Mac Pro Late 2013 Teardown

Teardown of the Mac Pro Late 2013 on December 30, 2013.

Written By: Andrew Optimus Goldheart

INTRODUCTION

After making its debut during the WWDC 2013 Keynote, the reimagined, reformulated Mac Pro finally arrived at iFixit's doorstep. Join us as we turn the (very) Late 2013 Mac Pro inside-out.

Follow us on Twitter, Instagram, and Facebook for all the latest news and updates!

[video: https://www.youtube.com/watch?v=h5_-sYIOD6M]

🔧 TOOLS:

- T5 Torx Screwdriver (1)
- T7 Torx Screwdriver (1)
- T8 Torx Screwdriver (1)
- TR9 Torx Security Screwdriver (1)
- T10 Torx Screwdriver (1)
- Spudger (1)

This document was generated on 2020-11-15 07:05:14 AM (MST).

Step 1 — Mac Pro Late 2013 Teardown

- The new Mac Pro has been released, and we've managed to get our hands on the entry-level model, "inexpensively" priced at *$2,999*.

- Tech Specs:
  - Quad-Core Intel Xeon E5 with 10 MB L3 cache and Turbo Boost up to 3.9 GHz
  - 12 GB (three 4 GB modules) of 1866 MHz DDR3 ECC memory
  - Dual AMD FirePro D300 graphics processors with 2 GB of GDDR5 VRAM each
  - 256 GB PCIe-based flash storage
  - 802.11ac Wi-Fi wireless networking and Bluetooth 4.0 wireless technology

This document was generated on 2020-11-15 07:05:14 AM (MST).

Step 2

- Contrary to popular belief, the new Mac Pro is closer in design to an aluminum beverage can than a trash can. (Not that there's anything wrong with trash cans—some of our favorite astromech droids are shaped like trash cans.)

- The back side (if a cylinder can have a back side) contains the power button and electrical inlet, as well as a tidy array of ports:

  - 3.5 mm speaker and headphone jacks

  - Four USB 3.0 ports

  - Six Thunderbolt 2 ports

  - Dual Gigabit Ethernet ports

  - HDMI 1.4 out

- Looks like neither trash nor fixer can get in through the top of this bin. Time to investigate that enticing lock switch...

Step 3

- Here's a strangely un-Apple-like design choice: simply sliding the lock switch allows us to remove the outer casing of the Mac Pro. No stubborn pentalobe screws here!

- What other improved repairability features will we find in this ~~soda can~~ desktop computer? Only time and spudgers will tell.

  - (i) We're sincerely hoping it's [more cowbell](#).

Step 4

- With the cylindrical cover removed, we get our first peek inside the Mac Pro.

- The dual graphics cards dominate the initial view. Their symmetry is broken only by the SSD cage nestled up alongside the second graphics card.

- Giving the Mac Pro a little spin, we find neatly positioned vertical RAM slots at either side of the I/O panel.

This document was generated on 2020-11-15 07:05:14 AM (MST).

Step 5
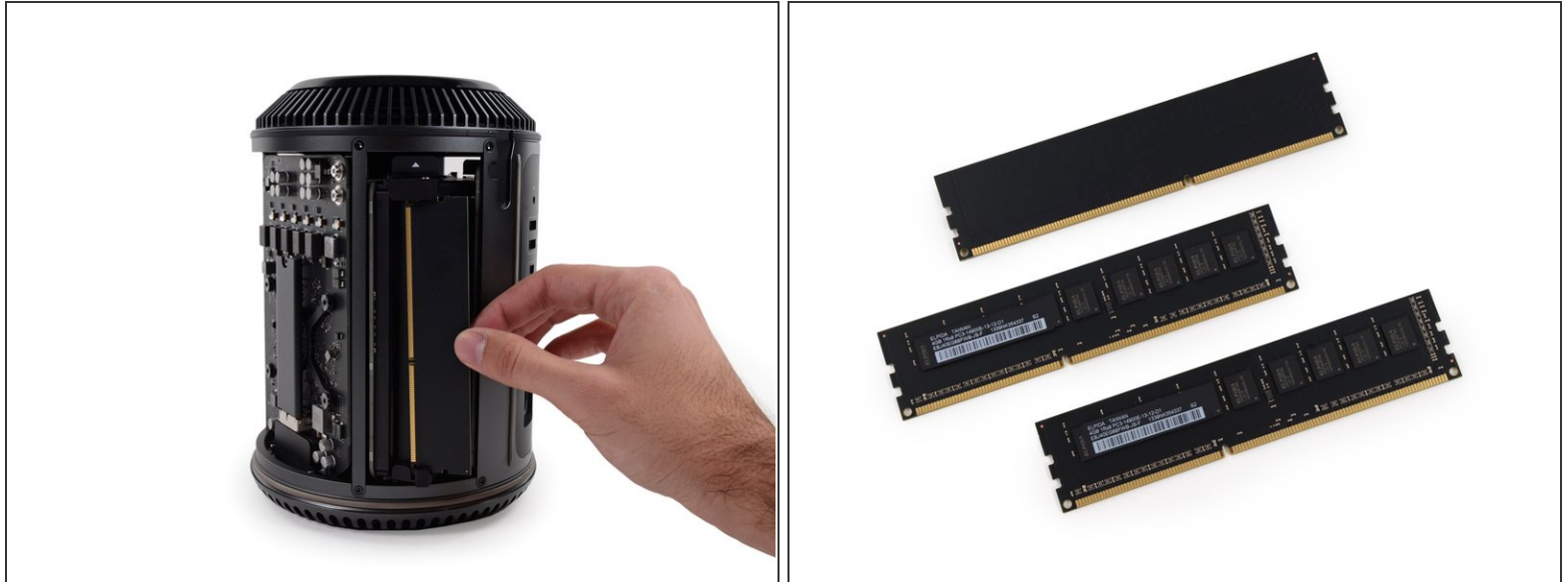
- [Good news, everyone!](#) The RAM in the Mac Pro Late 2013 is easily accessible and replaceable.

