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New updates on the ATLAS ROD board implementation for Pixel Layer 1 and Layer 2

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This work intends to briefly overview the new technological updates on the LHC ATLAS acquisition system of the Pixel Detector.

The herein presented Read-Out Driver (ROD) is a VME board devoted to data processing, configuration and control. It is designed to provide data formatting, frontend-specific error handling, and calibration.

This board was initially designed to interface the data sensed by IBL with the ATLAS TDAQ system. The Insertable B-Layer (IBL) is the innermost sensing layer of the ATLAS Pixel Detector, added during the 2013/2014 LHC long shutdown, to withstand higher luminosity and feature higher throughput performance. To read out the new layer of pixels, with

a smaller pixel size with respect to the other outer layers, a front end ASIC (FE-I4) was designed. Because of its optimal performance, it was decided to adopt the IBL ROD also for Pixel Layer 1 and Layer 2. Among the several advantages, one of the most important is the reduction of link occupancy due to the increased bandwidth (80 Mb/s, two times the previous one). 40 ROD boards, fabricated and tested in 2015, were installed in the Layer 2 acquisition system featuring outstanding performance while 13 (out of 45) RODs for Layer 1 are still under test and will be installed by the end of 2016.

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