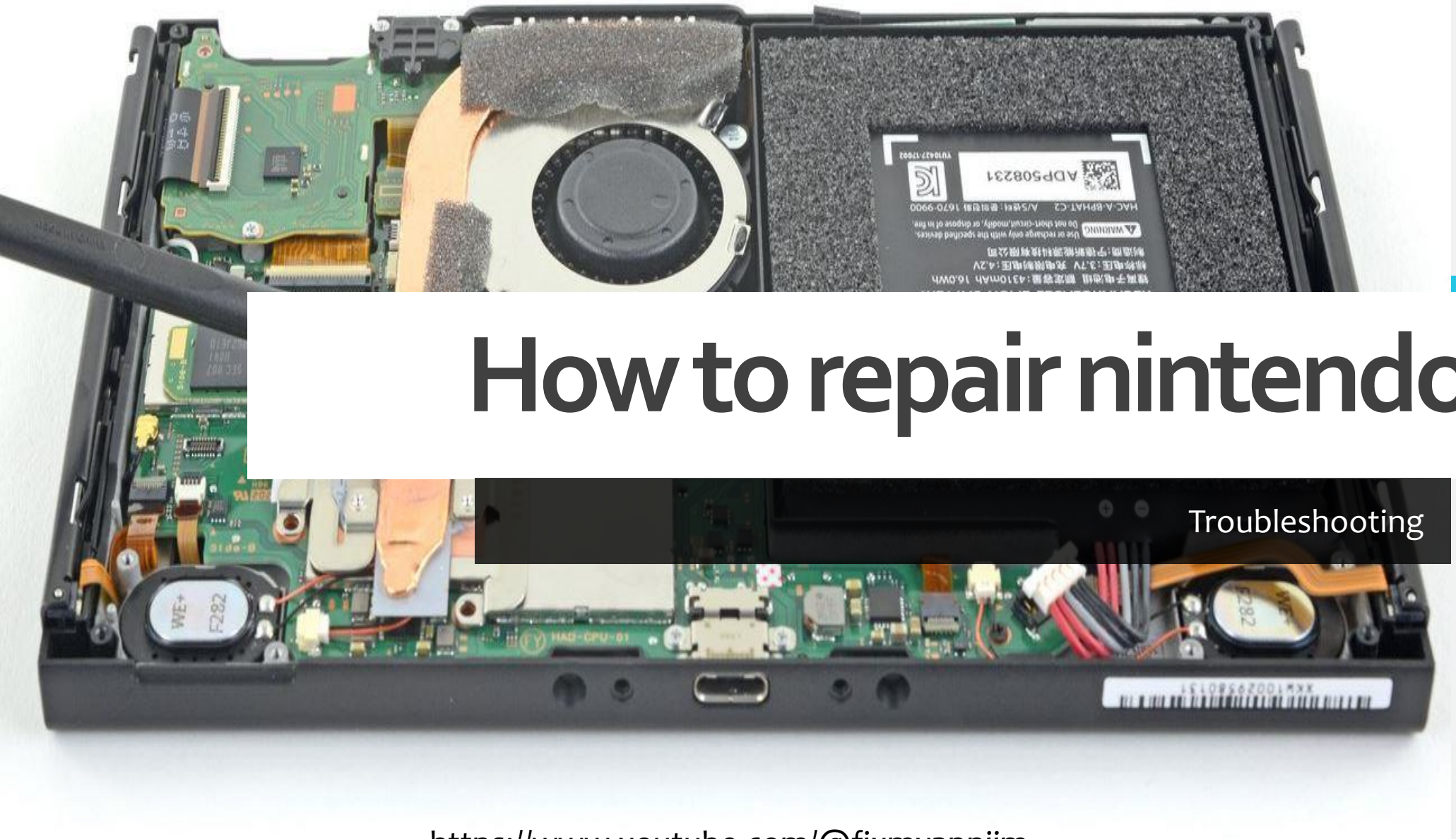


How to repair nintendo switch

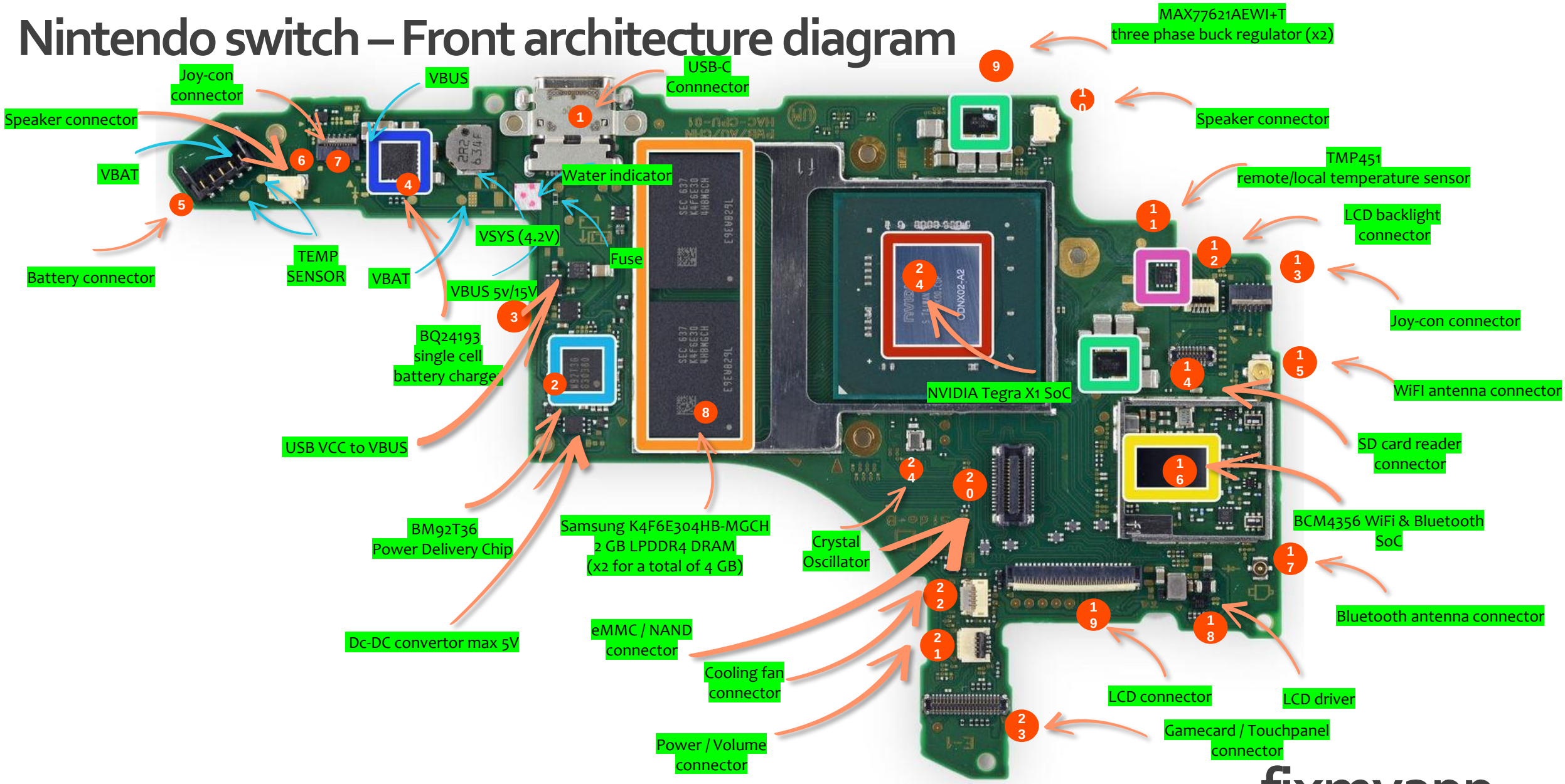
Troubleshooting

https://www.youtube.com/@fixmyappjim

fixmyapp
Research

Image source: ifixit.com

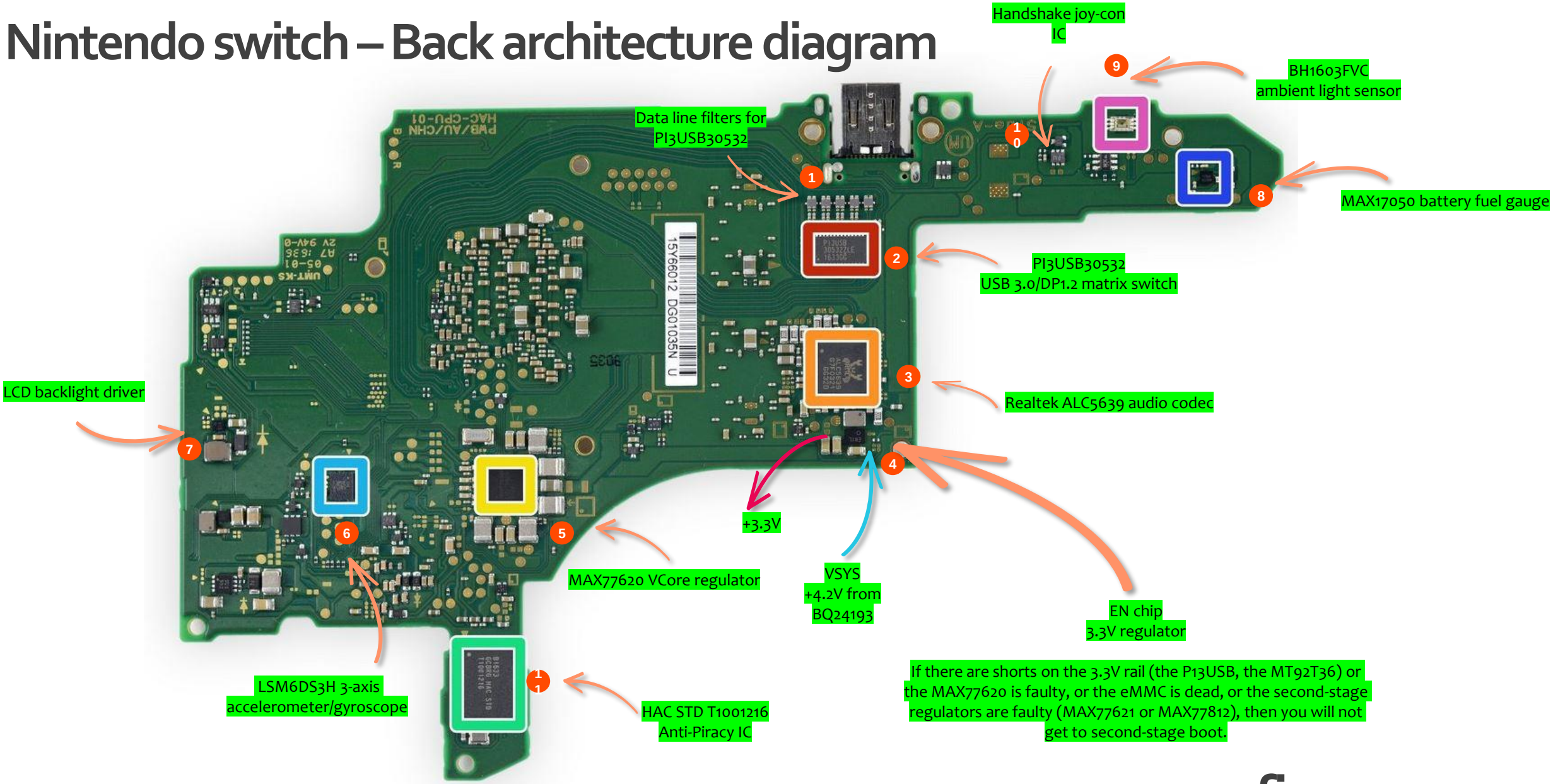
Nintendo switch – Front architecture diagram



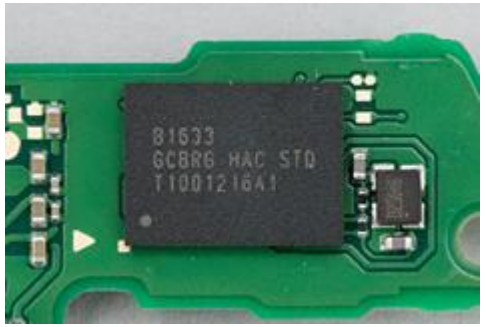
https://www.youtube.com/@fixmyappjim

fixmyapp Research

Nintendo switch – Back architecture diagram



Nintendo switch – IC's uniquely paired together during the manufacturing process.



