

# Modified Fibonacci Switched Capacitor Converter with Reduced Switch Stress and Increased Efficiency

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## ABSTRACT

Researchers at the University of California, Davis have developed a technology that introduces an alternative topology for Fibonacci switched-capacitor converters that significantly reduces switch losses and improves efficiency.

## FULL DESCRIPTION

This technology modifies the wiring connections of a conventional Fibonacci switched-capacitor converter to create an alternative configuration. By changing one switch connection per capacitor, it achieves a reduction in losses and an increase in efficiency without needing additional parts. This alternative topology can maintain the same conversion ratio as the conventional approach in both step-up and step-down configurations, while offering up to a 38% reduction in total switch losses and enhanced efficiency.

## APPLICATIONS

- ▶ DC-DC converters for 48 Volt to point-of-load applications.
- ▶ Systems requiring minimal Electromagnetic Interference (EMI) and high-power density.
- ▶ Applications demanding full integration and fixed output voltage ratios.

## FEATURES/BENEFITS

- ▶ Significant reduction in switch losses.
- ▶ Increased efficiency compared to conventional Fibonacci converters.
- ▶ No additional parts are required, only a modification of wiring connections.
- ▶ Maintains the same conversion ratio in both step-up and step-down configurations.
- ▶ Less switch stress, leading to potentially longer component lifespan.

## PATENT STATUS

Patent Pending

## CONTACT

Andrew M. Van Court  
[amvancourt@ucdavis.edu](mailto:amvancourt@ucdavis.edu)  
tel: .



## INVENTORS

- ▶ Alling, Sean D

## OTHER INFORMATION

### KEYWORDS

alternative configuration,  
efficiency, energy  
storage, Fibonacci  
converter, power  
conversion, switched-  
capacitor converter,  
reduction in losses,  
switch stress, voltage  
conversion, wiring  
configuration

## CATEGORIZED AS

- ▶ **Energy**
  - ▶ Storage/Battery
- ▶ **Engineering**
  - ▶ Engineering
- ▶ **Materials & Chemicals**

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University of California, Davis  
Technology Transfer Office

1 Shields Avenue, Mrak Hall 4th Floor,  
Davis,CA 95616

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