



# OpenPhoenux Smartphone: Learnings from the past and ideas for next year

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supported by



# What the inventors of „PC“ and „WWW“ did want...

computation, storage and communication is **personal**

WWW connects **decentralized** servers and clients to share

**everyone controls** his/her data published to the net

# ...but the Mainframe Dinosaur (or Borg?) is back!

Cloud & **Centralized** Services  
(iTunes, AppStore, FaceBook,  
Google, ...)

Facebook tries to become  
„The one and only Internet  
**Portal**“

Mainframe architecture!  
(Logically) Centralized Storage +  
**thin clients** (= Smart?Phones)

The user is not using the Web  
but becomes an **object** in  
the Web

The operator of the Computing  
Center **owns the User** and the  
World...  
(they even know things about you  
that you don't know)

Millions of different Apps **replace**  
the universal **Web-Browser**  
concept and try to inject  
advertising and data collection  
everywhere

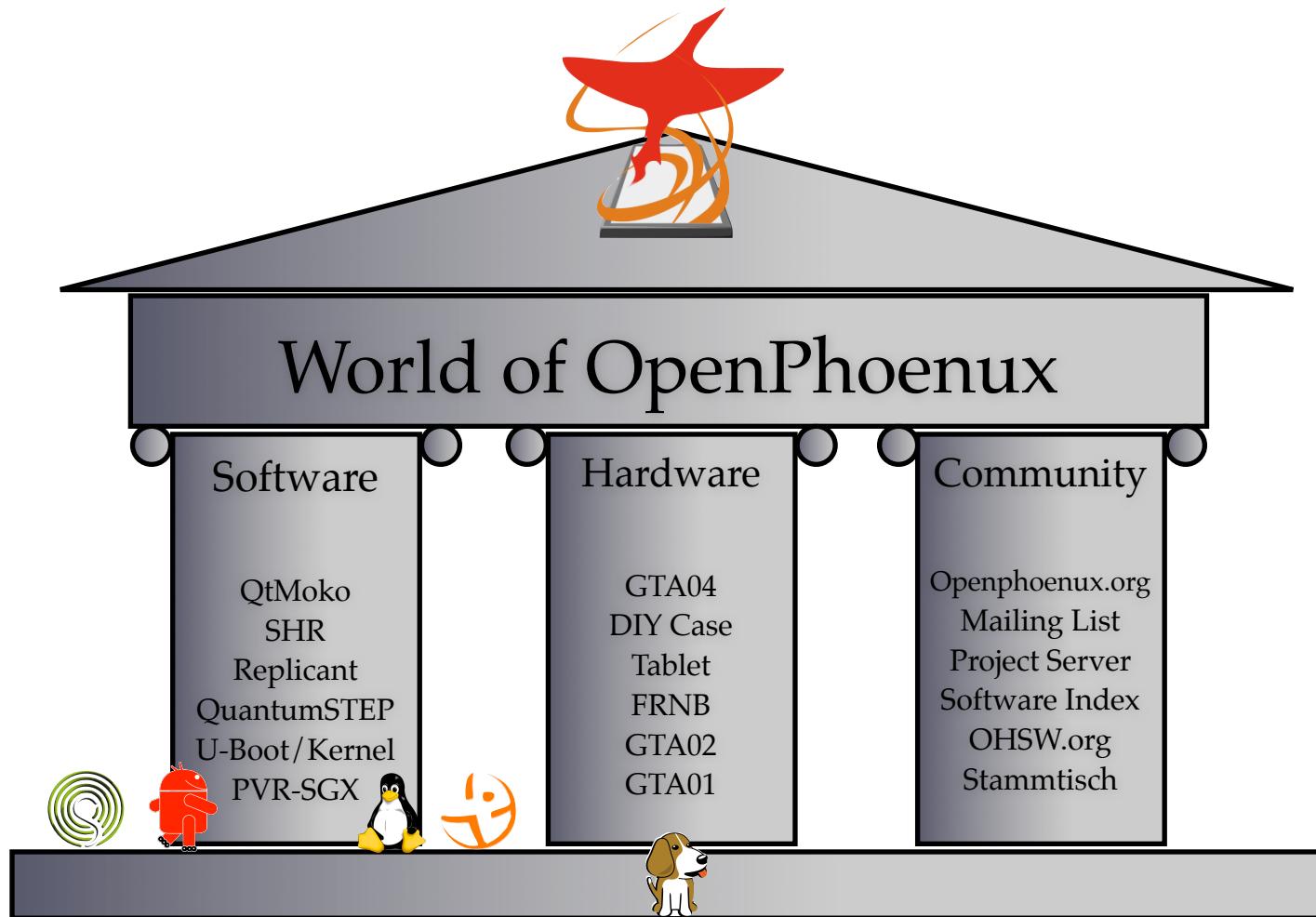
# You don't believe?

- Marketing and urban legends tell you:

Android and iOS are open enough  
for everybody. Yes!

- No.
- not every bit and piece is open and extensible or even long-living
  - Try to provide your own home screen to iOS. Even Facebook Home failed.
  - Try to connect a hardware keyboard. If you are lucky you have an USB host port.  
But do you have the driver?
  - Try to get an upgrade for your 2 years old Android device.
  - Try to understand why your device fails in a specific situation.
  - Try to make sure your data is safe.

# Solution: The Independent Mobile (communication) Tool Community



# OpenPhoenux Community

wants to be independent from this  
policed but still unsafe world

needs support by independently  
thinking people

please join and support!

# OpenPhoenux stands for

**participation** by everyone

**long-term support** (e.g. software upgrades for an 2007 Neo 1973)

**fights** planned **obsolescence** through open hard- and software

hardware **production** near to users (Europe) under **fair** labour **conditions**

**everybody** plays client and server roles and **keeps control** over his/her participation

allows to **inspect** what the system is doing

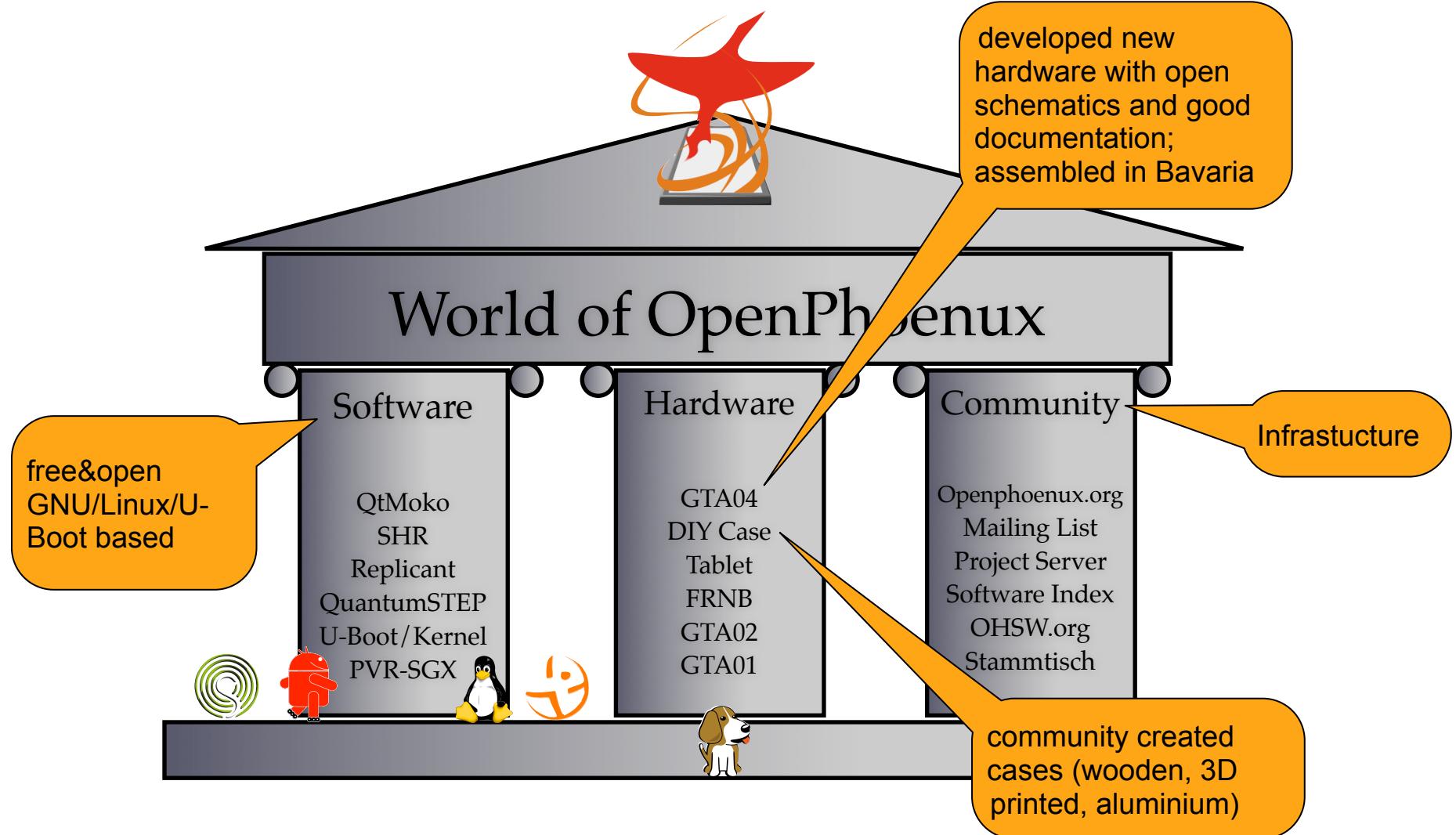
can be **repaired** using standard parts

