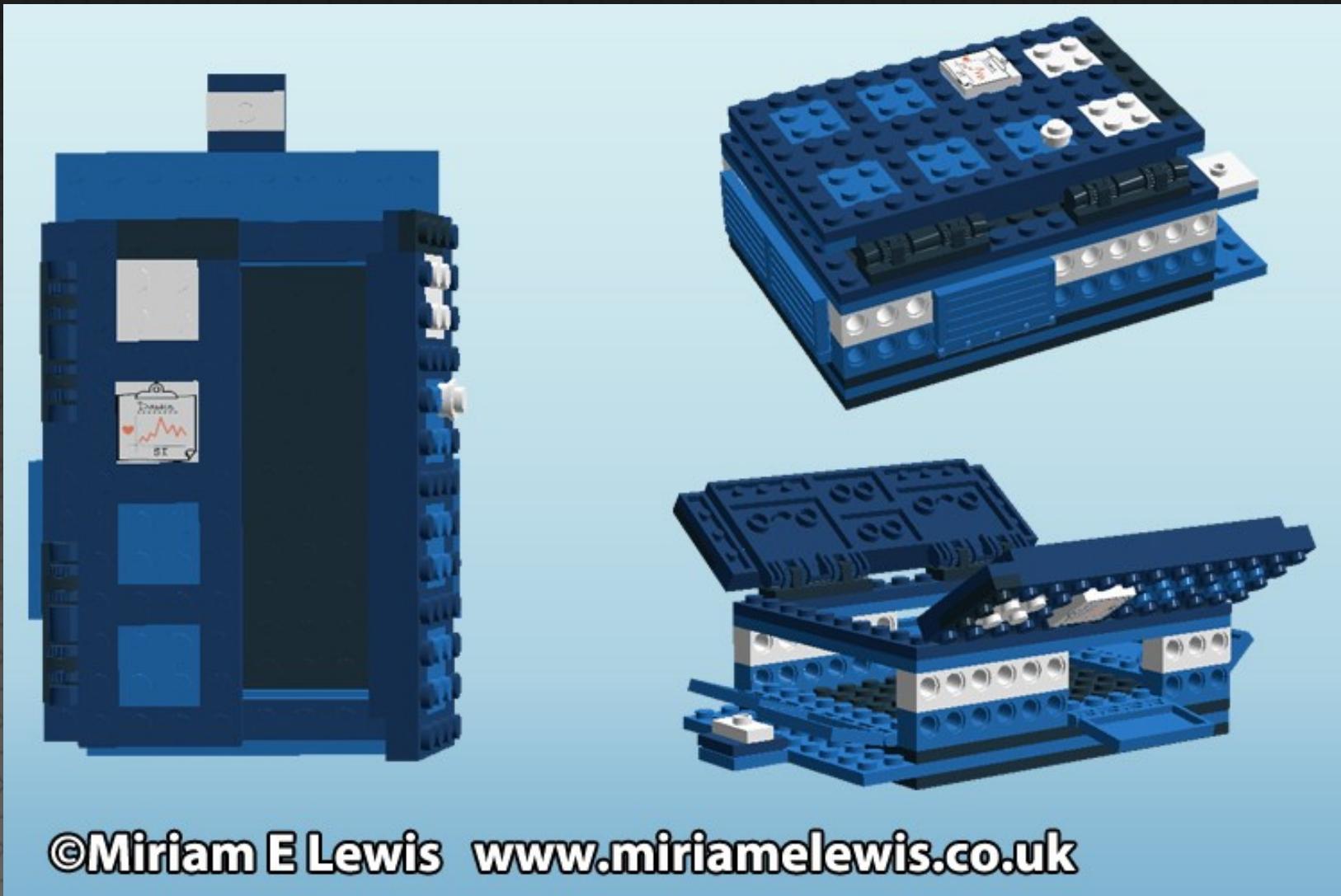


Blah blah blah.
Stop saying words and
show us pretty pictures
of cool things
people made.

Case closed.

- Make one
- 3D print one
- Buy one
- (or use the one it comes in)

Not bigger on the inside.