- The 4 GB DDR3L SDRAM (three for a total of 12 GB) modules are labeled as Elpida EBJ04EG8BFWB-JS-F.

- According to Apple, the RAM in the Mac Pro is configurable to 16 GB (four 4 GB), 32 GB (four 8 GB) or 64 GB (four 16 GB).

Step 6

- With a twist of a T8 screwdriver, the SSD assembly is easily removed from the device.
  - ⓘ For those playing along at home, we have only removed one screw, and the SSD is out. (Side note: the screw wasn't even proprietary!)

- On board we find some rather familiar friends:
  - Samsung S4LN053X01-8030 (ARM) Flash Controller

  - Samsung K9HFGY8S5C-XCK0 Flash Storage

  - Samsung K4P4G324EB 512 MB RAM

- This combination of hardware makes the Mac Pro's SSD suspiciously similar to those we've seen in the latest refresh of MacBook Pro Retina and MacBook Air.
  - To the point that only the last few digits of the model numbers are any different. Hmmm...

Step 7

- Regulatory markings have been relegated to the bottom cover/air inlet, where we find a few more informative tidbits:

  - The Mac Pro Late 2013 is identified as model A1481 with an EMC Number of 2630...

  - ...and it's rated for 100-240 volts AC, making it a willing international travel partner.

- [There can only be one](#) fan. The Mac Pro is vented by a single fan, which pulls air from under the case, through the core, and out the top of the case.
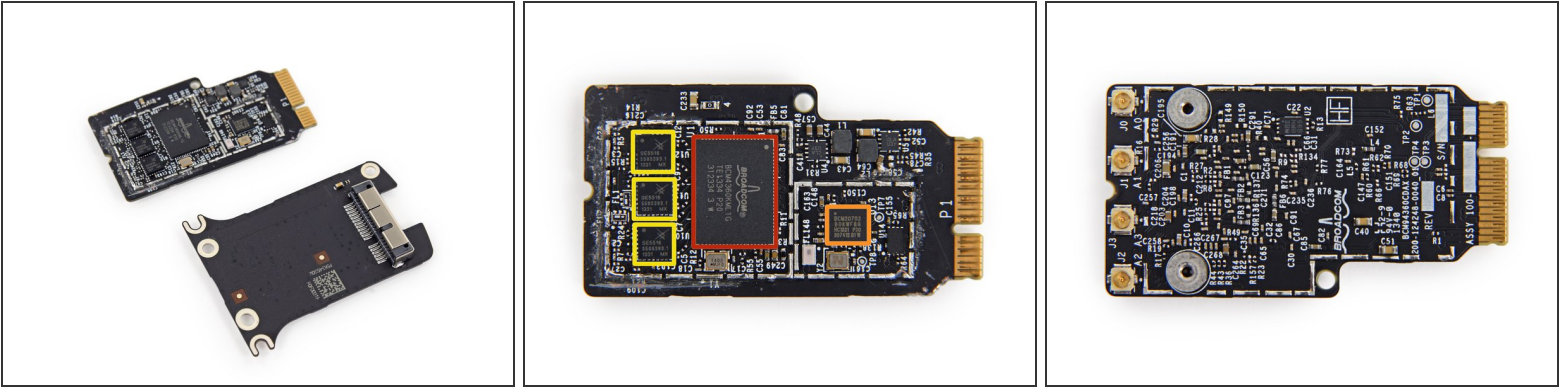
Step 8

ⓘ **Teardown update:** You asked, we answered. We popped the plastic roof off the fan module and found a whole new stash of precision engineering.

