



## Efficient VLSI Design & Implementation of Digital PID controller for Classic Temperature Controller

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**Abstract**— This paper explains a method for the design and implementation of digital PID controller for classic temperature controller based on Complex Programmable Logic Device (CPLD) device. It is more compact, power efficient, EEPROM based, cheaper and provides high speed capabilities as compared to software based PID controllers. The proposed work is based on the implementation of digital PID controller for the Classic temperature controller. The PID controller is designed using QUARTUS and Simulink to generate a set of parameters associated with the desired controller. The architecture was implemented on hardware to give flexibility and compatibility with the Simulink design of a controller. The controller parameters are then included in VHDL that implements the PID controller for temperature control on to CPLD. QUARTUS program is used to design PID controller to calculate and plot the time response of the control system as per temperature variation.

**Keywords**— Architecture on Hardware, VHDL Programming, Digital PID controller, Temperature sensor, CPLD, QUARTUS.