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Development of the Quality Control System of the Readout Electronics for the Large Size Telescope of the Cherenkov Telescope Array observatory

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The Cherenkov Telescope Array (CTA) is the next generation VHE gamma-ray observatory, which improves the sensitivity by a factor of 10 in the range 100 GeV–10 TeV and an extension to energies well below 100 GeV and above 100 TeV. CTA consists of different types of telescopes, which are called large size telescope (LST), medium size telescope (MST), small size telescope (SST), and Schwarzschild-Couder telescope (SCT), respectively. The prototype of the LST is currently being built and will be installed at the Observatorio Roque de los Muchachos, island of La Palma, Canary islands, Spain.
Having to record very fast signals in a noisy environment where the background frequency can reach up to 400 MHz, a fast digitization speed of the readout system coupled to a fast photosensor like a photomultiplier tube (PMT) is crucial to increase the pixel signal-to-noise ratio. Each telescope is equipped with several thousand photon sensor pixels and the readout system attached to the sensors is in a camera container located at the focal position.
The readout system for the LST prototype has been designed and around 300 readout boards will be produces in the coming months, half by japanese companies and half by italian companies. We have developed an automated quality control system in order to certify that the board production fulfills specific qualification standards. The system can be used on the company production line in order to identify faulty components and react in short time for fixes to deliver a full set of working board.
We will present in detail the design of the quality control system, with special emphasis on the embedded hardware used for producing test pulses of programmable amplitude and the test qualification procedures.

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