- Snug in a nest of antennas, the AirPort card fits onto a small adapter board that also connects to the fan below.

- Those three large screws secure the fan, with vibration-dampening rubber bumpers, like we've seen in iMacs.

Step 9

- More deja vu as we uncap the AirPort card and find what looks to be the same configuration found in most Apple products today:

  - Broadcom BCM4360 5G Wi-Fi 3-stream 802.11ac gigabit transceiver

  - Broadcom BCM20702 single-chip Bluetooth 4.0 HCI solution with Bluetooth Low Energy (BLE) support

  - Skyworks SE5516 dual-band 802.11a/b/g/n/ac WLAN front-end modules

Step 10

- The gold antenna array pops out, and sees all.

- With the fan released, it looks to be powered by a Nidec brushless DC motor, model number AG720K01.

- The motor controller IC is an Allegro Microsystems A5940LPT Three Phase Sensorless Sinusoidal Fan Driver.

- (i) We noticed a few cavities around the edges of the impeller filled with some sort of epoxy (on both sides). We suspect it's for fine-tuned balancing, to keep the fan running smooth and quiet.

Step 11

- A view from above: The Mac Pro utilizes a giant triangular heat sink ("Thermal Core"), shared by the dual graphics cards and CPU.

- ⓘ Looks like the Mac Pro has taken some design pointers from the recent AirPort Extreme and Time Capsule bodies: a thin, vertical design with individual boards on separate sides.

- We use our spudger to pry the graphics card data connectors from their sockets. This FCI Meg-Array connector is the same type used for the G4 & G5 PowerPC processor daughtercards, and looks to be a fully custom way of hooking up PCI-E, with many pins in a pressed-in connector.

www.iFixit.com

Step 12

- With the Mac Pro's structure dominated by the central heat sink, we'd best start by peeling parts off.

- A clamp and four screws hold each of the dual AMD FirePro D300 graphics cards in place.

- Amidst the usual processing power and cost comparison with a similar home-built desktop PC, these graphics cards may be the key to Apple finally undercutting homebrew systems on a pure power basis.

- ⓘ While this stacks up fairly well for current Apple GPU offerings, the proprietary nature, and lack of an elegant external GPU option, may age this device before its time.

Step 13
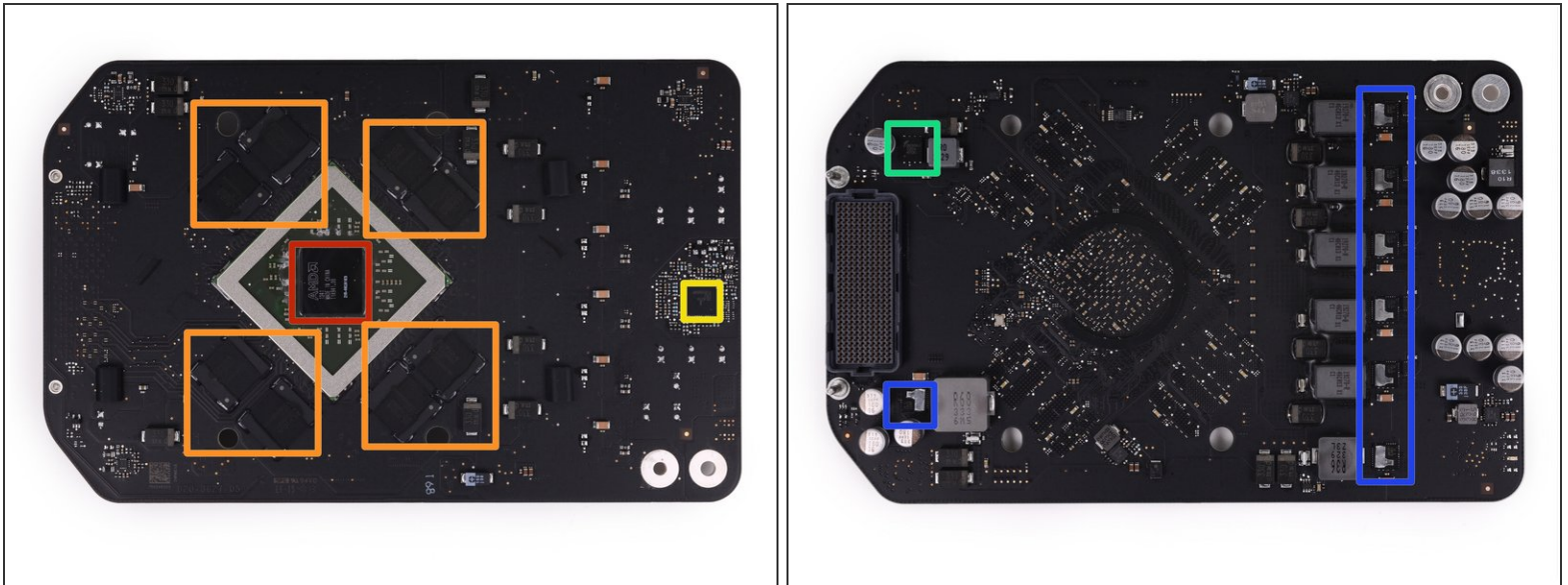
- The back side of each graphics card contains:
  - AMD FirePro D300 graphics processor
  - Elpida [W2032BBBG](#) 2 GB (8 x 2 Gb = 16 Gb = 2 GB) GDDR5 VRAM
  - Intersil [ISL 6336](#) 6-Phase PWM Controller with Light Load Efficiency Enhancement and Current Monitoring
- The front side has the following ICs:
  - Fairchild Semiconductor DD30AJ
  - International Rectifier [IR3575](#) Synchronous Buck Gate Driver with integrated MOSFET and Schottky diode