HAC STD T1001216
Anti-Piracy IC

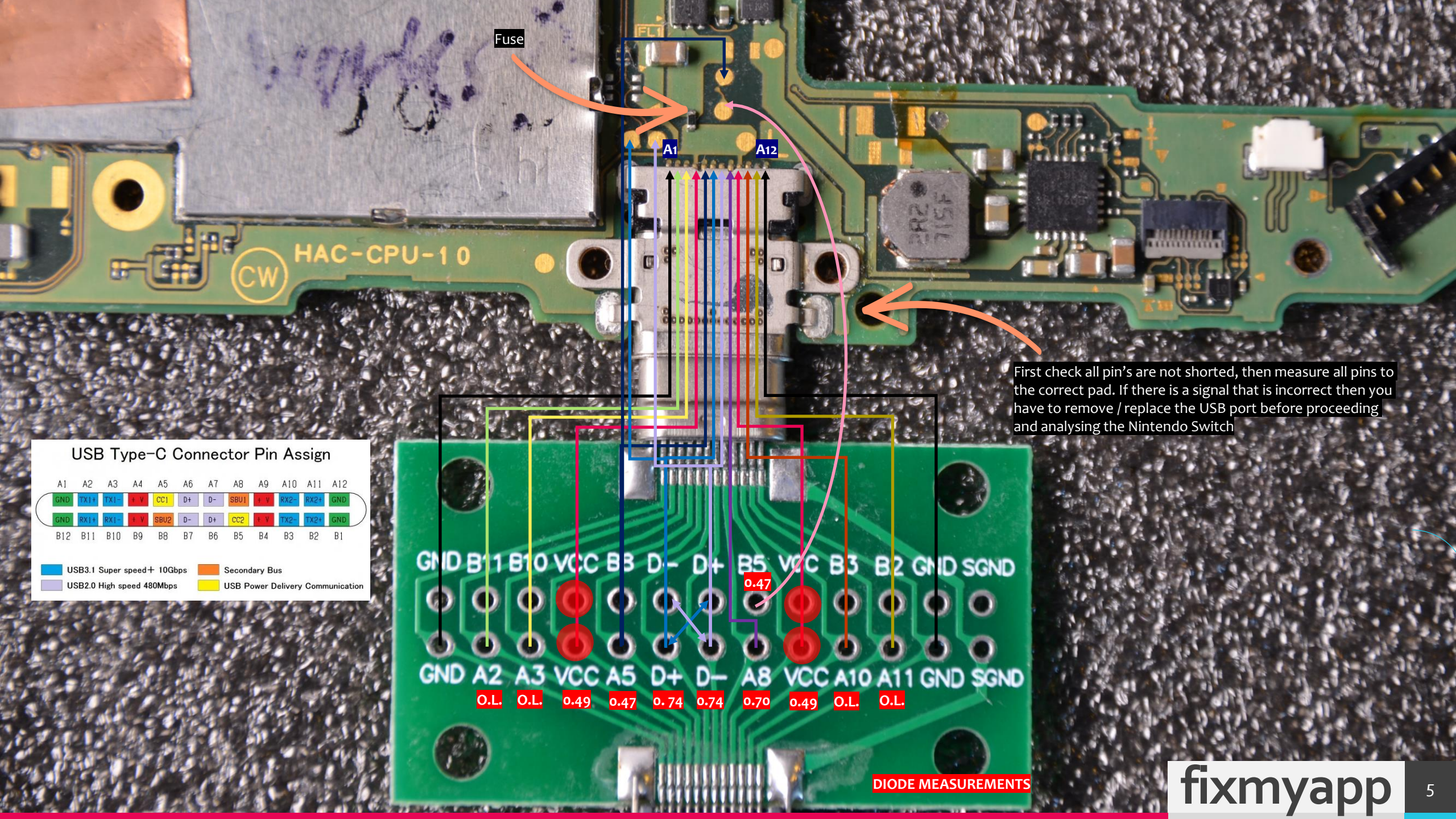


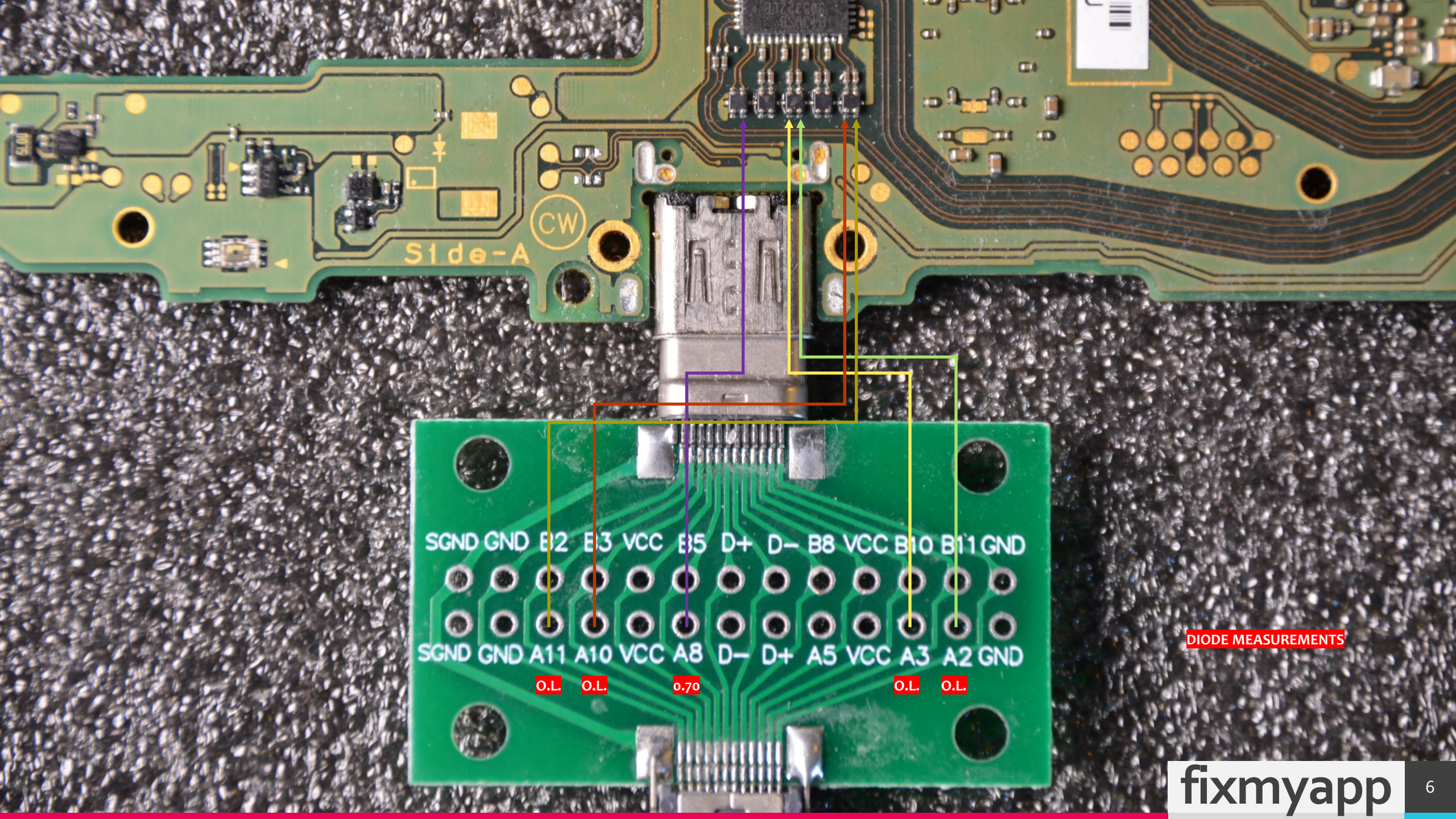
NVIDIA Tegra X1 SoC



eMMC

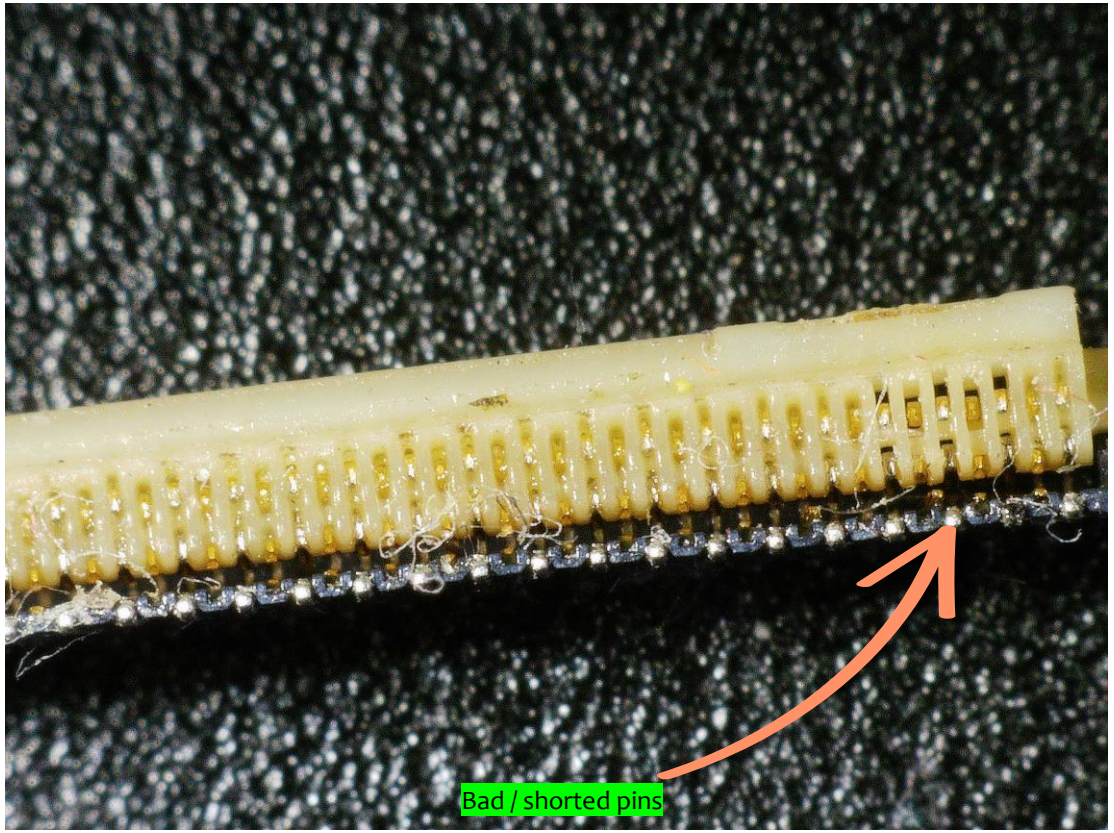
If one of these IC's is damaged then it is game over you have a donor motherboard

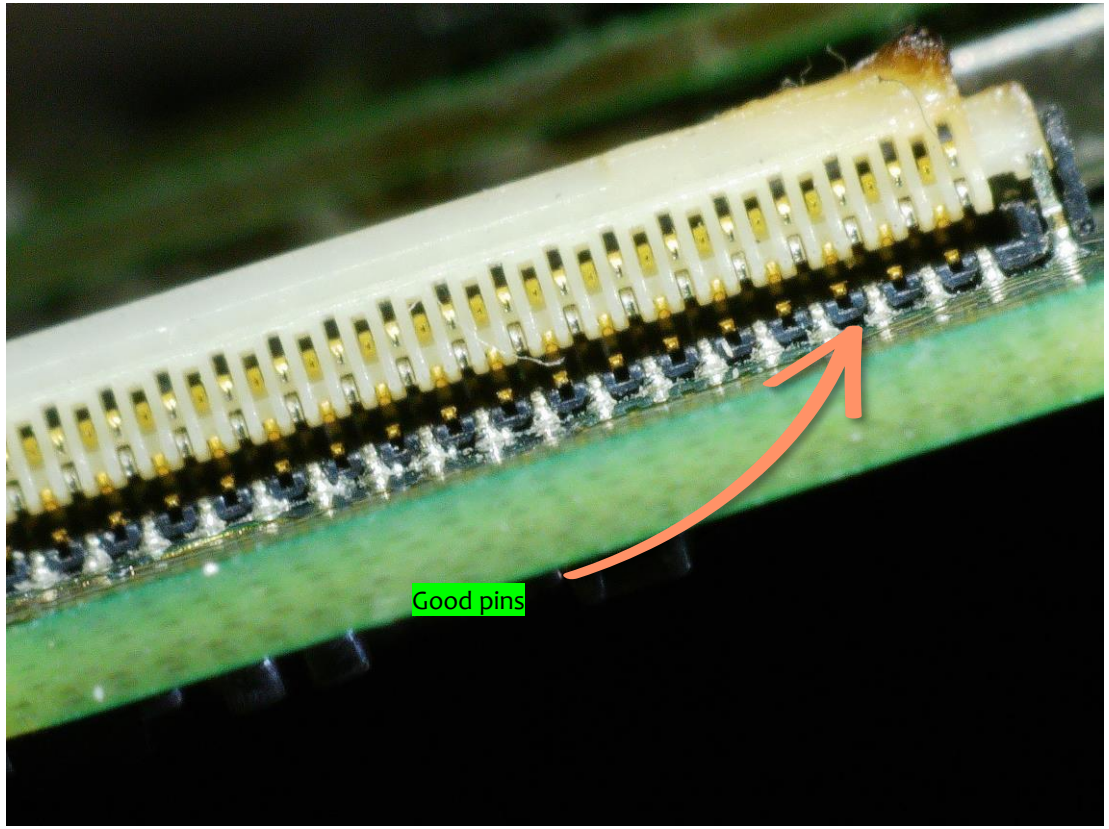

Fuse
A1
A12
HAC-CPU-10
First check all pin's are not shorted, then measure all pins to the correct pad. If there is a signal that is incorrect then you have to remove / replace the USB port before proceeding and analysing the Nintendo Switch
USB Type-C Connector Pin Assign
A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12
GND TX1+ TX1- +V CC1 D+ D- SBU1 +V RX2- RX2+ GND
GND RX1+ RX1- +V SBU2 D- D+ CC2 +V TX2- TX2+ GND
B12 B11 B10 B9 B8 B7 B6 B5 B4 B3 B2 B1
USB3.1 Super speed+ 10Gbps
Secondary Bus
USB2.0 High speed 480Mbps
USB Power Delivery Communication
GND B11 B10 VCC B3 D- D+ B5 VCC B3 B2 GND SGND
0.47
GND A2 A3 VCC A5 D+ D- A8 VCC A10 A11 GND SGND
O.L. O.L. 0.49 0.47 0. 74 0.74 0.70 0.49 O.L. O.L.
DIODE MEASUREMENTS

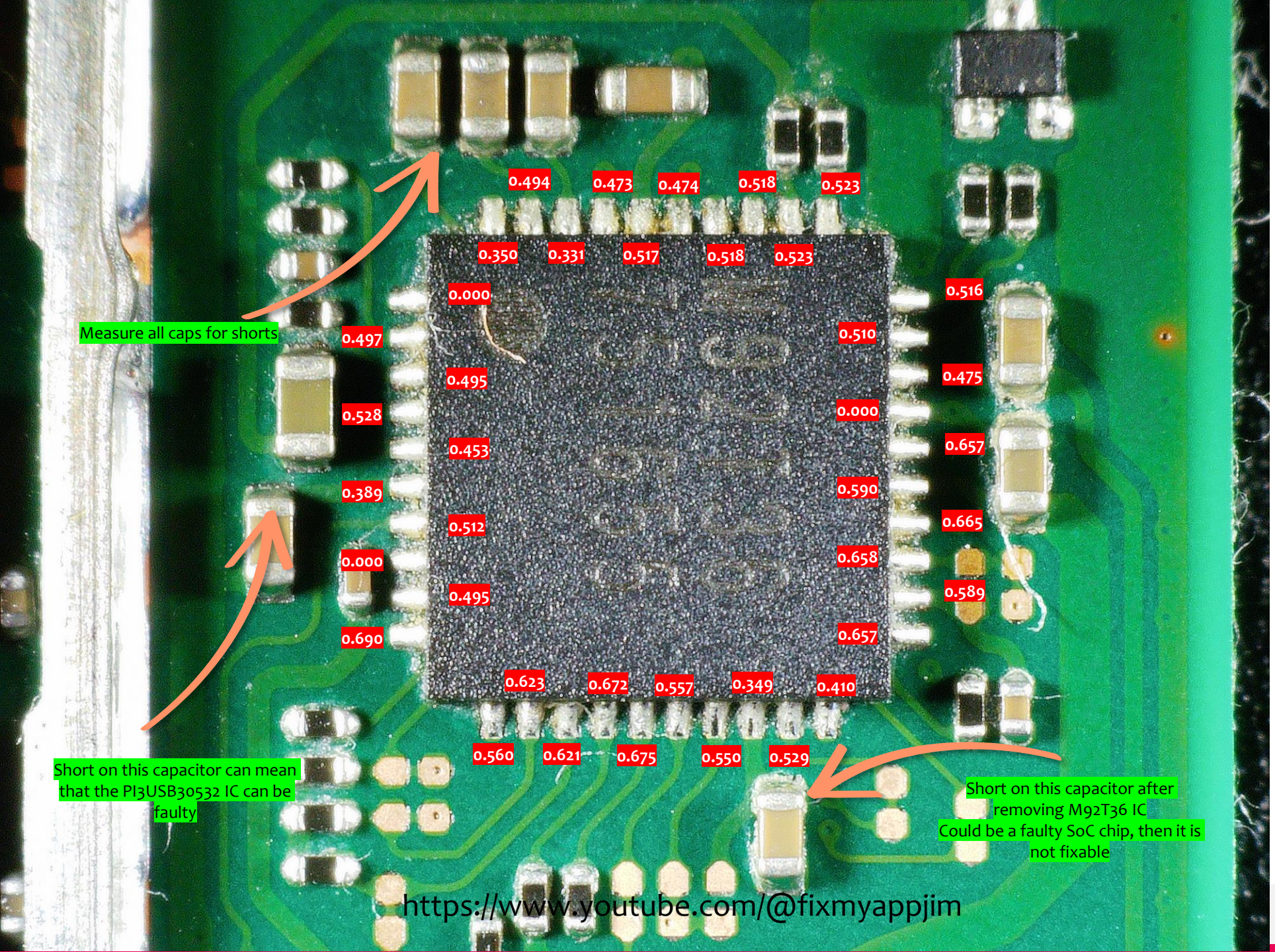


DIODE MEASUREMENTS

Check pins on LCD connector







M92T36

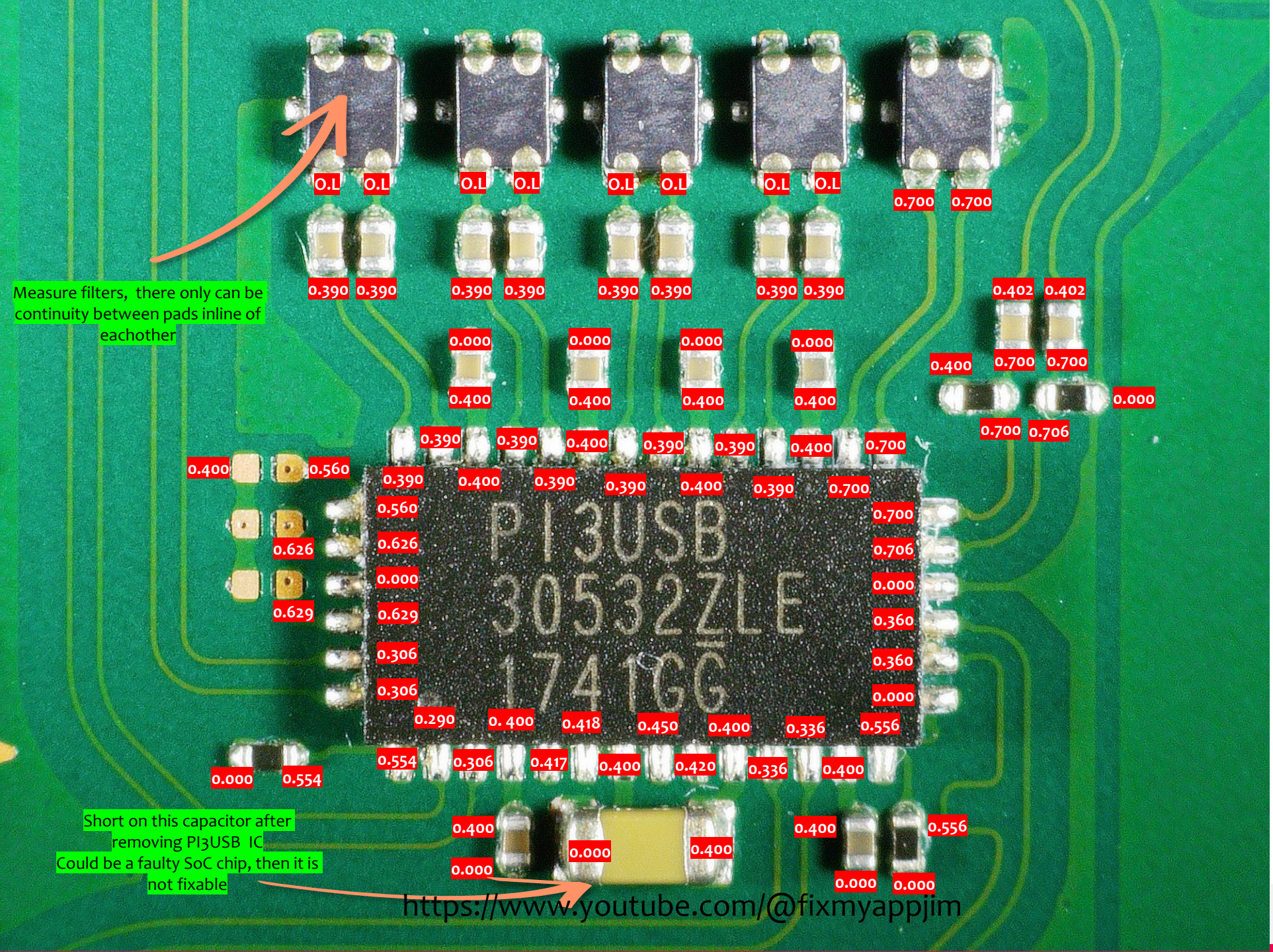
The M92T36 is a power management IC (integrated circuit) used in the Nintendo Switch console. It is responsible for regulating power supply and charging functions.

The M92T36 has been known to develop faults or failures in some Nintendo Switch units, leading to issues such as charging problems, battery drain, or power-related issues.

DIODE MEASUREMENT

https://www.youtube.com/@fixmyappjim

fixmyapp Research



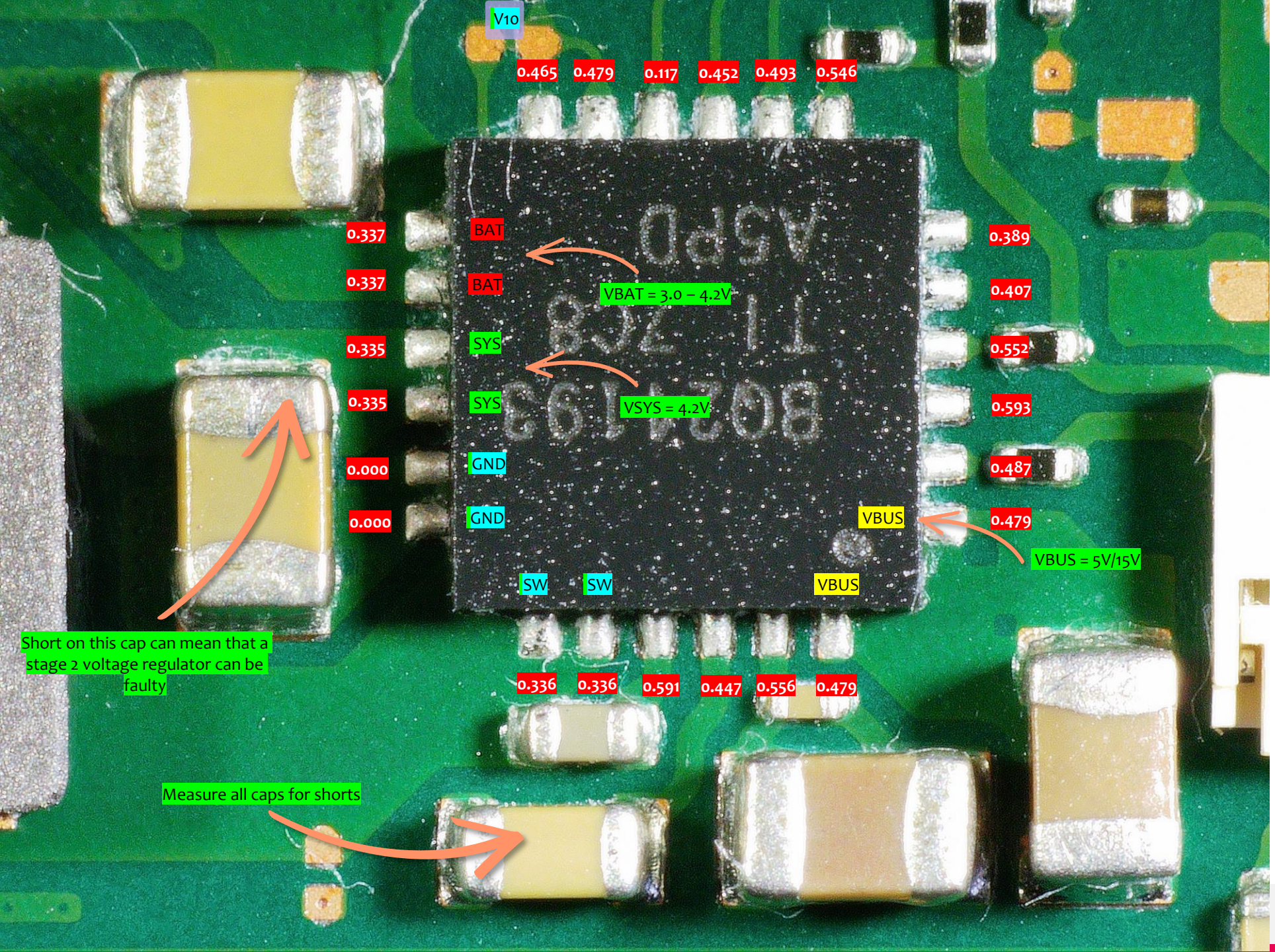
PI3USB

The PI3USB3 could potentially serve as a USB switch to handle USB data and power connections between different components of the console.