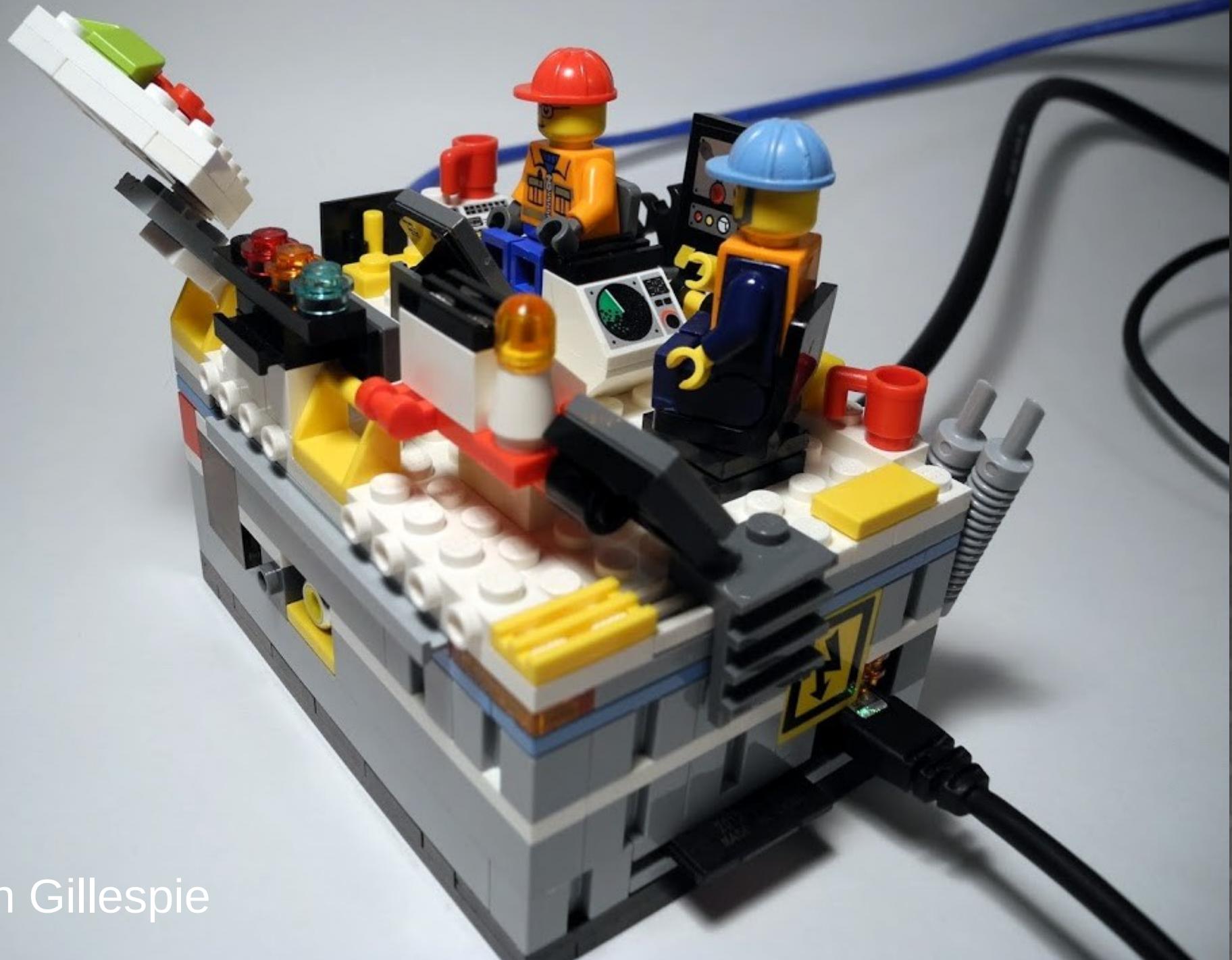
©Miriam E Lewis www.miriamlewis.co.uk

fedora 

Temple of Pi

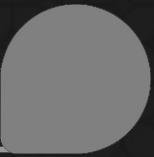


©Miriam E Lewis www.miriamelewis.co.uk



Brian Gillespie

Or just buy it.



