uRoc Concentrator for VMM Front End’s.

Alexandru Rusu
Dorothea Pfeiffer

alex.rusu@srstechnology.ch

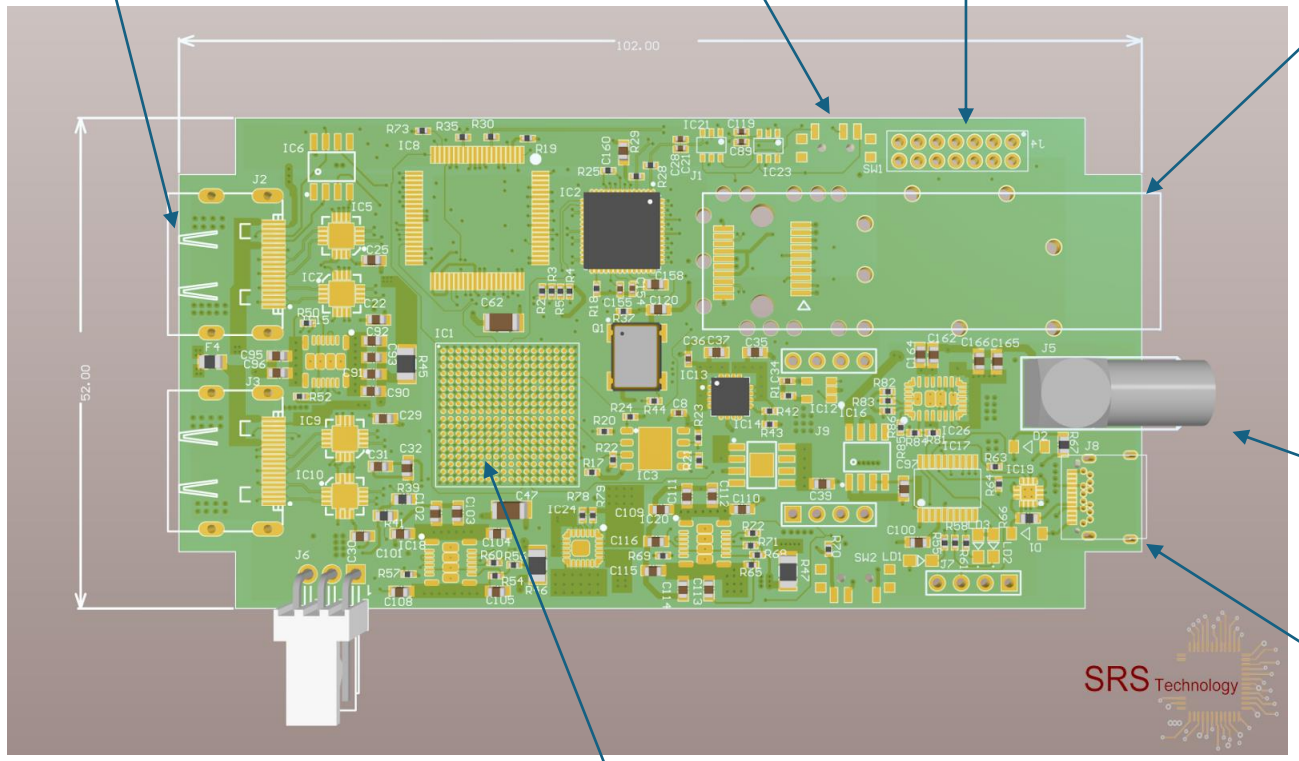
µRoc V1 design

2 Hybrids inputs plus power trough cable

Switch for Ethernet or SERDES protocol

Jtag

SFP for 1GBE fiber or copper



- µRoc is a mini concentrator for the VMM hybrids very small 102x52 mm almost the size of the hybrids that can fit in the VTC box.
- Initially it was designed for SiPM applications however it works also for gas detectors.
- The µRoc is be capable to read 2 VMM hybrids with the same HDMI connectivity and also provide LV power and Bias Voltage for the SIPM's.
- The output of the µRoc is done with Fiber SFP or Ethernet SFP at 1GBE.
- For several µRoc's one board will become the master and will distribute optically to the others the clock.
- Possibility to switch On/Off µRoc's and VMM's via Lemo connector by inserting a 50 ohm termination or via command in the slow control (needs to be implemented in the firmware)
- The power consumption for the uRoc and 2 hybrids is around 15W.

