Open Hardware PowerPC Powerboard Tyche Desktop

The PowerPC Open Hardware Desktop, first step before the laptop version

Roberto Innocenti - Power Progress Community

Power Progress Community

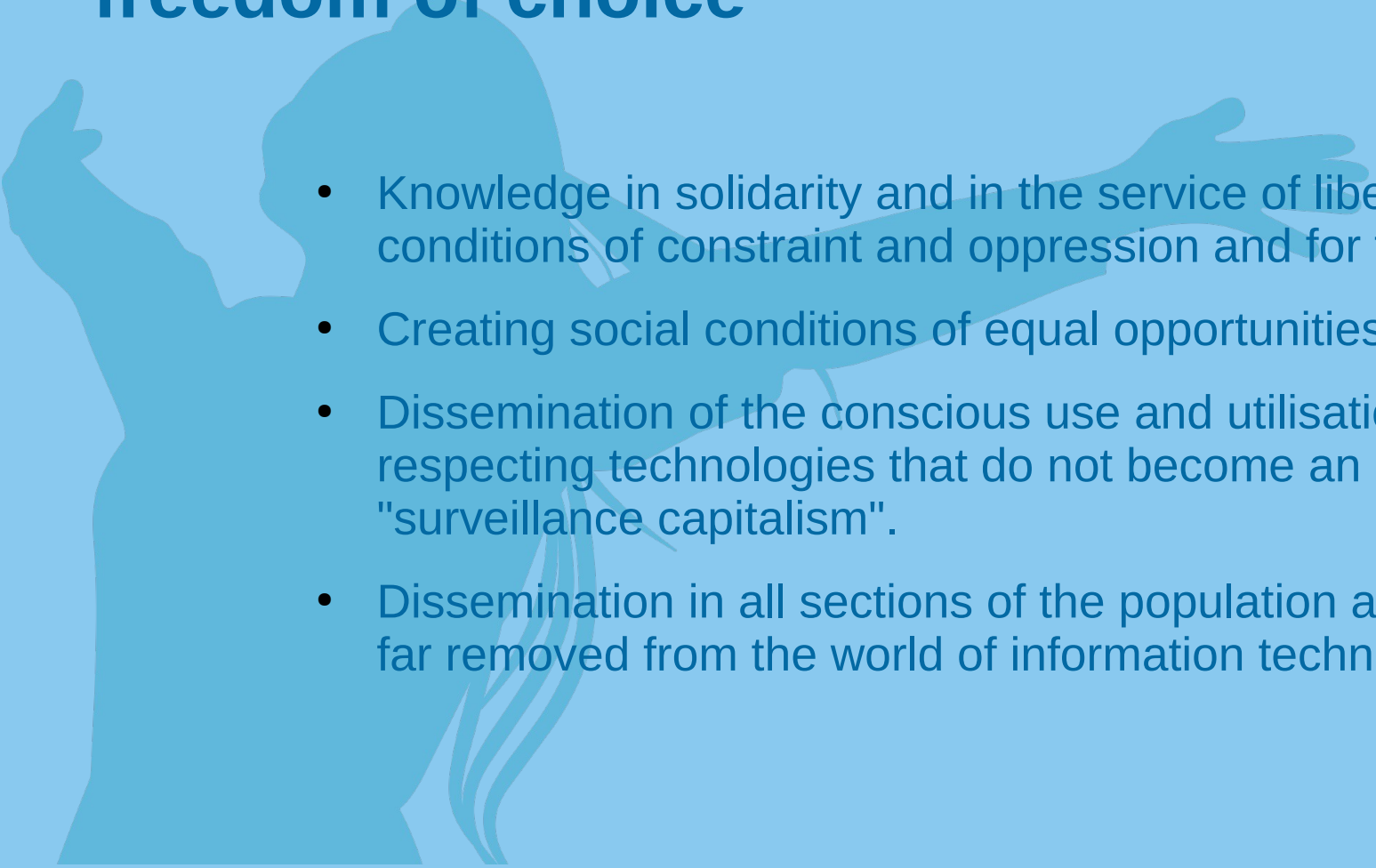
SFSCON

Power Progress Community is a non profit association, registered in Italy, all of its members are volunteer. Actually doesn't make commercial activities.

