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## Firmware development and testing of the ATLAS Pixel Detector / IBL ROD card

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The ATLAS Experiment is reworking and upgrading systems during the current LHC shut down. In particular, the Pixel detector is inserting an additional inner layer called Insertable B-Layer (IBL). The Readout-Driver card (ROD), the Back-of-Crate card (BOC), and the S-Link together form the essential frontend data path of the IBL's off-detector DAQ system. The strategy for IBLROD firmware development focused on migrating and tailoring HDL code blocks from PixelROD to ensure modular compatibility in future ROD upgrades, in which a unified code version will interface with IBL and Pixel layers. Essential features such as data formatting, frontend-specific error handling, and calibration are added to the ROD data path. An IBLDAQ testbench using realistic frontend chip model was created to serve as an initial framework for full offline electronic system simulation. In this document, major firmware achievements concerning the IBLROD data path implementation, tested in testbench and on ROD prototypes, will be reported. Recent Pixel collaboration efforts focus on finalizing hardware and firmware tests for IBL. Time plan is to approach a final IBL DAQ phase by the end of 2014.

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