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WP2: report activities for HASPIDE General Meeting 02/2024

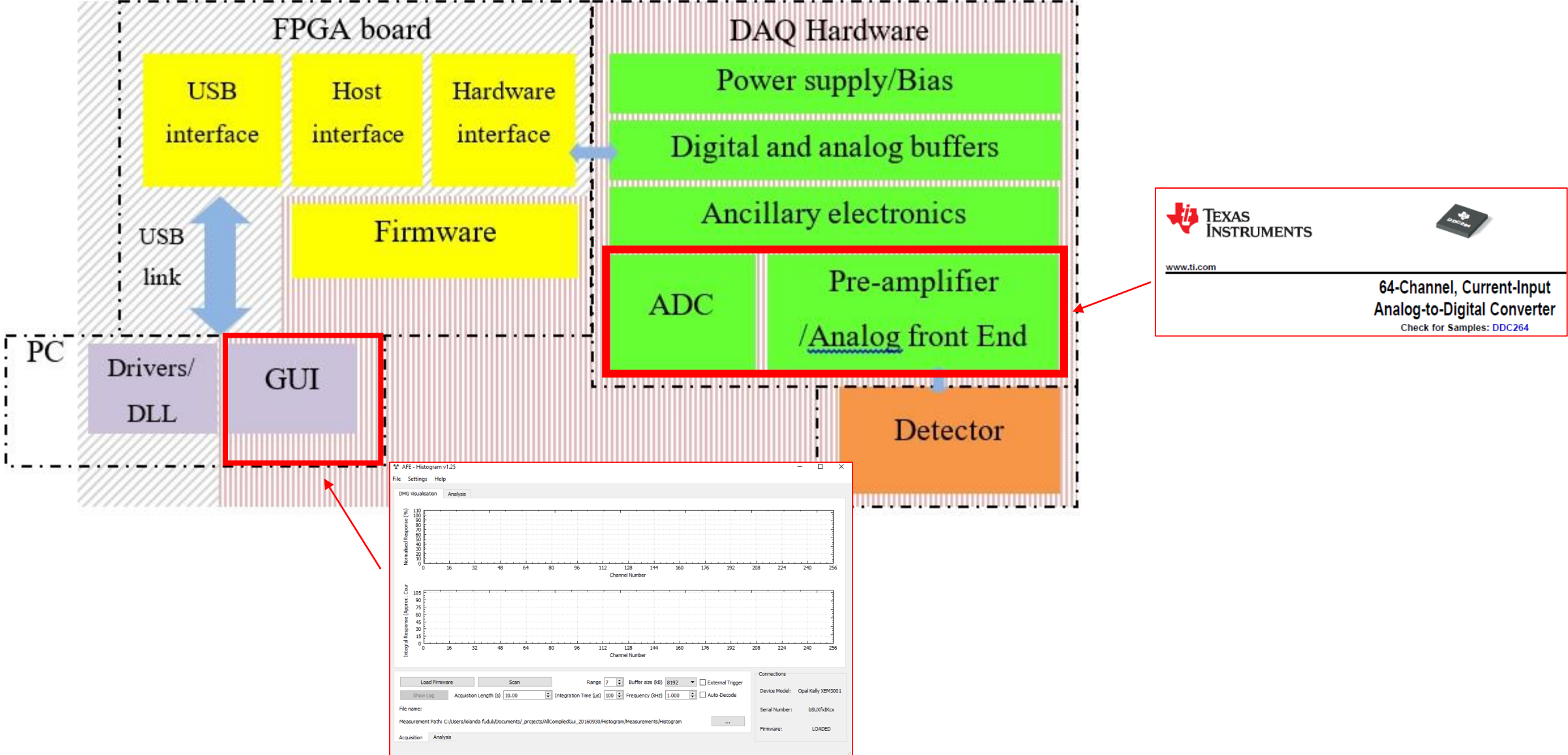
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MEDICAL
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PHYSICS