Our DNA

- The association is run by hobbyists that work for fun on the project on their spare time, no one is getting paid, only the funded electronic engineers
- We have a very flexible business plan, no tight time-to-market strategy
- We can afford to run a donations campaign for an unlimited amount of time, and that is not allowed by any crowdfunding platform.

Solidarity-based knowledge and freedom of choice



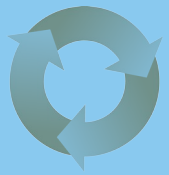
- Knowledge in solidarity and in the service of liberation from conditions of constraint and oppression and for freedom of choice.
- Creating social conditions of equal opportunities.
- Dissemination of the conscious use and utilisation of freedom-respecting technologies that do not become an information mine for "surveillance capitalism".
- Dissemination in all sections of the population and especially those far removed from the world of information technology.

Sectors of Action

Power Progress Community

SFSCON

Design Open Hardware,accessible to the widest range of people.



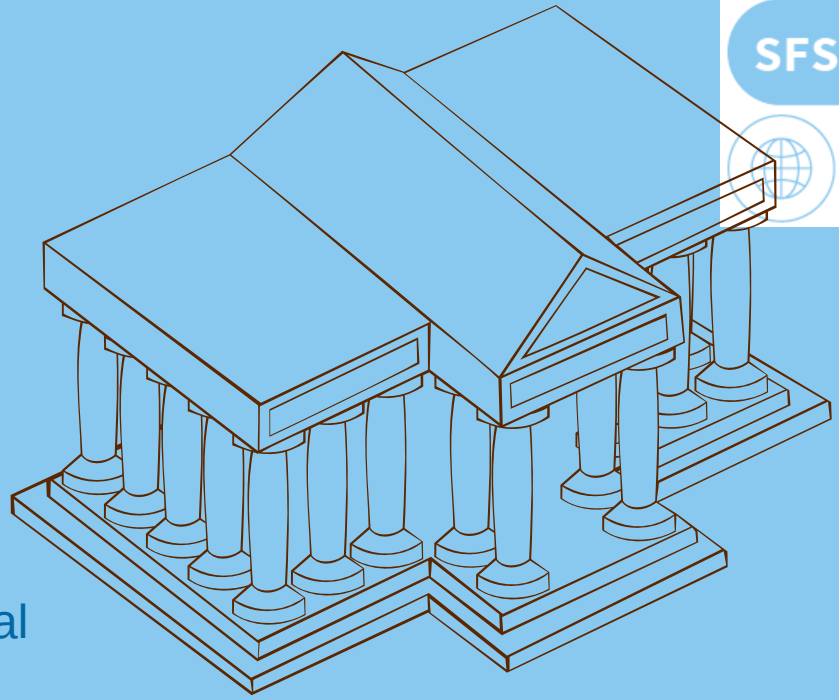
Facilitate the re-use of dismissed or low-cost hardware by means of free software.

Encourage people to use free software.

Open Science: practice of science in such a way that others can collaborate and contribute, where research data, lab notes and other research processes are freely available, reuse, redistribute,reproducible data and methods

Universities and Schools

- Active collaboration with Universities and Schools
- to give students the opportunity to
  - design open hardware computers and electronic devices
  - Develop applications with free software licences
  - so that they can gain high-tech, intellectual and educational experience of a high technological, intellectual and collaborative level.



Open Hardware PowerPC Notebook at Embedded Systems Course at Università Statale di Milano – May 2025