**no** central, intransparent, stock exchange listed instance that gives **directions**

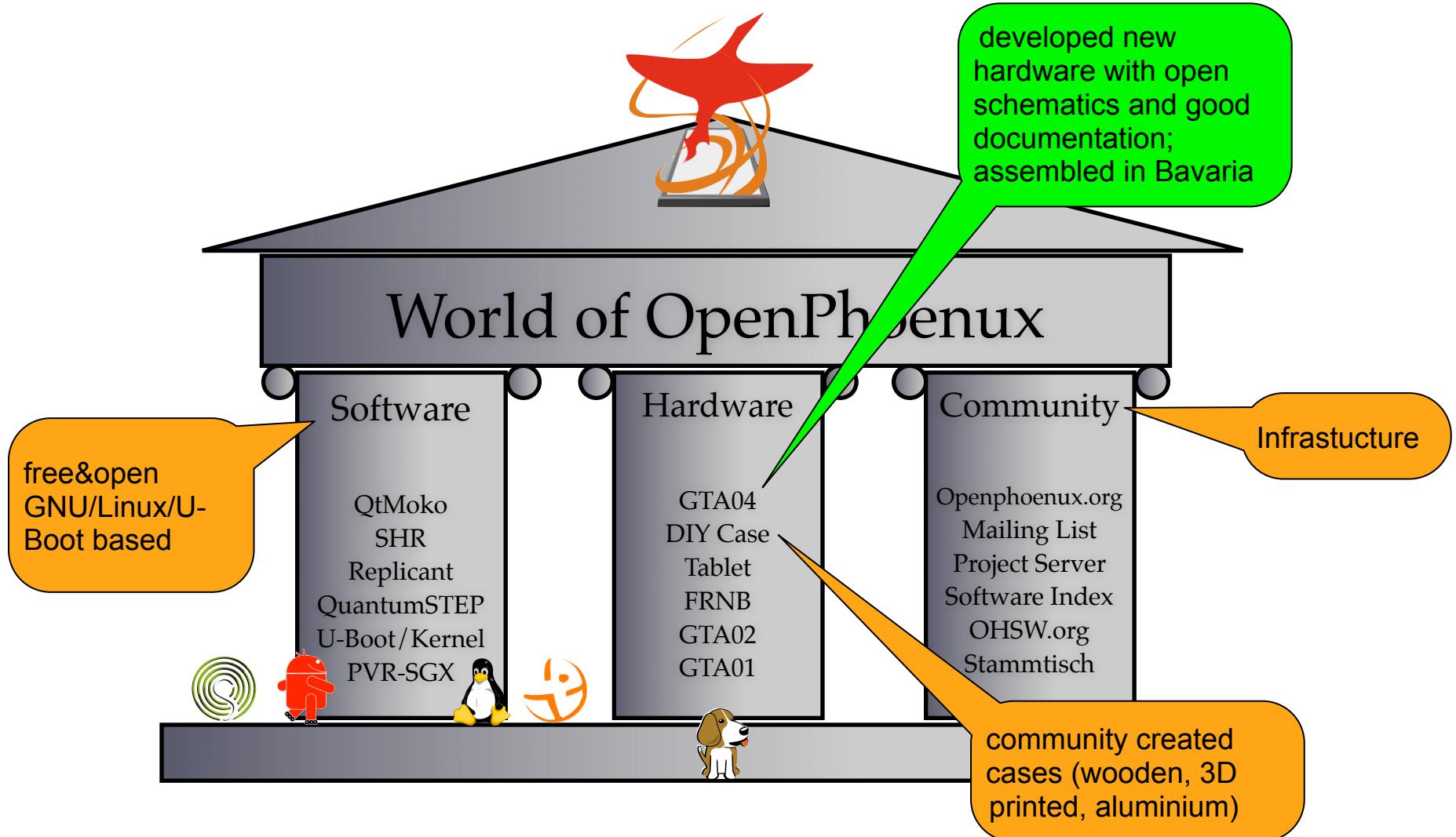
**independent** from the "modern mainframe" and back to the networked, **decentralized web**

**makes** the technical system **transparent**, not the user

# OpenPhenix already has



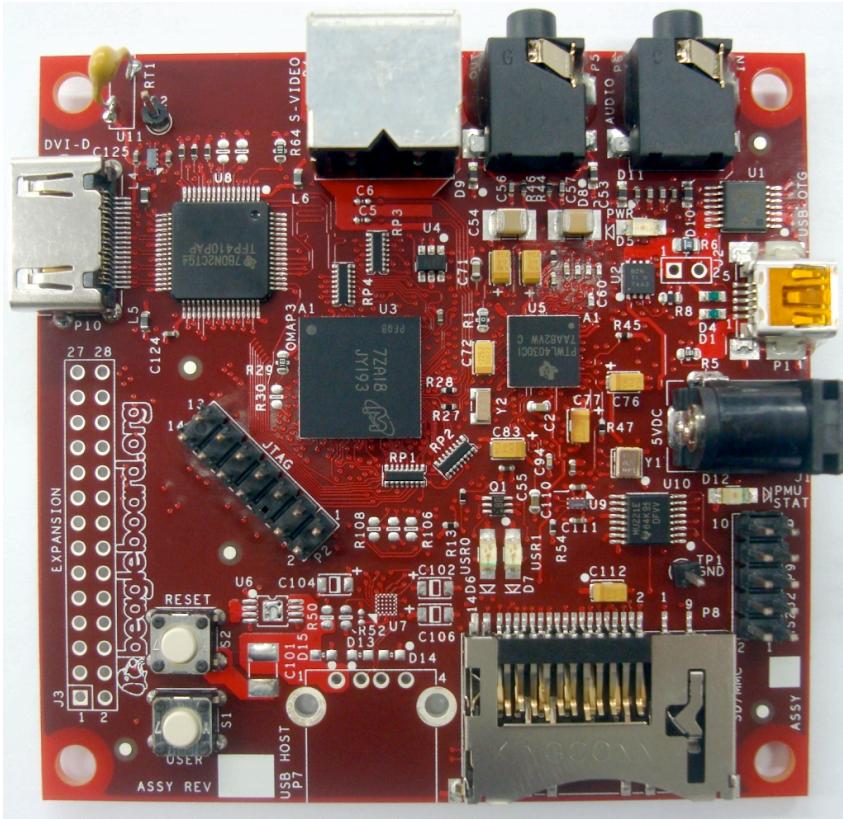
# OpenPhenix already has: Hardware



# Hardware

- GTA02 hardware (Openmoko Freerunner)  
did go out of production in 2009
- How do we improve the hardware?
  1. open kernel for big \${BRAND} → reverse engineering
  2. order design from some \${MANUFACTURER}  
→ hope for openness and long-term support
  3. DIY, “Use the source, Luke!” → GTA04

# Using the source: Beagleboard

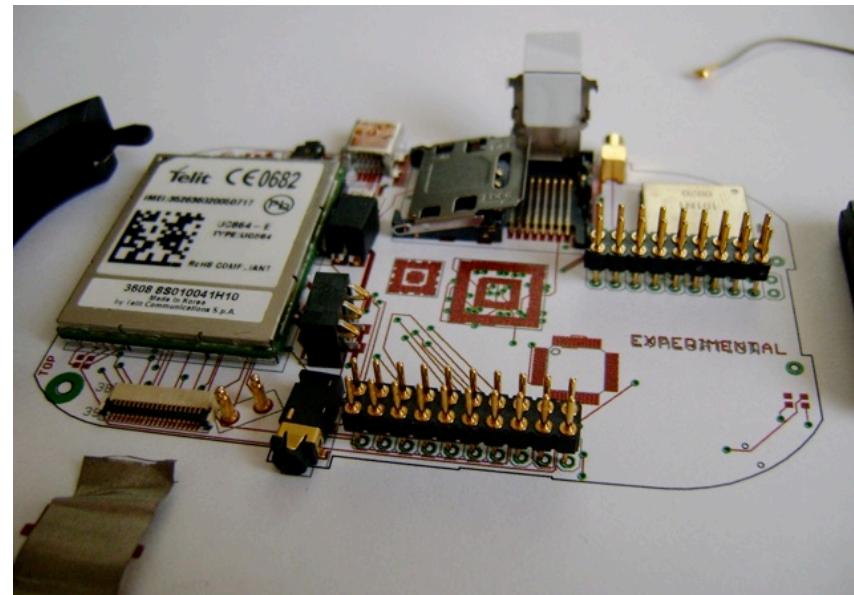
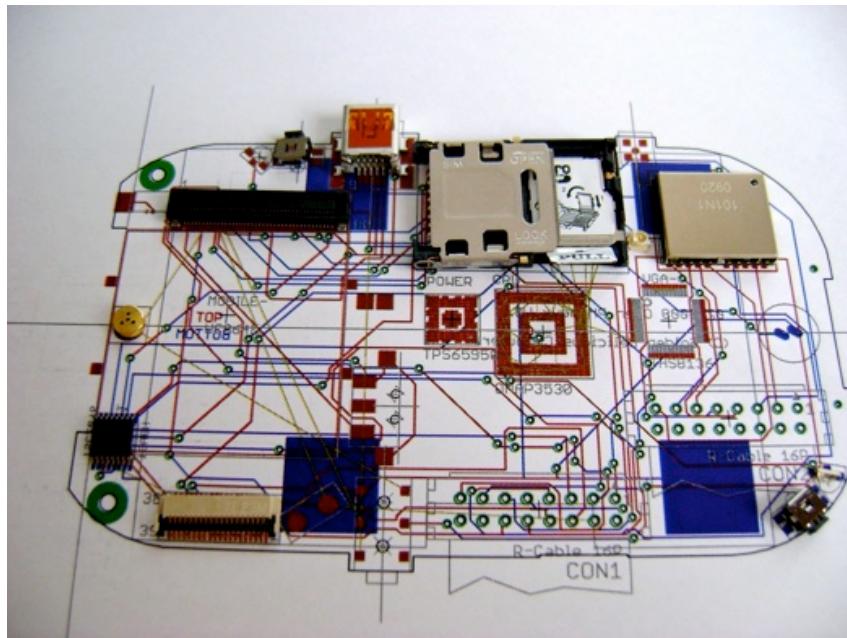


# Beagleboard

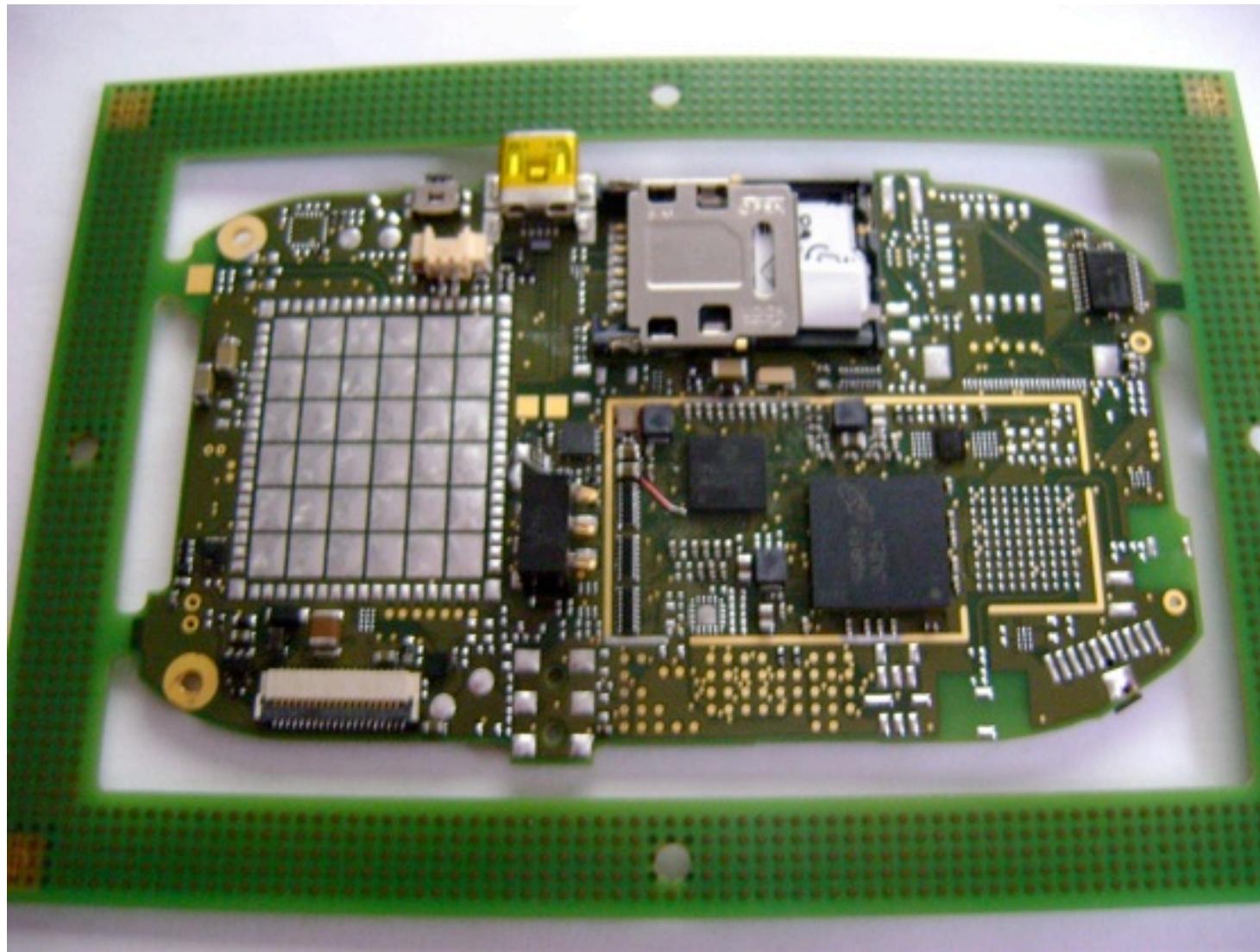
- Full Linux support
  - Open schematics
  - Open layout
  - Expansion connectors
  - Lots of documentation
  - Components available