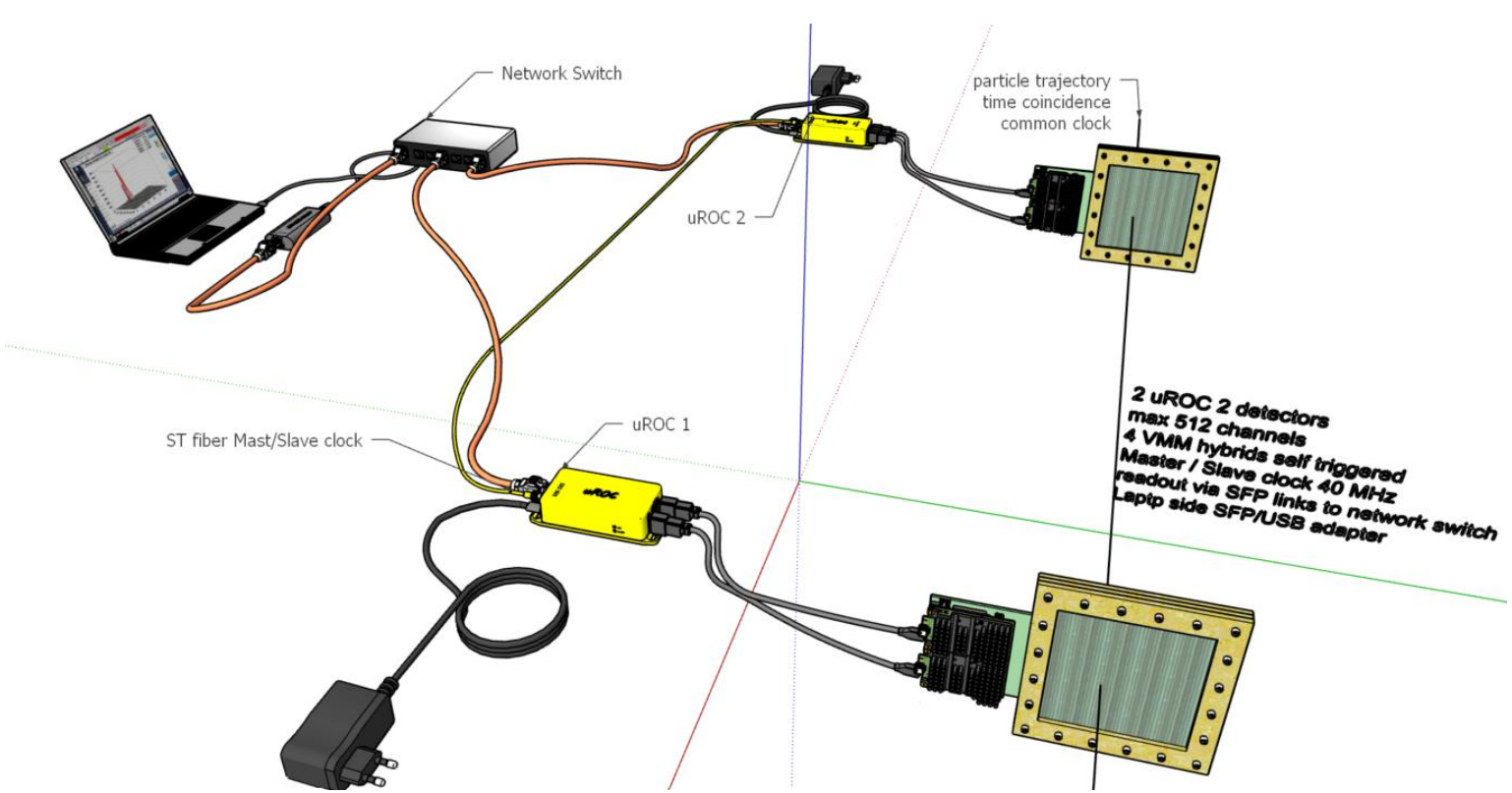
USB C Power

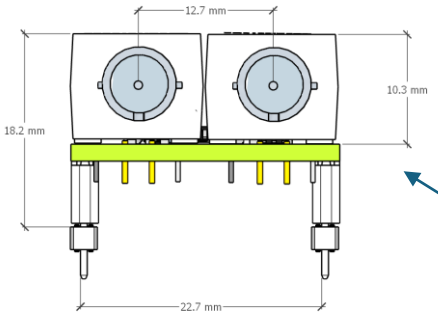
Output for the bias voltage

Artix 7 FPGA

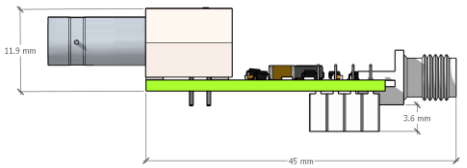
µRoc common clock distribution

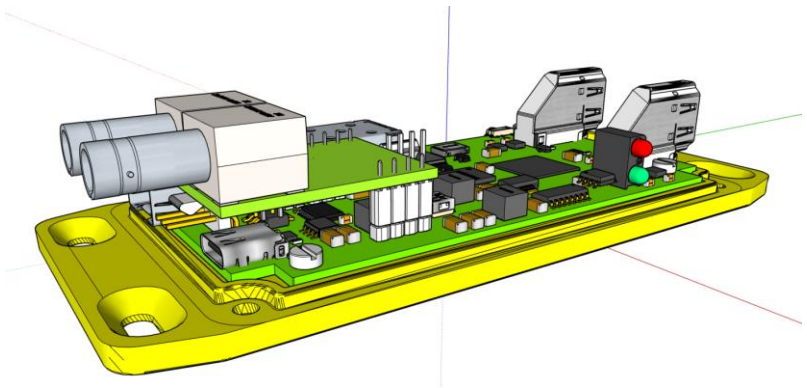
- The circuit was defined and design is ongoing
- It does require firmware