Revivo with Scratch

10+ teachers
5+ classes
100+ students (primary shool) young programmers

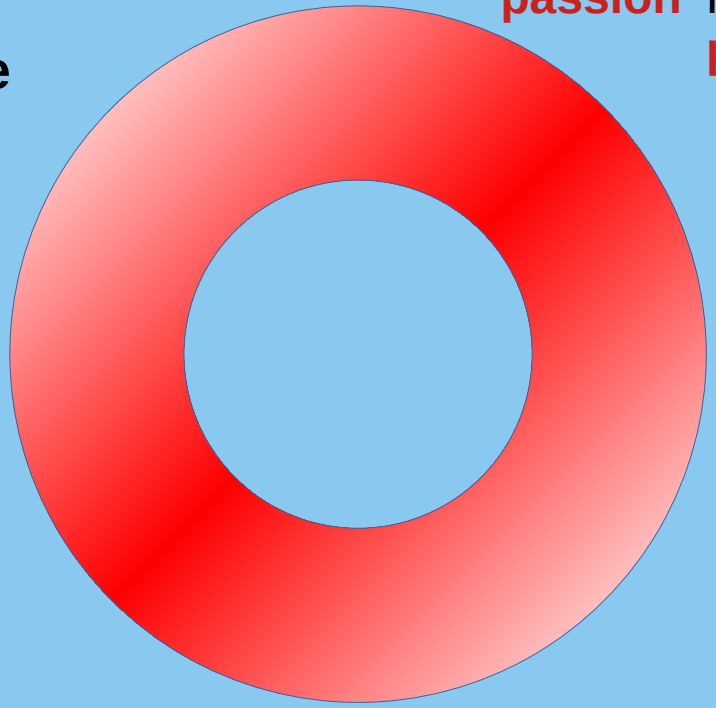
Thanks to collaboration of:

- Università degli studi di Urbino Carlo Bo,
- Istituto Tecnico Superiore I.T.I.S. di Urbino,
- Comune di Colli al Metauro,
- il Sistema bibliotecario CoMeta

Talk regarding ““AI”” at LibrePlanet 2024

Being the protagonist of change

- is not a life for those who want to sit back and watch the world and life go by like a spectator
- We feel life growing
- We feel a sweet joy and meaning within us
- We aim to free ourselves from conditioning that we feel oppressive
- We want to feel free to choose and to build



Open Hardware
passion

Big
endian
passion

PowerPC
passion

Free Software
passion

Endianess
passion

Faith to
succeed
To achieve

RISC
passion

obstinacy
software patches

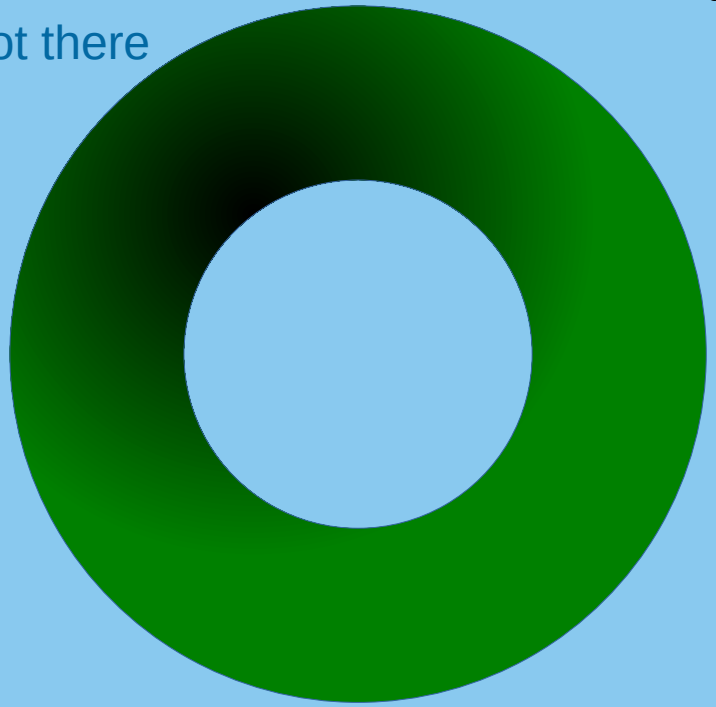
Rebellion
from Closed
source

obstinacy
Create what
we need

Rebellion from what
we don't like

obstinacy
creating hardware

- be protagonists
- disacovered interesting people
- collaborated with other interesting people
- Our action count
- more agile to overcome difficulties
- accept Complexity
- Open hopes
- Harmony with others
- Good use of energies
- Realized what was not there

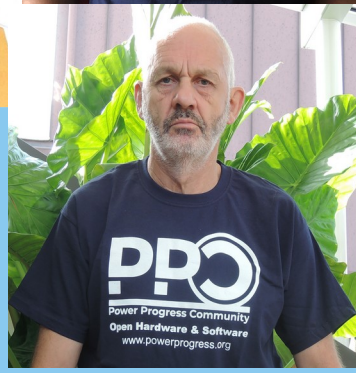


Power Progress Community

SFSCON

Power Progress Community

SFSCON



Why PowerPC Architecture?

