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The full scale prototype of the PIP-II dedicated RFPI system

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The Radio Frequency Protection Interlock safety system is integral to the modern accelerator infrastructure. It is responsible for instantaneous RF signal permits drop in case of sudden cavities operation conditions violations.

Information about the cryogenic system status, coupler bias high voltage and current, electron pick-up current level, temperatures, RF signal leakage, LLRF system status, and cavity RF signals levels are, among others, input signals to this safety system. Different signal types require various input conditioning stages. Regardless of the initial form of each entry, all monitored values are transferred to the digital representation and compared with safety margins. The FPGA-based main logic unit uses these limits to detect faults in the system and to disable output permits immediately therefore stopping the cavity operation with RF power.

After the successful design and evaluation of the proof of concept prototype, the next iterations of the RFPI project took place. The full-scale prototype has been proposed and designed. The contribution discusses a new setup that can be configured to protect up to four cavities at the same time. The updates and modifications to the PoC design including different SoC module usage, signal conditioning modules redesign into double FMC form, and configuration flexibility improvements are being discussed. Moreover, the initial evaluation of the system components' performance results is presented.

Minioral

No

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