Step 14
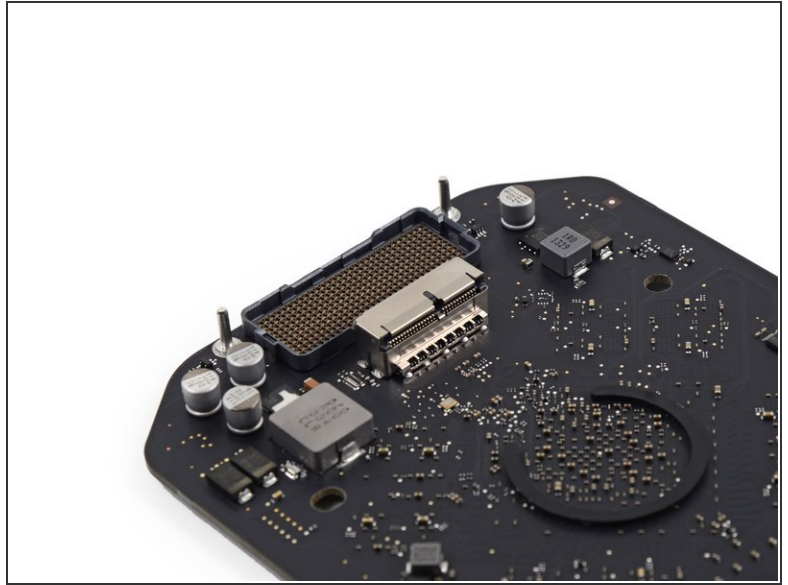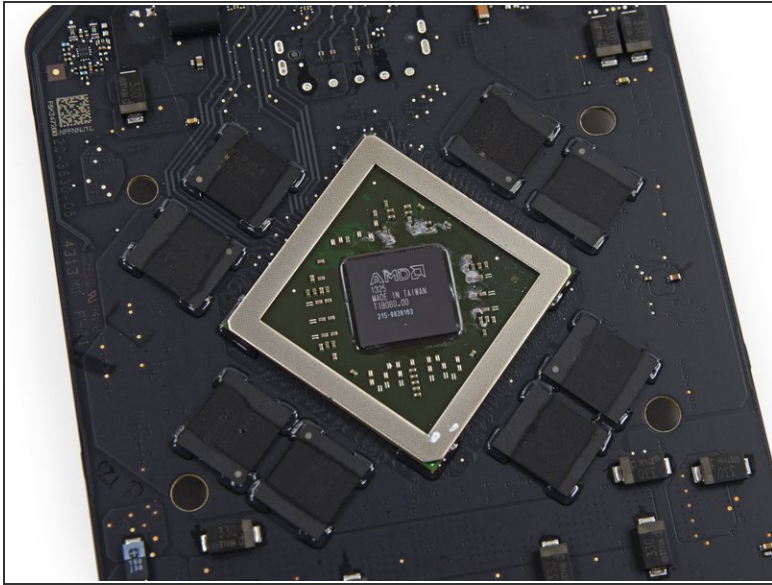
- But wait, there's *more.* Just one more: a second, slightly different FirePro card.

- (i) This GPU—same make and model—hails from Taiwan, unlike its Chinese-made twin.

- The other important difference to note is that this card (and only this card) hosts the slot for the SSD. This seems to us like a potential opportunity for expansion—perhaps higher storage configurations make use of two of this variety, for doubling up on SSDs?

Step 15

- The FirePro bone's connected to the... um...

- A novel disc-shaped daughterboard ties everything together at the base of the machine. Having spudgered away the ribbon cables, we flip it over for a closer look.

- Dominated by inscrutable proprietary connectors, we can only hope the ICs on this interconnect board will tell us more about its purpose.