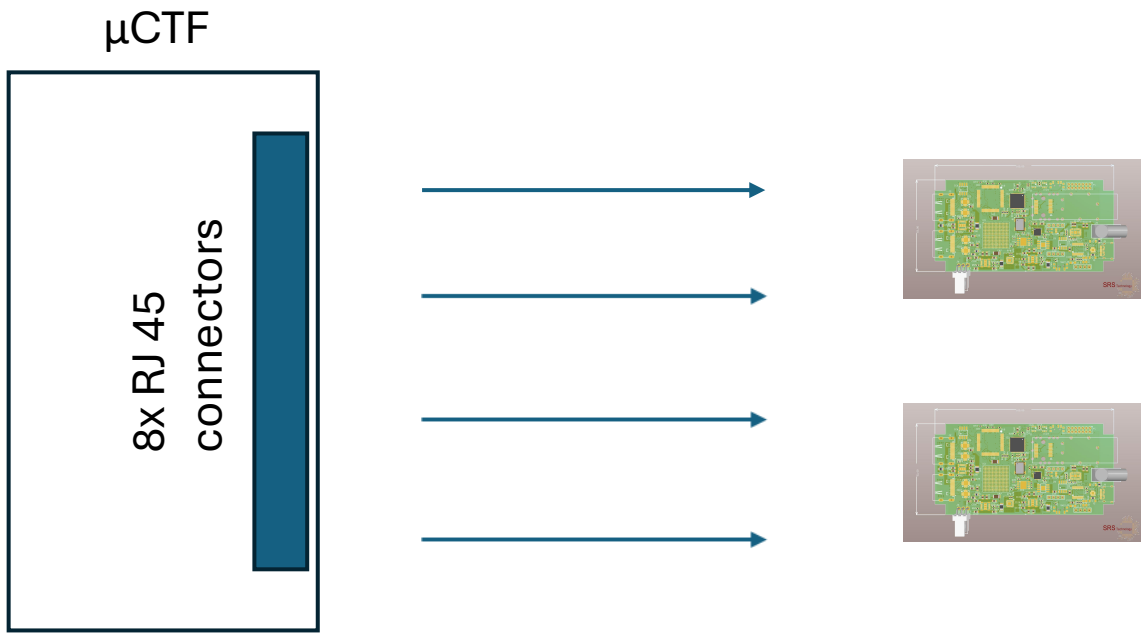
Roc Ck Mezzanine





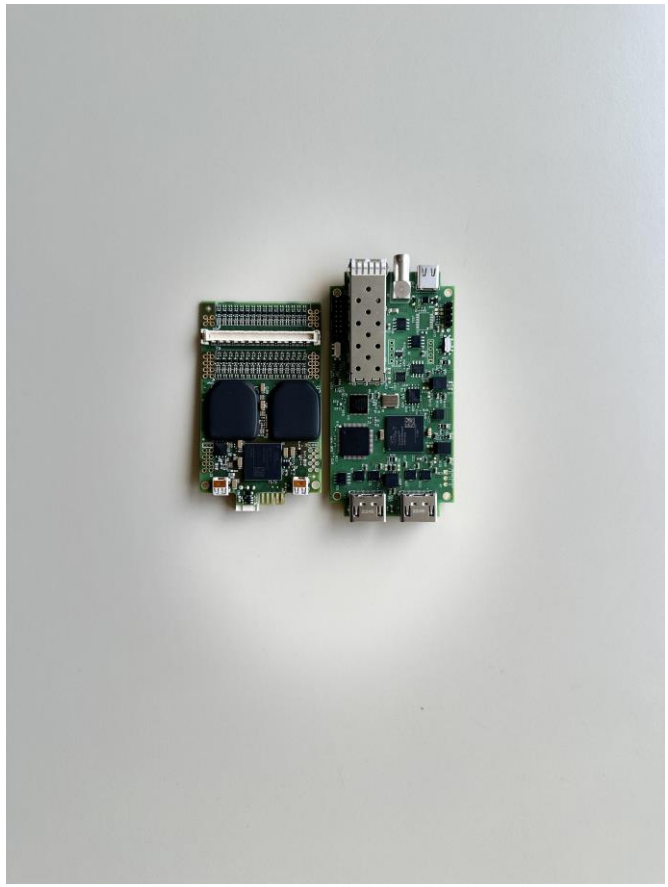
Thanks to Hans for the 3D representation

Alternative clock distribution



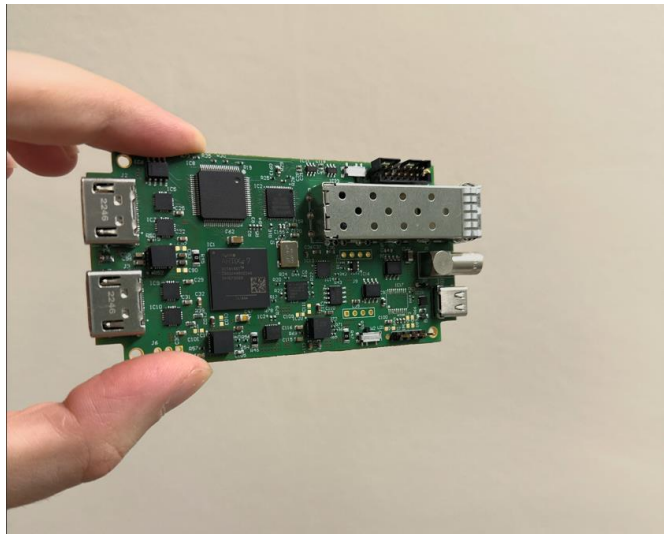
- Similar to the CTF one can make a clock fanout board
- Ideally the board should fit in the same box as the uRoc.
- The advantage is that there is no firmware required
- In the 2nd revision of the uROC an RJ45 connector will be added, and we will remove the SERDES chip (for space reasons) that Is currently unused.

Status for µRoc V1



Size comparison between VMM Hybrid and µRoc

- First 2 prototypes have been built
- The firmware for the board is completed
- A second revision of the board is mandatory.
- The revision is ongoing and explorations are done for a production of larger batch.



