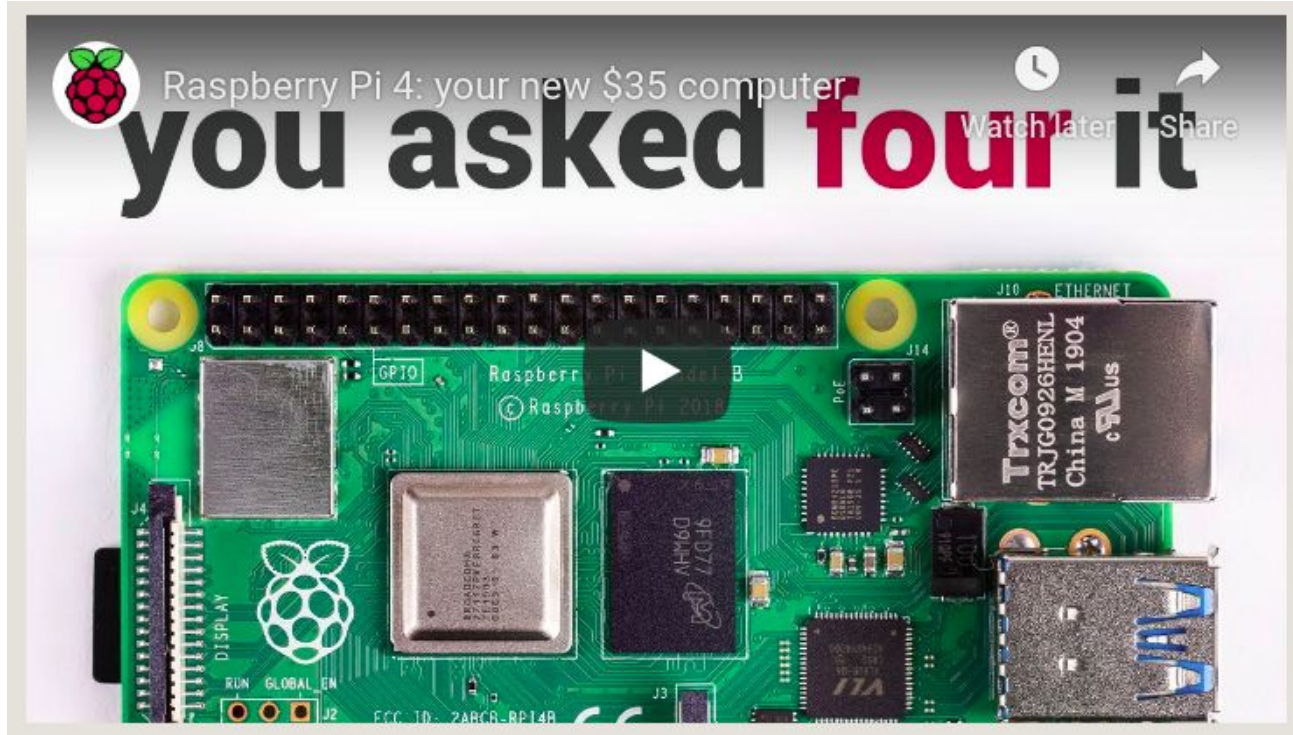# RPi4 - A First Look

A One-Jar Jam With Plenty of Ports

Brian DeLacey, BLU @ MIT, August 21, 2019 from 7:15 pm to 9:00 pm

Raspberry Pi Foundation Positioning

See https://www.raspberrypi.org/blog/raspberry-pi-4-on-sale-now-from-35/

Agenda

1. General Introduction to this thing called RPi - first ever "BLU RPi Jam"
2. History of the RPI
3. A side by side comparison with other RPi models
   a. View https://youtu.be/pOboAW5RqAg - Is the Raspberry Pi 4 really that bad? (It's great!)
4. A board level review of the main RPi4 components
   a. View https://youtu.be/eDnLIBhWxYI - RPi 4 vs 3. Benchmarked & Performance (It's fast!)
5. What's this thing called Raspbian?
6. Taking a look at a rack of RPis
7. Discussions: Throttling, GPIO, USB attachables and more
8. Test Drive - GUI, Terminal, discussion on performance
9. Audience Participation - What have attendees done with their RPis? What's the newest RPi4 really good for? What's missing? What's it offer?
10. Q&A