<http://www.thedailybrick.co.uk/lego-sets/custom/lego-custom-raspberry-pi-case.html>

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Aren't you a little small for an HTPC?

- RaspBMC/XBMC
 - 1080p
 - Share over NFS, SMB, FTP, HTTP, USB, XYZ, and other acronyms
 - Install to SD, USB, or run off NFS Embedded Samba TVHeadend FTP SSH

Can you do it?



Anton Hvornum • 5 months ago

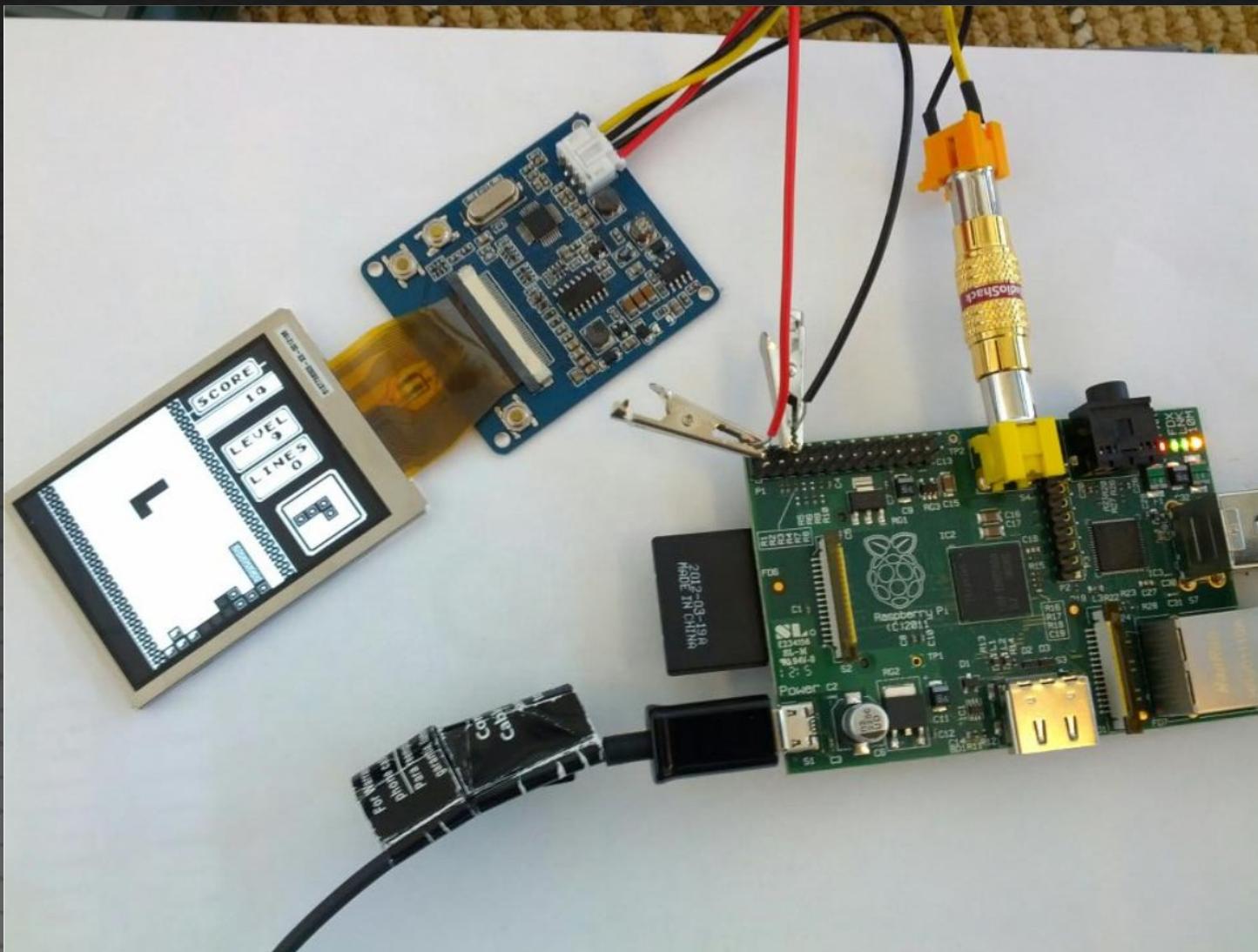
Within 3 minutes, i've:

- * Opened a package containing a Raspberry Pi
- * Found a SD card in a drawer
- * Googled "Raspberry pi xbmc"
- * Installed Raspbmc onto the SD card
- * Booted it and it works...

