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Upgrade of the Analog Integrator for EAST Device

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Integrators are fundamental instruments to recover differential signals from magnetic probes in Experimental Advanced Superconducting Tokamak (EAST) experiments. While previous analog integrators are single-ended input, which has low common mode rejection ration (CMRR), a kind of difference integrator is introduced which has the same structure as the standard difference amplifier. The linear fitting method is used to determine the effective drift slope, which is used to rectify the integration signal in real time. To improve the maintainability and testability of the integrator system, a new integrator controller was developed, which uses an ARM micro-controller and the lightweight IP protocol stack to realize the network control. The tests show that the upgrade integrator works well, its CMRR is high up to 125 dB when the common voltage is 1.5 V, and the processed integration drift is less than 200 uVs during 1000 s integration, which is much better than the previous integrator.

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Description

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