RPi4 BLU Jam

RPi Jam Map - https://www.raspberrypi.org/jam/

RPi Family History

| Family	Model	Form Factor	Ethernet	Wireless	GPIO	Released	Discontinued
Raspberry Pi 1	B	Standard (85.60 × 56.5 mm)	Yes	No	26-pin	2012	Yes
	A		No			2013	Yes
	B+		Yes			2014	
	A+	Compact (65 × 56.5 mm)	No			2014	
Raspberry Pi 2	B	Standard	Yes	No	40-pin	2015	
Raspberry Pi Zero	Zero	Zero (65 × 30 mm)	No	No		2015	
	W/WH			Yes		2017	
Raspberry Pi 3	B	Standard	Yes	Yes		2016	
	A+	Compact	No			2018	
	B+	Standard	Yes			2018	
Raspberry Pi 4	B (1GB)	Standard	Yes	Yes		2019[26]	
	B (2GB)						
	B (4GB)						

See https://en.wikipedia.org/wiki/Raspberry_Pi#Model_A

4 vs 3B+

RASPBERRY PI 3B+
VS. RASPBERRY PI 4.
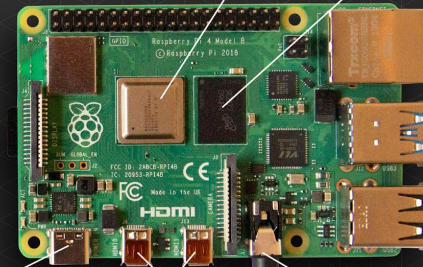
RASPBERRY PI 3B+
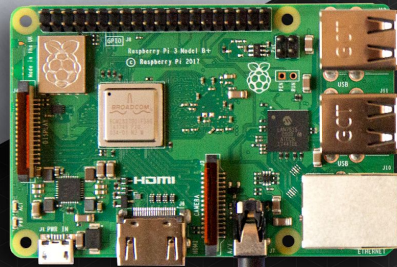
RASPBERRY PI 4

64-Bit Quad-Core ARM Cortex-A72 processor

4GB DDR4 SDRAM

Gigabit ethernet

USB 3.0

USB 2.0

USB C (for power)

Dual Micro HDMI

Audio jack

pi-top.com/kickstarter

Source: https://medium.com/pi-top/raspberrypi4-f38f12633345

Is the Raspberry Pi 4 really that bad? (in response to early "noise in the system")

Is the Raspberry Pi 4 really that bad?

In short, the answer is no.

"I can tell you with confidence, this thing is an absolute beast. … I am genuinely excited about the Raspberry Pi 4 performance, because it is actually really good."

Is the Raspberry Pi 4 really that bad? https://youtu.be/pOboAW5RqAg, Thomas Sanladerer

Raspberry Pi 4 vs 3. Benchmarked & Performance Tested.

Raspberry Pi 4 vs 3. Benchmarked & Performance Tested.

Some highlights from the Adafruit Review

- Fast! QuadCore 1.6, BCM2711 SoC, 64-Bit, quad core, ARM Cortex-A72 CPU at 1.5GHz
- Power? 3AMP / 5V (cameras / displays / heat spreader) "you shouldn't need a heat sink, but.."
- 1GB / 2GB / 4GB LPDDR4 Ram
- USB3 (x2) super fast and USB2 (x2)
- USB-C
- microHDMI (x2) 4K at 60 fps
- Power port is USB-C
- DSI Display (no change)
- Camera Connector (no change)
- Classic Audio / Video NTSC / Pal - 3.5mm stereo audio and composite video
- Gigabit ethernet (first time - better for NAS - processor upgrade)
- WiFi and Bluetooth (802.11b/g/n/ac WiFi and Bluetooth 5.0 - Broadcam chip)
- Rasbpian Buster
- GPIO Backwards Compatible (with a little bit more)
- Need a new case

Adafruit - Raspberry Pi 4 Model B is here!

https://youtu.be/VpG9r7CMTYs, See also https://youtu.be/CXCjpJasvG0

What's it good for?