# In theory it could fit (Aug. 2010)



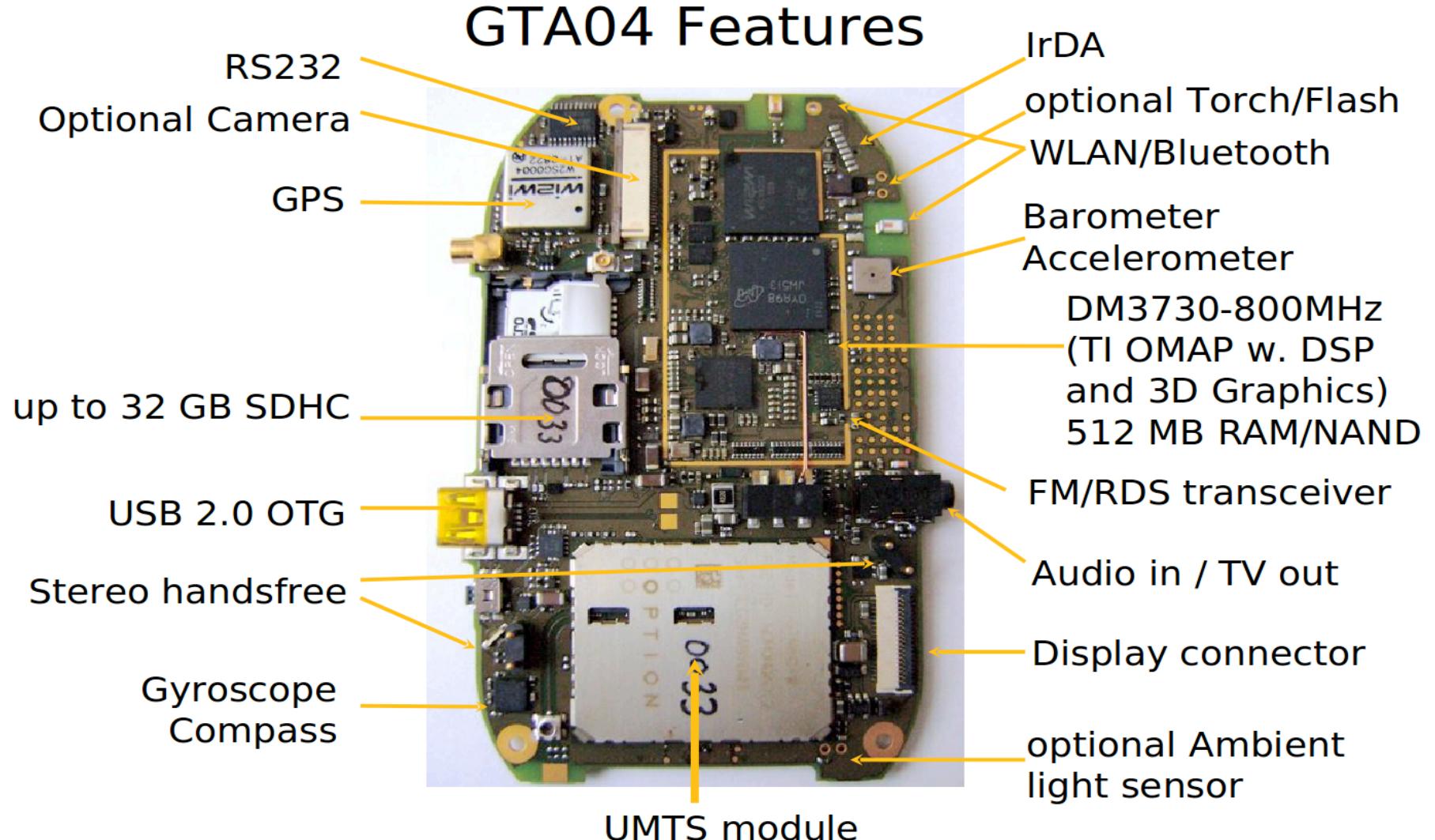
# GTA04A2 (Feb. 2011)



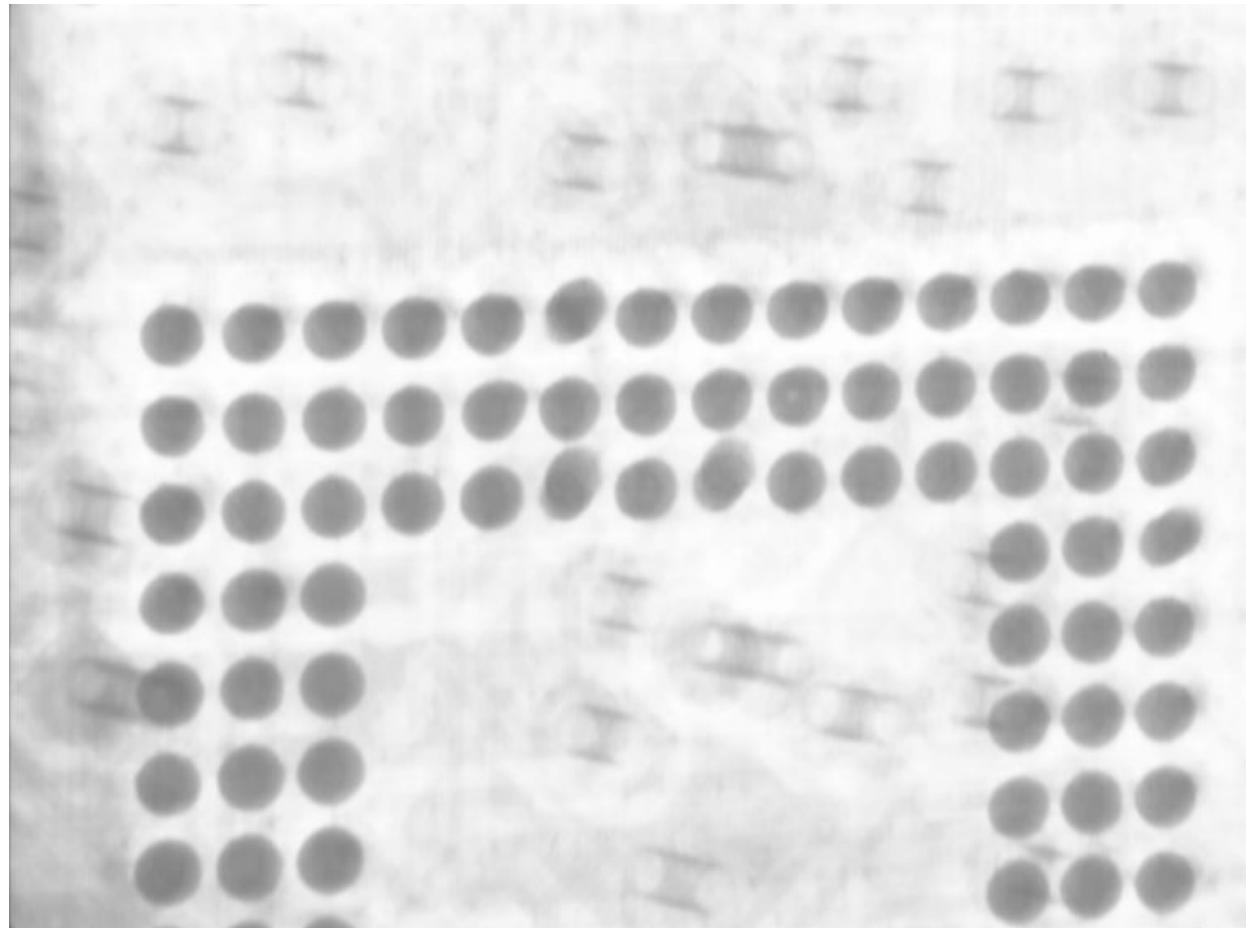
# GTA04A3 (June 2011)