Step 16
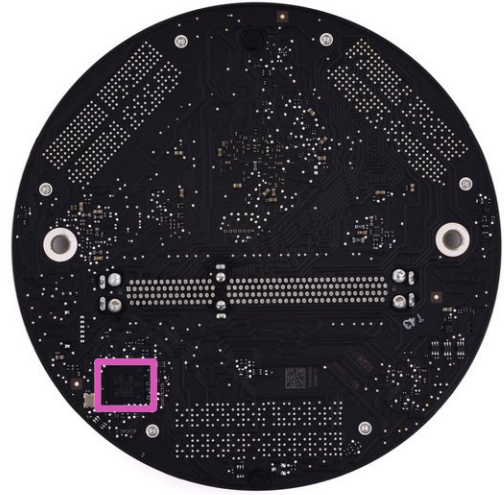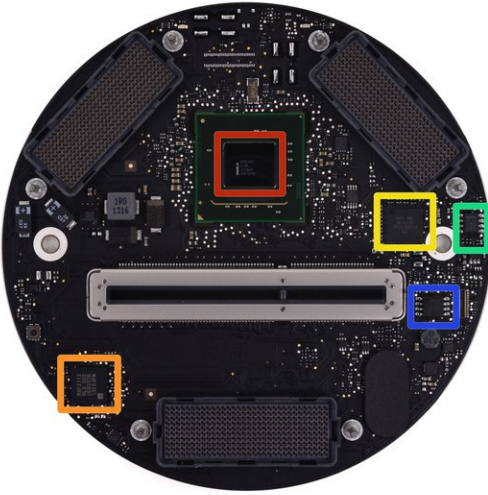
- The logic board, dual graphics cards, and I/O port board all connect to this single board.

- Wrangling all that data requires a small posse of ICs. We find:

  - Intel BD82C602J Platform Controller Hub

  - Renesas R4F2113NLG H8S/2113 16-Bit Microcontroller

  - ICS 932SQL435AL 3817528F

  - Texas Instruments LM393 Dual Differential Comparator

  - MXIC 25L6406E 64M-BIT CMOS Serial Flash

- The back of the daughterboard features the same 980 YFC LM4FS1BH System Management Controller found in the Mid 2013 MacBook Air refreshes.

Step 17

- Pulling up a black cover grille, we discover where Apple hid the power supply: it's sandwiched between the I/O panel and the logic board.

- The power supply's connecting cables are cleverly conceived, but a bit tricky to remove. Our handy Torx driver is helpful here...

- ...and with that, the I/O board and power supply peel away as a unit.

Step 18
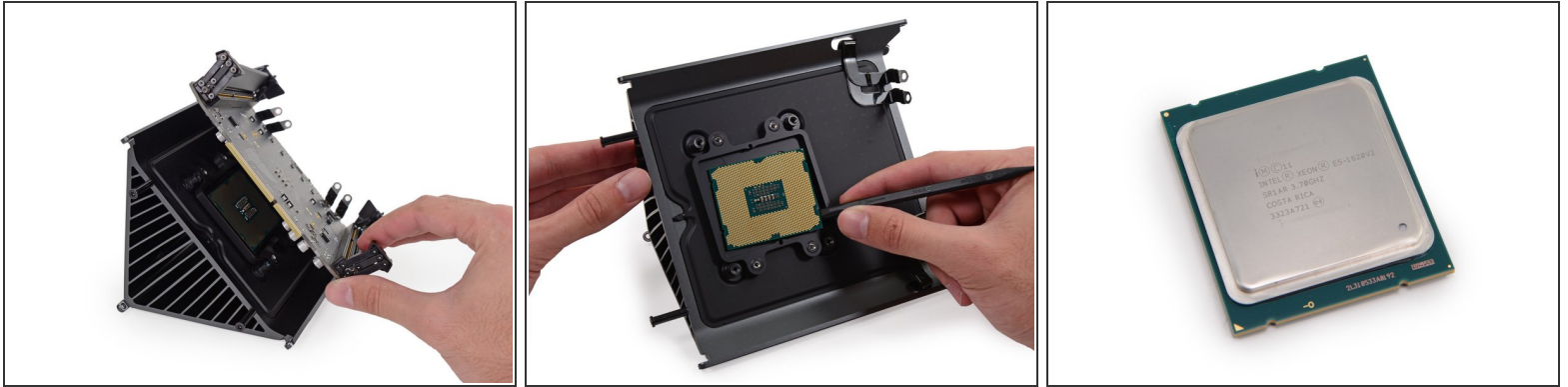
- The logic board is the next logical step. The CPU is the last to go, left clinging to the side of the heat sink via a thin smear of thermal paste.