The PowerPC architecture design is newer than the other successful CPU architectures:

X86 – 1978 MIPS – 1981 ARM – 1983
PowerPC – 1991

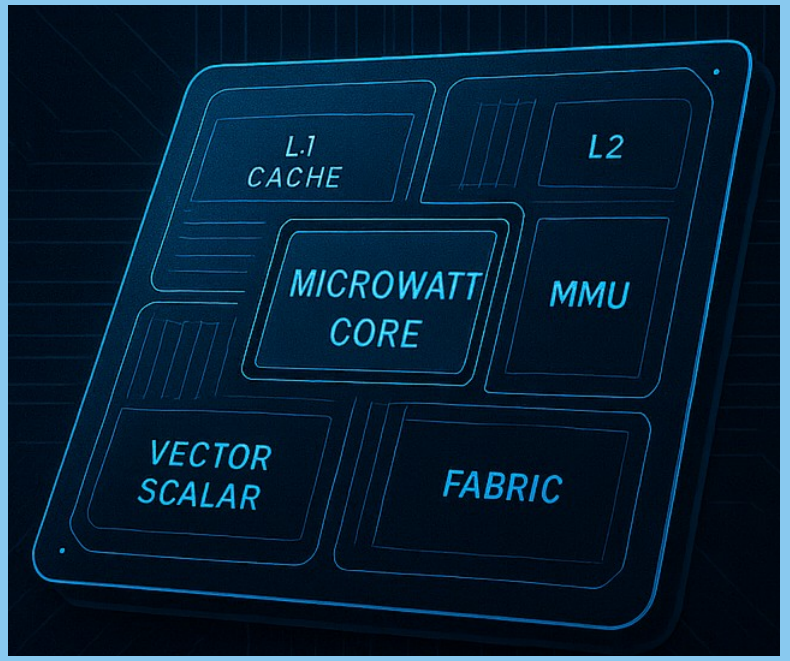
From the beginning, PowerPC was designed with more features than other CPUs.

From August 2019 Power ISA is Open, so developers can design chips based on the royalty-free

chipfoundry

OpenPOWER HW Design Hackathon

https://chipfoundry.io/challenges/microwatt



SFSCON 2018 Bolzano OSHW PPC Notebook

- In 2018 we have presented the schematics of our first board
- Now in 2025 we present the schematics of our second board

Our Open Source Hardware Path

Objective: Certification of Oshwa

https://certification.oshwa.org/

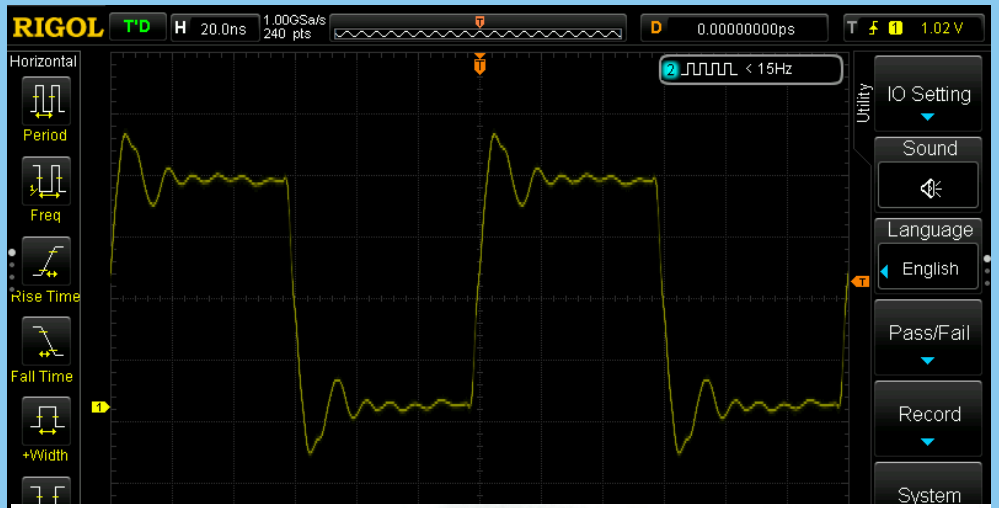
Steps taken for Powerboard Tyche Notebook:

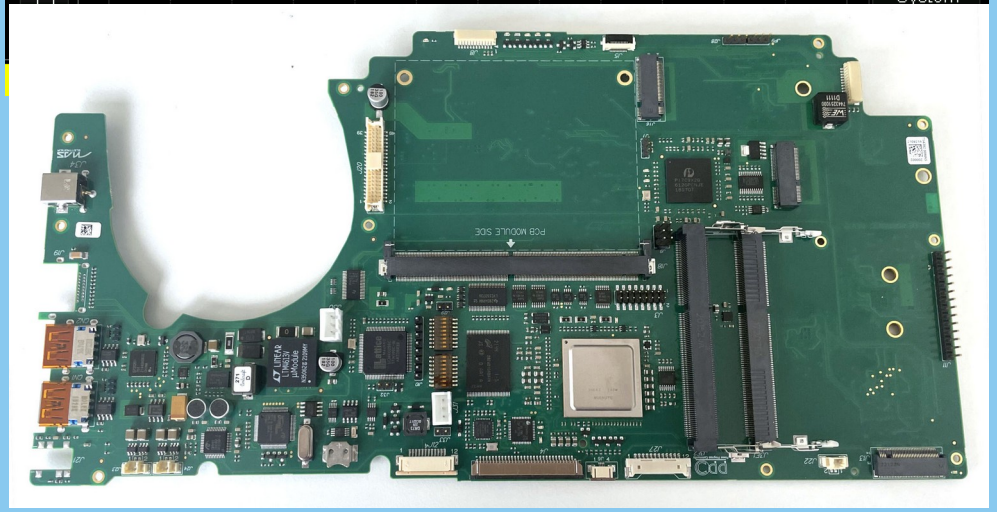
- Advice from the NYU Technology Law and Policy Clinic to make the project as open hardware as possible.
- Contacted Chip manufacturers for authorization to distribute the project as Open Hardware
- Publication of the electrical schematic (Orcad source) with Cern 1.2 License
- Publication of PCB source (Mentor Expedition) and exported in Altium and Kicad

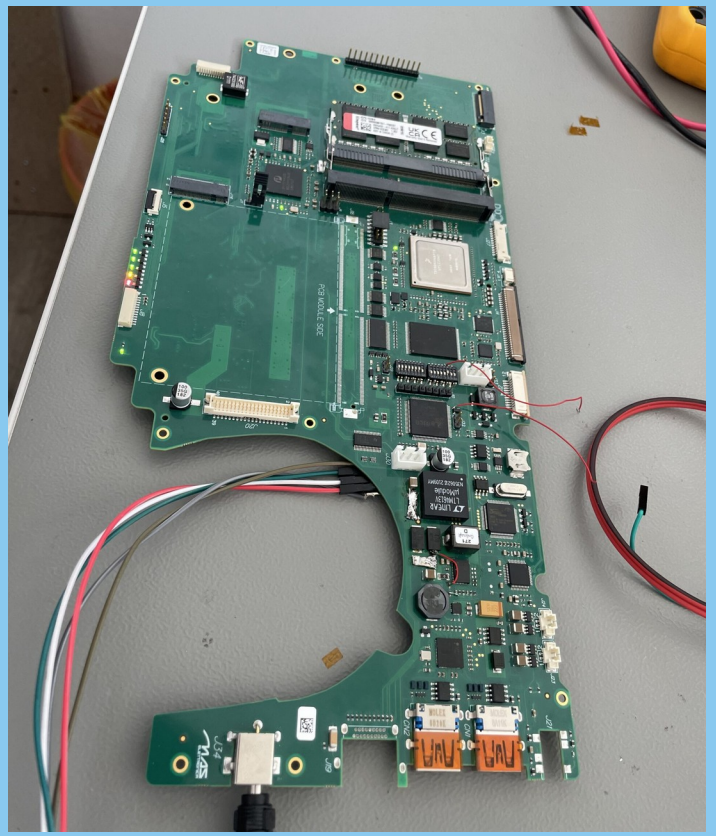
https://gitlab.com/power-progress-community/oshw-powerpc-notebook/powerpc-laptop-mobo