According to Lady Ada

"This is basically a full PC. This is two to three times faster than the Pi 3B+. … People will really enjoy being able to do video, audio … it could do a lot of machine learning stuff maybe without an accelerator … doing video machine learning, audio, maybe even computer some models … the dual HDMI is pretty cool."

Hey, Buster! (It's an OS)

Buster – the new version of Raspbian

187 Comments

Amid all the furore about the release of a certain new piece of hardware, some people may have missed that we have also released a new version of Raspbian. While this is required for Raspberry Pi 4, we've always tried to maintain software backwards-compatibility with older hardware, and so the standard Raspbian image for all models of Raspberry Pi is now based on Buster, the latest version of Debian Linux.
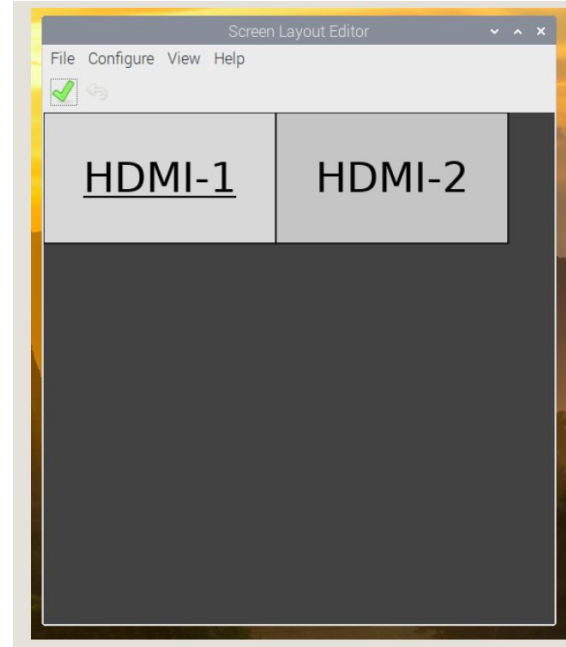
Why Buster?
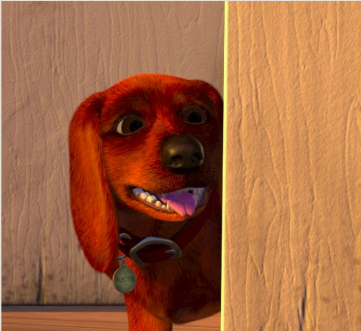
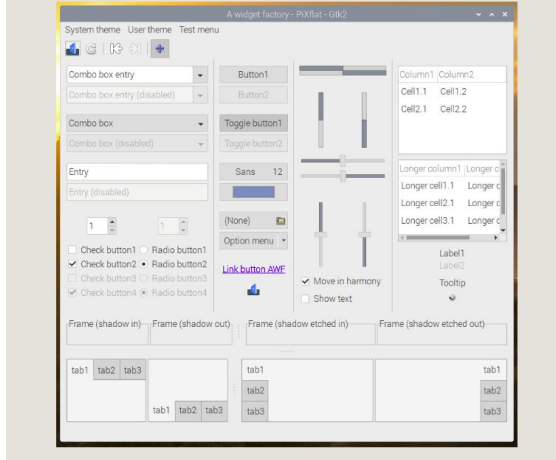"There are no huge differences between Debian Stretch and Debian Buster. In a sad reflection of the way the world is nowadays, most of the differences are security changes designed to make Buster harder to hack. Any other differences are mostly small incremental changes that most people won't notice, and this got us thinking..."