This could involve routing USB signals between the console's USB-C port, internal circuitry, and possibly external accessories or the docking station.

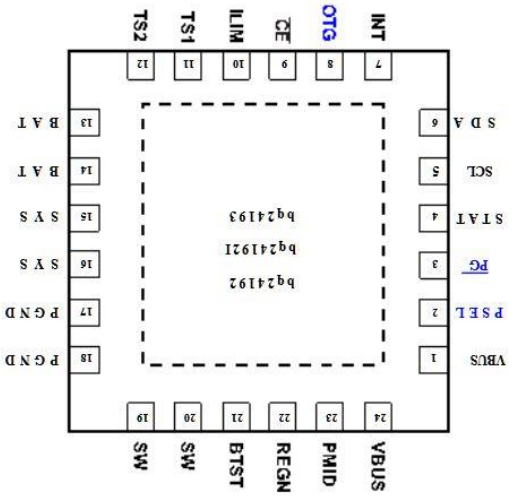
DIODE MEASUREMENT

fixmyapp Research



BQ24193

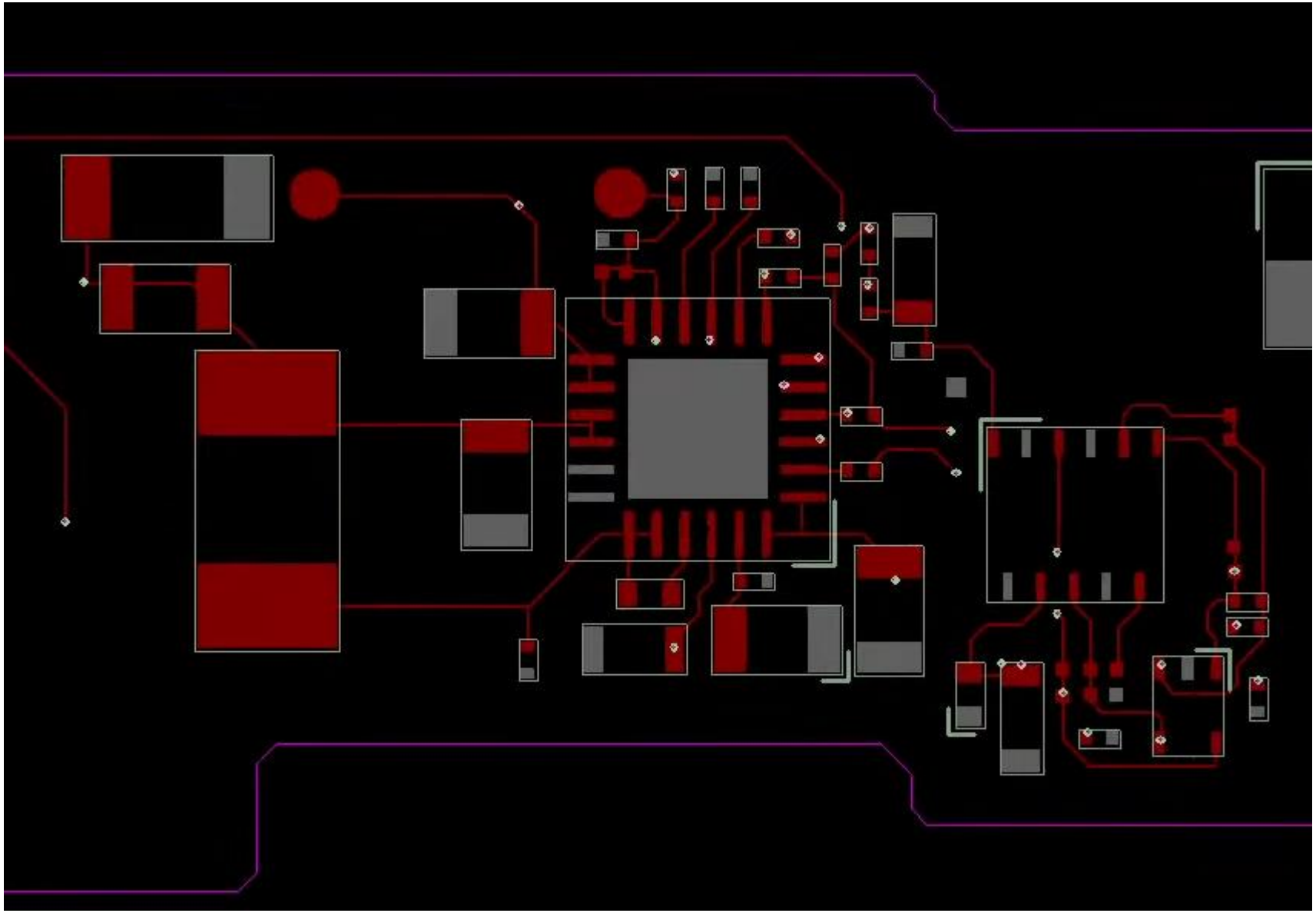
One of the notable functions of the BQ24193 is its ability to provide a charging profile that is optimized for the battery used in the Nintendo Switch. It supports various charging modes, including pre-conditioning, constant current charging, and constant voltage charging, ensuring that the battery is charged in a controlled manner.

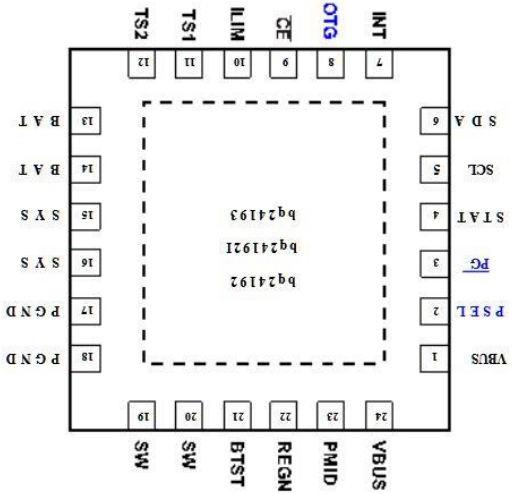


DIODE MEASUREMENT

RESISTANCE MEASUREMENT

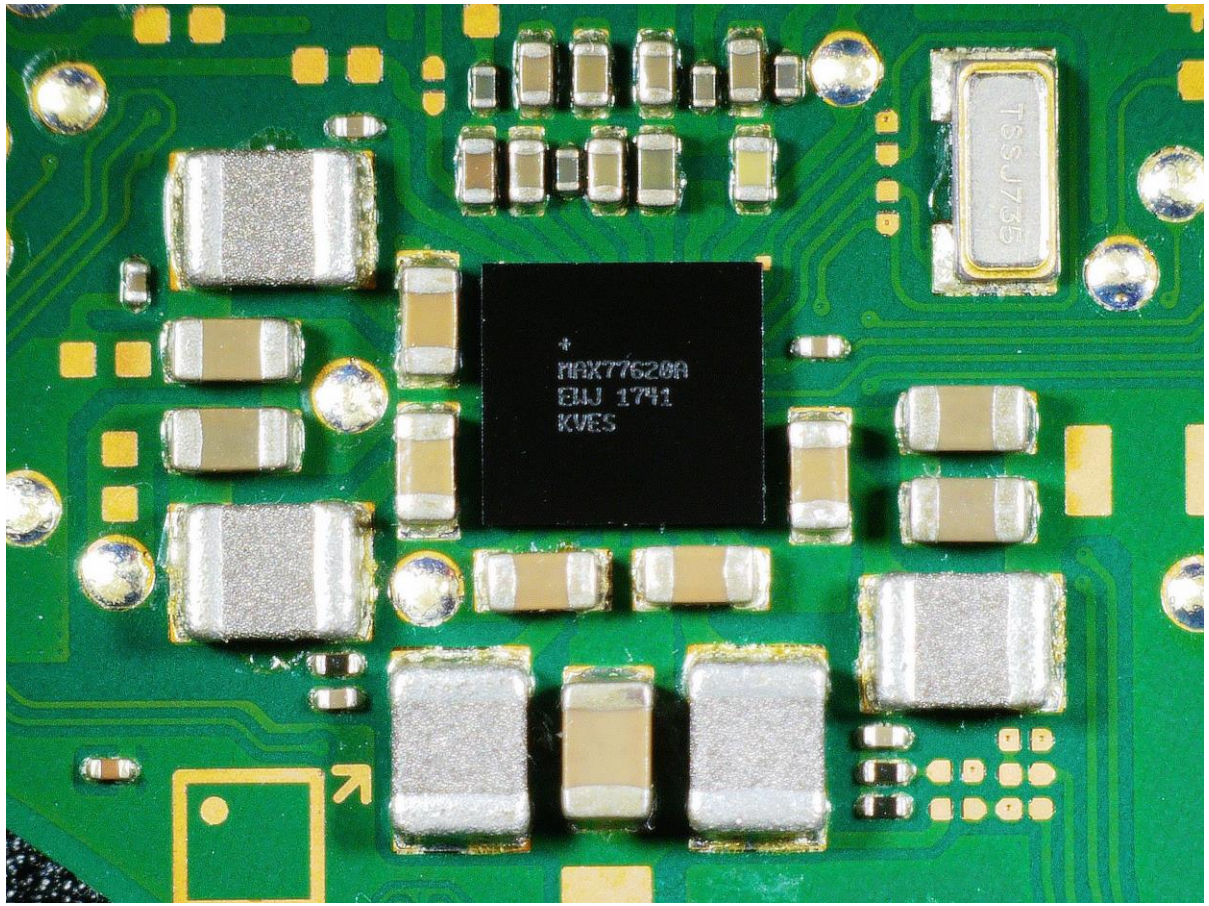
fixmyapp Research

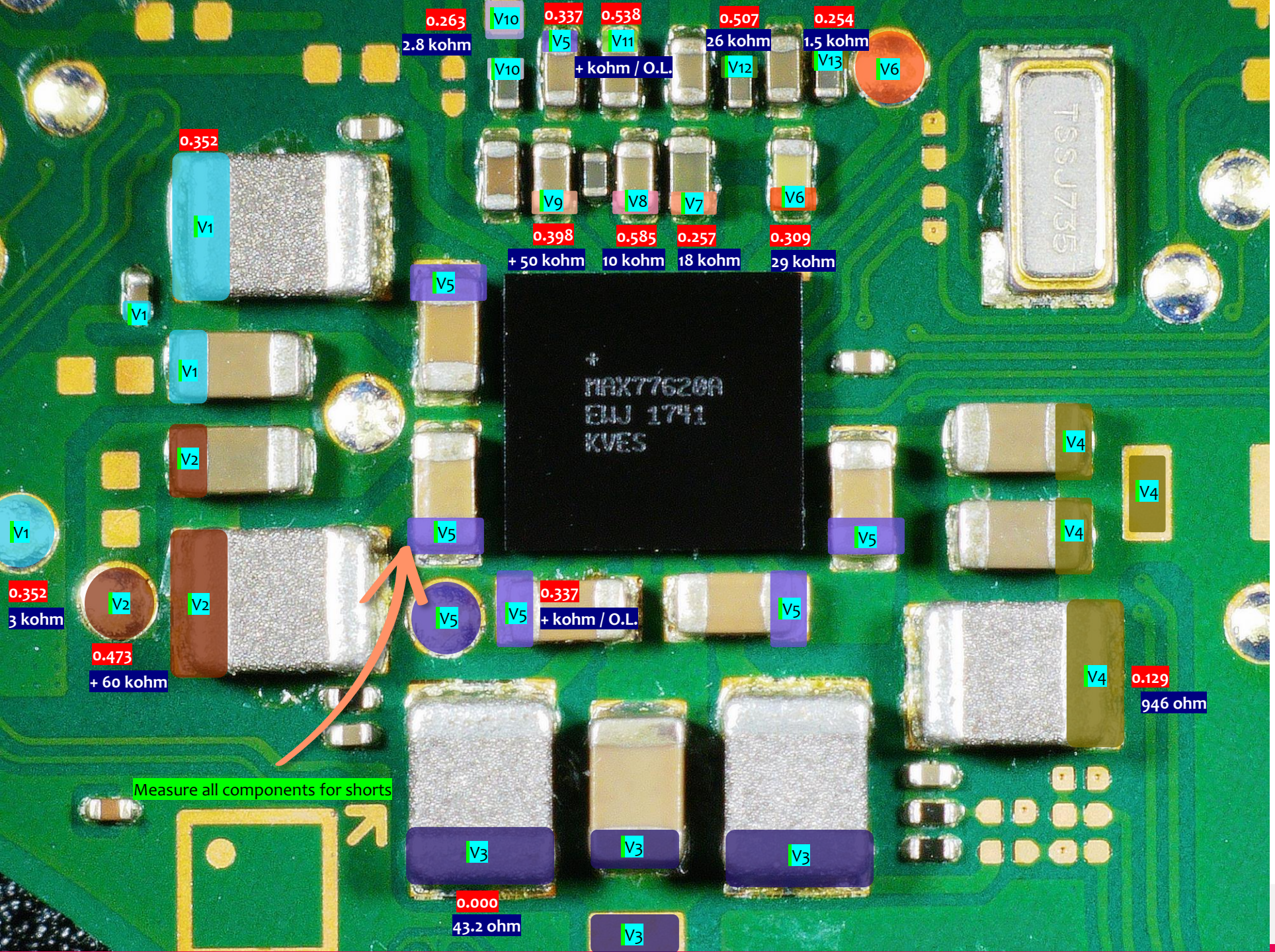



TS2
TS1
ILIM
CE
OTG
INT
SDA
SCL
STAT
PG
PSEL
VBUS
BAT
BAT
SYS
SYS
PGND
PGND
SW
SW
BTST
REGN
PMID
VBUS
bq24193
bq24192I
bq24192

MAX77620 Voltage regulator (Vcore)

This voltage regulator is responsible for generating the most important voltages to core component: Vcore, Vmem and other components. It will send an enable signal to the second stage voltage regulators MAX77621





MAX77620 Voltage regulator (Vcore)

1 - boot

V6 = 1.05V

1 + 2 - boot

V1 = 1.8V

V2 = 1.3V

V3 = 1.0V

V4 = 1.1V

V7 = 1.05V

V9 = 3.3V (input)