2023-2024 Notebook Powerboard Tyche Prototypes

hardware tests – uboot and cpld fixes







From Tentative Fix of Notebook Prototypes

November 2024

Found New Hardware Designer to try to fix boot problem on Notebook Prototypes

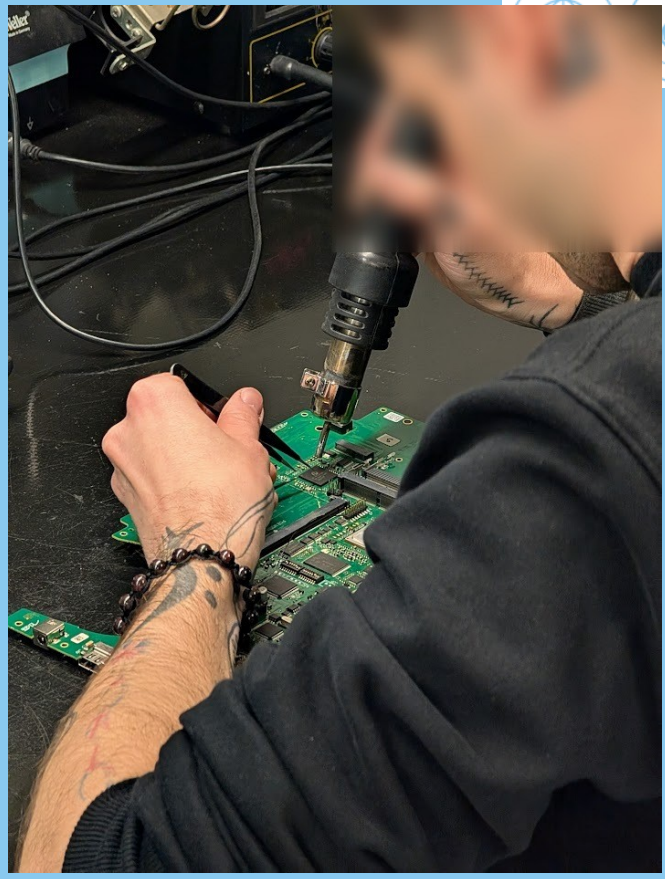
Febraury 2025

Firmware Engineer: compare signals with T2080 Devkit,updates to CPLD to have pre-boot signaals egual to the T2080 devkit

April 2025

Even with same pre boot signal still doesn’t boot.

To help isolate the issue even further, was de-soldered the Pericom chip and Sata3 chip, without improvment



to the New Desktop Design

May 2025

Consultation of donors to the strategic changes to first realize desktop board merging the design with the updated T2080 RDB devkit design

June 2025

NXP agreement to provide latest T2080 RDB design
Architectural Study to merge Powerboard Tyche design with the updated NXP T2080 devkit design