# GTA04A4 – OpenPhoenux

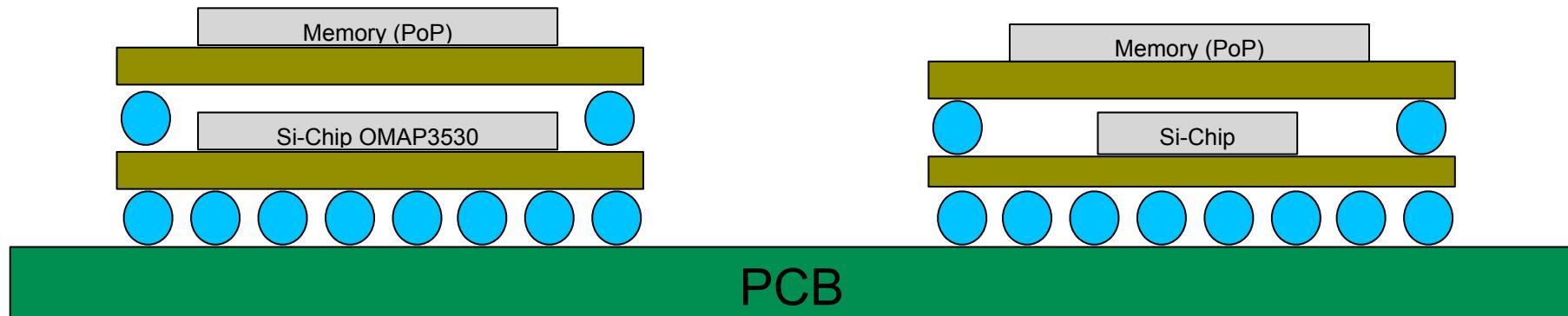


# Production Problems...

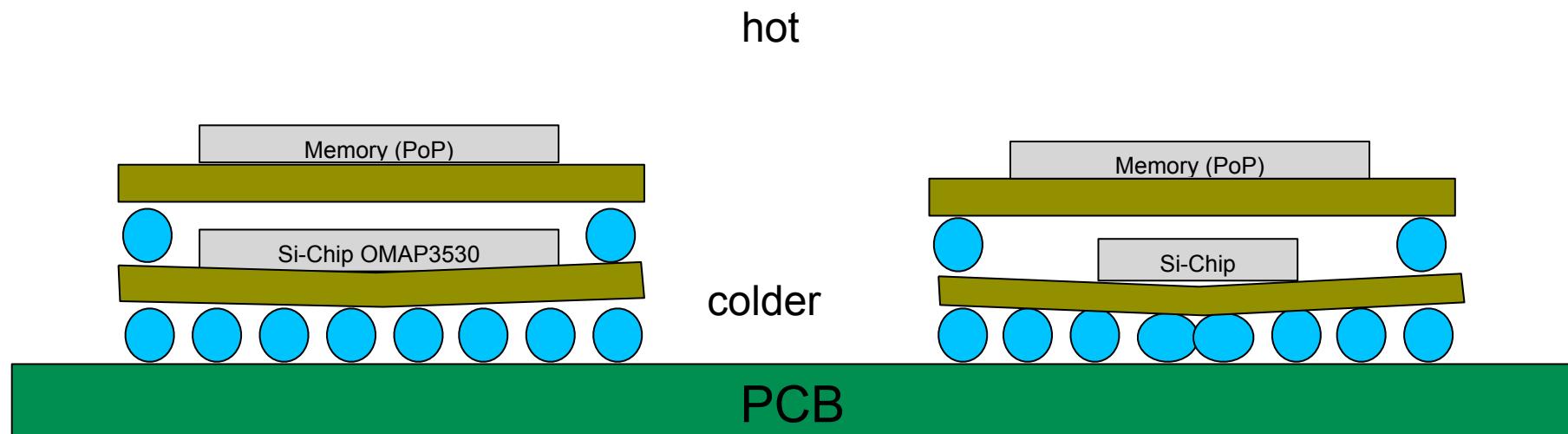


# Before Reflow Soldering

OMAP3530 -> DM3730 (Die-Shrink)

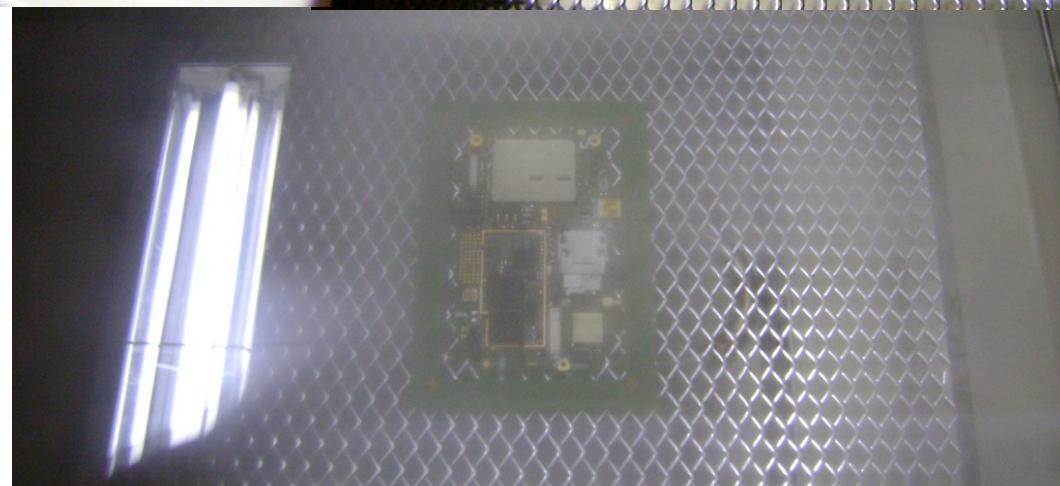


# Heat to 260°C...

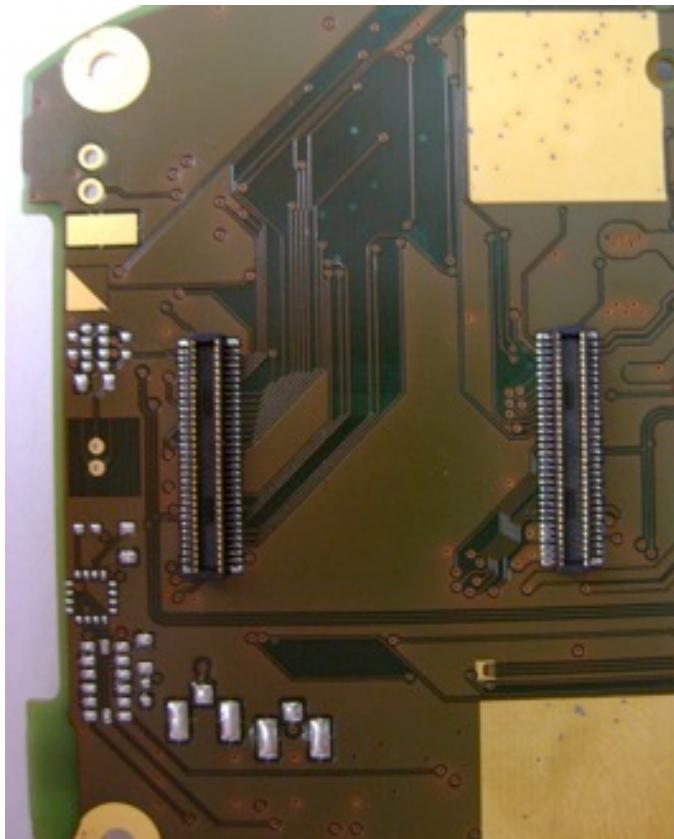


Warping squeezes balls in the middle  
-> short circuits on VDD1, VDD2  
-> difficult to repair, expensive