I havn't even figured out who's behind raspbmc or anything, but whoever you are... i love you!

72 ^ | v • Reply • Share >

PiBoy



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PIP-Boy 3000



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RIP Pi-PIP-Boy



<http://blog.ryangrieve.com/the-raspberry-pipboy/>

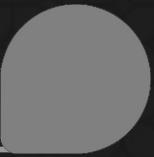
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Emulating your childhood



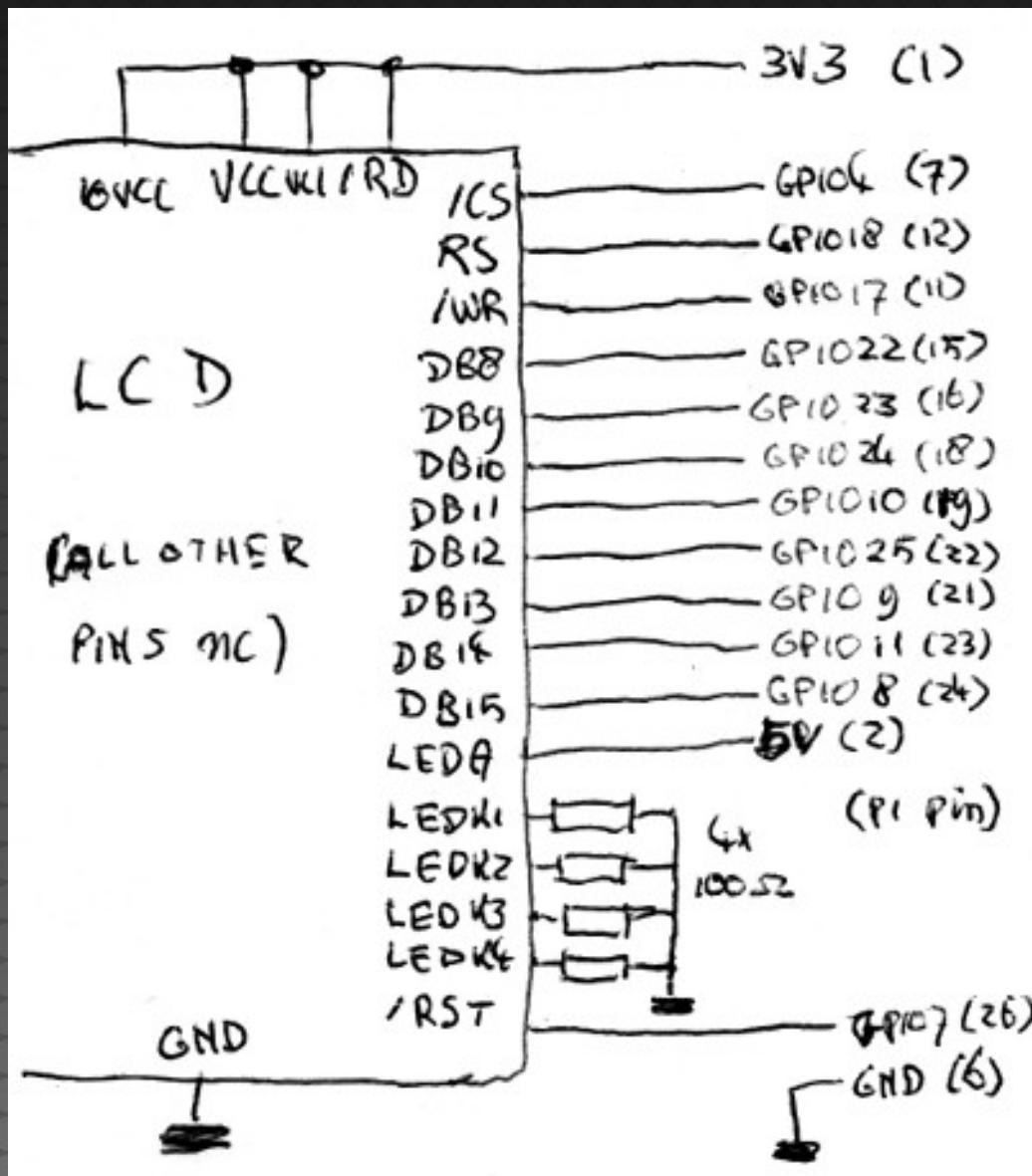
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SpritesMods.com