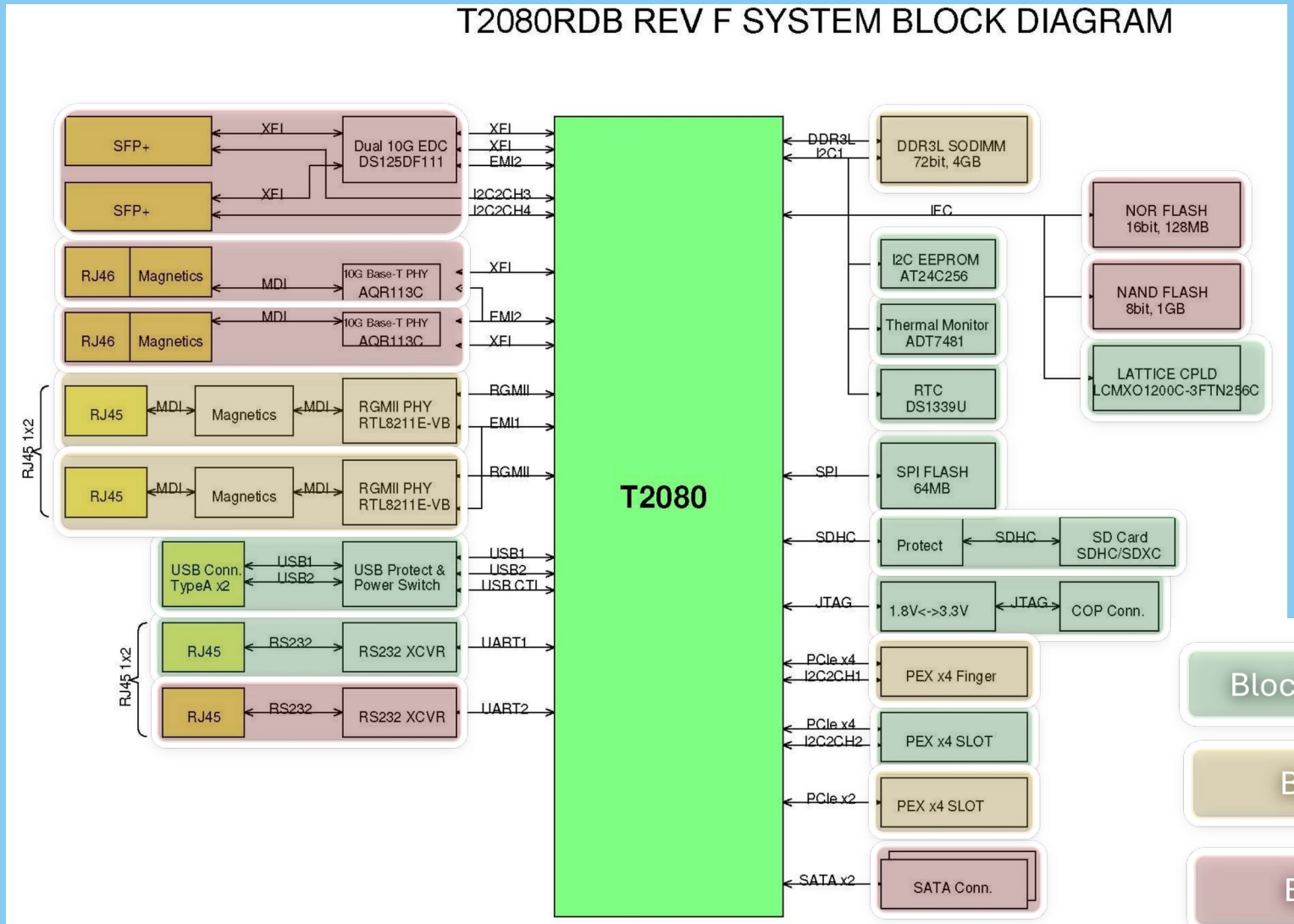
July 2025

Start of the Schematics design merging the two source, Start of the Donation Campaign to finance the Schematics

October 2025

Completed the Schematics design and setup for PCB design, manufacturer have provided us estimation and timeline for the PCB layout design.