V10 = 1.0V

2 - boot

V8 = 3.3V

V11 = 2,9V

V12 = 1.3V

V13 = 1.05V

Always present

V5 = VSYS = 4,2V

DIODE MEASUREMENT

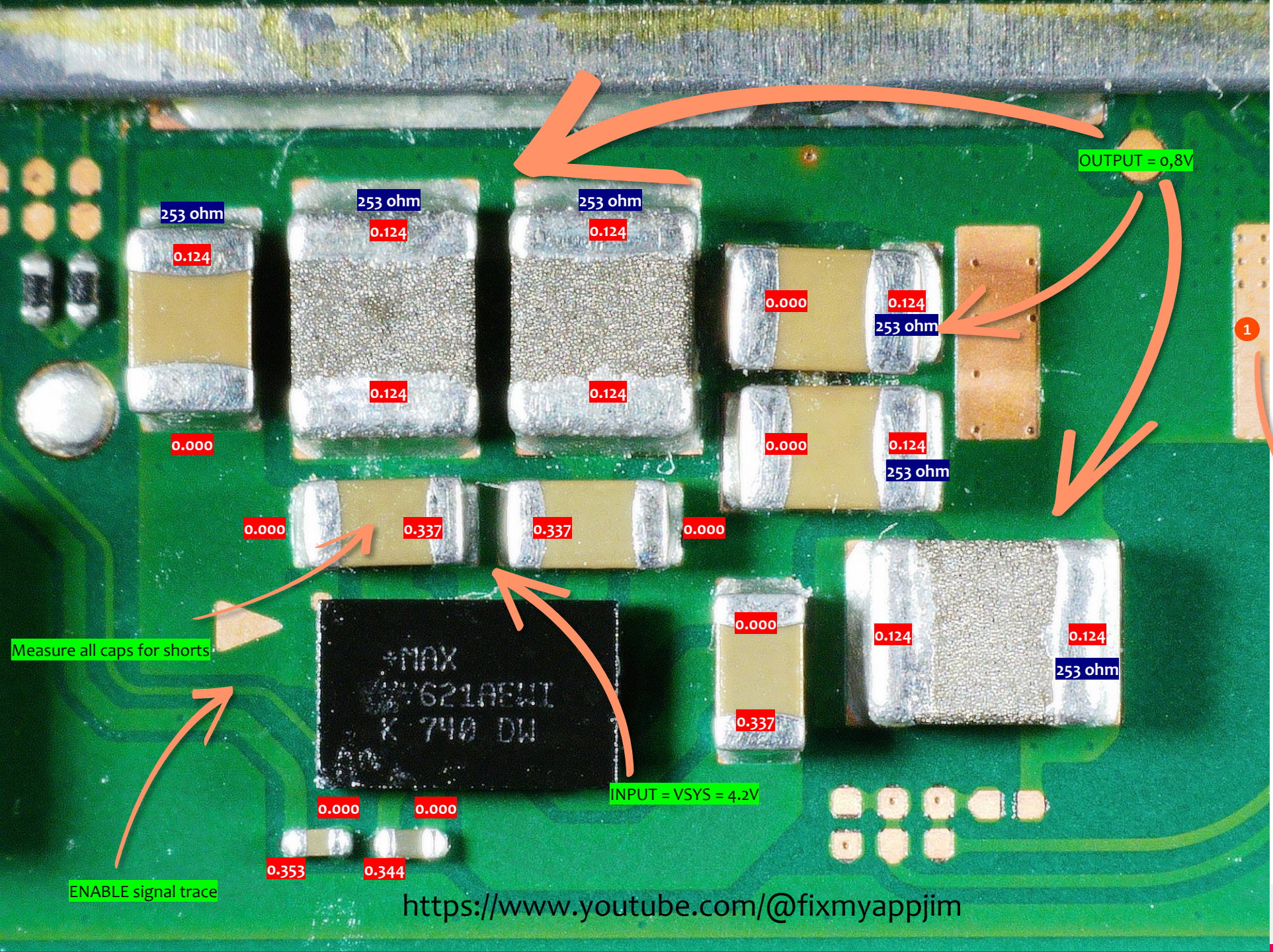
RESISTANCE MEASUREMENT

Source:
https://www.retrosix.wiki

MAX77621AEWI

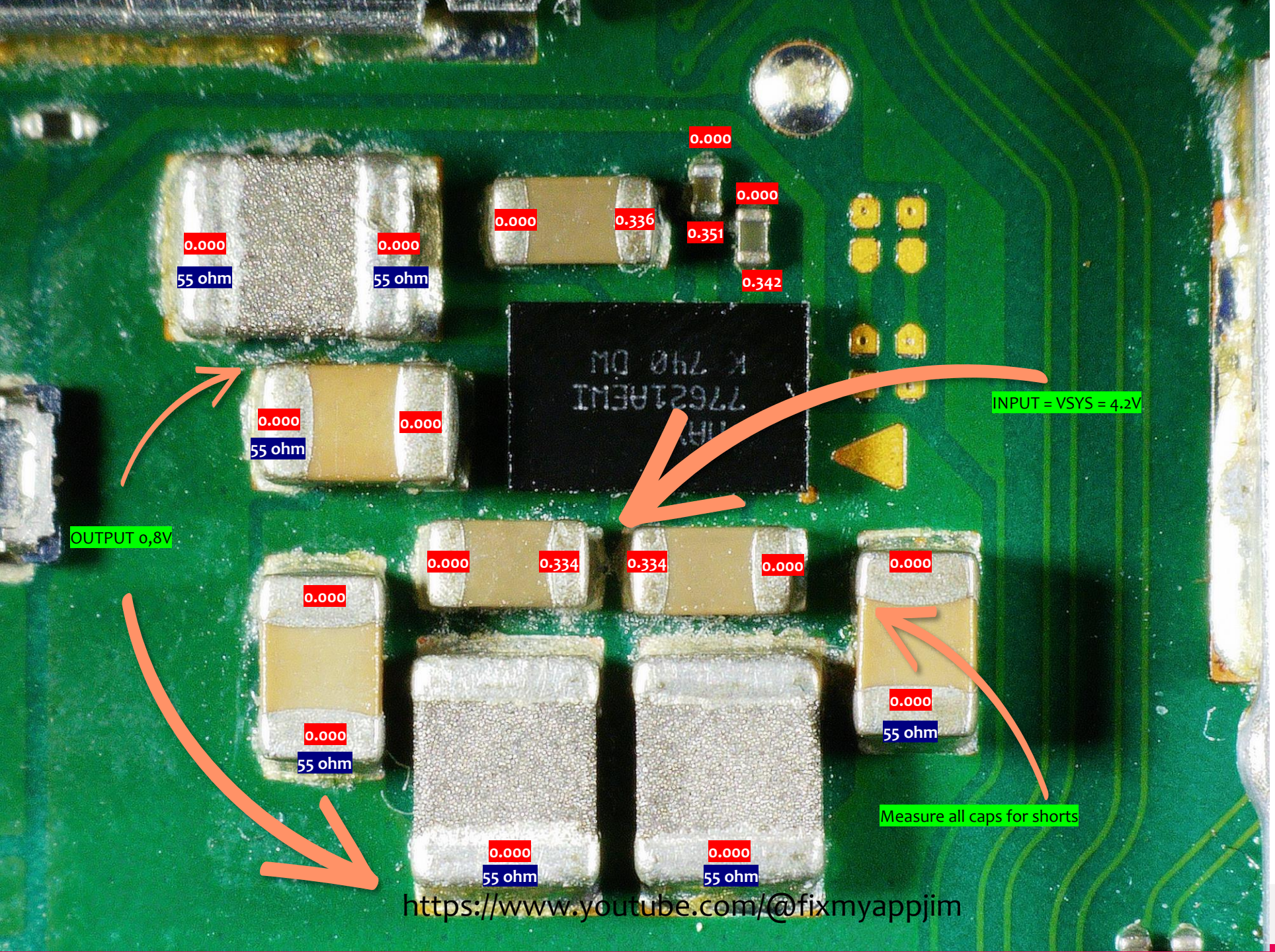
If eMMC is not working, then this voltage regulator will not turn on as this is a second stage voltage regulator.

Low impedance power rails can deliver power to the CPU/GPU with minimal resistance. When measuring capacitors in diode mode will give a beep but remember the resistance is **LOW** measure it with a **OHM meter**.



https://www.youtube.com/@fixmyappjim

fixmyapp Research



MAX77621AEWI

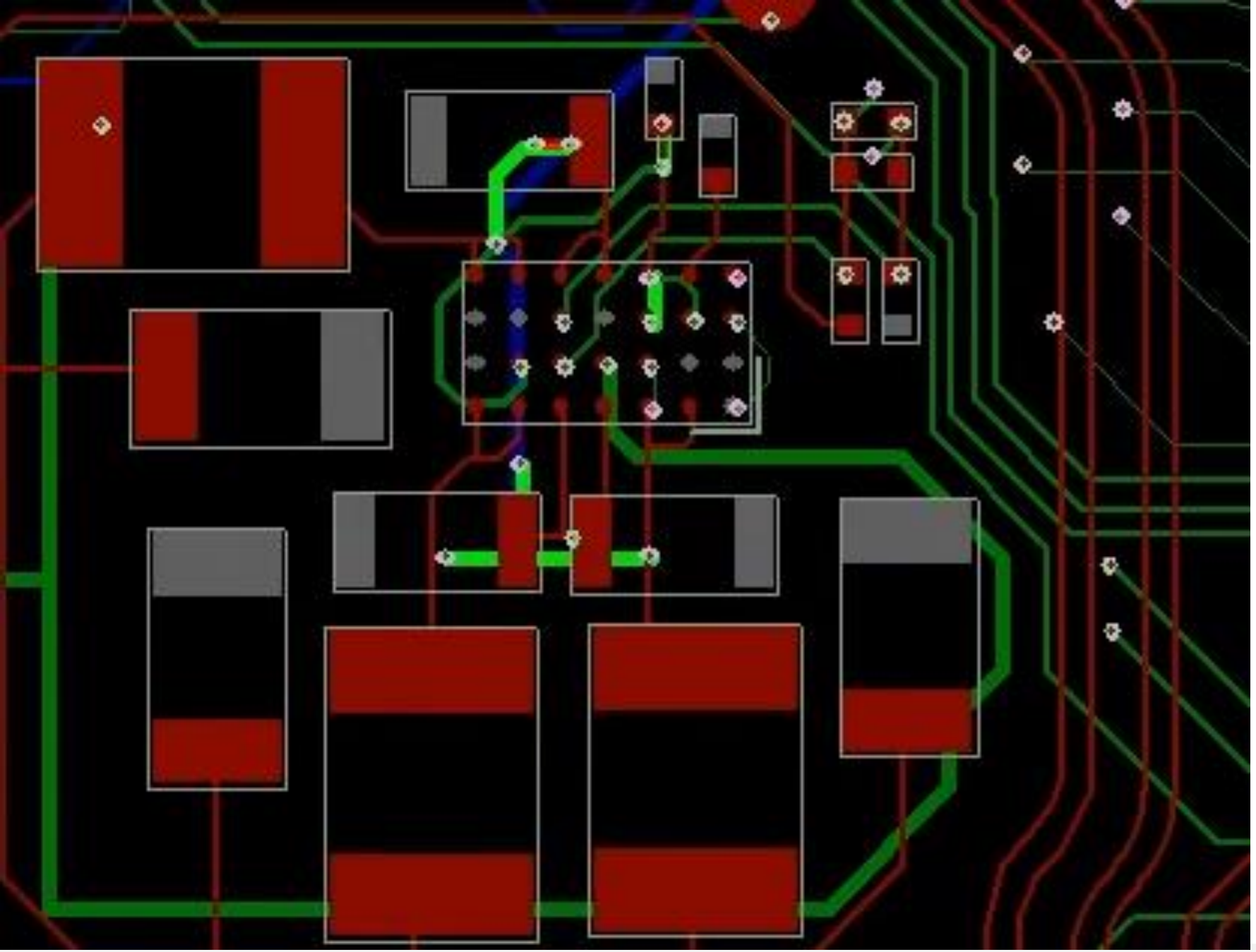
If eMMC is not working, then this voltage regulator will not turn on as this is a second stage voltage regulator.

DIODE MEASUREMENT

RESISTANCE MEASUREMENT

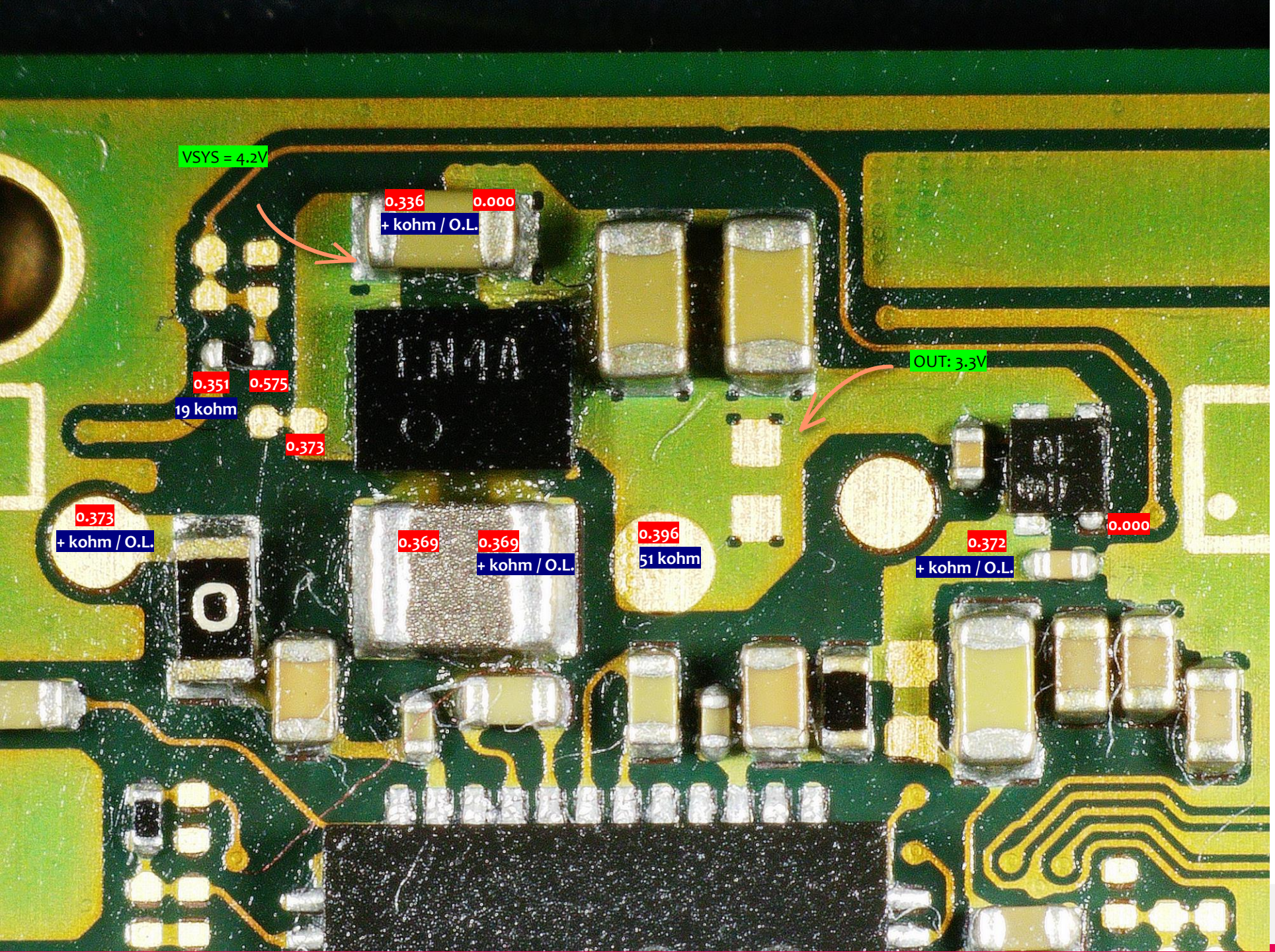
https://www.youtube.com/@fixmyappjim

fixmyapp Research



MAX77621AEWI

If eMMC is not working, then this voltage regulator will not turn on as this is a second stage voltage regulator.

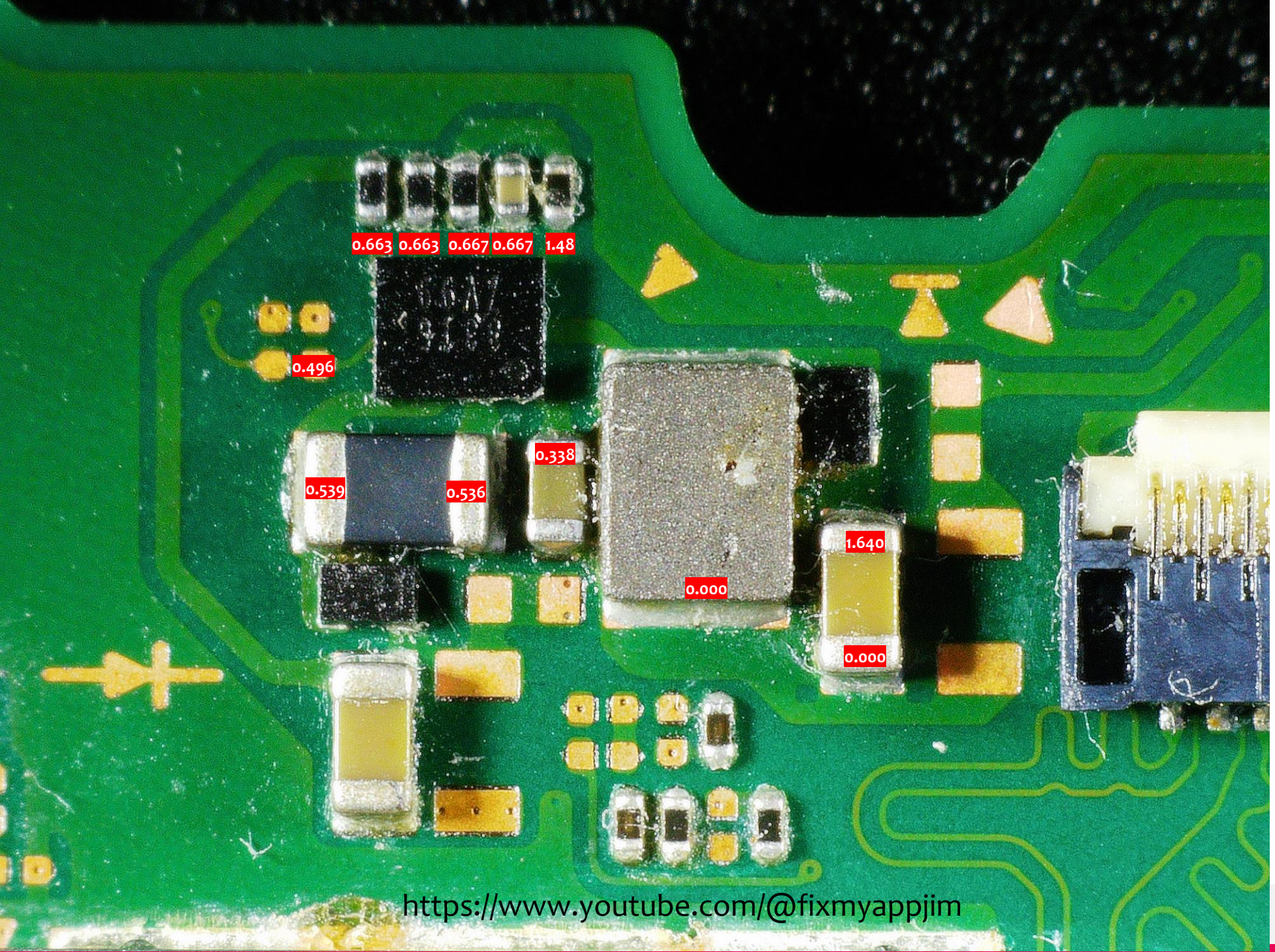


EN4A 3.3 Voltage regulator

If the power rail 3.3V is shorted, then you can inject 1V by soldering a wire to the capacitor and check which component is shorted on the power rail by using a thermal camera or isopropyl alcohol.