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Teeny arcade!



www.instructables.com/id/Coffee-Table-Pi



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HACK ATTACK

STAGE 4

Chapter Focus

Learn to control sprites with the mouse, program objects to bounce back, and start a game by pressing the spacebar.

The Game

Help Scratchy attack flying viruses and stop them from touching the server at the bottom of the screen. If you successfully block 30 viruses, you win the game!

Stage

New background: Paint Import Camera

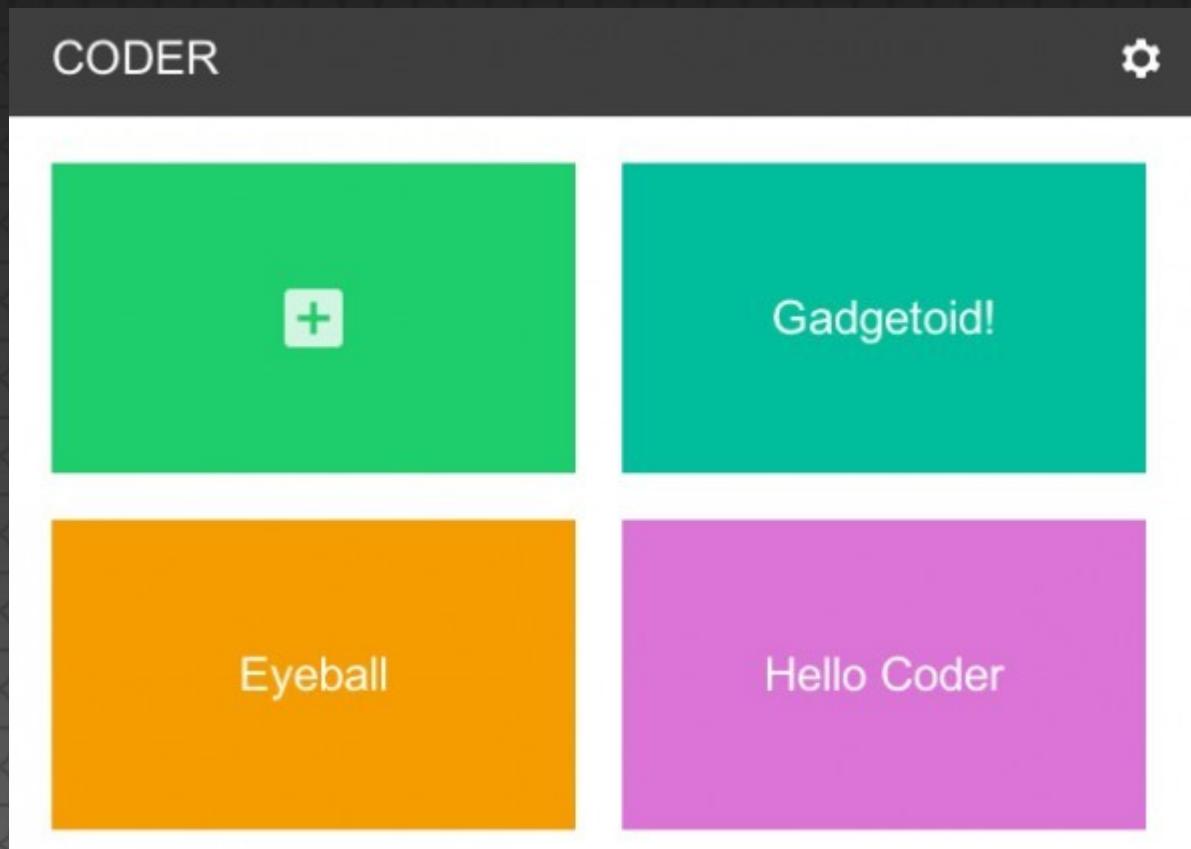
HongKong

First, go to the **Stage** and import a sparkly nighttime picture of Hong Kong!