https://www.raspberrypi.org/blog/buster-the-new-version-of-raspbian/

Buster gets a new look

https://www.raspberrypi.org/blog/buster-the-new-version-of-raspbian/

Growing Number of Reviews

https://www.yodeck.com/news/the-raspberry-pi-4-ultimate-review/

Toms Hardware - https://www.tomshardware.com/reviews/raspberry-pi-4-b,6193.html

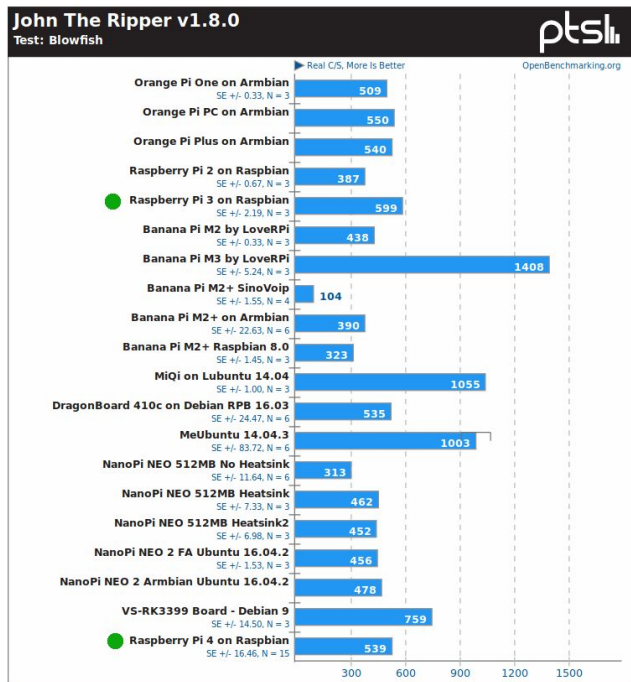Learn by Making - https://medium.com/pi-top/raspberrypi4-f38f12633345

TechRepublic   https://www.techrepublic.com/article/raspberry-pi-4-model-b-review-this-board-really-can-replace-your-pc/

TechRepublic: The new Raspberry Pi 4 is "basically a PC"

Raspberry Pi 4 Model B review: This board really can replace your PC

Benchmarks

John The Ripper v1.8.0
Test: Blowfish

ptsl

▶ Real C/S, More Is Better   OpenBenchmarking.org

Board	Score
Orange Pi One on Armbian — SE +/- 0.33, N = 3	509
Orange Pi PC on Armbian — SE +/- 0.33, N = 3	550
Orange Pi Plus on Armbian	540
Raspberry Pi 2 on Raspbian — SE +/- 0.67, N = 3	387
🟢 Raspberry Pi 3 on Raspbian — SE +/- 2.19, N = 3	599
Banana Pi M2 by LoveRPi — SE +/- 0.33, N = 3	438
Banana Pi M3 by LoveRPi — SE +/- 5.24, N = 3	1408
Banana Pi M2+ SinoVoip — SE +/- 1.55, N = 4	104
Banana Pi M2+ on Armbian — SE +/- 22.63, N = 6	390
Banana Pi M2+ Raspbian 8.0 — SE +/- 1.45, N = 3	323
MiQi on Lubuntu 14.04 — SE +/- 1.00, N = 3	1055
DragonBoard 410c on Debian RPB 16.03 — SE +/- 24.47, N = 6	535
MeUbuntu 14.04.3 — SE +/- 83.72, N = 6	1003
NanoPi NEO 512MB No Heatsink — SE +/- 11.64, N = 6	313
NanoPi NEO 512MB Heatsink — SE +/- 7.33, N = 3	462
NanoPi NEO 512MB Heatsink2 — SE +/- 6.98, N = 3	452
NanoPi NEO 2 FA Ubuntu 16.04.2 — SE +/- 1.53, N = 3	456
NanoPi NEO 2 Armbian Ubuntu 16.04.2	478
VS-RK3399 Board - Debian 9 — SE +/- 14.50, N = 3	759
🟢 Raspberry Pi 4 on Raspbian — SE +/- 16.46, N = 15	539