DIODE MEASUREMENT

RESISTANCE MEASUREMENT



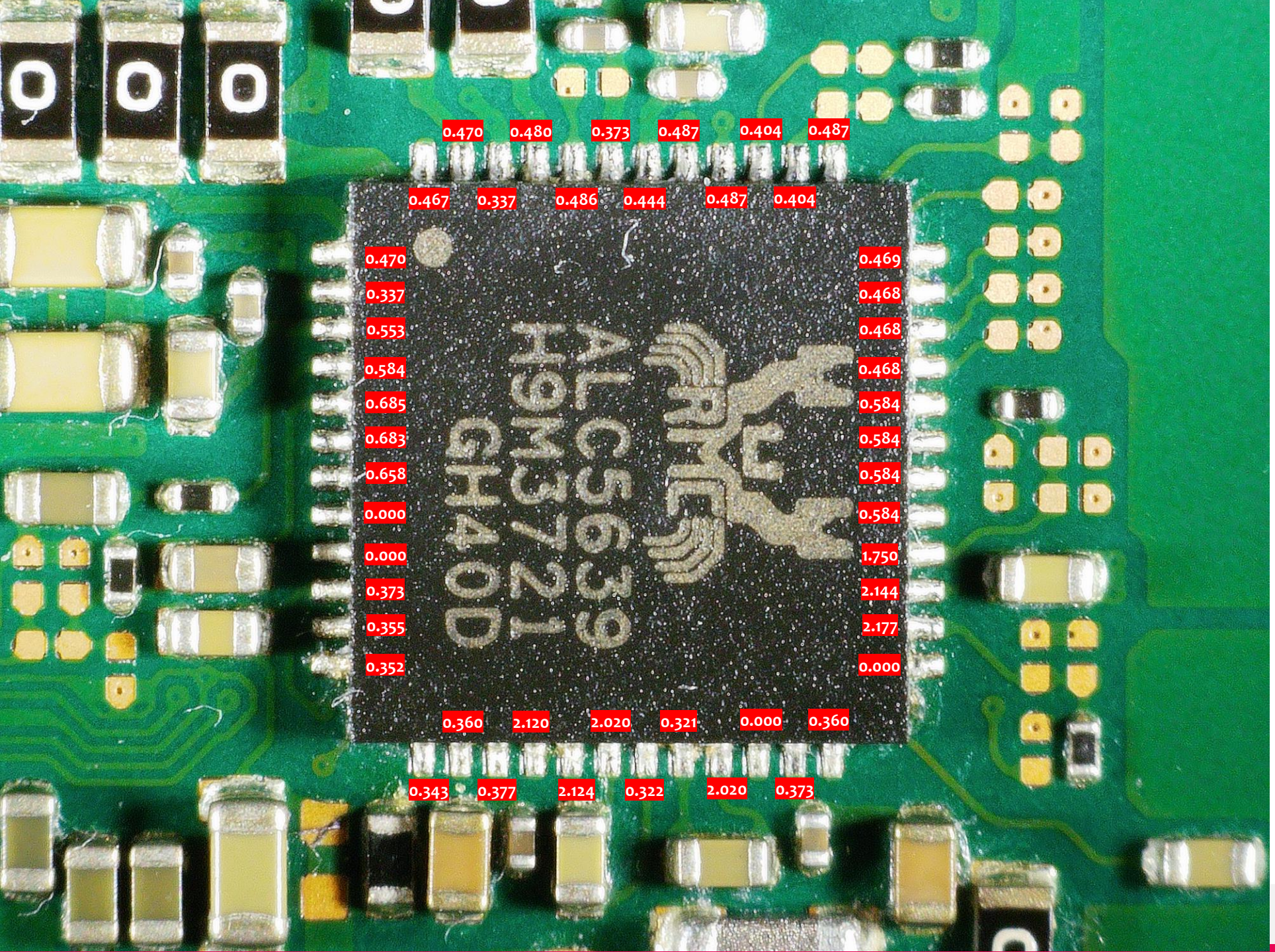
LCD driver

The LCD driver in the Nintendo Switch is responsible for controlling the display on the console's screen.

DIODE MEASUREMENT

https://www.youtube.com/@fixmyappjim

fixmyapp Research

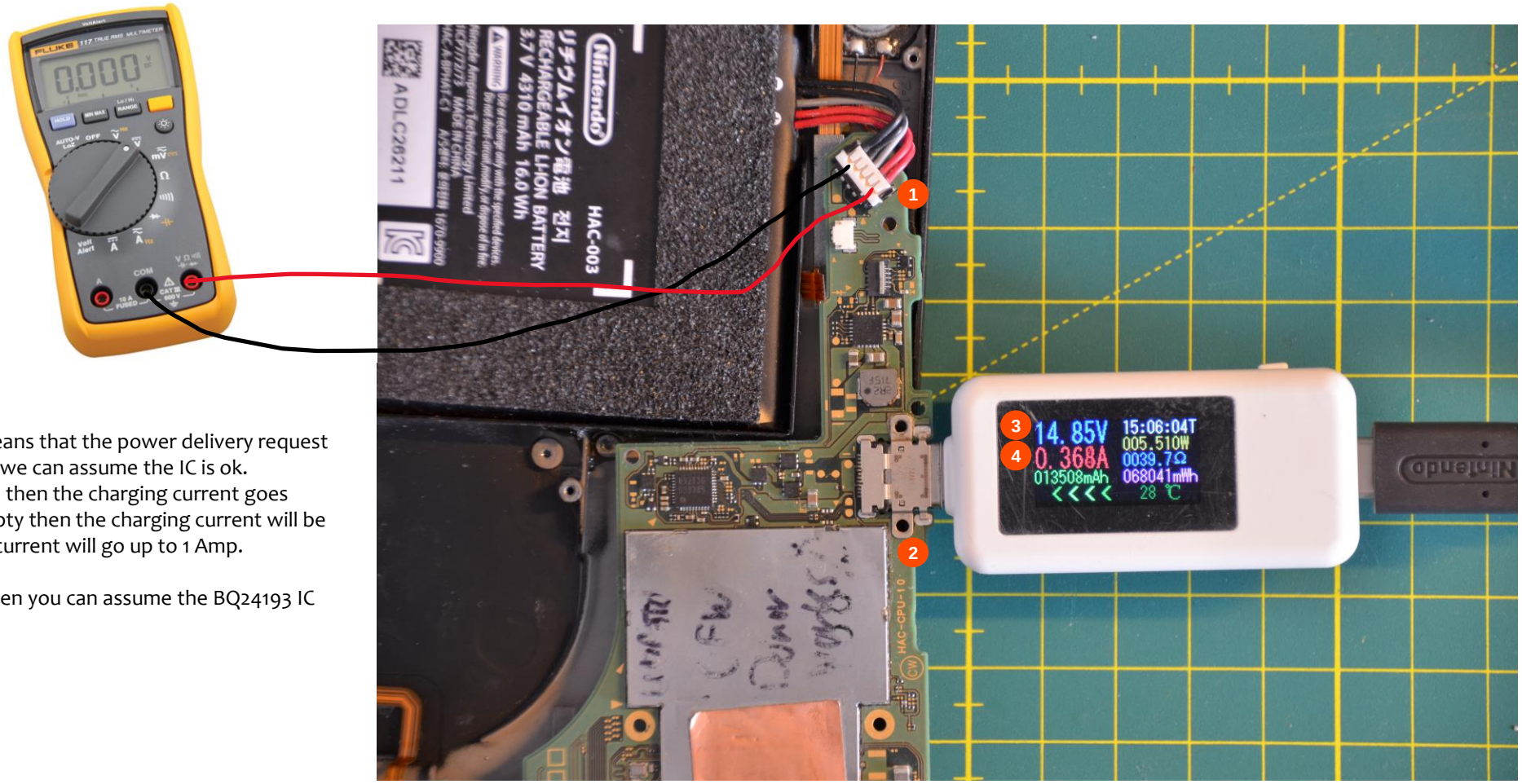


Realtek ALC5639 audio codec

ALC5639 is responsible for converting digital audio signals from the console's internal audio processing unit into analog audio signals for output through the built-in speakers or headphone jack. It might also provide audio input capabilities for features like voice chat or microphone support.

DIODE MEASUREMENT

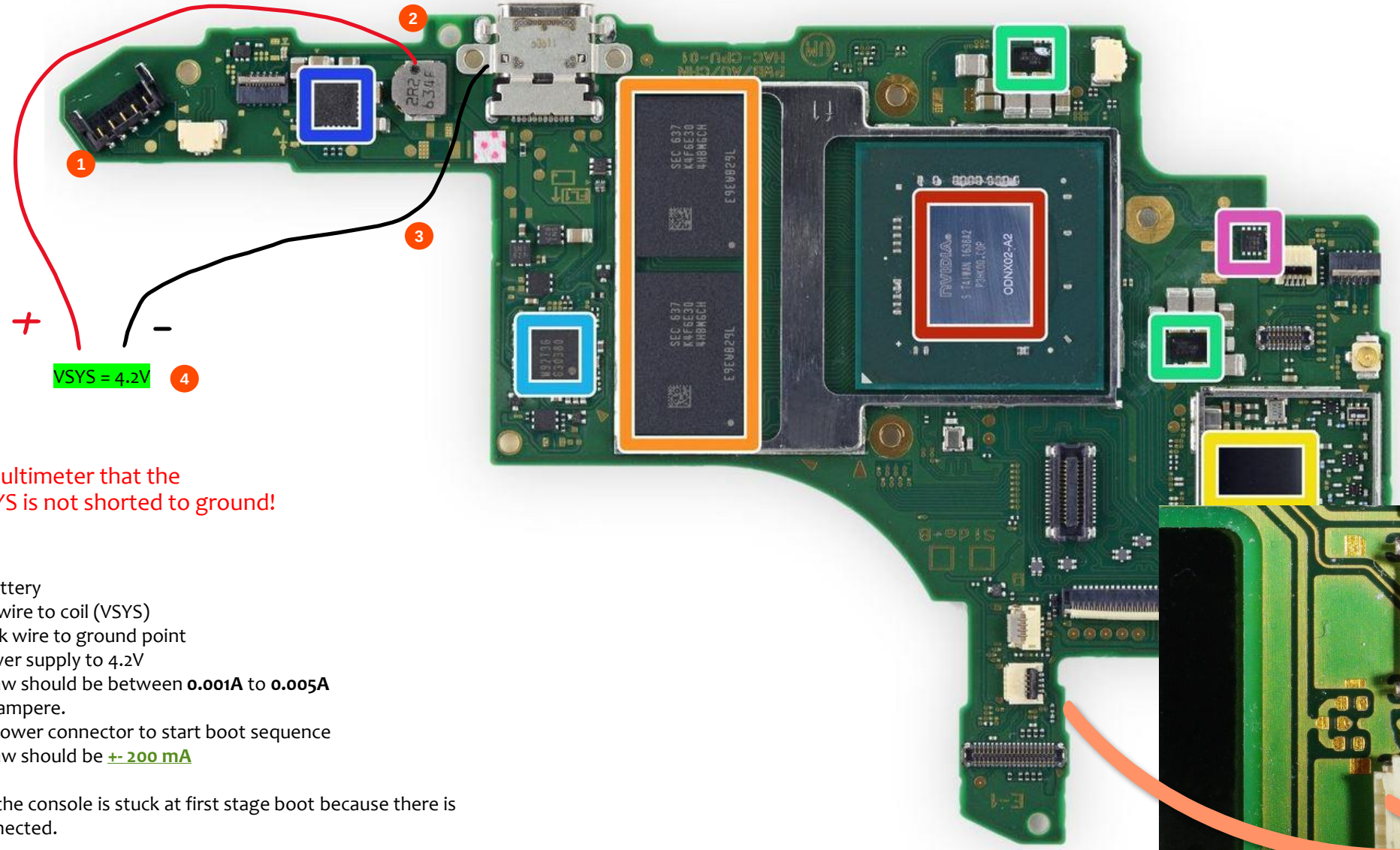
Nintendo switch – Battery charging test



1. Connect battery
2. Connect USB-C current meter
3. Charging voltage is 15V, this means that the power delivery request with MT92T36 IC is working so we can assume the IC is ok.
4. Charging current. Battery is full then the charging current goes down. When the Battery is empty then the charging current will be low after a while the charging current will go up to 1 Amp.

When you see a current is drawn then you can assume the BQ24193 IC is working.

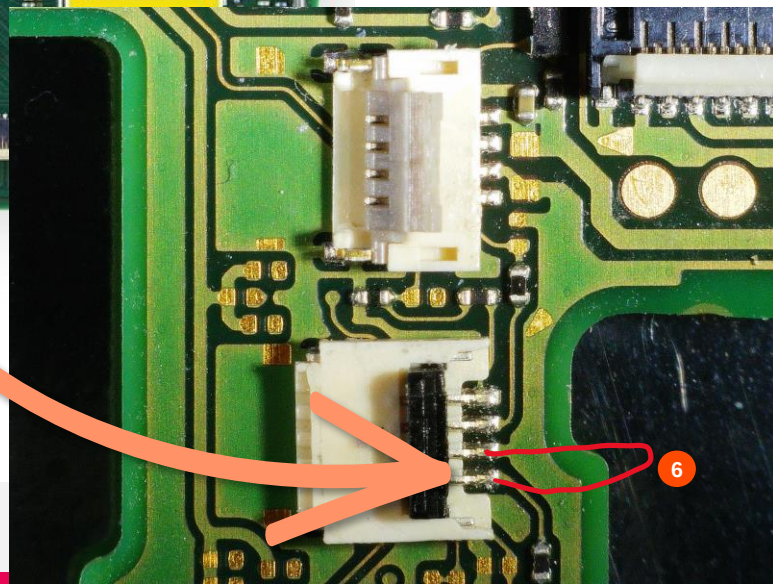
Nintendo switch – First stage boot – Test no shorts



Check with multimeter that the powerrail VSYS is not shorted to ground!

1. Remove battery
2. Solder red wire to coil (VSYS)
3. Solder black wire to ground point
4. Set lab power supply to 4.2V
5. Current draw should be between **0.001A** to **0.005A** (1 to 5mA) ampere.
6. Jump the power connector to start boot sequence
7. Current draw should be **+- 200 mA**

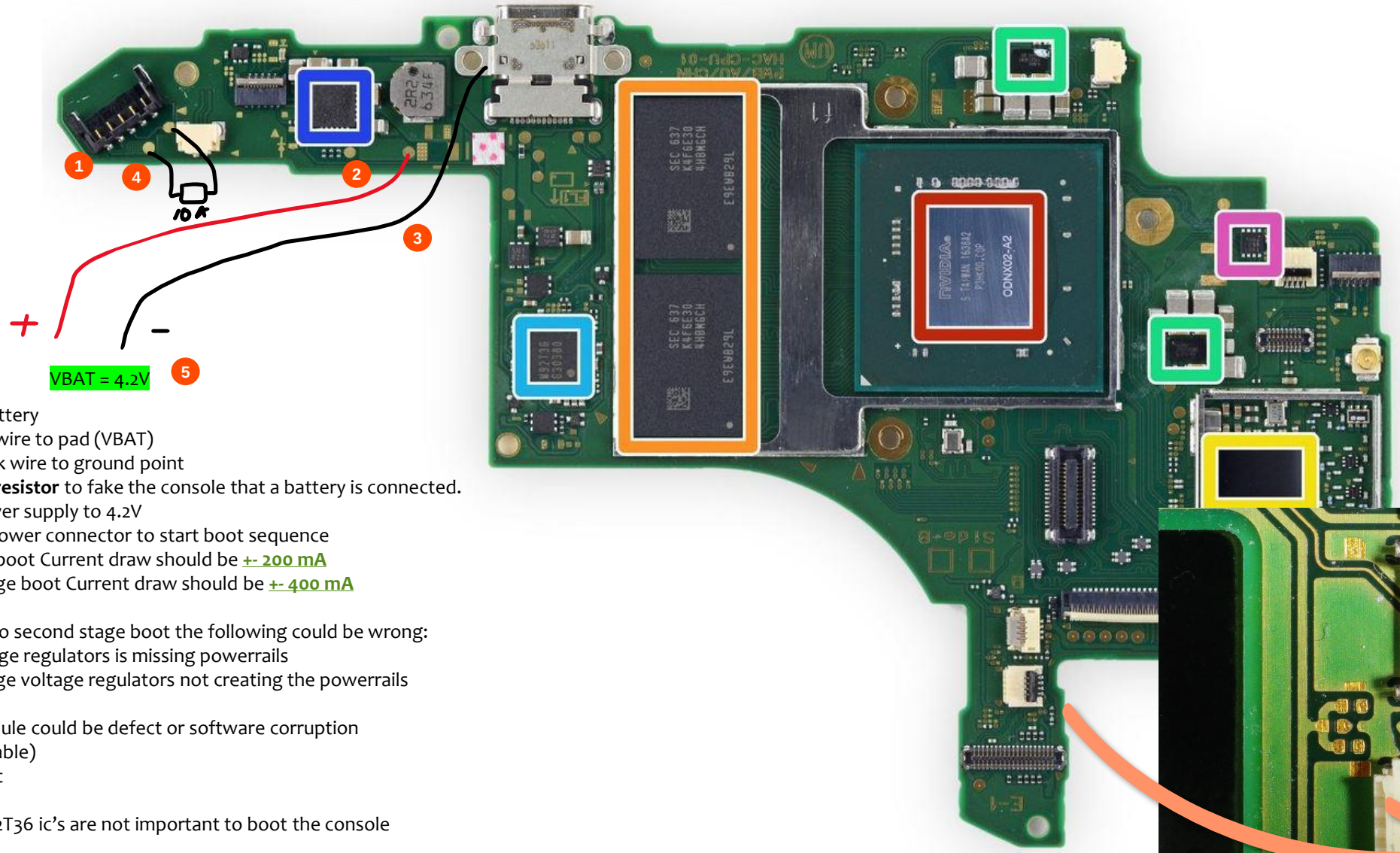
This is good as the console is stuck at first stage boot because there is **no battery** connected.