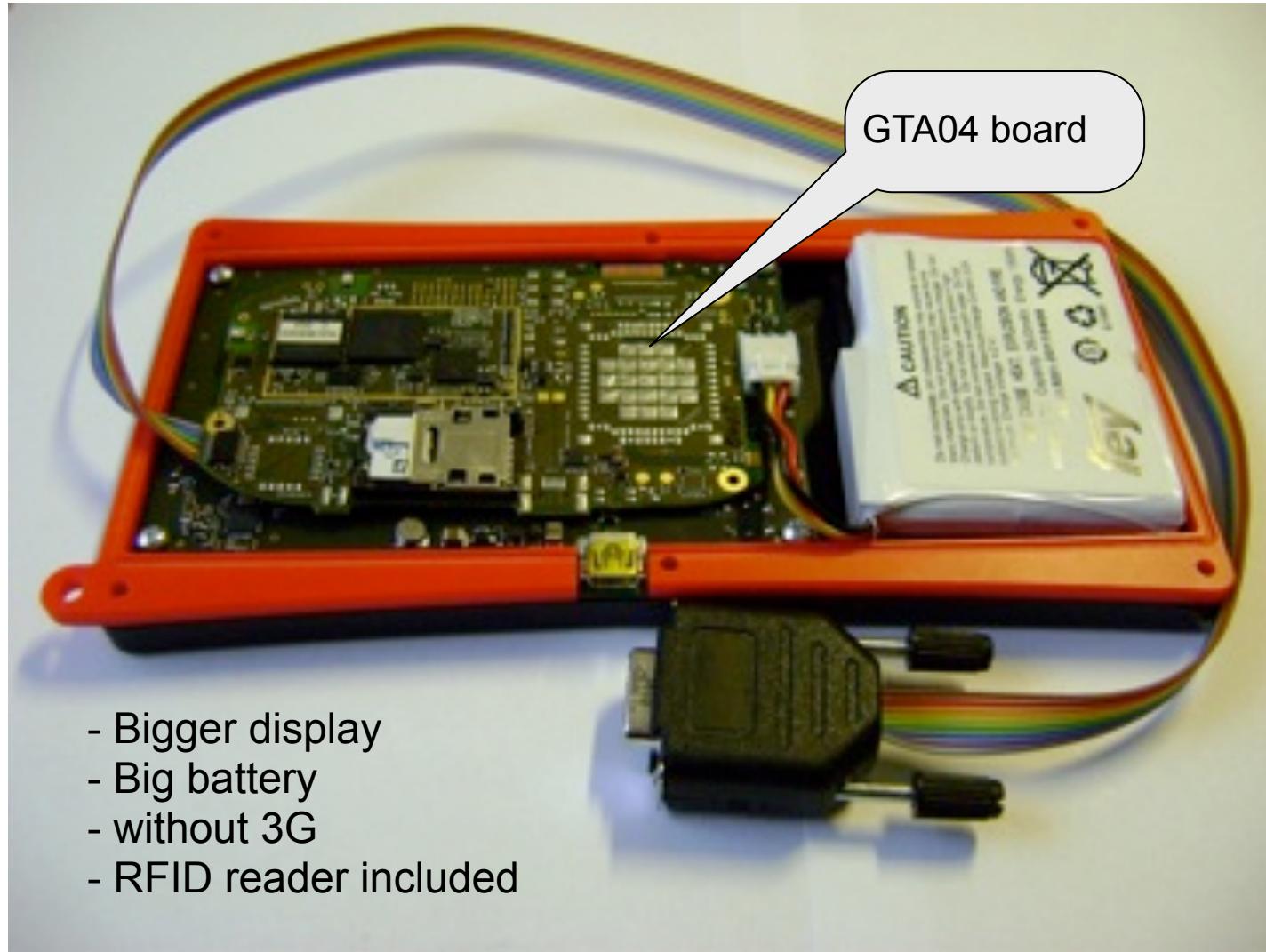
# Solution: Vapour Phase



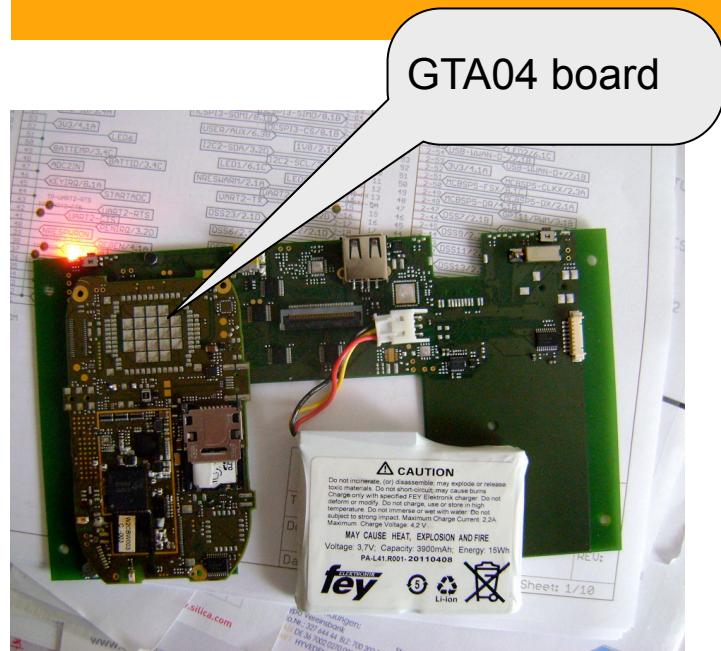
# The GTA04 module approach



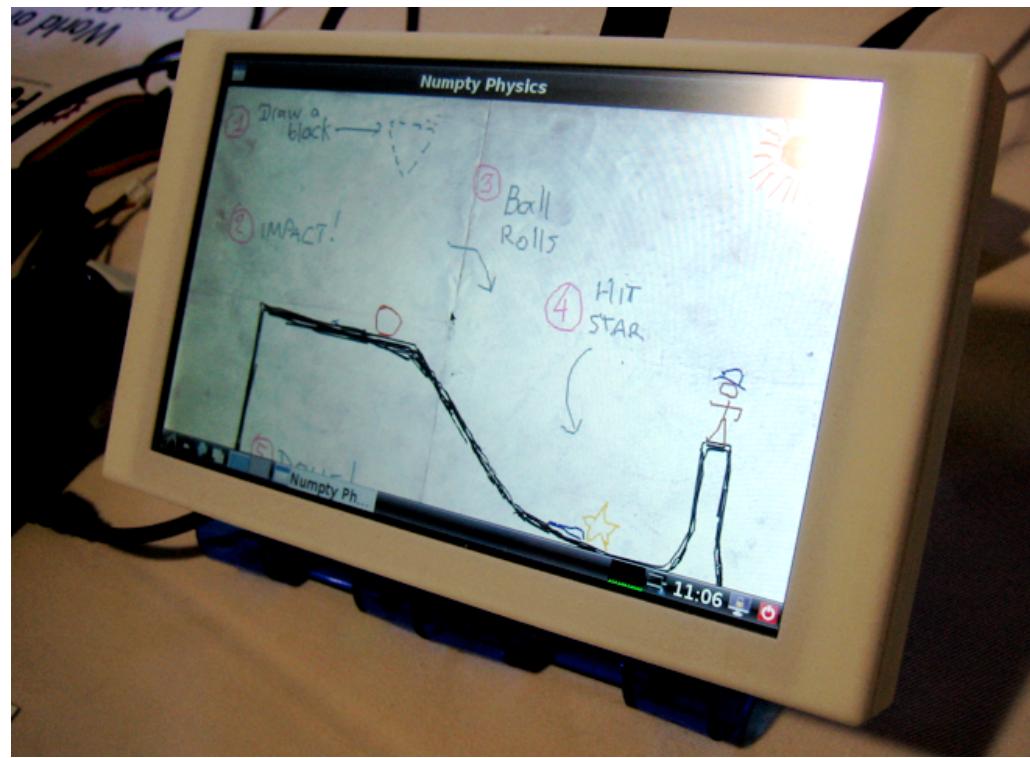
# Letux 3704 portable terminal with WiFi/BT,



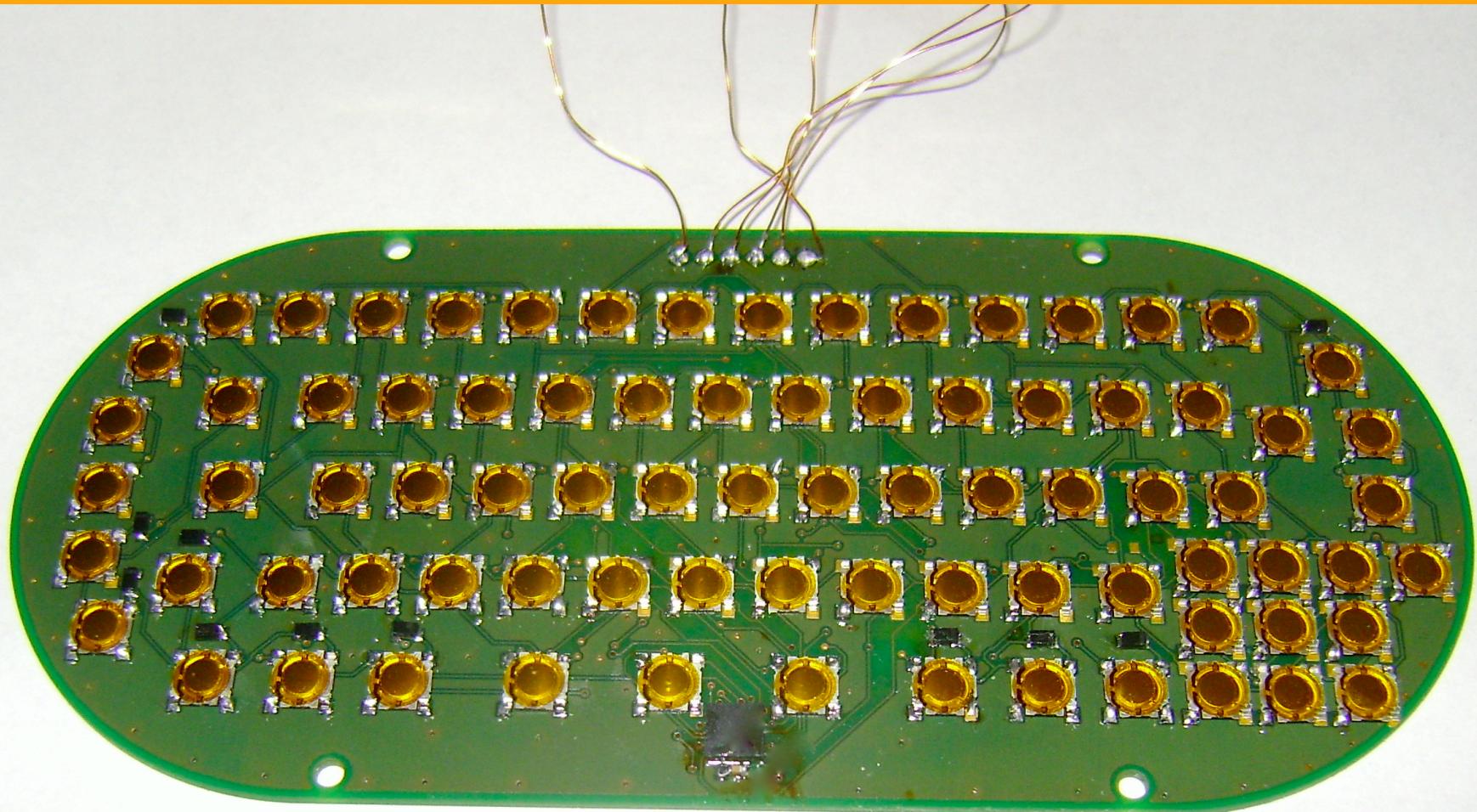
# Letux 7004 Tablet Prototype



- 7 inch tablet
- GTA04 inside
- UMTS (optional), WLAN, BT, GPS, USB
- ~10-15h operation time
- Qi inductive charger

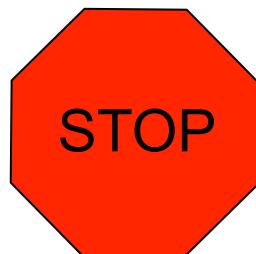


# Hardware Keyboard Prototype



# Mass production: GTA04A5

- GTA04A5 revision of PCB is ready to go to production
  - small modifications to replace obsolete components or improve production process
  - fix small bugs
- Price is still high due to small batch size
- But: there are not enough orders to start a new batch  
(200 units could be produced within ca. 8-10



# Is this a problem unique to OpenPhoenux?

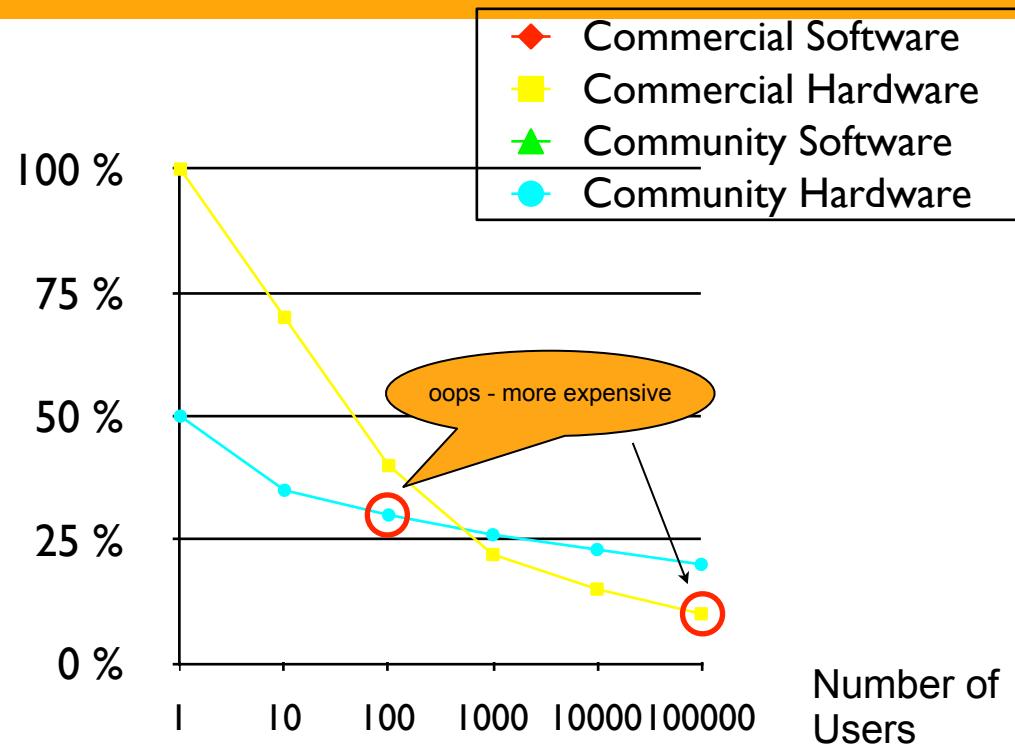
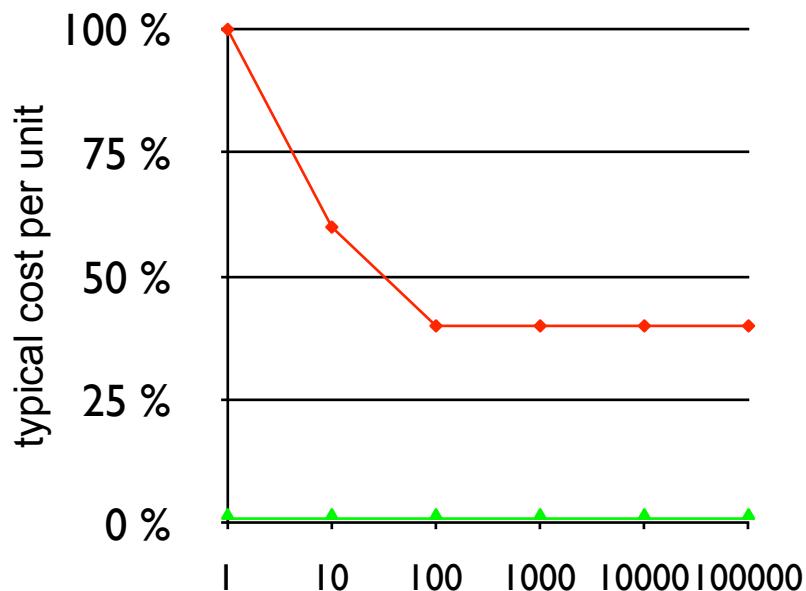
Für die „Tonspur“ / Diskussion

- No:
- - Ben Nanonote
- - Vivaldi (Spark)
- - Always Innovating, GeeksPhone, ...
- What is the root cause?
- - building hardware costs money
- - components get only cheaper in high quantities
- - small projects don't have the financial backing to buy high enough quantities to fulfill users's price expectations that are defined by big players
- Kickstarter?
- - US based
- - needs something unique and new that attracts \*new\* customers/consumers (like Pebble, RFduino, ...)
- - but must also be comparable in price to alternatives (e.g. Nexus 4)
- - needs a big team to prepare a professional campaign or will fail immediately
- - the quality expectation is very high!