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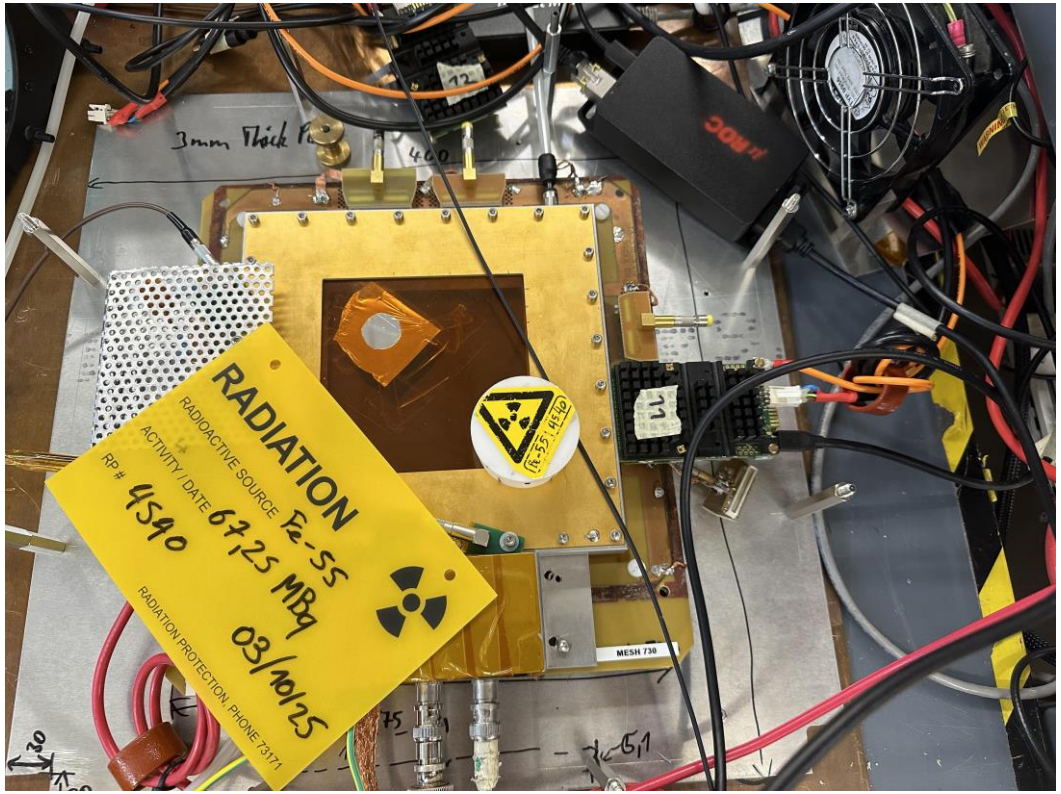
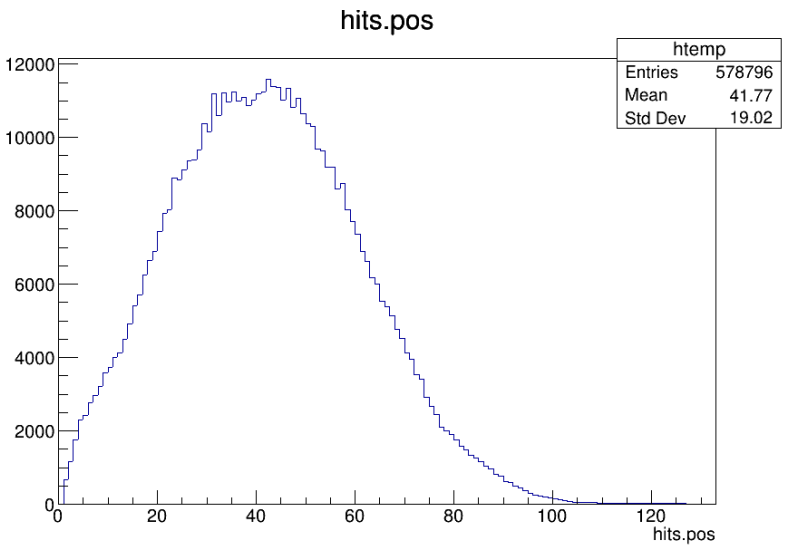
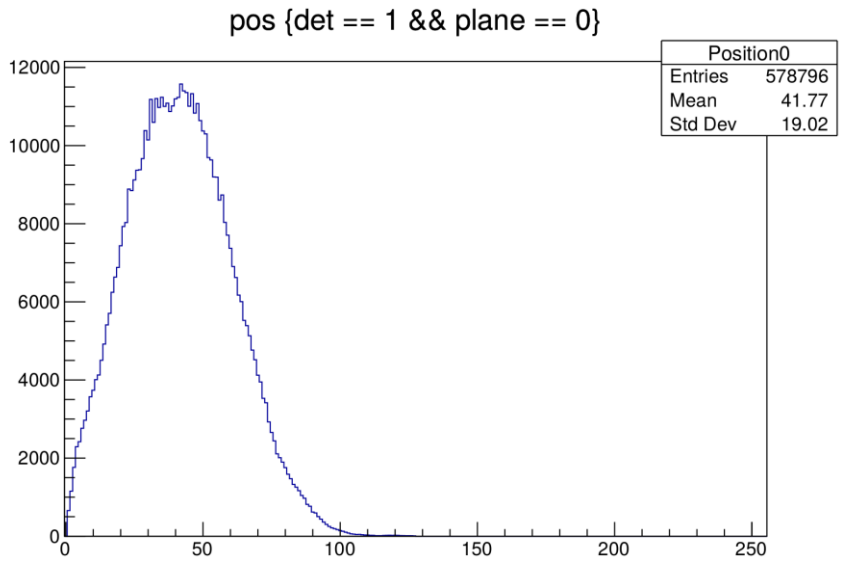
Testing set-up in the GDD lab

