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Design of a Low-Noise, Charge Sensitive Amplifier for MCP-PMT Detector Readout

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Readout of micro-channel plate detectors using cross strip anodes require low noise, fast charge sensitive amplifier (CSA) front-end electronics. The goal of this CSA project is to improve noise and shaping time from the "PreShape32" amplifier ASIC of the RD-20 collaboration at CERN, presently used in the readout system. A target noise of 100e- + 50e-/pF (<1000e- noise overall) with <100ns shaping time is desired. Overall gain should be better than 5mV/fC. Two amplifiers have been manufactured and tested (CSAv1 and CSAv2) with a third presently being designed. All have been designed using a 130nm IBM CMOS process.

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