Did you know you can add programs to the Stage, too? We can add this program to make our city glow!

```
when I receive [start v]
clear graphic effects
forever
repeat (2)
  wait (0.3) secs
  change [brightness v] by (-5)
repeat (2)
  wait (0.3) secs
  change [brightness v] by (5)
```

Googler Coder



```
1 // Try changing the variables below
2 SpaceRocks.projectileColor = "#00FFFF";
3 SpaceRocks.projectileSpeed = 40;
4 SpaceRocks.enemyColors = [ "#FF4500", "#00CDAC" ];
5 SpaceRocks.shipColor = "#00CDAC";
6 SpaceRocks.lineThickness = 2;
7 SpaceRocks.outlineShapes = true;
8 SpaceRocks.fillShapes = true;
9
10
11 // The 3 letter name for your ship
12 SpaceRocks.ship.name = "You";
13
14 // Ship properties
15 SpaceRocks.ship.speed = 3;
16 SpaceRocks.ship.size = 1;
17 SpaceRocks.ship.drag = 0;
```

SCORE: 0
LIVES: 1

CODER

</>



Googler Coder

The screenshot shows the Googler Coder application. At the top, there's a navigation bar with tabs for CODER, HTML, CSS, JS, and NODE. To the right of the tabs are icons for a folder, a magnifying glass (eye), and a gear (settings). Below the navigation bar is a code editor window containing the following HTML code:

```
1 <!DOCTYPE html>
2 <html>
3 <head>
26 <body class="">
27 <div class="pagecontent">
28 <h1>Raspberry Pi Hacks<
29 <p>Coder helps you learn
30 </div>
31 </body>
32 </html>
```

To the right of the code editor is a preview panel titled "Raspberry Pi Hacks" which displays the rendered HTML page with the heading "Raspberry Pi Hacks" and the paragraph "Coder helps you learn".

Raspberry Pi Hacks

Coder helps you learn how to make web pages.

Powering Potential



PoweringPotential.org

fedora 

PiLorean

fortoffee.org.uk/raspberry-pi-delorean/



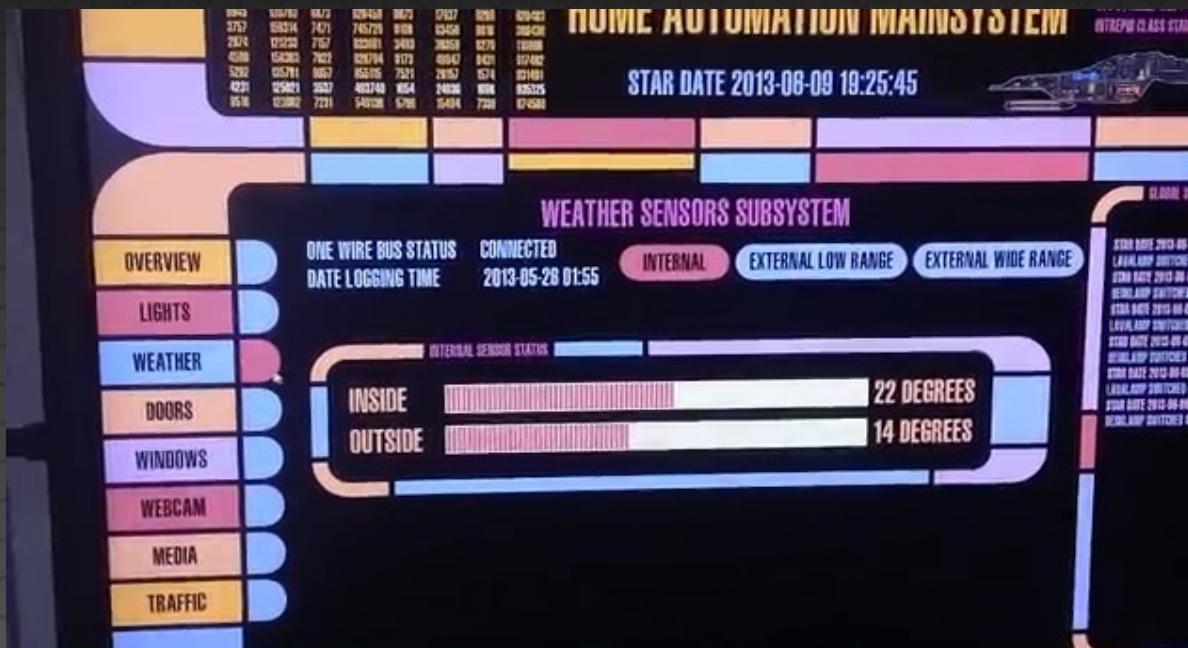
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PiLorean



