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# Open Hardware and Application Specific Design for the monitoring system of the Belle II forward/backward electromagnetic calorimeter

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Control and monitoring of experimental facilities as well as laboratory equipment requires handling a blend of different tasks. Often in industrial or scientific fields there are standards or form factor to comply with and electronic interfaces or custom busses to adopt. With such tight boundary conditions, the integration of an off-the-shelf Single Board Computer (SBC) is not always a possible or viable alternative.
The availability of electronic schematics and PCBs with Open-source Hardware license for various SBCs overcome such integration problems, making feasible the implementation of a custom architecture composed by a central core inherited from a vendor reference design (most likely the microprocessor, static RAM and flash memory) augmented with application-specific integrated circuits and hardware resources, in order to handle the requirements of the specific environment. The user is then able to exploit most of the supported tools and software provided by Open Source community, fulfilling all the constraints enforced by his environment.

We have used such an approach for the design and development of the monitoring system framework of the ECL endcap calorimeter of the Belle2 experiment, presently under construction at the KEK Laboratory (Tsukuba, J). In this work we present and discuss the main aspects of the hardware and software architectures tailored on the needs of a detector designed around CsI scintillators.

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