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An Automated Test Stand for Production Testing of CMS Pixel Detector Optical Transmitters

Monday, August 8, 2016 6:30 PM (2 hours)

The Real-time Systems Engineering (RSE) Department at Fermilab is responsible for the delivery of a new optical transmitter module for the Phase 1 upgrades of the Forward Pixel Detector of the Compact Muon Solenoid (CMS) experiment at the Large Hadron Collider (LHC) at CERN. The delivery of these modules was made possible by an automated test stand developed by RSE. This test stand employs custom hardware (to distribute test patterns to the electrical inputs of the transmitter channels) and an optical switch (to select the optical outputs of the transmitters for delivery to optical test equipment for eye pattern characterization and bit error rate performance measurements). The operation of the system is controlled by virtual instruments written in the National Instruments' Labview environment. This approach minimized the manual labor involved in the production testing of over 700 readout channels and resulted efficient data logging and analysis for the tested modules. The test stand architecture, test and calibration procedures, and production testing results will be presented.

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