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The Study of Digital LLRF Control System for CSNS Linac

China spallation neutron source(CSNS) is located in Dongguan city in Guangdong province. The accelerators of CSNS mainly consist of an H- linac which accelerates the H- beam energy to 81 MeV and a rapid cycling synchrotron (RCS) accelerator which accumulates the proton beam to a high current pulse and then accelerates it to 1.6 GeV. The infrastructure and equipment manufacture are now in progress. The RF system for the 81 MeV Linac requires 9 units of RF power sources: two 4616 tubes power RFQ, 4 klystrons power DTLs, and 3 solid state amplifiers power two bunchers and one debuncher. Each unit has one independent digital low level RF (LLRF) control system which is used to stabilize the amplitude and phase of the RF accelerating field along the linac, and to minimize beam loss. Now the LLRF prototype has been developed, the test results show that the fluctuation range of amplitude and phase satisfy our requirements. This paper will address the layout of CSNS linac LLRF system, the related hardware designs and the algorithm implementations.

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