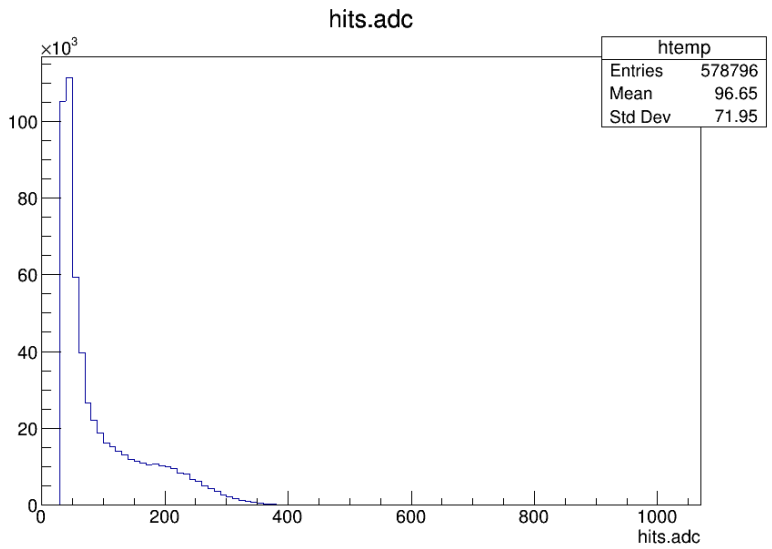


For better maneuverability, the uRoc was inserted in the same box as the PBX.