(x-axis: 300 600 900 1200 1500)

```
7   Run Began: Mon Jun 24 20:45:40 2019
8
9   Command line used: iozone -e -I -a -s 100M -r 4k -r 16k -r 512k -r 1024k -r 16384k -i 0 -i 1 -i 2
10  Output is in kBytes/sec
11  Time Resolution = 0.000001 seconds.
12  Processor cache size set to 1024 kBytes.
13  Processor cache line size set to 32 bytes.
14  File stride size set to 17 * record size.
15                                              random   random   bkwd    record   strid
    e
16           kB    reclen   write  rewrite   read    reread   read    write   read   rewrite   read  fwrite
    frewrite  fread  freread
17       102400      4    22017   26219    26320   26983    518    1113
18       102400     16    74339   80166    85491   84292    2204   6957
19       102400    512    92358   91388    94616   96972    35399  53793
20       102400   1024    92372   92300    96088   97583    53058  66673
21       102400  16384    92204   92644    94833   96150    88518  89131
22
23  iozone test complete.
```

So around 94MB/s read and 92 MB/s write that's about what we should expect from USB 3.0 with this drive, and much better than the 30+MB/S one would get with Raspberry Pi 3.

REF https://www.cnx-software.com/2019/06/24/raspberry-pi-4-benchmarks-mini-review/

Commercial Pi

"Commercial users make up around 50% of end customers who are purchasing Raspberry Pis.

But what are companies doing with these Pis?

Are they ready to be deployed at a large scale or are the projects mainly pilots?

Is the Raspberry Pi really ready for industrial applications?

Our latest post contains a brief history of the Raspberry Pi, reasons why commercial users are deploying them in their processes and facilities, and some examples of Raspberry Pis being used in commercial projects."

See https://blog.temboo.com/raspberry-pi-iot

It's funny ...

"It's funny how the mouse is bigger then the computer itself"

-   Bob Bobbins

According to Explaining Computers, "the Pi has struggled with streaming video in a browser .. we aren't going to have that problem anymore"

Source:

Explaining Computers, Comment Section
Raspberry Pi 4 Model B
https://youtu.be/CXCjpJasvG0

Boots at 5.1V and 900 milliamp (0.9 A)

#270 The Raspberry Pi4: The good, the bad & the ooops! // Review

From the comments, "My pi 3b+ can't even boot at 5volt 1amp. The pi 4 can though. That's impressive."

NOTE: Other reviews suggest 1.8A as an operating floor

#270 The Raspberry Pi4: The good, the bad & the ooops! // Review
https://www.youtube.com/watch?v=AHIId3cjmTM, 9:31