- After teasing it away with a spudger, we decipher its markings:

  - Quad-Core Intel Xeon E5-1620 v2 with 10 MB L3 cache, clocked at 3.7 GHz, Turbo Boost up to 3.9 GHz.

- While it took a bit of a trek, a CPU upgrade appears entirely possible—and well worth it, with an alleged cost savings of $1050 for an upgrade to 12 cores.

Step 19
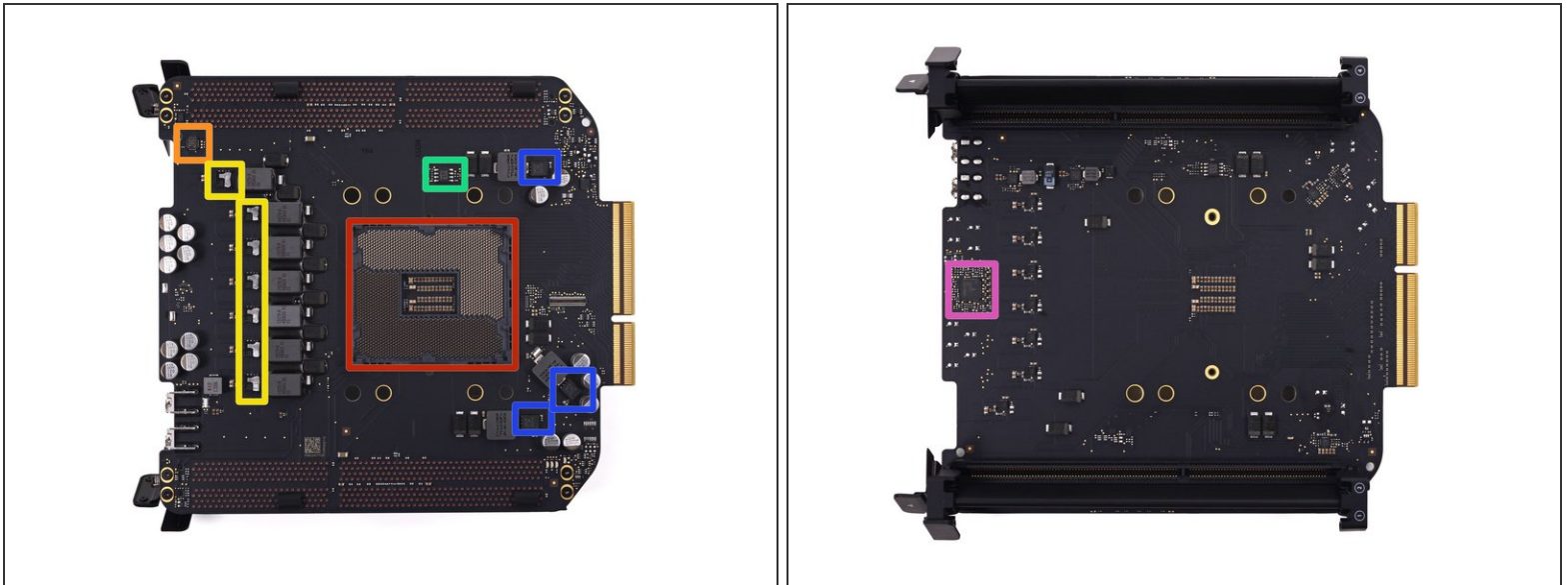
- Let's identify the ICs on the rear of the logic board:
  - LGA 2011 (Socket R) CPU socket
  - Microchip EMC1428 8-Channel Temperature Sensor Monitor
  - International Rectifier IR3575 Synchronous Buck Gate Driver with integrated MOSFET and Schottky diode
  - NXP PA9517A Level Translating I2C-Bus Repeater
  - Texas Instruments 58872D
- The front side of the logic board:
 - Intersil ISL 6367 Hybrid Digital Dual PWM Controller