UNIVERSITY
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AUSTRALIA

Activity: 128 channels Data acquisition system for HASPIDE: architecture



Front-end (DDC264) main parameters

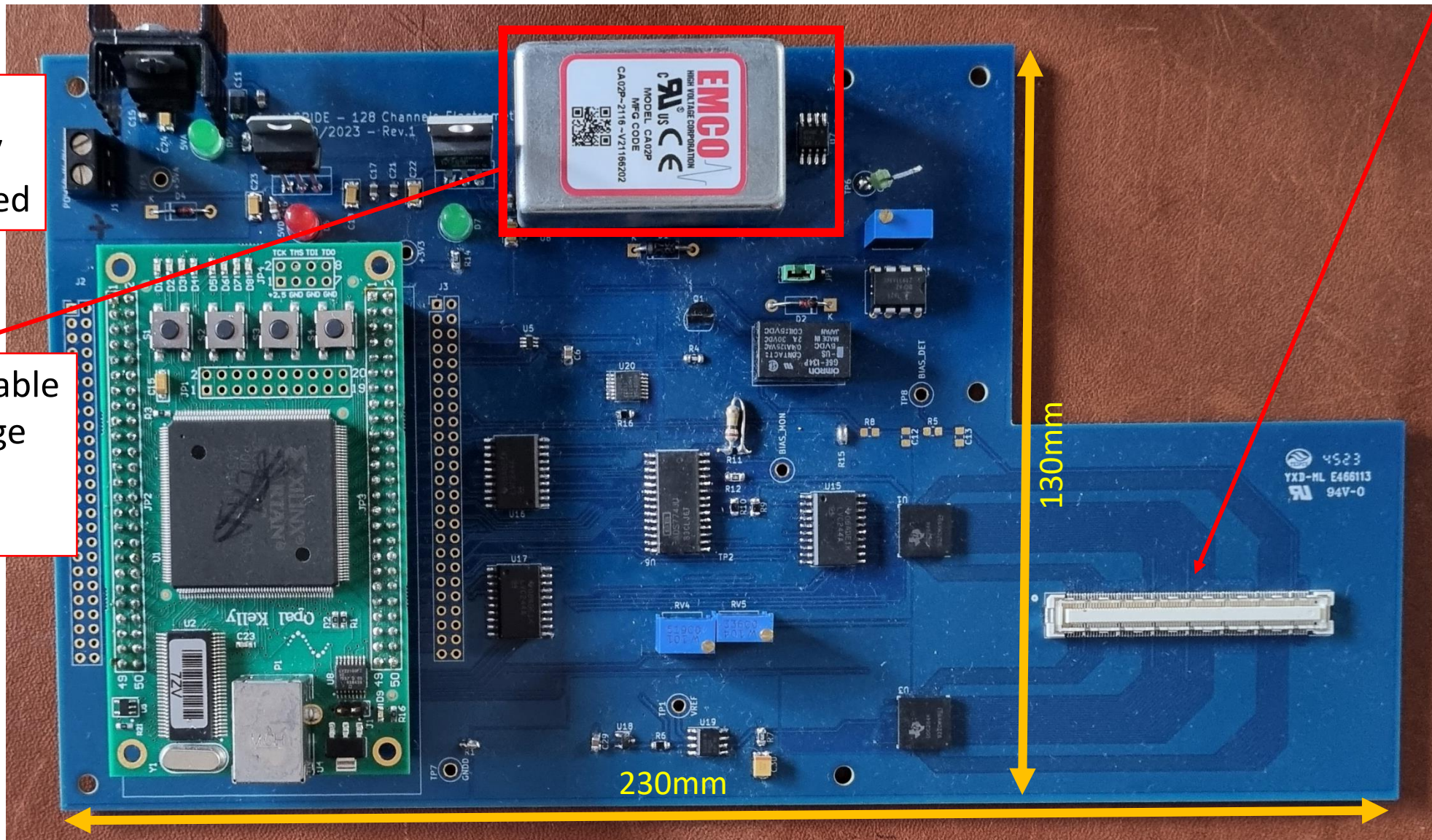
Parameter	Description	Value
Dynamic range	Adjustable in 4 ranges	12.5pC to 150pC
Range sampling	Adjustable	16 bit
Integration time	Integration time of the input current	$> 160 \times 10^{-6} \text{ s}$
Input current	Input current sign	POSITIVE – Readout must occur from the P+ side of the sensor
Data rate	Maximum data rate	3 kSPS
Noise	Maximum noise (30pF sensor capacitance)	6.3 ppm of Full Scale Range
Number of Channels	Fixed number of channels readout in parallel	128
PCB tech	6 layers: 2 power, 1 AGND, 1 DGND planes, 2 signal planes	Standard FR4, BGA reflow assembling, SMT, TH.