# Community Hardware has an inherent cost problem (1)

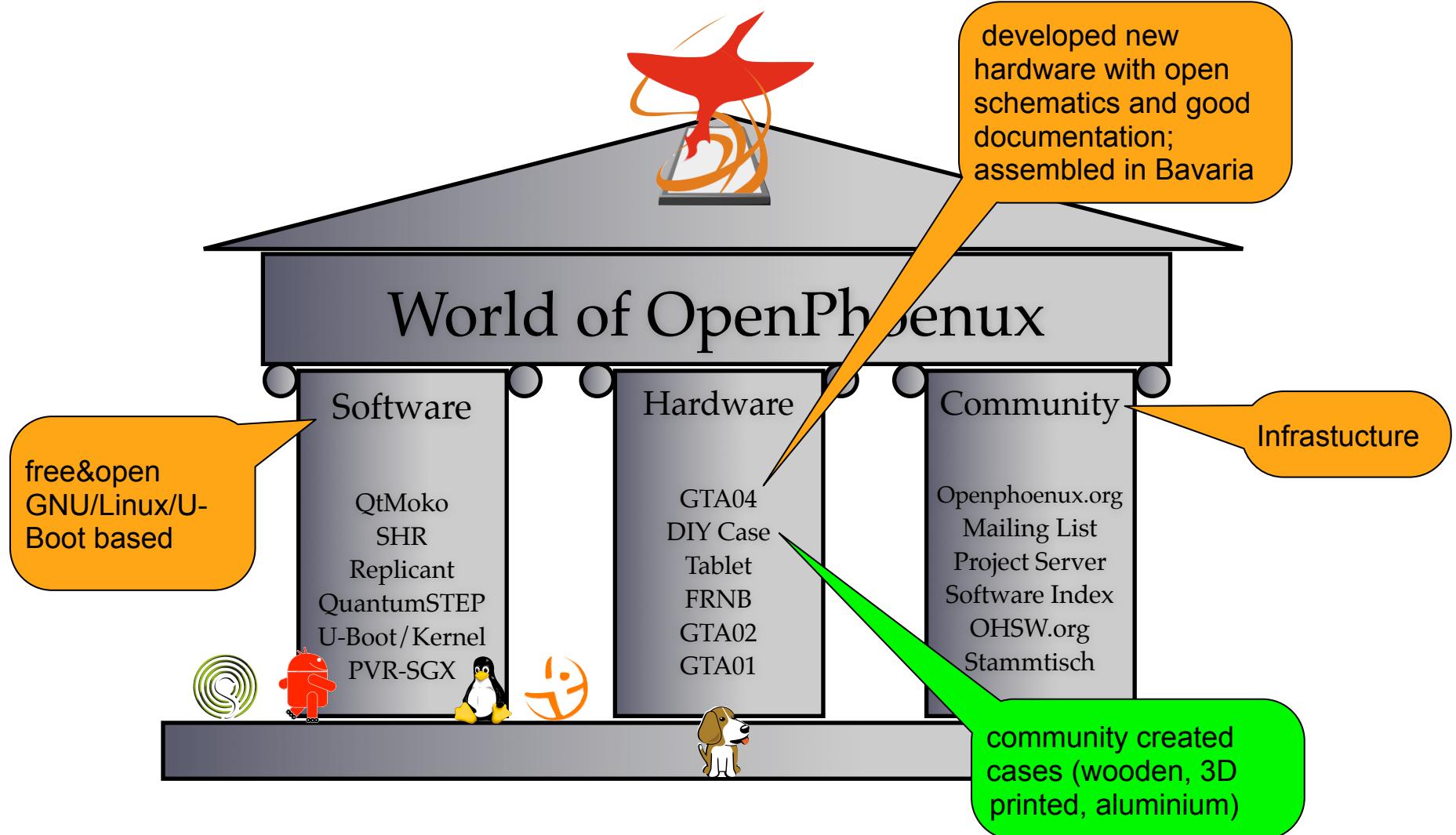
Cost	Development	Production	Distribution
<b>Commercial Software</b>	high	low	low
<b>Community Software</b>	lower (volunteers, less quality management, documentation)	none (everything online)	very low (downloads only)
<b>Commercial Hardware</b>	high	goes down with volume	medium
<b>Community Hardware</b>	lower (volunteers, less quality management)	higher due to low volume (and fair conditions)	same

# Community Hardware has an inherent cost problem (2)



- Community Software is inherently cheaper than commercial
- People compare prices of production batch size 1 Mio-units vs. 100 units and find the commercial (closed) HW much cheaper than the community developed (open) device
- „... too expensive!“, „... scam!“, „... Vivaldi announces 200 EUR!“
- there is no solution or „white knight“ - open hardware is and will be more expensive

# OpenPhenix already has: Mechanics



# Wooden case by Radek



# Wooden case 2



# Laser sintering by Shapeways

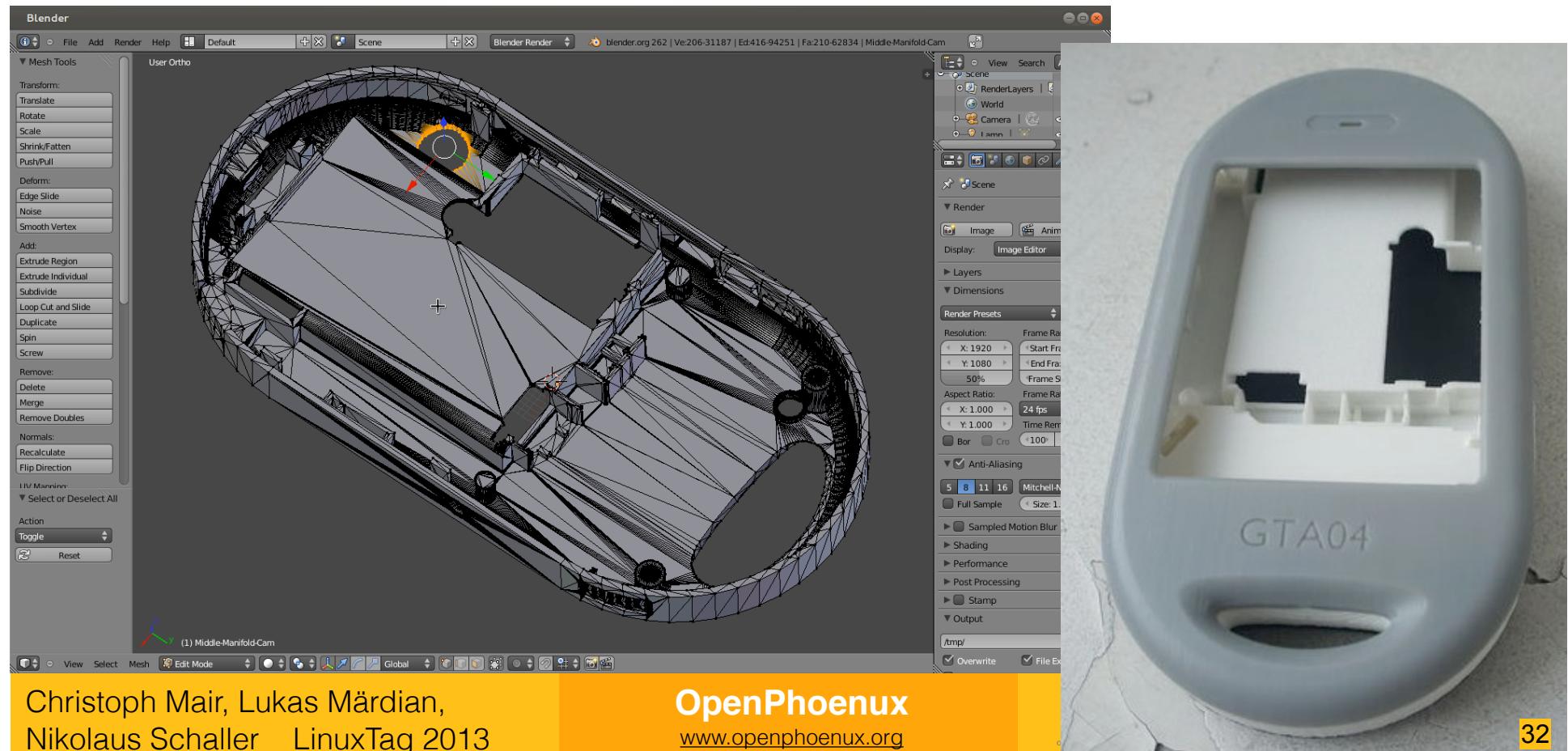
Modify 3D CAD data from Openmoko GTA01/02



Different materials and color options are available!