Step 20
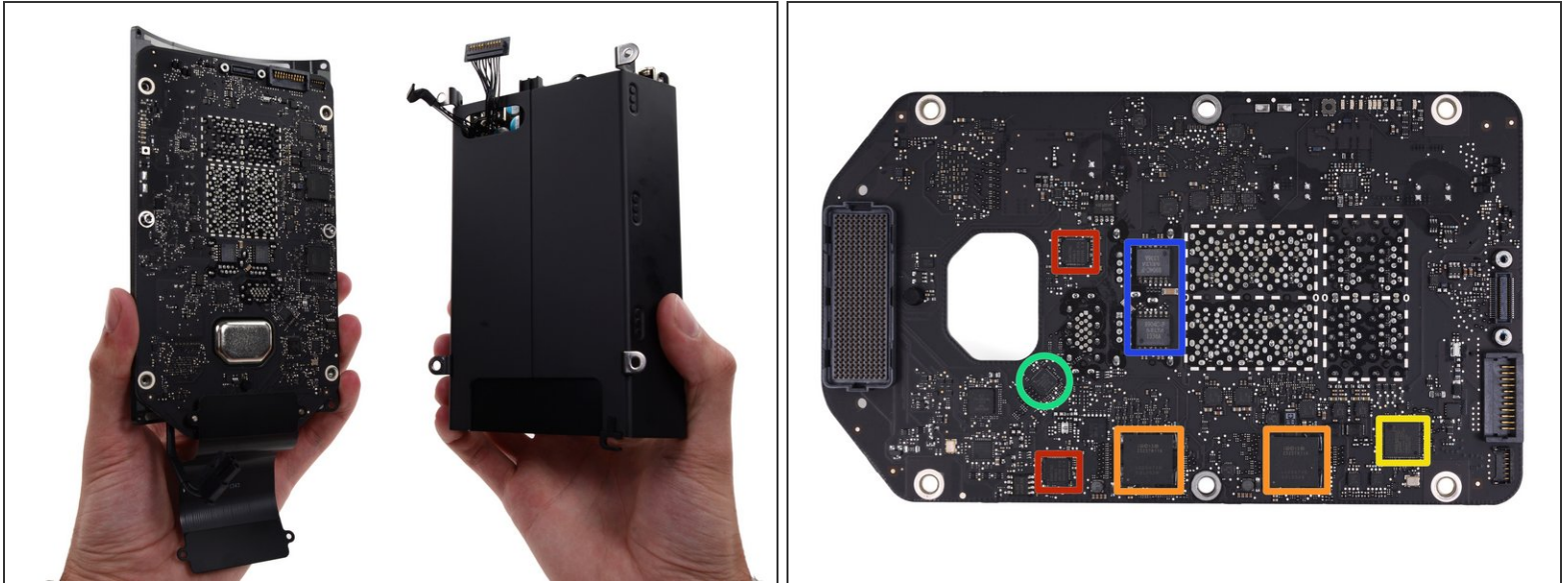
- Hard to port! Port board, that is.

- Notable ICs on the back of the port board:

  - Broadcom BCM57762 Gigabit Ethernet Controller

  - Intel DSL5520 Thunderbolt 2 Controller

  - Fresco Logic FL1100 4-port USB 3.0 Host Controller

  - Parade PS8401A HDMI Jitter Cleaning Repeater

  - Delta 8904C-F

Step 21
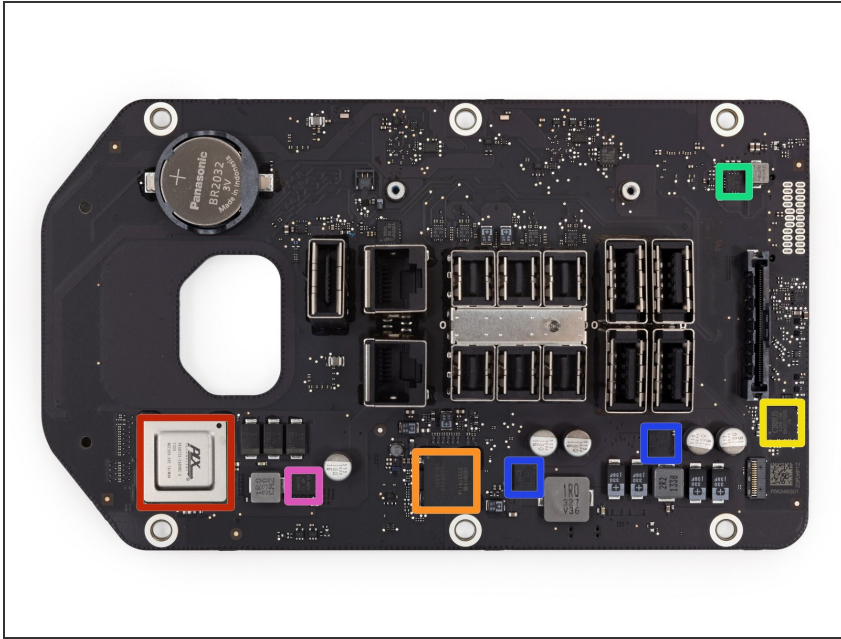
- The front side of the port board:
  - PLX Technology PEX8723 [PCI Express Switch](#)
  - Intel [DSL5520](#) Thunderbolt 2 Controller
  - Cirrus 4208-CRZ Audio Codec (seen in the [MacBook Pro 15" Retina Display](#))
  - Intersil 14AIRZ F335QV
  - Texas Instruments 58888D
  - Texas Instruments 58872D
- Also along for the ride is a standard BR2032 CMOS battery.