PCB and assembling:

High density HIROSE 150 contacts FPC connector for sensor

Power input: +9V unregulated

Programmable High Voltage module: <100V

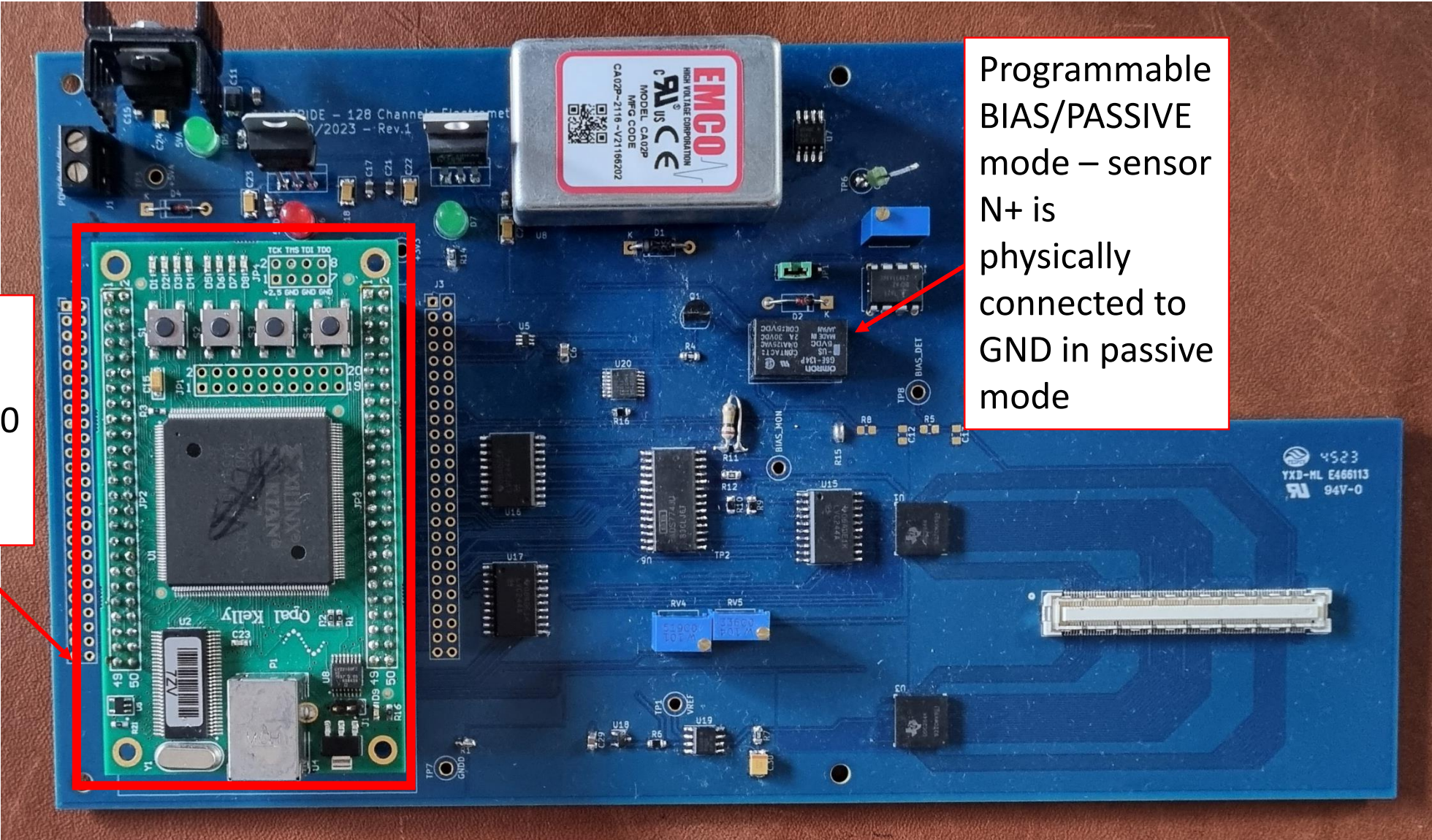


130mm

230mm

4523
YXD-NL E466113
94V-0

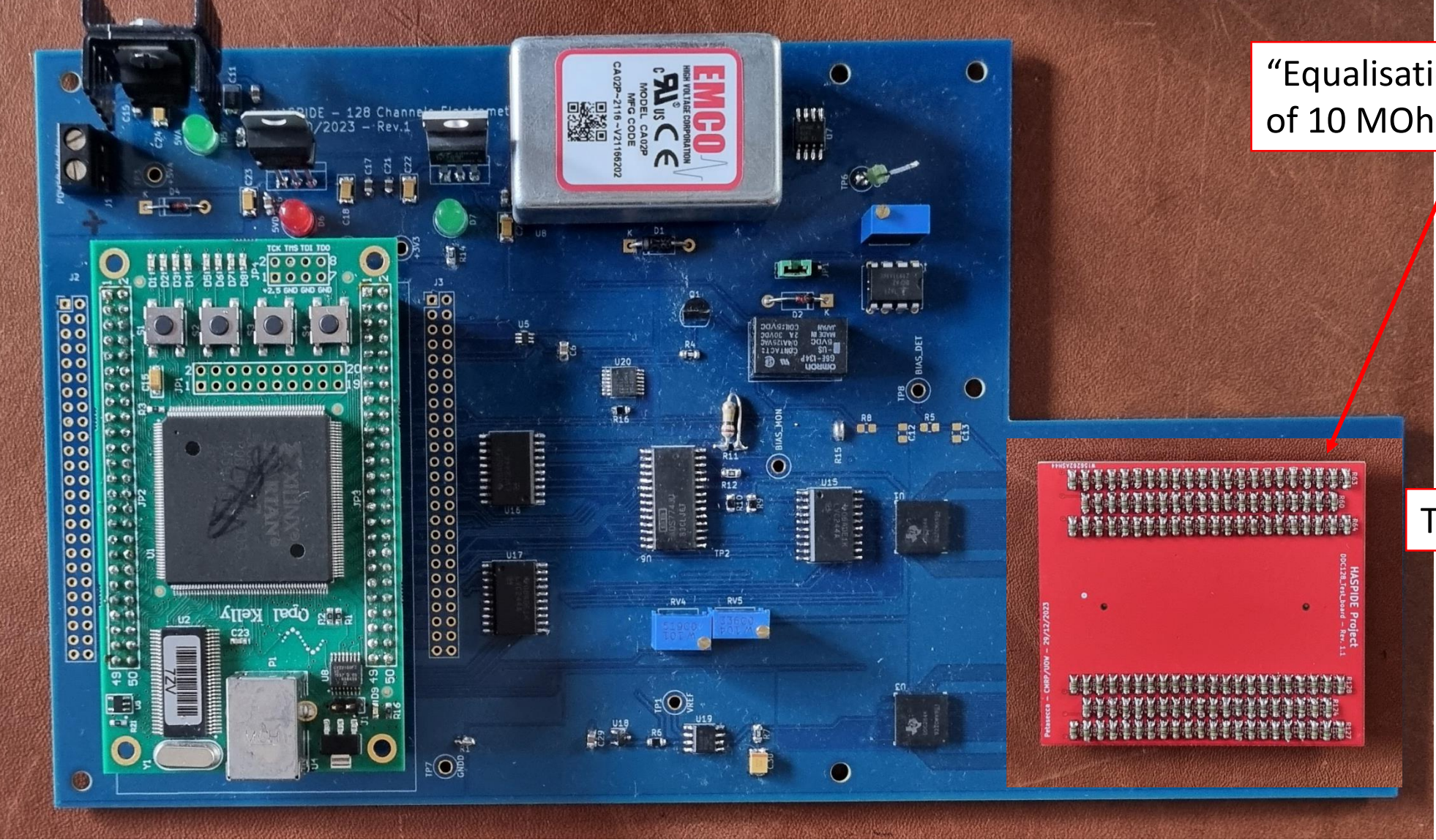
PCB and assembling:



Xilinx SPARTAN6 with USB2.0 interface (Cypress)

Programmable BIAS/PASSIVE mode – sensor N+ is physically connected to GND in passive mode

PCB and assembling:



“Equalisation input device” – set of 10 MOhm resistors (0.1%)

TOP - BOTTOM views



WP2: UOW contribution schedule and progress

128 Channels electrometer:

- Hardware: design, pcb and assembling → completed
- Firmware: Beta version → completed
- Software:
 - Beta version GUI → completed
 - Alpha version Decoding function → 80%
 - Alpha version post-processing functions (equalization, calibration, visualization of amplitude vs time for a selected channel) → 50%
- Expected delivery: End of April.

- TO BE PLANNED (and discussed):
 - Design of the probes for different type of detectors
 - Connection tech of the detectors to the probe
 - Based on the FPC HIROSE connector, the kapton probe MUST have a stiffener to be mechanically reliable to repetitive connections and disconnections from the electronic readout.