Data taken with µRoc



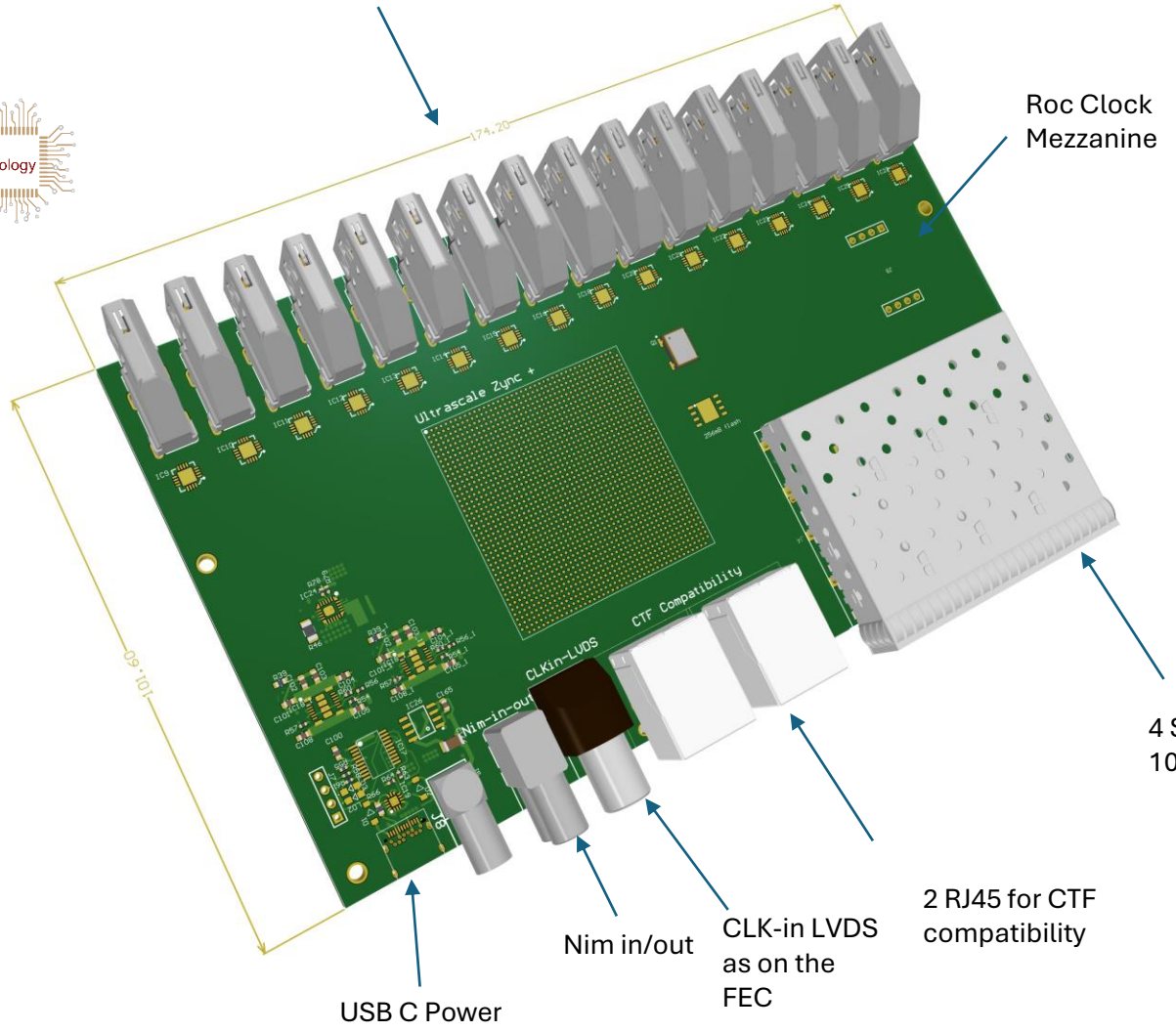




Due to some bugs in the 1st uRoc prototype we could not use the 2nd HDMI port and we took data with only 1 hybrid.

Backup Slides

maxiRoc V1



- Similar to the uRoc the maxiRoc is a compact concentrator with higher number of channels.
- The maxiRoc features the powerful Ultrascale + ZU17EG that has 32 Transceivers of 16.3 Gb/s and 16 of 32.75 Gb/s much faster than the current FEC with Virtex 6 130T at 6.6Gb/s.
- For reading 16 Hybrids at 10 GBE it requires around 70k Slices (thanks to Doro Simulation) and the Ultrascale + has 423000 LUTs (1 slice à 8 LUTs)
- 926k Logic cells and 796 Block Rams.
- The board will be in smaller size 174x101 mm and it can be fitted in a box.
- The power comes from the USB-C.
- The maxiRoc will not power the 16 Hybrids. Power should be used from the PBX or external.
- The Roc Mezzanine can be plugged in for common clock.
- The CTF can be used for common clock.
- The design has started.
- 4GB DDR4 Memory implemented