<http://www.youtube.com/watch?v=ncXxBmbuFII>

LCARS Home Automation



<http://www.youtube.com/watch?v=176YaM5jta4>

Ice cream with your Pi



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Ice cream with your Pi

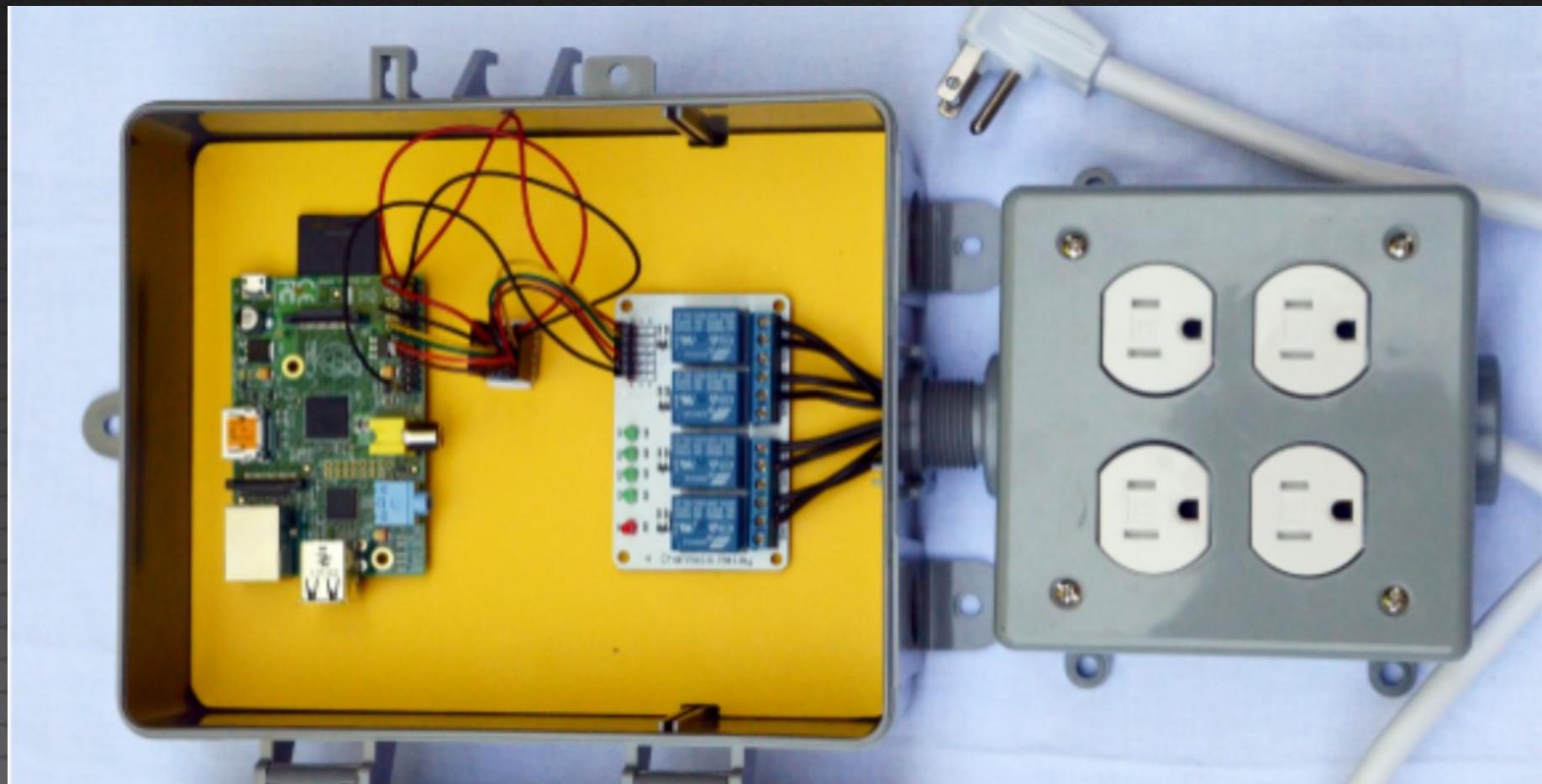


Coffee ordering



<http://www.youtube.com/watch?v=BQBOPGSfFwY>

Control Christmas lights



Best Valentine EVER





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About 14,600 results (0.64 seconds)

[Geiger Counter - Radiation Sensor Board for Raspberry Pi tutorial](#)

www.cooking-hacks.com/.../geiger-counter-raspberry-pi-radiation-sensor-board/ ▾

Manifesto. The main finality of the Radiation Sensor Board for **Raspberry Pi** is to help people in Japan to measure the levels of radiation in their everyday life ...

[Manifesto - The Board - The Geiger Tube - Types of radiation](#)

[RPi Geiger Counter | MAKE](#)



makezine.com/2013/06/12/rpi-geiger-counter/ ▾

by John Baichtal - in 725 Google+ circles

Jun 12, 2013 - The **Raspberry Pi** is a perfect platform to be a cheap but very versatile **geiger counter**. It can be connected to a TV/Monitor to display a nice ...

[Raspberry Pi • View topic - My Raspberry Pi Geiger Counter](#)

www.raspberrypi.org/phpBB3/viewtopic.php?f=37&t=27305 ▾

Dec 28, 2012 - 1 post - 1 author

I got a Mighty Ohm **Geiger counter** for Christmas and made it into a Random Number Generator. Luckily you can mute the counter so I won't be ...