Incorruptable
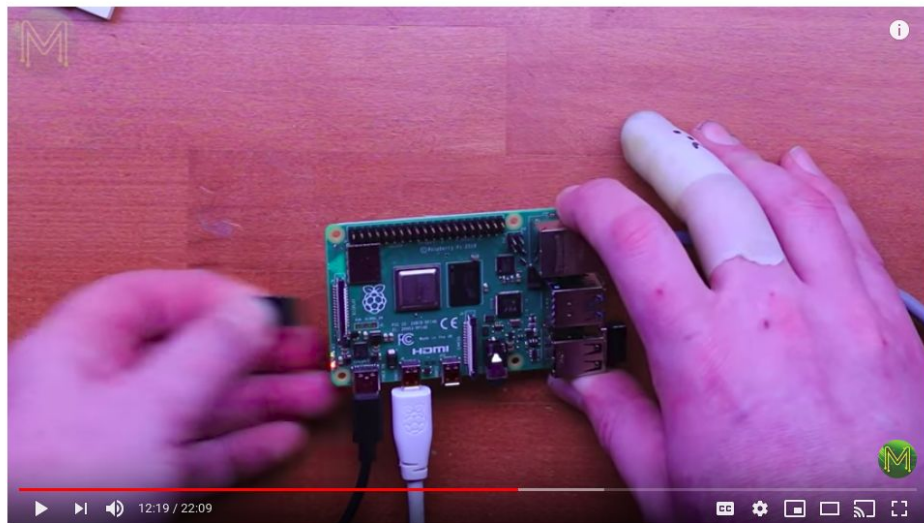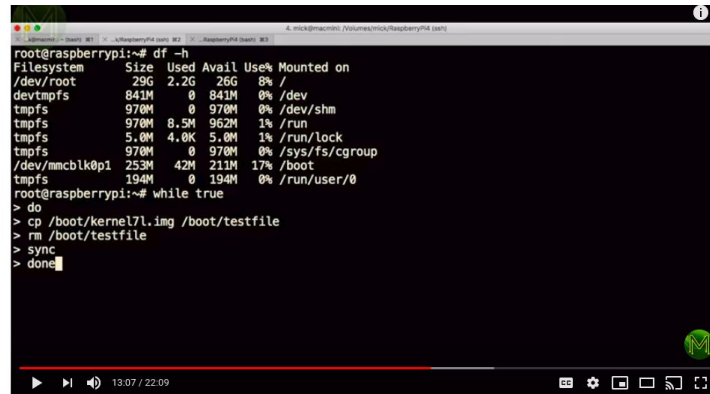
#270 The Raspberry Pi4: The good, the bad & the ooops! // Review
https://www.youtube.com/watch?v=AHIId3cjmTM, 12:18
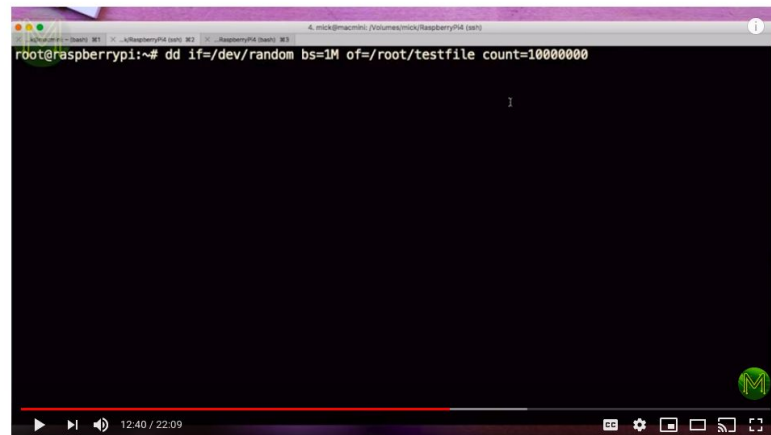
What's the one thing you can't get the RPi4 to do?

"I'm really having a hard time trying to get this thing to die. Maybe if I write to the MS DOS boot partition?"

Turning power off, pulling SD Card out during read / write...

"I really can't get this card to be corrupted in any way. I tried writing to the SD Card Boot partition continuously. I've tried writing to the Linux file system - shutting it down, starting it up multiple times … I just cannot get this SD Card to be corrupted. So I think that's a bit of a winner … they've managed to solve the SD Card corruption issue."

From the comments,

"I'm impressed by your abrasive corruption test, claps, that alone is all I've ever wanted."