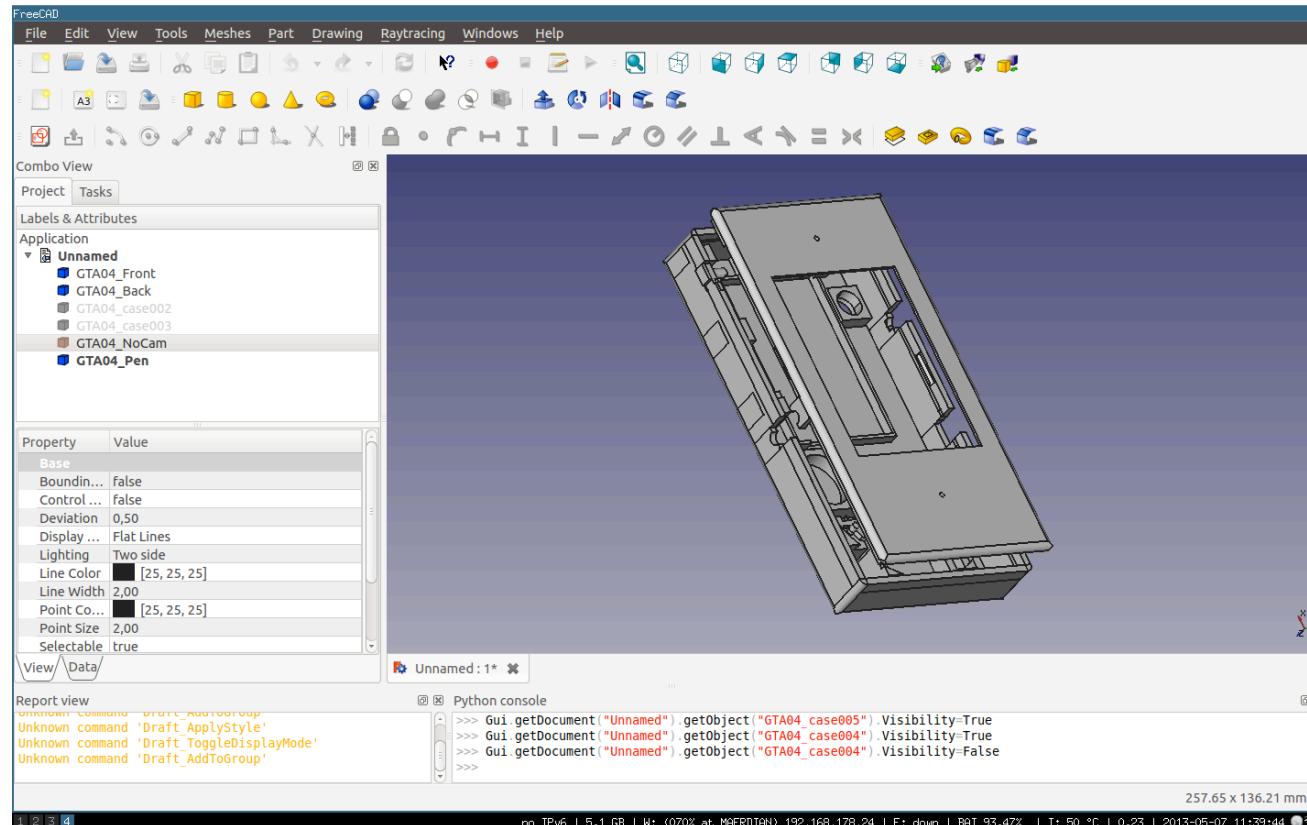
# Case Production

- Step 1: reproducing the original Freerunner case, using 3D printing technology

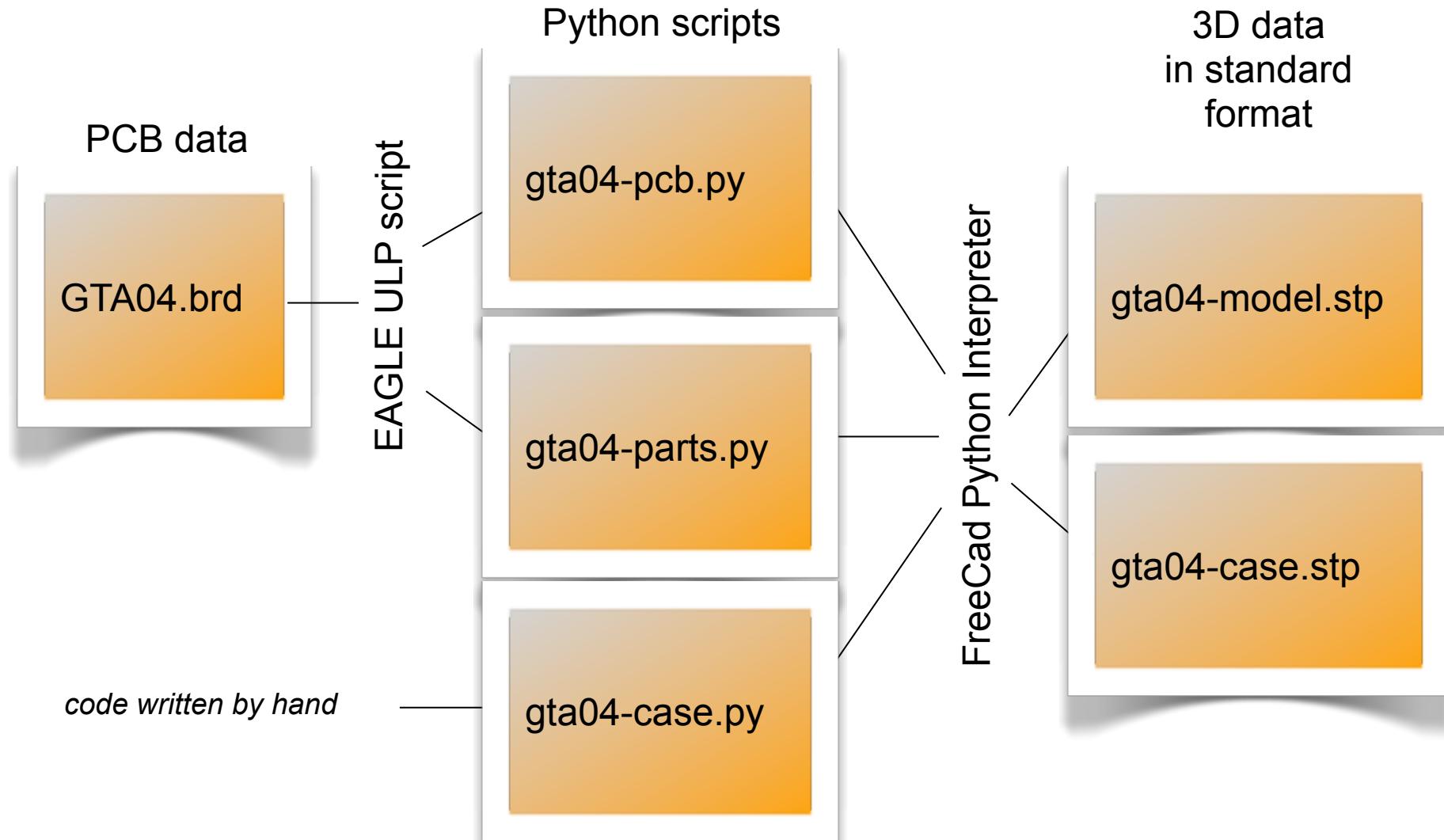


# Case production

- Step 2: generating a 3D model from the PCB data in a semi-automatic way.



# How it works

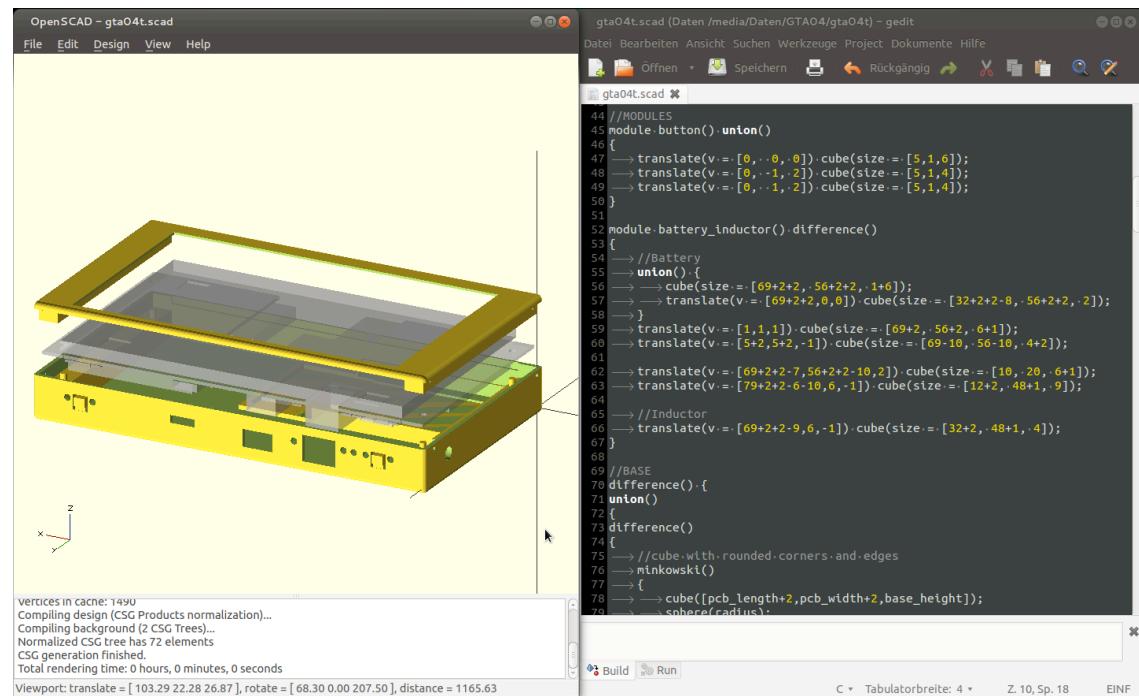


# Case Production 3

- Step 3: design a good looking & feeling case (based on PCB model / generated ref. case)

Design contributions are  
VERY welcome. We're  
looking for industrial  
designers / 3D modellers!

[http://  
download.goldelico.com/  
gta04/CAD/](http://download.goldelico.com/gta04/CAD/)  
<http://slyon.de/CAD/>



# Case Production 4

- Alternatives: Do It Yourself!



RepRap, Alu/Wood milling, deep-drawing

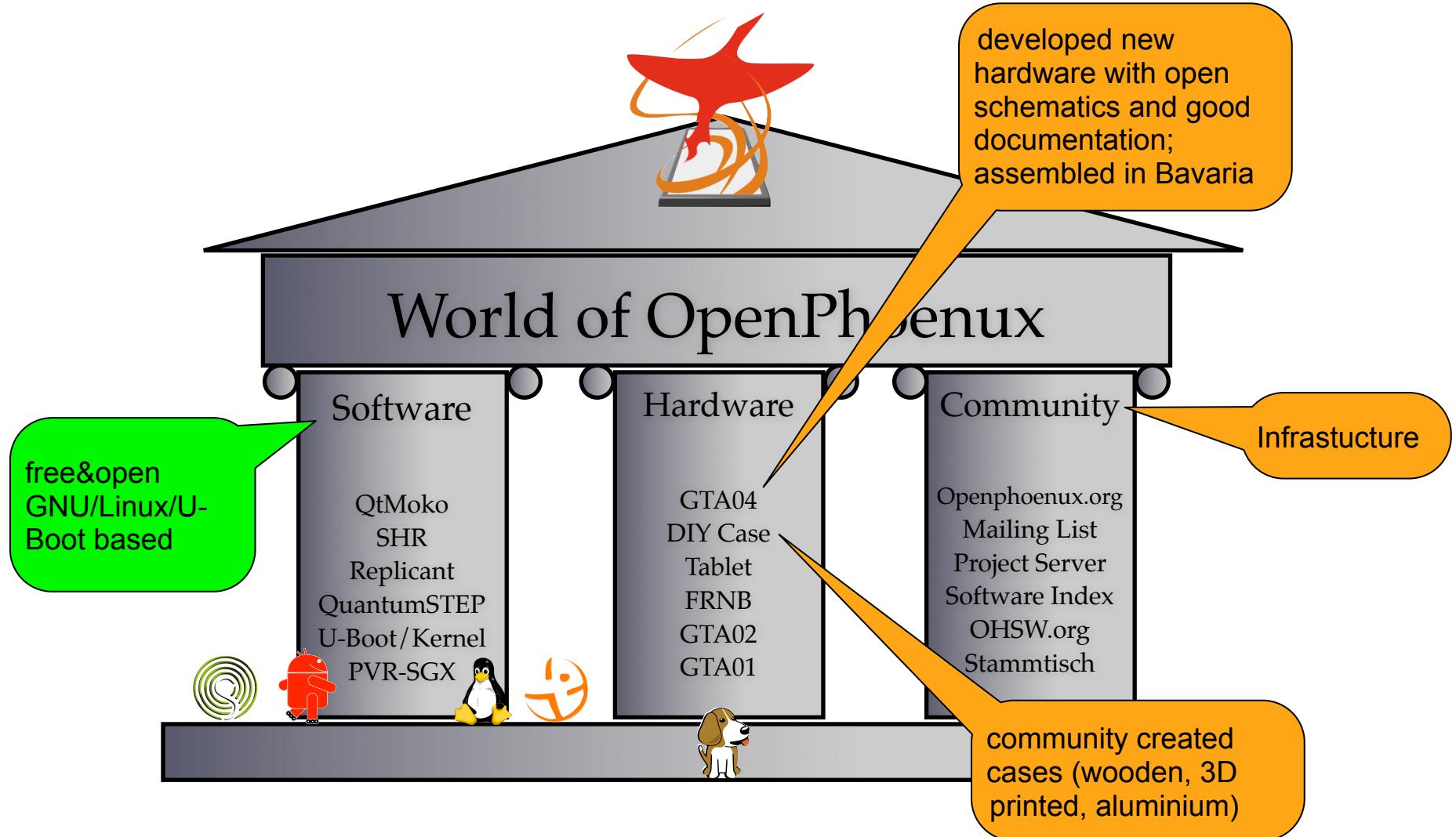
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OpenPhenix  
[www.openphoenix.org](http://www.openphoenix.org)



