Custom Hardware Platform Based on Intel Edison Module

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SPES Project

SPES (Selective Production of Exotic Species) is a second generation ISOL radioactive ion beam facility actually in construction at the National Laboratory of Legnaro, Italy. The aim of SPES is to provide high intensity and high-quality beams of neutron-rich nuclei to perform forefront research in nuclear structure, reaction dynamics and inter-disciplinary fields. SPES’s control system requires a big effort embedding the control of different devices and their subsequent integration into EPICS framework.

What Inspired This Work

The necessity to extend the control reach to small groups of magnet power supplies around the SPES accelerator suggests the design of a low power, low cost, microprocessor based embedded controller, capable of running the EPICS IOC software together with one or more RS232/RS422 interfaces.

How can I take control?

The Solution

Intel Edison compute module integrates a 22 nm Intel Atom Processor dual-core 500 MHz.

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A Simple Custom Desktop PC

The possibility of designing a custom hardware platform based on a Computer on Module represents a big step toward a “General Purpose Embedded System”, bridging the gap between custom developments and commercial off-the-shelf personal computer.

Key Features

- 8 layers PCB, FR-4 glass epoxy dielectric
- 132mm x 72mm (DIN-RAIL mounting)
- PoE+ 30 W
- Low power (observed up to 3 W)
- ATX-P4 bidirectional 12V power supply
- Wi-Fi dual-band (IEEE 802.11 a/b/g/n)
- Two RS232/422 DSUB connectors
- Dual stacked USB 2.0 type A connector
- microSD
- Two ethernet interfaces
- 20 x GPIO flat cable connector

The prototype proved to be an adequate solution for embedding the control of different devices in our accelerator complex. The possibility to boot a full Linux distribution and the x86 architecture make the EPICS IOC development straightforward.

Thanks to Link Engineering and DPE Elettronica for supporting the Place&Route.
Thanks to Prime Elettronica for assembly the prototype.

15th International Conference on Accelerator & Large Experimental Physics Control Systems