Powerboard Tyche Desktop Architectural Study



Blocks could be used as they are

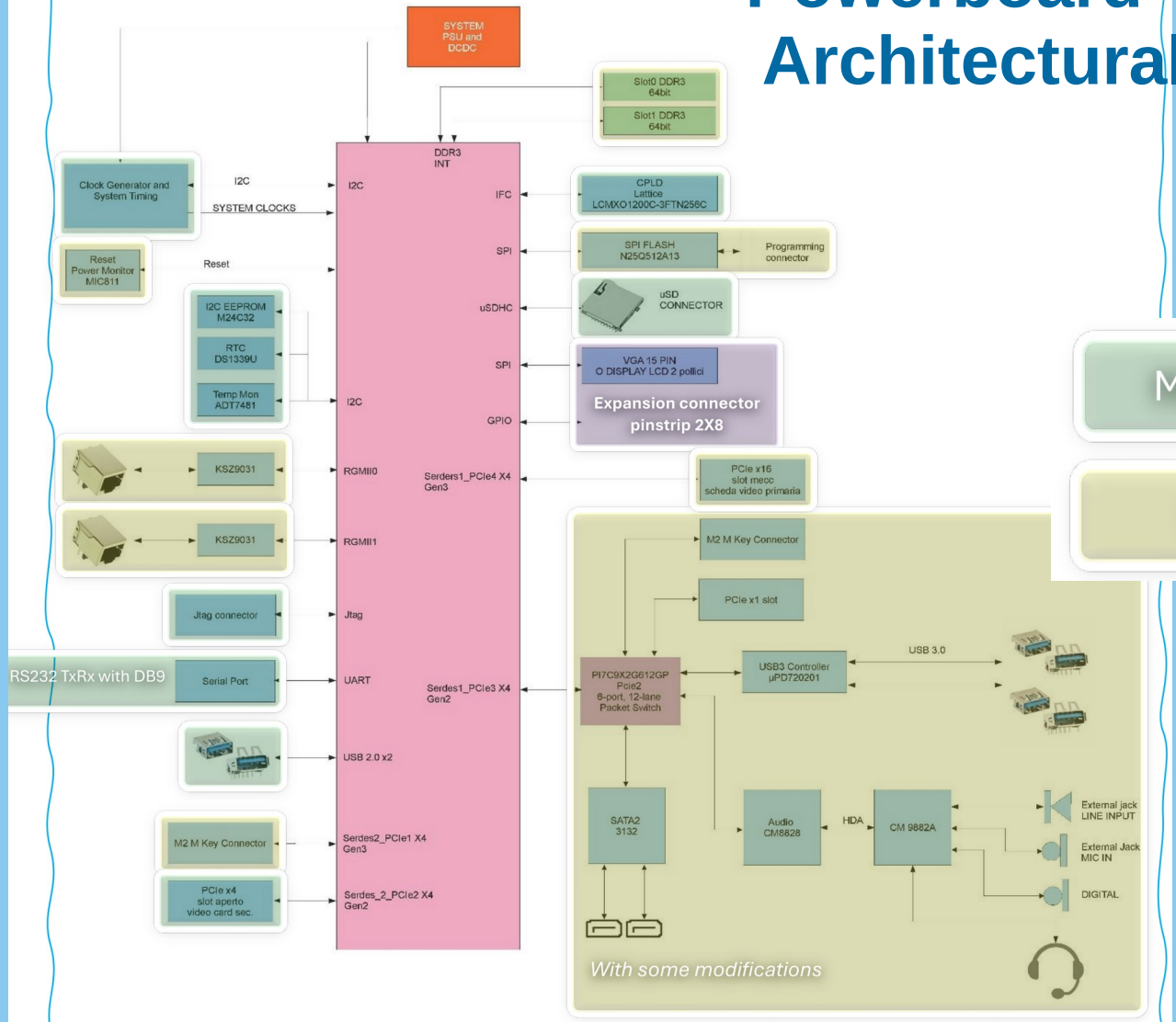
Blocks should be modified

Blocks should be removed

Powerboard Tyche Desktop Architectural Study

Power Progress Community

SFSCON



Module to take from **T2080RDB Rev F**

Module to take from **ACB_0001_0**

Specs

Form Facttor: Micro ATX
CPU: NXP T2080, e6500 64-bit Power Architecture with Altivec technology
    4 x e6500 dual-threaded cores, low-latency backside 2MB L2 cache,
16GFLOPS x core
RAM: 2 x DDR3 Slots
VIDEO
    PCIE3 x16 VIDEO Card 1
    PCIE2 x16 VIDEO Card 2
AUDIO: C-Media 8828 sound chip, audio IN and audio OUT jacks (3x2)
USB: 2 USB 3.0 ports
      2 USB 2.0 ports
      2 USB 3.0 ports internal for FRONT
STORAGE:
    2 NVM Express (NVMe)
    2 x SATA2
    1 x SDHC card reader
NETWORK:
    2 x Gigabit ethernet RJ-45 connector

To the New Desktop Design [donations driven]

November 2025

- Send Questionaire to NXP analisys and approval to disclose as Open Harware our design
- Start PCB Design

December 2025

- After NXP agreement publish Schematics – Cern License
- PCB Design

January 2026

Preparation for Prototypes Production

April 2026

Prototypes Produced

May 2026

Hardware Tests + uboot updates

June 2026

Tentative: Ready for Production

Donation Campaigns

1	Electrical Schematics 14 July 2025 - open	€ 5.400
2	PCB Printed Circuit Board	€ 12.000
3	protptypes	€
4	Hardware Tests	€ 3.400
7	U-boot fine tune	€

Thanks PowerPC GNU/Linux distro

Power Progress Community

debian

Ppc64 port

MintPPC

http://mintppc.nl

Fienix

https://fienixppc.blogspot.com

gentoo linux™

https://wiki.gentoo.org/wiki/PPC

Adélie Linux

https://www.adelielinux.org/

Our Resources

Association	https://powerprogress.org/
Association Forum	https://forum.powerprogress.org
PPC Notebook updates	https://powerpc-notebook.org/
Wiki PPC Notebook	https://wiki.powerpc-notebook.org
Forum PPC Notebook	https://forum.powerpc-notebook.org
Survey to collaborate	http://survey.powerpc-notebook.org/
Our Repositories	https://gitlab.com/power-progress-community/

Thank You!
Q&A