Source:
https://www.retrosix.wiki

https://www.youtube.com/@fixmyappjim

Nintendo switch – Second stage boot – Fake battery connected

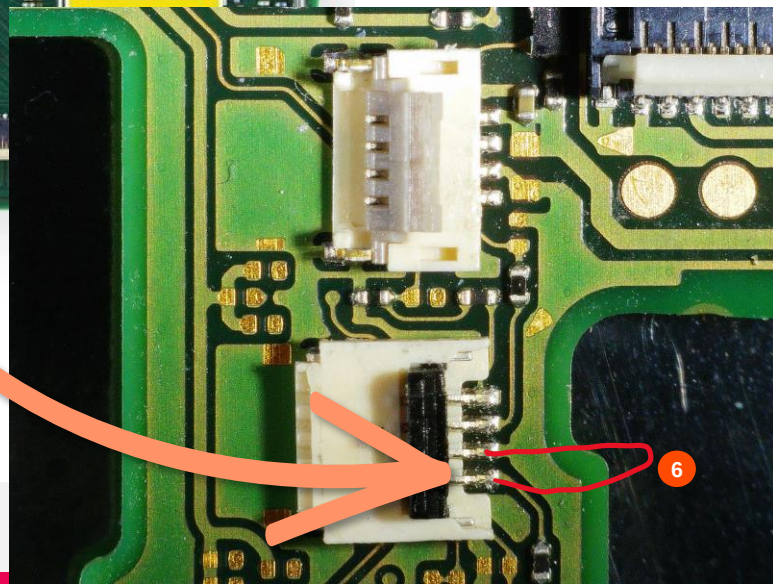


1. Remove battery
2. Solder red wire to pad (VBAT)
3. Solder black wire to ground point
4. Solder **10k resistor** to fake the console that a battery is connected.
5. Set lab power supply to 4.2V
6. Jump the power connector to start boot sequence
7. First stage boot Current draw should be **+- 200 mA**
8. Second stage boot Current draw should be **+- 400 mA**

When there is no second stage boot the following could be wrong:

1. Vcore voltage regulators is missing powerrails
2. Second stage voltage regulators not creating the powerrails (shorts)
3. eMMC module could be defect or software corruption (not repairable)
4. RAM defect

PI3USB or MT92T36 ic's are not important to boot the console

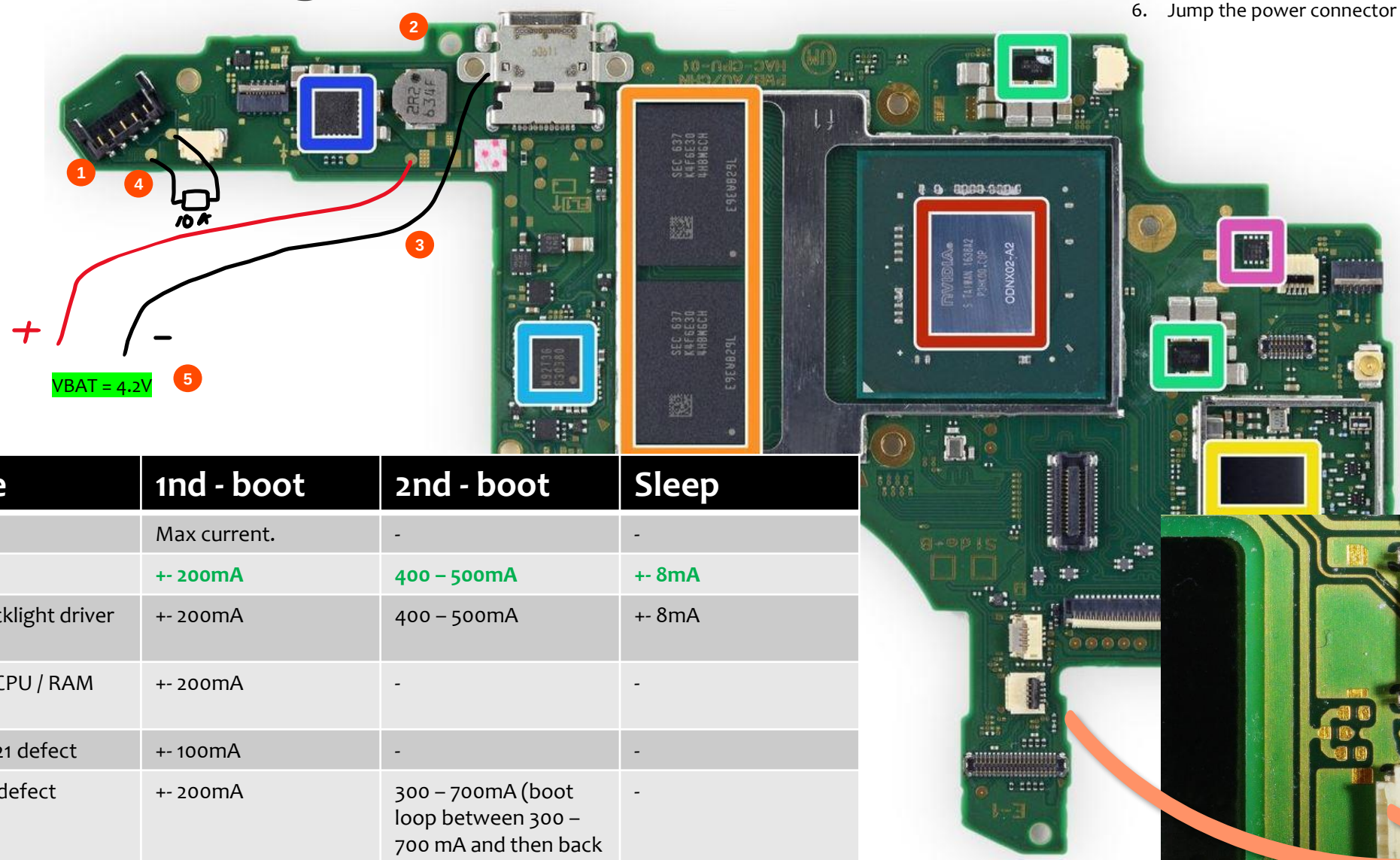


Source:
https://www.retrosix.wiki

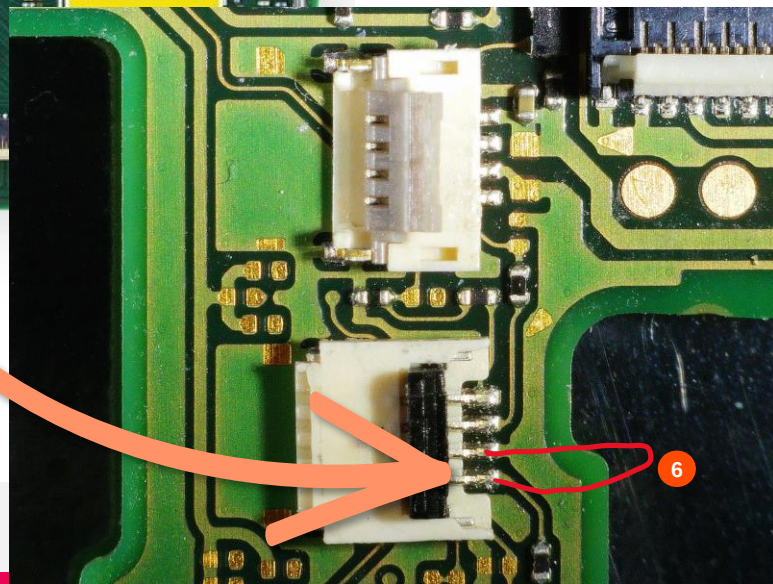
https://www.youtube.com/@fixmyappjim

Current draw diagnostic table

1. Remove battery
2. Solder red wire to pad (VBAT)
3. Solder black wire to ground point
4. Solder 10k resistor to fake the console that a battery is connected.
5. Set lab power supply to 4.2V
6. Jump the power connector to start boot sequence



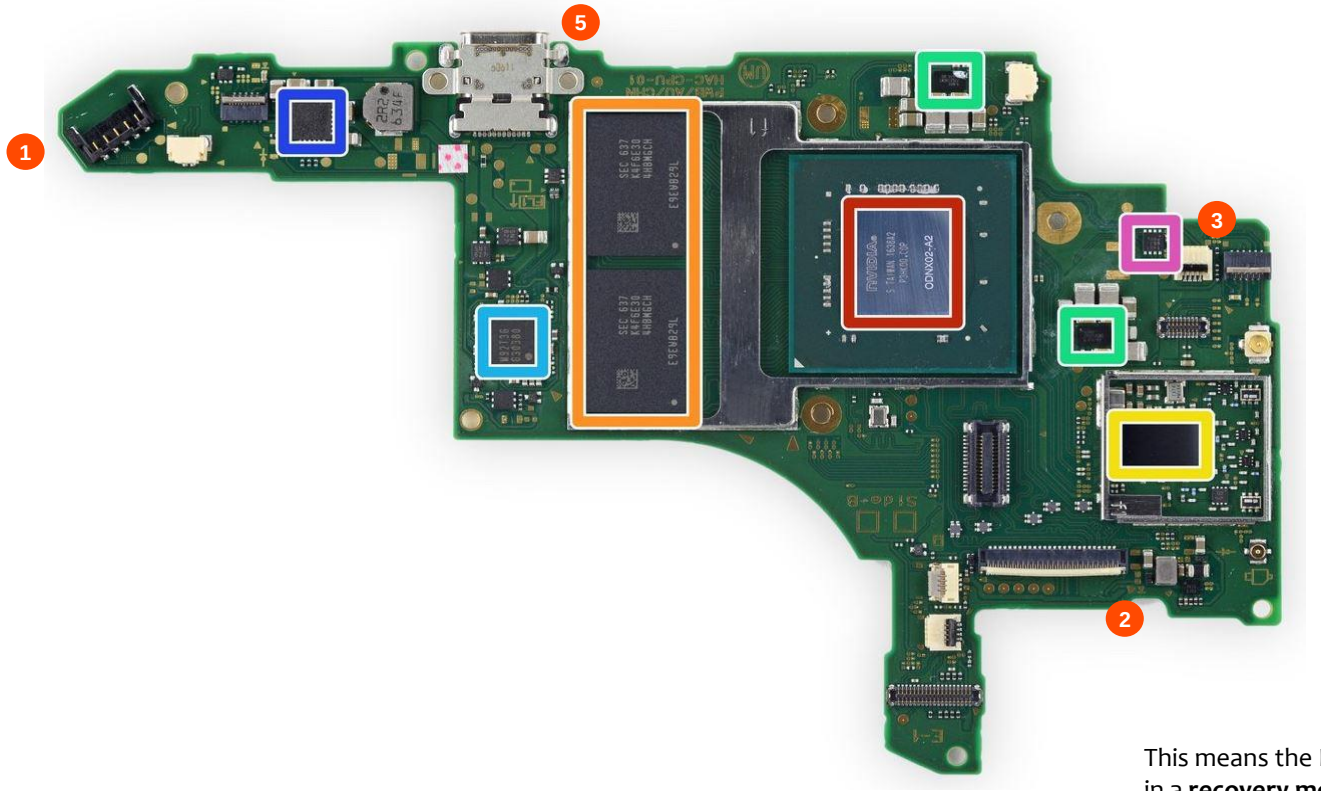
Cause	1nd - boot	2nd - boot	Sleep
Short	Max current.	-	-
Working	**+- 200mA**	**400 – 500mA**	**+- 8mA**
LCD / Backlight driver defect	+- 200mA	400 – 500mA	+- 8mA
eMMC / CPU / RAM defect	+- 200mA	-	-
MAX77621 defect	+- 100mA	-	-
M92T36 defect	+- 200mA	300 – 700mA (boot loop between 300 – 700 mA and then back to 200mA)	-



Source:
https://www.retrosix.wiki

https://www.youtube.com/@fixmyappjim

Troubleshooting eMMC or Short witch Tegra RCM software

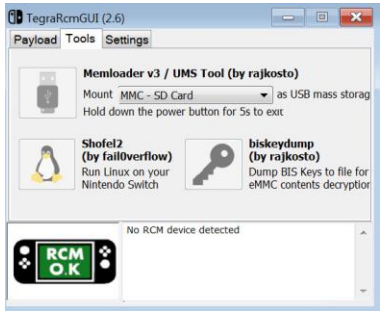


1. Connect battery
2. Connect LCD
3. Connect Backlight LCD

Use the RCM mode of the Nintendo Switch to diagnose / narrowing down problem area by using Tegra RCM software.

Download Tegra RCM software

4. Install Tegra RCM
5. Connect USB-C cable to the computer
6. You will get one of the pictures below



This means the Nintendo switch is in a **recovery mode** because it can't read the eMMC

Possible cause:
- Bad eMMC module
- Bad M92T36 IC

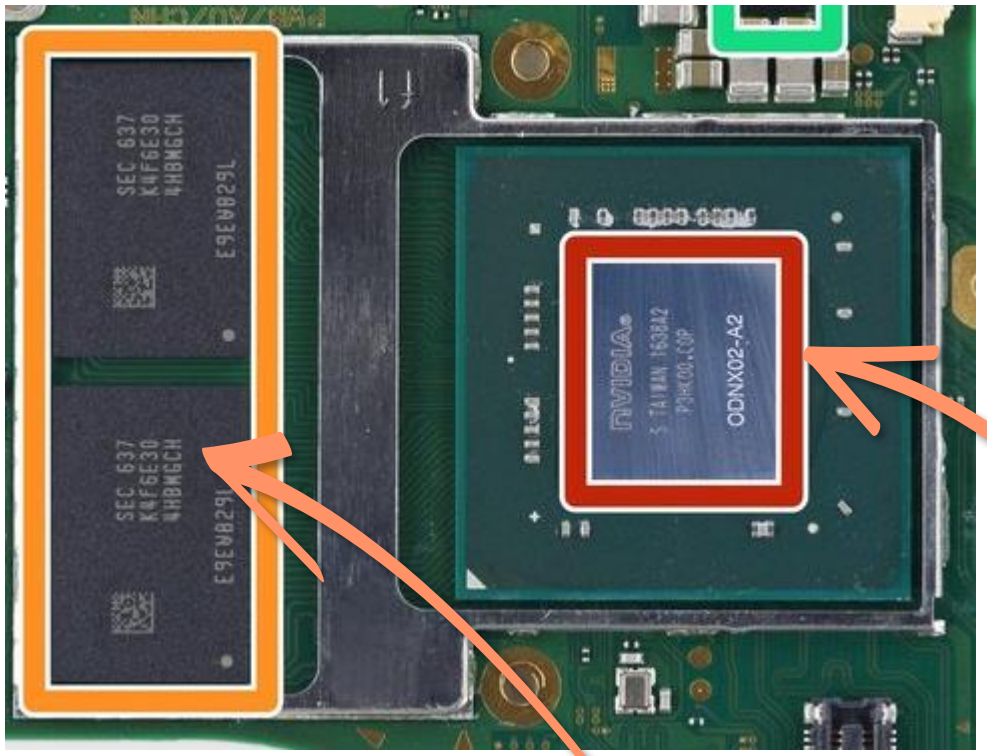


This means there can be an short or component that is bad

Possible cause:
- Short on motherboard
- Defect IC (M92T36, PI3USB, BQ24193, MAX IC etc)

Blue Screen of Death (BLOD)







NVIDIA Tegra X1 SoC

eMMC

2 GB LPDDR4 DRAM

Blue Screen of Death (BLOD)



NVIDIA Tegra X1 SoC

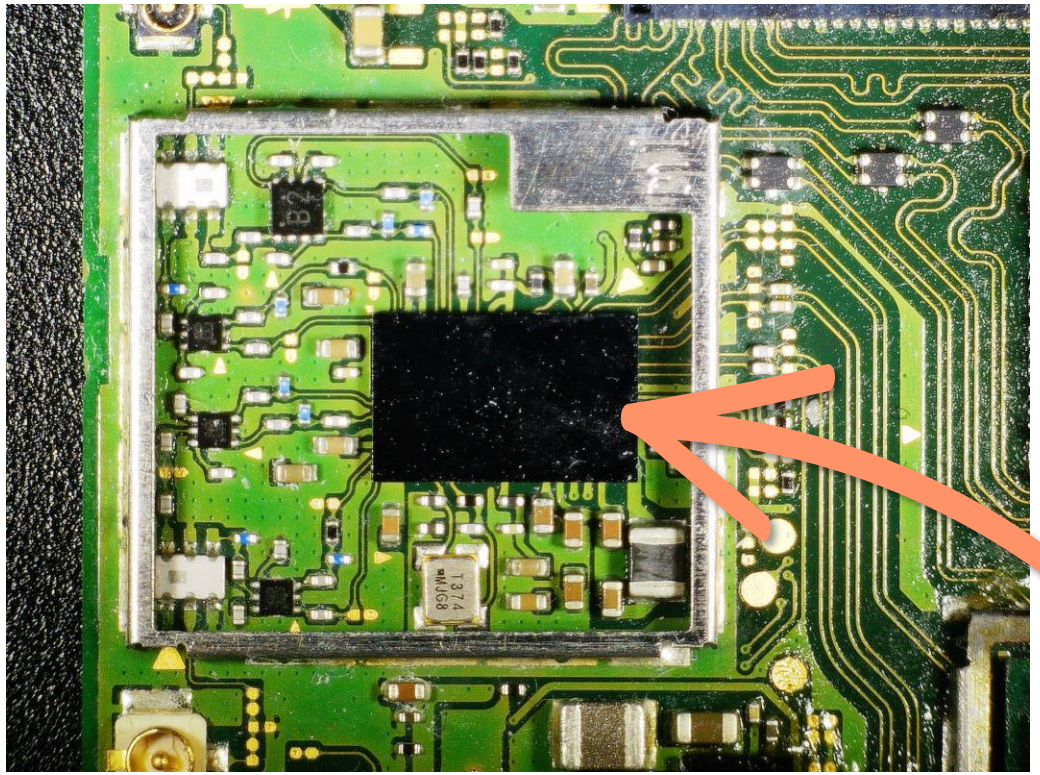
2 GB LPDDR4 DRAM

HAC-CPU-20

fixmyapp Research

Orange Screen of Death

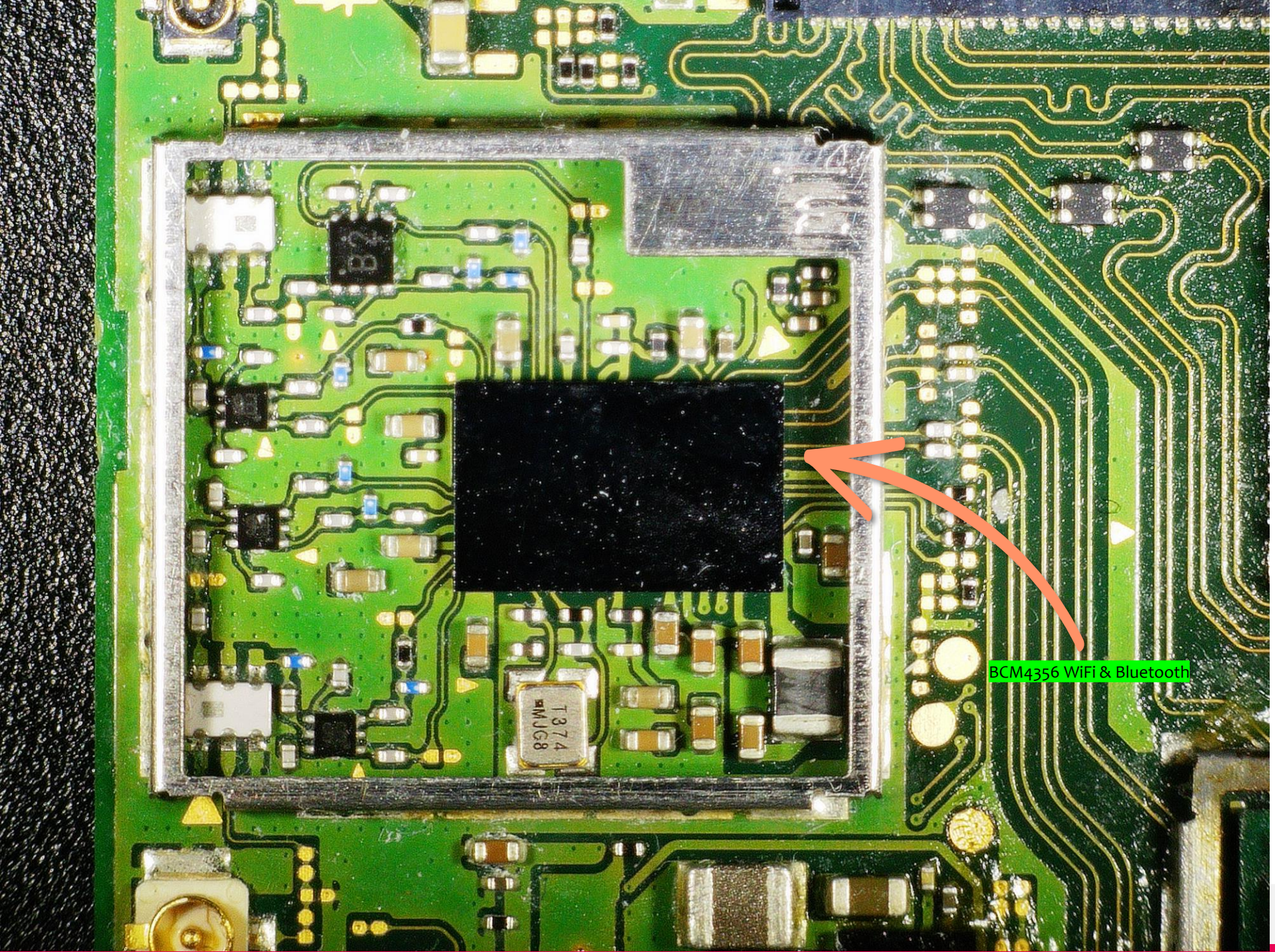




If the Wi-Fi and Bluetooth functionality is not working on a Nintendo Switch you can get a orange screen of death.

