

DIGITAL PWM CONTROLLER FOR A LOW-POWER SWITCHING CONVERTER

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ABSTRACT

The digital controllers will increasingly replace currently predominant Analog controllers in high frequency switch mode supply applications.

In this work we are designing a digital controller for an experimental low power converter in a battery powered system with power management. We are designing a DC to DC converter which acts as a buck converter when load requirement is less than the input and it acts as boost converter when load requirement is more than the input using PWM converter technique. Two operating modes are used to maintain high efficiency over specific range of input voltages.

In order to reduce the limitations imposed by fixed point arithmetic's and the delay due to sampling and processing, a PID regulator is used. Potential advantages of digital controllers include much improved flexibility, reduced design time, programmability, elimination of discrete tunings components, improved system reliability, easier system integration and possibility to include various performance enhancements.

The overall aim of designing this circuit is to get tight regulation and maintain high efficiency over a wide range of input voltages and varying load currents.