Step 22
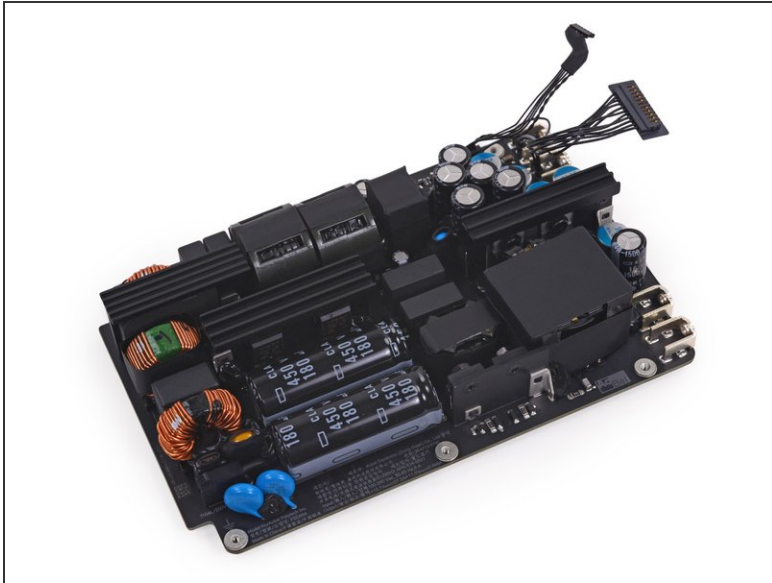
- With a rated output of 12.1 Volts and 37.2 Amps, we're looking at a 450 Watt power supply. The power supply has no dedicated cooling, and relies on the main system fan to keep cool—allowing the Mac Pro to idle at a whisper-quiet 12 dBA.

  - (i) For comparison, we found a 450 Watt PSU in our recent Steam Machine teardown. The Steam Machine's SilverStone power supply featured a "silent running 80 mm fan with 18 dBA minimum."

- And a quick look at what's left on the behemoth of a heat sink: Heavy gauge, flat power cables run from the PSU to the logic board and graphics cards, and remain intertwined in the heat sink.

Step 23
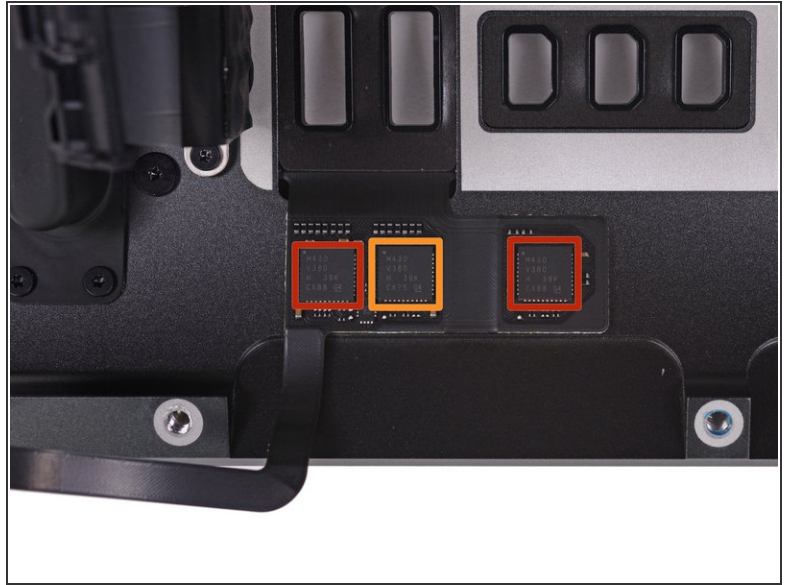
- With the I/O panel cover belly-up, we spot one last trio of unidentified ICs, labeled as follows:
  - Two M430 V380 H 39K CX88 G4
  - One M430 V380 H 39K CX7S G4

- We speculate they may be Texas Instruments [MSP430](#) 16-bit Microcontrollers.

Step 24

- Mac Pro Late 2013 Repairability Score: **8 out of 10** (10 is easiest to repair)

- For being so compact, the design is surprisingly modular and easy to disassemble. Non-proprietary Torx screws are used throughout, and several components can be replaced independently.

- The easily-opened case is designed to make RAM upgrades a snap.

- The fan is easy to access and replace.

- While it will require a bit of digging, the CPU is user-replaceable—meaning intrepid fixers should be able to save considerably by upgrading from the base-level processor configuration.

- There is no room, or available port, for adding your own internal storage. Apple has addressed this with heaps of Thunderbolt, but we'd personally rather use the more widely compatible SATA if we could.

- With some proprietary new connectors and tight cable routing, working on this $3,000 device without a repair manual could be risky.

To reassemble your device, follow these instructions in reverse order.