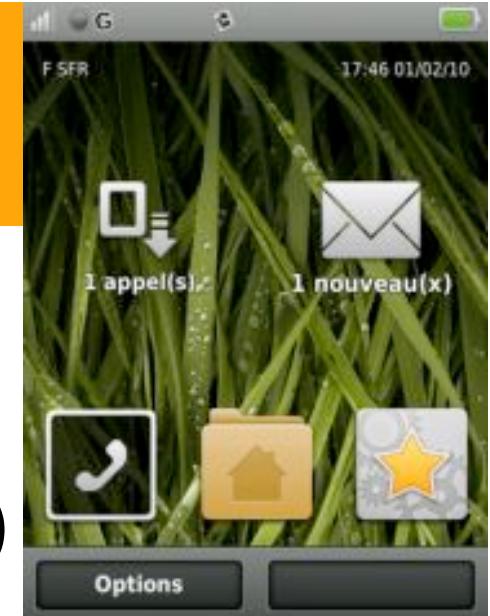
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36

# OpenPhenix already has: Software

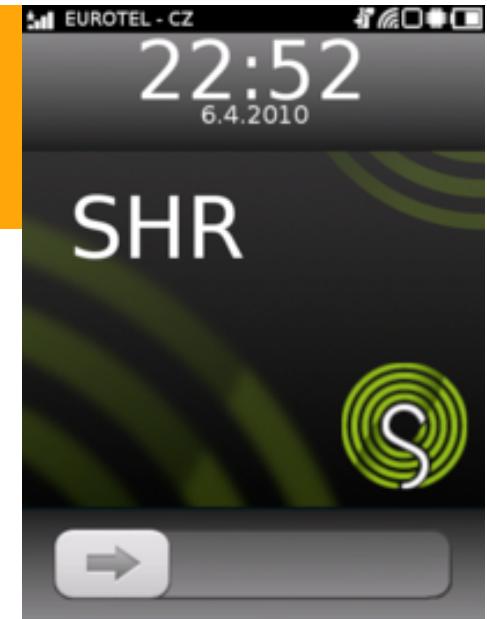


# QtMoko

- Based on Debian
- Consistent Qt UI (on Framebuffer)
- Primary OS in GTA04 community
- Stable and usable as daily phone (calls, messages, browsing, games/apps, ...)
- <http://qtmoko.sf.net>

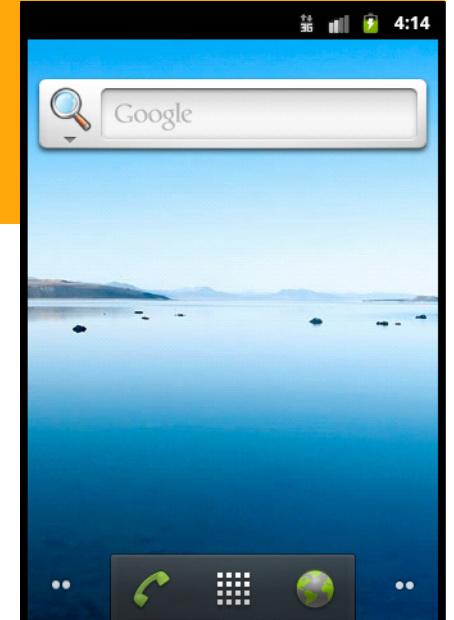


- Based on OpenEmbedded
- Xserver with Enlightenment, Qt, GTK, ... (Freedom of choice)
- Small userbase, small group of developers
- Useable as daily phone, if few manual tweaks are applied
- <http://shr-project.org>



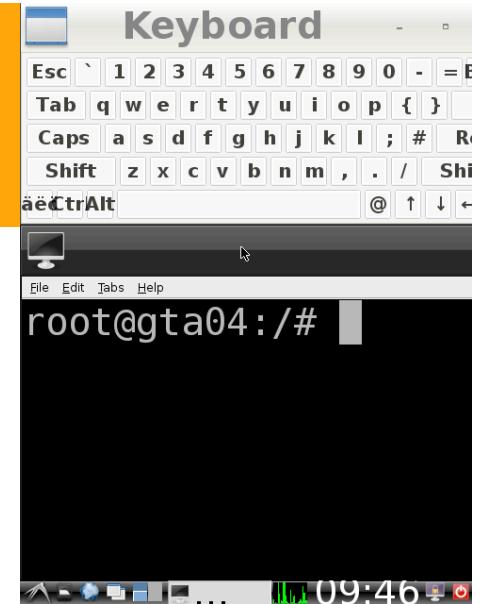
# Replicant

- Based on Android (v2.3)
- Very fast UI (not accelerated)
- 1 kernel issue left (resolved?!)
- Available for broader usage, now
- Small group of developers
- <http://replicant.us>

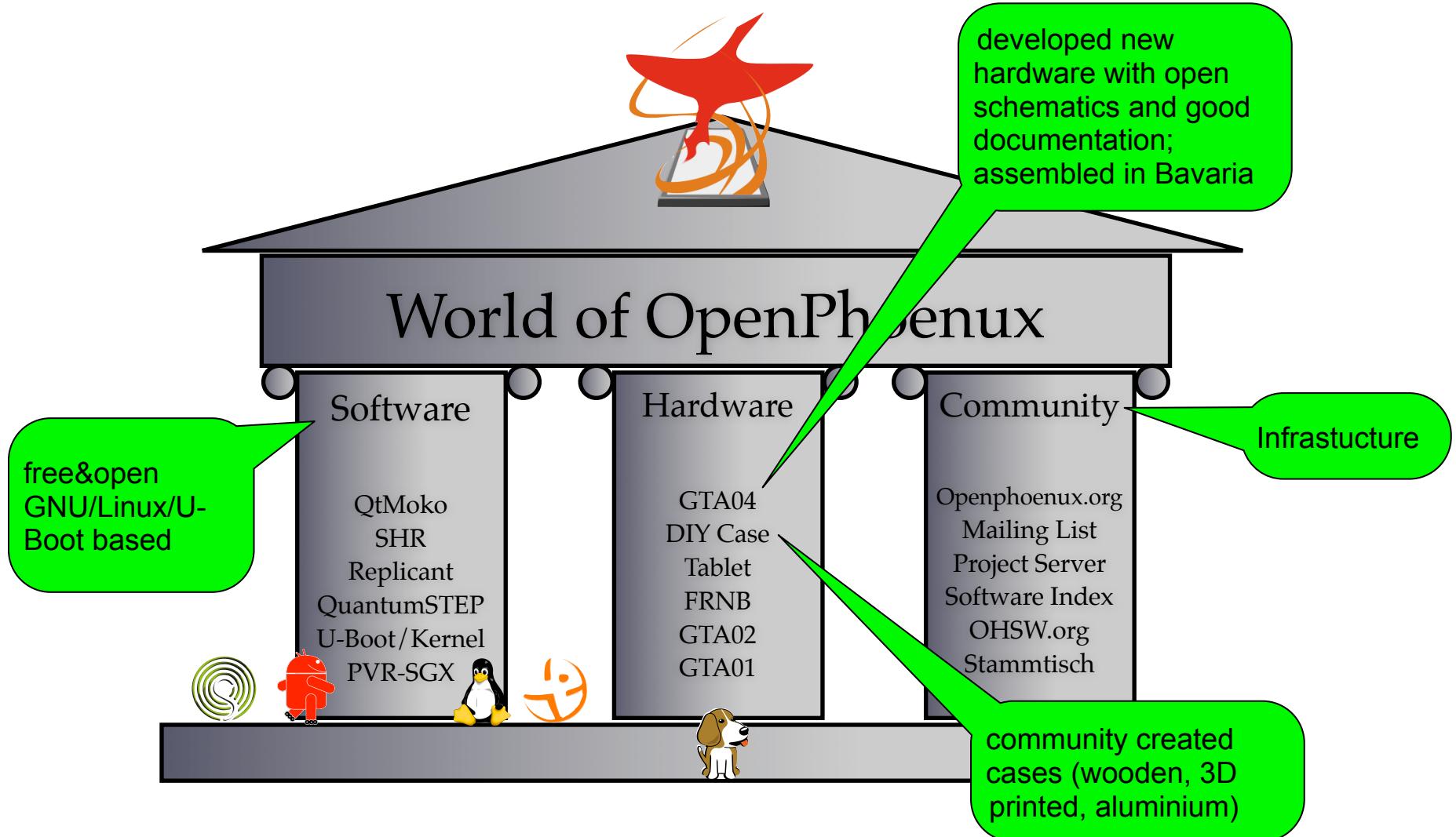


# Debian/LXDE

- plain Debian, including minor addons
- Stable reference system, preinstalled
- Good starting point for own (HW/SW) projects
- LXDE (not optimized for touchscreen)
- <http://projects.goldelico.com/p/gta04-rootfs>



# OpenPhenix: Ideas for Next Year



# Hardware

We could do a lot of things, if there were more support by interested people, e.g.:

- build many more GTA04A5 boards
- build new complete devices with 3D printed cases
- build a lot of Letux 7004 tablets
- prototype a Cortex A15 variant with bigger display and LTE
- work on a hardware keyboard

# Software

- Due to the open bootloader, open drivers and open documentation it is possible to port any OS to the GTA04 platform.
- Are YOU interested to port e.g. WebOS, FirefoxOS, UbuntuPhone, SailfishOS, \${your\_favourite}OS to the most open hardware platform available?

# Community



# WANTS YOU!

# Q&A

- Meet us @ Booth 141-144, Hall 7.1c  
("Hardware & Embedded Corner")
- Visit  
[www.openphoenix.org](http://www.openphoenix.org)
- Become Independent!