CUSTOM HARDWARE PLATFORM BASED ON INTEL EDISON MODULE

D. Pedretti, D. Bortolato, F. Gelain, M. Giacchini, D. Marcato, M. Montis, S. Pavinato, J. A. Vasquez,
INFN-LNL, Legnaro (PD), Italy
M. Bellato, R. Isocrate, INFN Sez. Di Padova, Padova, Italy

WEM307

What inspired this work

Context:

Selective Production of Exotic Species.

SPES is a second generation ISOL radioactive ion beam facility in construction at the National Laboratory of Legnaro – INFN – Italy.

To achieve the benefit of a distributed control system, a big effort is required for embedding the control of a single instrument or a small group of devices.

Magnet power supply control system:

We aim extending the control reach to small groups of magnet power supplies and we are developing a low cost and low power microprocessor board which acts as an Ethernet to RS232 translator and is capable of running the EPICS software IOC.

A custom, low power and low cost desktop PC

① Computer on Module

Towards a general purpose embedded system

② First prototype - key features:

- PoE+ 30W
- Ethernet TCP/IP
- USB 2.0
- RS232/RS422
- 20 x GPIO
- microSD
- Wi-Fi
- x86 architecture

③ Debug

A revision of the DC power distribution was necessary to improve the network performance.

Conclusions
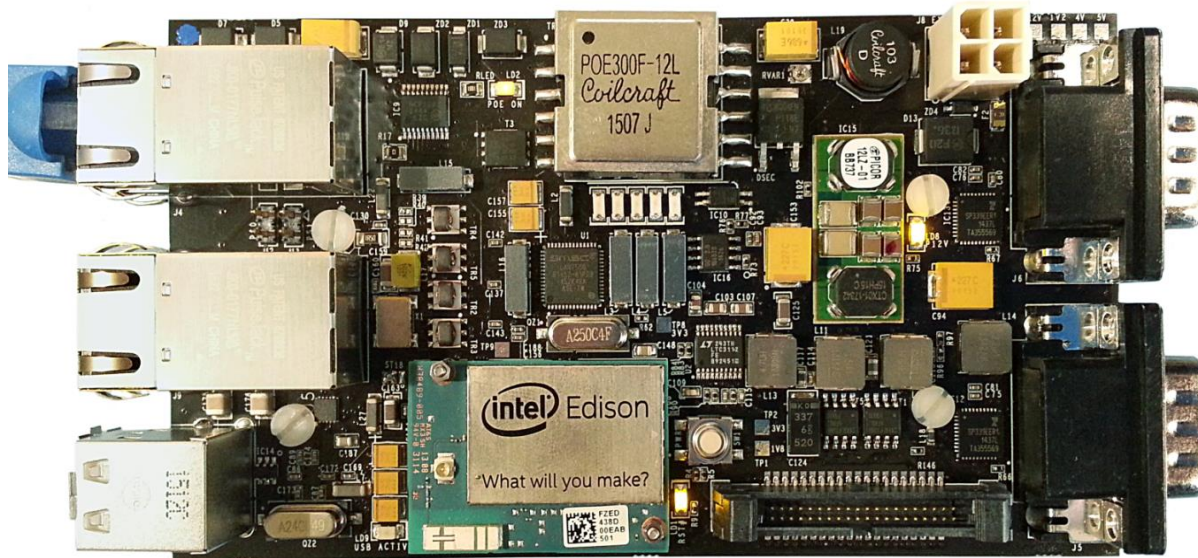
132 mm x 72 mm, 8 layers FR-4 PCB

- DIN-RAIL mounting.

- Low power: less than 3W with no USB devices.

- x86 architecture makes software development straightforward.

- PoE is a great benefit in an Ethernet distributed control system.

- We could boot a full Linux distribution and successfully run an EPICS software IOC.

- The prototype proved to be an adequate solution for embedding the control of different equipments in our accelerator complex: magnets power supply, oscilloscopes, stepper motors.