[Geiger Counter Kit - Radiation Sensor ID: 483 - \\$99.95 : Adafruit ...](#)

www.adafruit.com/products/483 ▾

Adafruit Industries, Unique & fun DIY electronics and kits **Geiger Counter Kit** - Radiation Sensor ID: 483 - Detect particles and/or make a cool ... **Raspberry Pi** (96).

[Nuclear Emergency Tracking Center](#)

www.netc.com/Radiation%20Equipment%20Compatible.html ▾

Special Deal - Complete Radiation Monitoring Site - for \$199.00 - Sold Out 1. **Raspberry Pi** Model B, case and power supply. 2. GMC-200 **Geiger counter**. 3.

[Apollo-NG - PiGI - Raspberry Pi Geiger-Müller Interface](#)

[Shop for raspberry pi geiger counter on Google](#)

Sponsored ⓘ



[Netio Geiger Counter Board Gc08 \(assembled\)](#)
[Sbm-20 Arduino Raspberry Pi](#)

\$51.30 · eBay

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[Geiger Counter at Amazon](#)

www.amazon.com/ ▾

★★★★★ 378 reviews for amazon.com

Buy **geiger counter** at Amazon!

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More ideas

- Samba
- Remote print server
- LEGO robot
- Temperature sensor
- Light sensor
- Listen to aircraft transponders
- Spotify (Pi MusicBox)
- Control 3D printer

Resources

- learn.adafruit.com
- elinux.org
- instructables.com
- *Beginner's Guide to Raspberry Pi*
- *Raspberry Pi Hacks*
- Contact:
 - @suehle | ruth@redhat.com
 - @spotrh | spot@fedoraproject.org

Download slides:
rsuehle.fedorapeople.org/raspi

Get the book:
[http://oreil.ly/
raspberry_pi_hacks](http://oreil.ly/raspberry_pi_hacks)

