

In-Situ Calibration: Migrating Control System IP Module Calibration From the Bench to the Storage Ring

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Abstract

The Control System for the Advanced Light Source (ALS) at Lawrence Berkeley National Lab (LBNL) uses in-house designed IndustryPack® (IP) modules contained in compact PCI (cPCI) crates with 16-bit analog I/O to control instrumentation. To make the IP modules interchangeable, each module is calibrated for gain and offset compensation. We initially developed a method of verifying and calibrating the IP modules in a lab bench test environment using a PC with LabVIEW. The subsequent discovery that the ADCs have significant drift characteristics over periods of days of installed operation prompted development of an “in-situ” calibration process—one in which the IP modules can be calibrated without removing them from the cPCI crates in the storage ring. This paper discusses the original LabVIEW PC calibration and the migration to the proposed in-situ EPICs control system calibration.