#270 The Raspberry Pi4: The good, the bad & the ooops! // Review
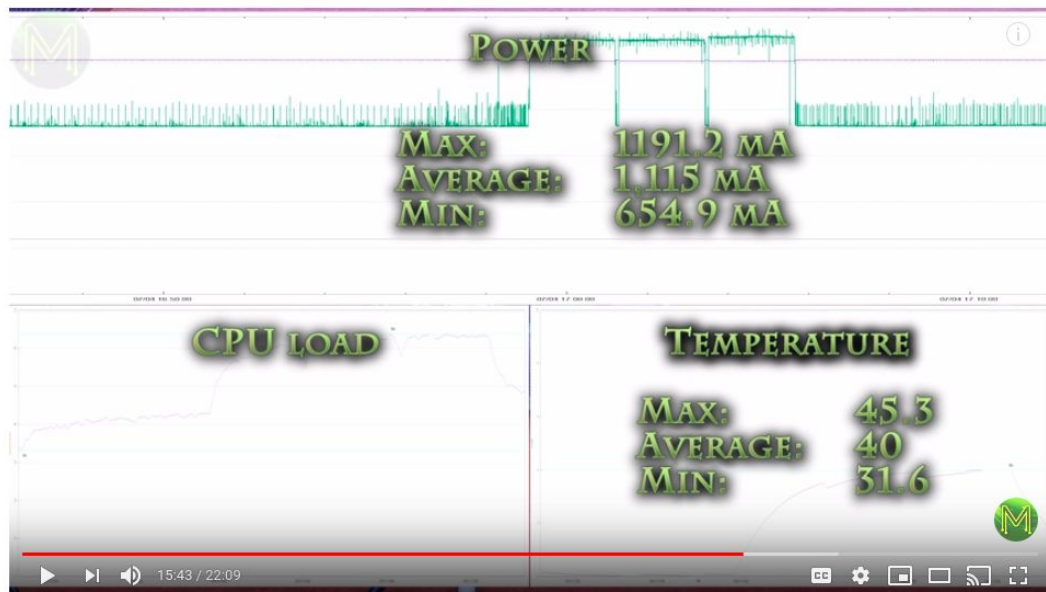https://www.youtube.com/watch?v=AHIld3cjmTM, 13:18

How hot is it?

63.8 celsius without heat sink

45.3 celsius with heat sink

"The RPI4 was able to cope with getting up to 63 - 64 degrees celsius and still sort of chugging along so that's pretty good."

NOTE: Other reviews indicate it gets hotter under heavy, synthetic load conditions but throttles back speed / power to help reduce temperature.

#270 The Raspberry Pi4: The good, the bad & the ooops! // Review
https://www.youtube.com/watch?v=AHIld3cjmTM, 15:30

Installation

https://www.raspberrypi.org/downloads/raspbian/

Raspbian Buster with desktop and recommended software

https://www.raspberrypi.org/downloads/raspbian/

Etcher - https://www.balena.io/etcher/

Tron Resources (a momentary flashback)

Zen - http://cinemajam.com/mag/features/philosophy-of-tron

Legacy - Trash or Truth? https://www.denofgeek.com/us/movies/16835/the-james-clayton-column-tron-philosophy

Miracles in the most preposterous - https://slackersbazaar.wordpress.com/2012/01/19/the-philosophy-of-tron/

Transhumanism - https://medium.com/@wanderingskull/messing-with-my-zen-thing-man-transhumanism-and-the-philosophical-implications-of-tron-legacy-18fa811fb1b7

Wiki says - https://en.wikipedia.org/wiki/Tron

Interview with Bonnie MacBird (note the Boston connection)
https://mediamikes.com/2011/09/interview-with-trons-bonnie-macbird/

RPi Safeguarding Page

AN IMPORTANT NOTE - https://www.raspberrypi.org/safeguarding/

The Raspberry Pi Foundation believes that a child, young person, or vulnerable adult should never experience abuse of any kind.

We have a responsibility to promote the welfare of all children, young people, and vulnerable adults, and to keep them safe. We are committed to follow practices that protect them. These practices are laid out in our safeguarding policy.

Safeguarding resources for you
Find practical advice on safeguarding
Complete our free safeguarding e-learning module
Use our best practise guidance for volunteers and staff
Code of behaviour for Raspberry Pi activities
Guidelines for social media and communications
Report safeguarding concerns to us using our safeguarding report form; if you have an urgent safeguarding concern, please call our 24-hour telephone support service
For the whole world: +44 (0) 203 6377 112
For the UK only: +44 (0) 800 1337 112

To reach out to us regarding safeguarding, please email safeguarding@raspberrypi.org.