Replace or reflow the WiFi IC.

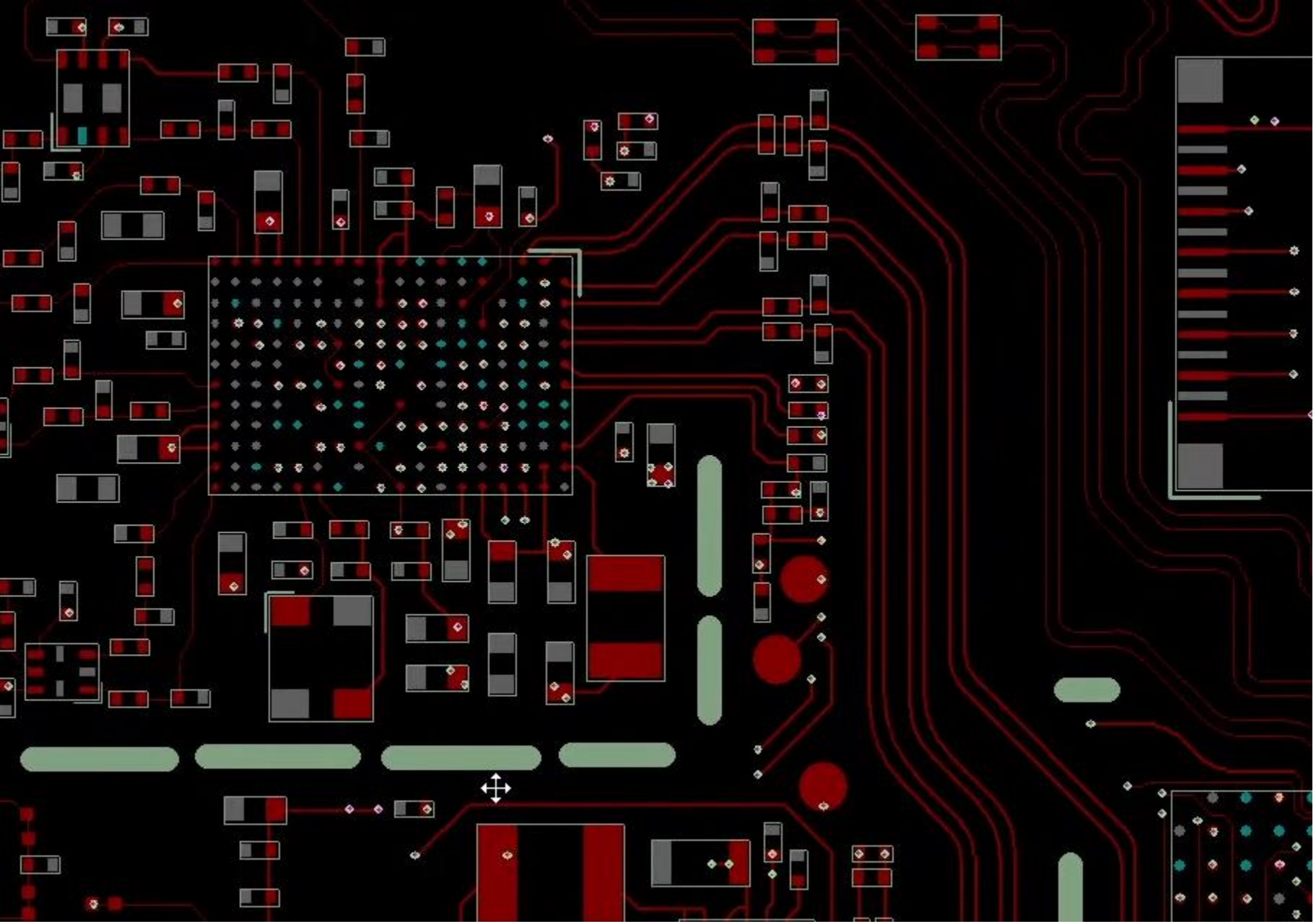
BCM4356 WiFi & Bluetooth



WiFi / Bluetooth communication problems

If the Wi-Fi and Bluetooth functionality is not working on a Nintendo Switch, it is possible that the underlying issue lies with the wireless communication chip.

The Nintendo Switch uses a combined Wi-Fi and Bluetooth chip for wireless connectivity.



WiFi / Bluetooth communication problems

If the Wi-Fi and Bluetooth functionality is not working on a Nintendo Switch, it is possible that the underlying issue lies with the wireless communication chip.

The Nintendo Switch uses a combined Wi-Fi and Bluetooth chip for wireless connectivity.

Touchscreen V1 / V2





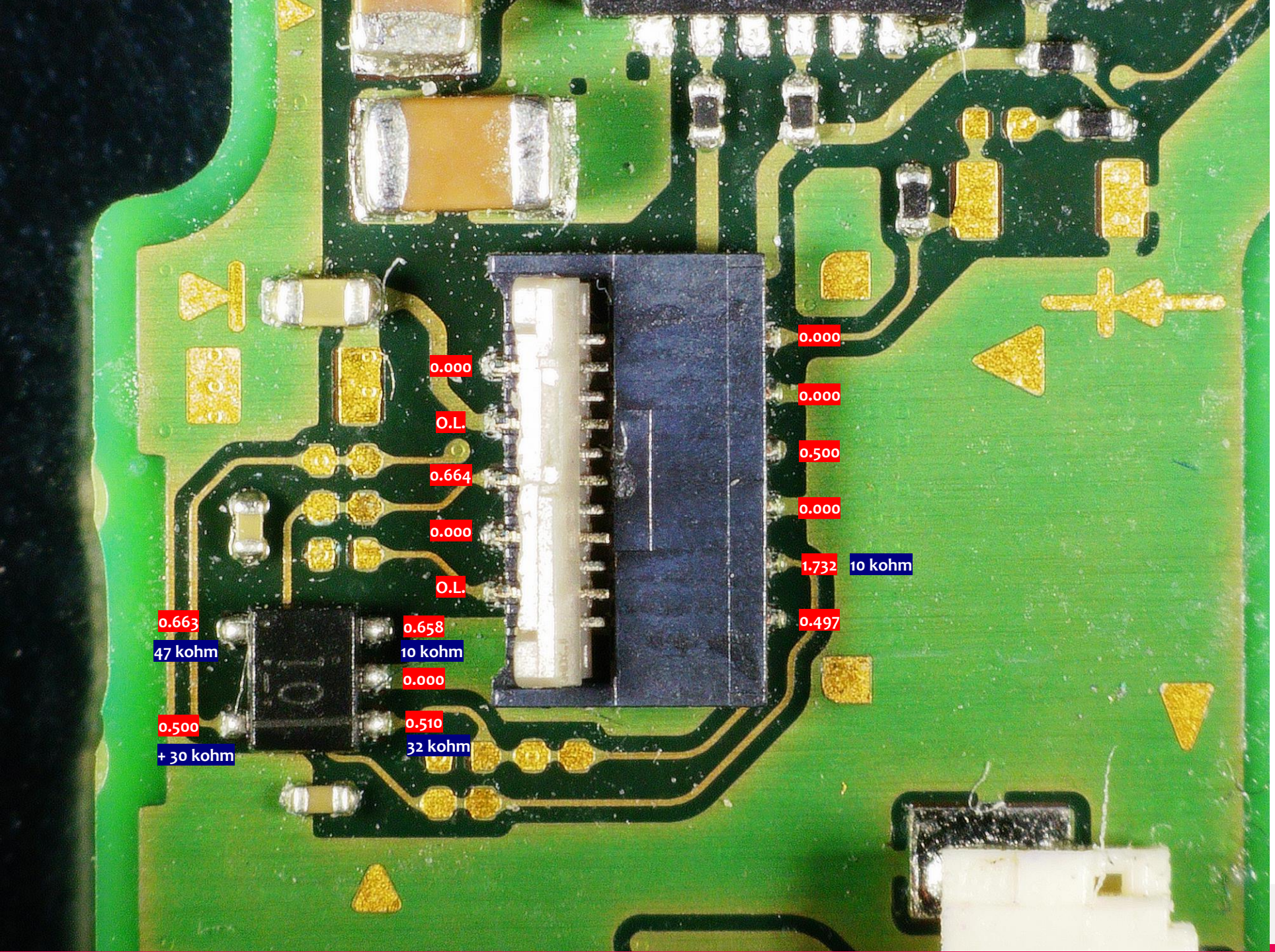


If the touchscreen is not working be aware that you have to get the right version.

Check the old touchscreen if there is no QR code then you need a version 1 touchscreen.

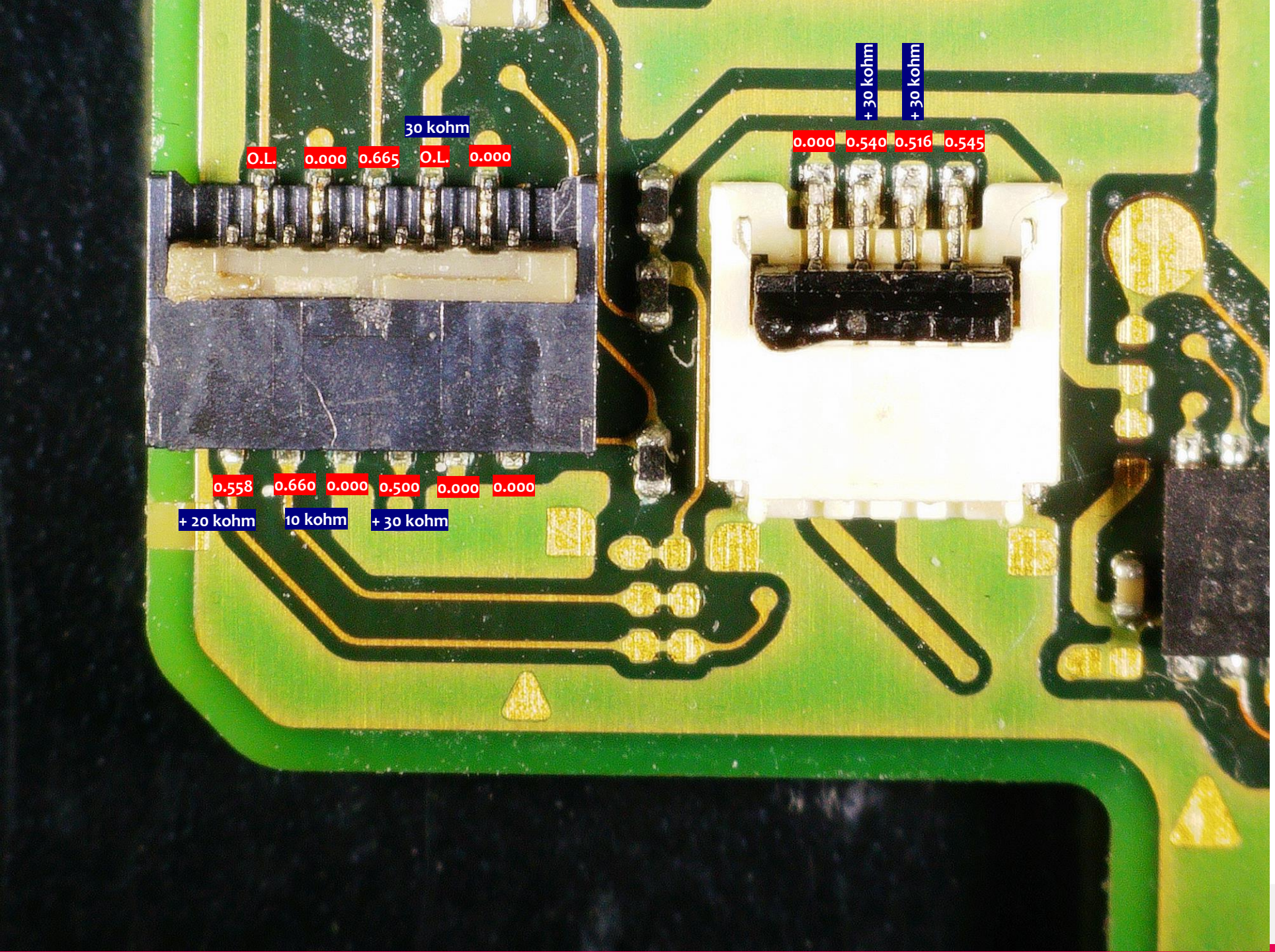
If you bought the wrong version the touchscreen wil behave strange.

Joy-con connector nearby battery connector



DIODE MEASUREMENT

RESISTANCE MEASUREMENT

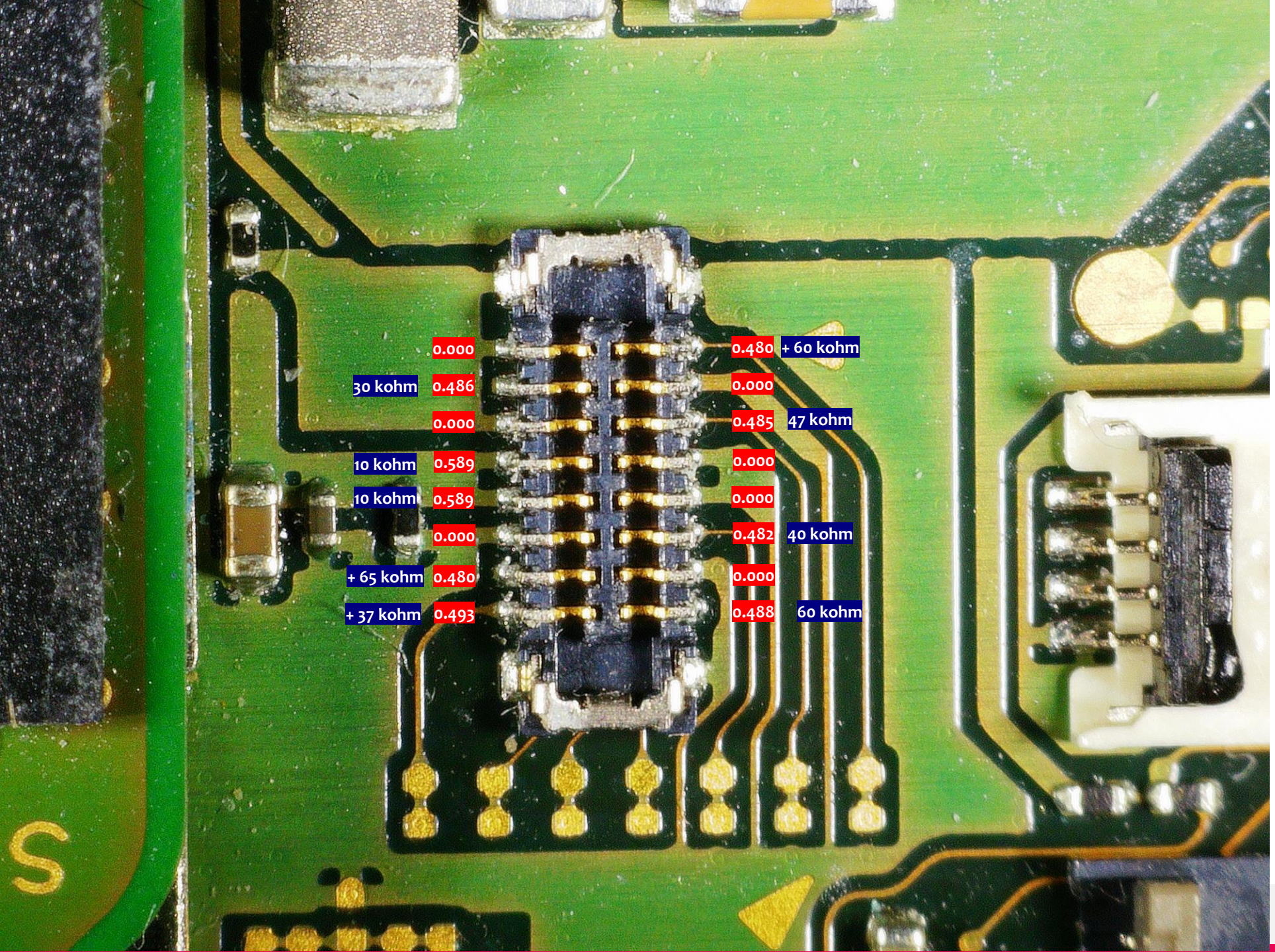


Joy-con connector (left)
Back-light connector (right)

DIODE MEASUREMENT

RESISTANCE MEASUREMENT

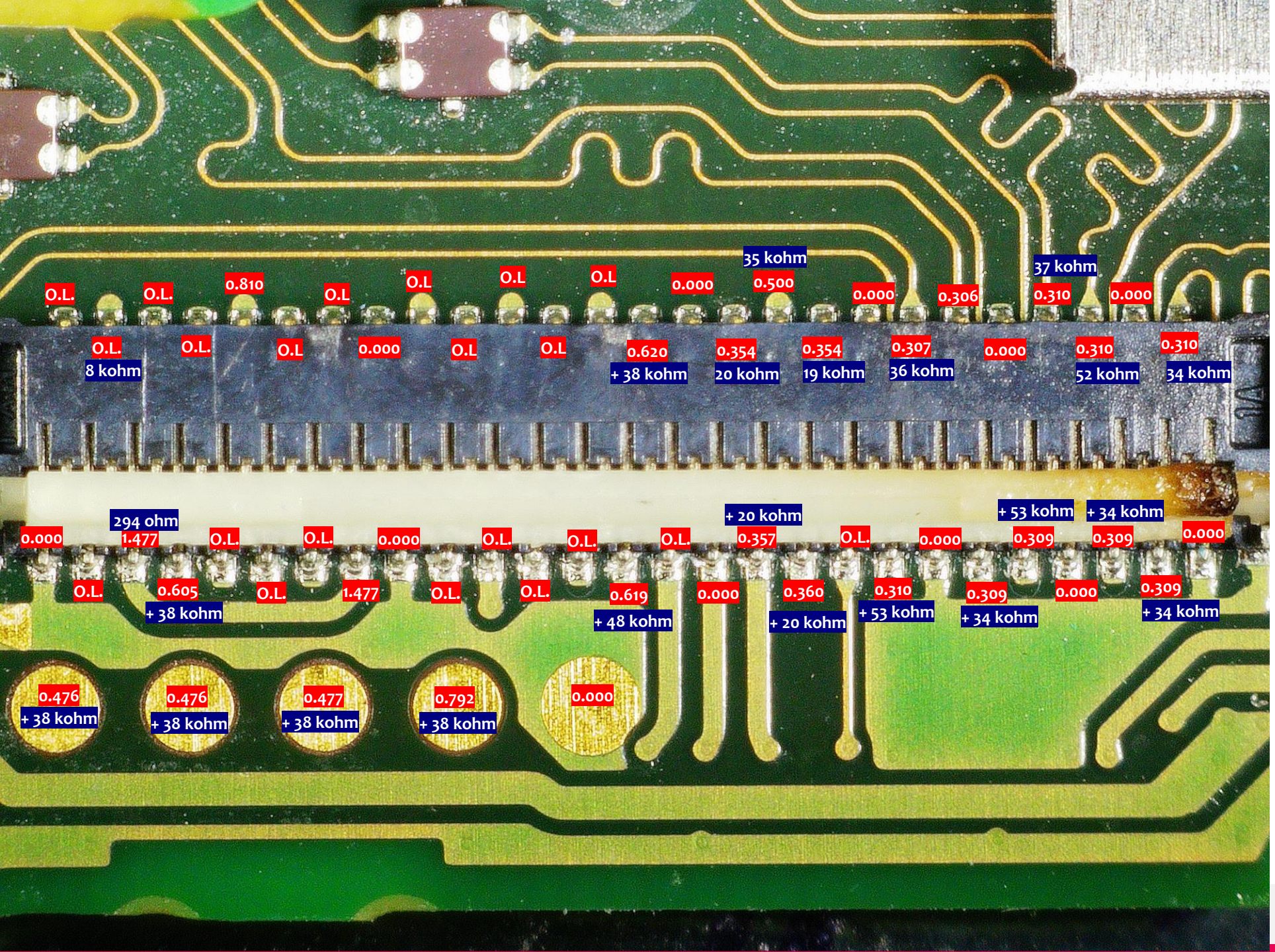
SD-Card connector



DIODE MEASUREMENT

RESISTANCE MEASUREMENT

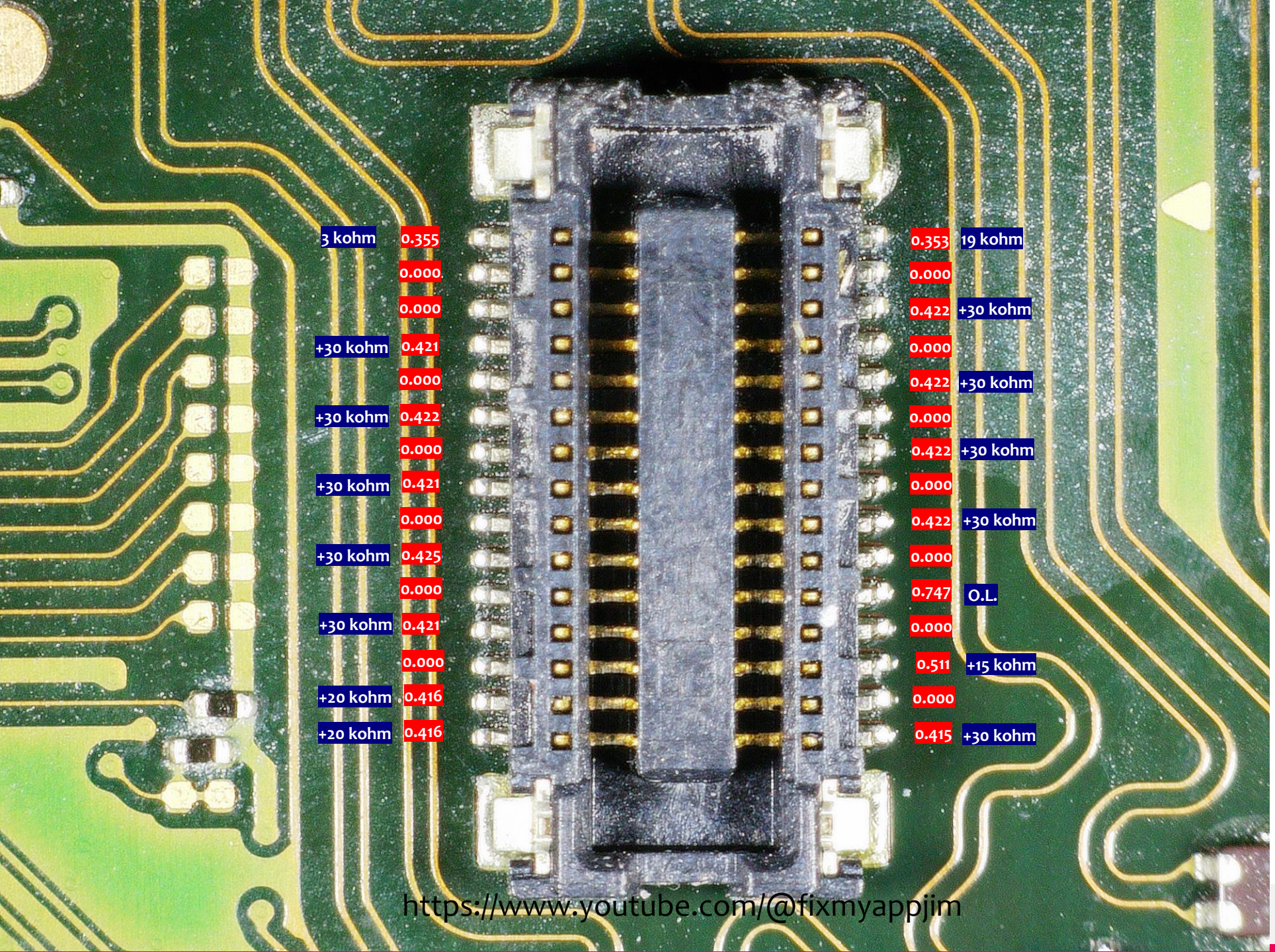
LCD connector



DIODE MEASUREMENT

RESISTANCE MEASUREMENT

eMMC connector on motherboard

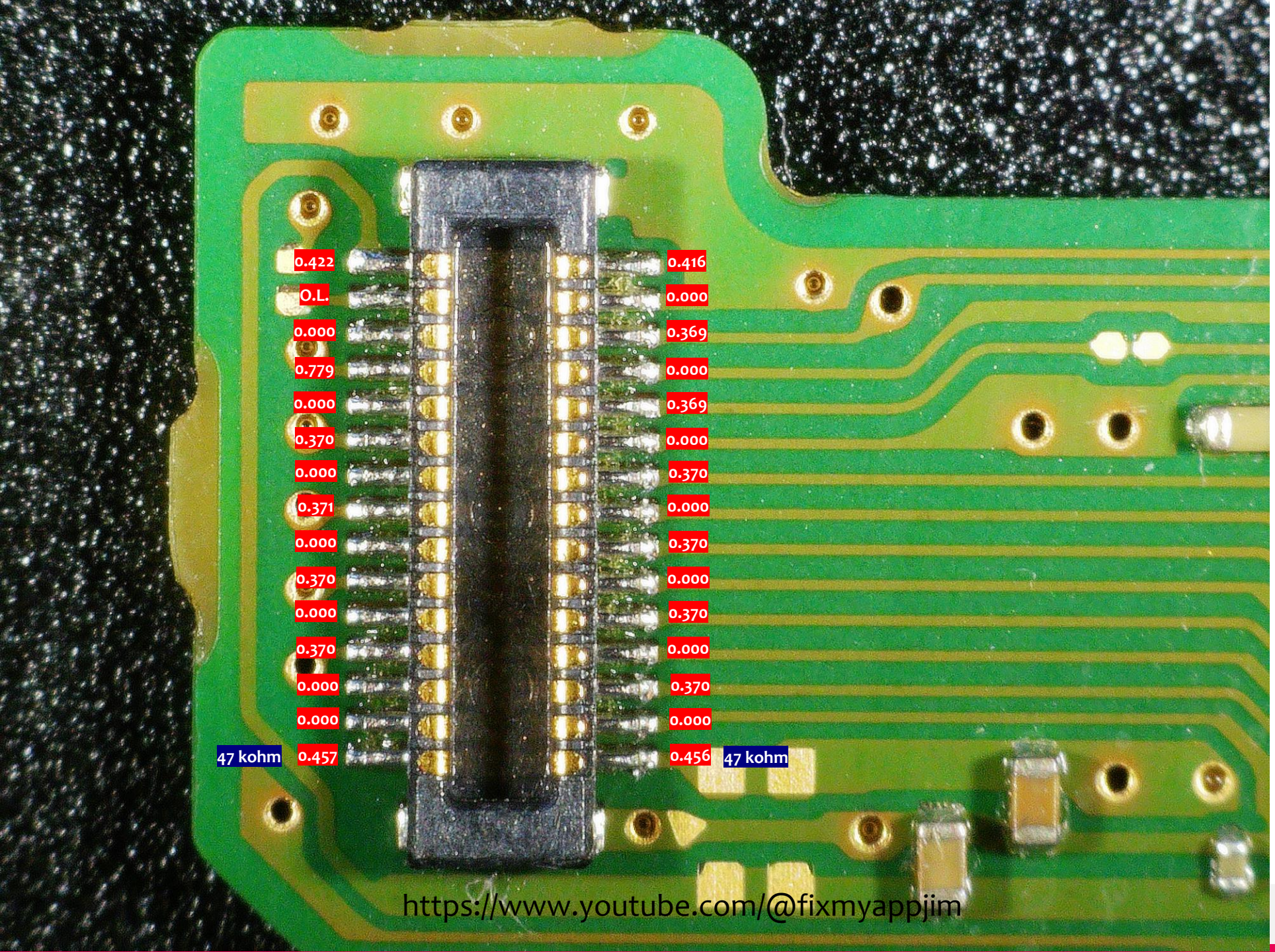


DIODE MEASUREMENT

RESISTANCE MEASUREMENT

https://www.youtube.com/@fixmyappjim

eMMC connector on module



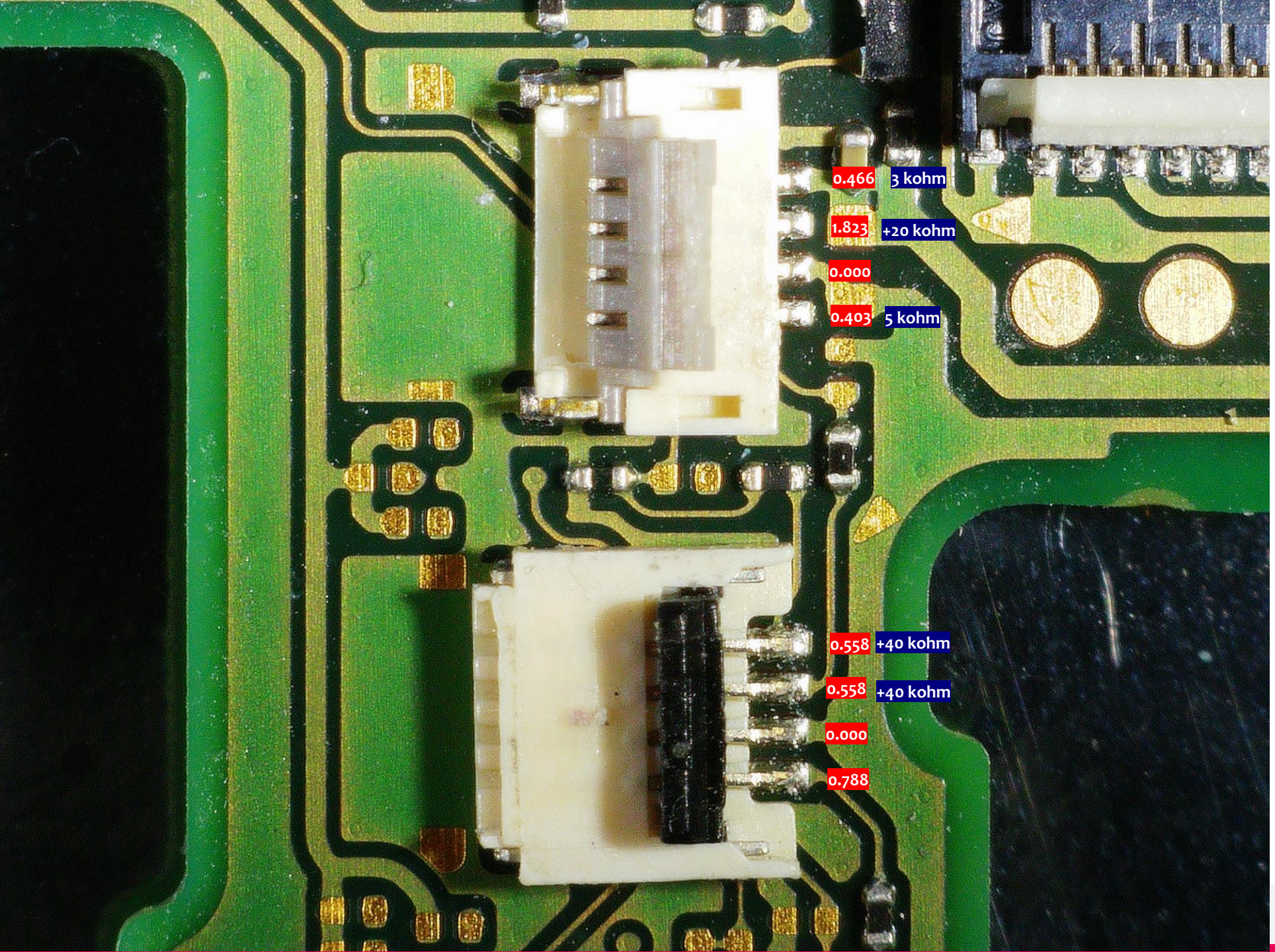
DIODE MEASUREMENT

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fixmyapp Research

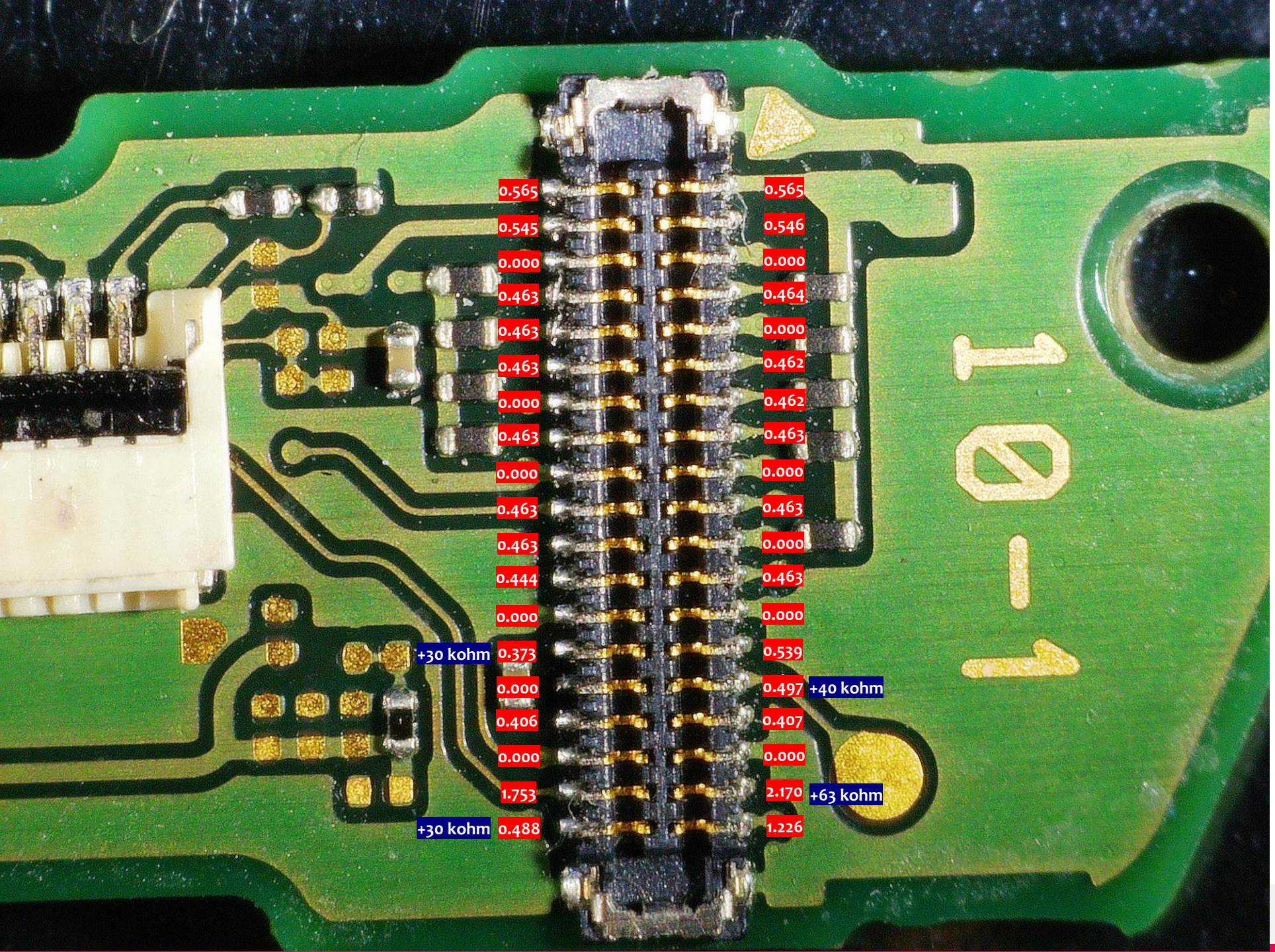
Fan connector (top)
Power / volume connector (bottom)



DIODE MEASUREMENT

RESISTANCE MEASUREMENT

Touch/Game card connector



DIODE MEASUREMENT

RESISTANCE MEASUREMENT