

## Direct and Cross-Coupling Audio-Susceptibilities of the Peak Current-Mode Controlled Independent-Input Series-Output Boost Converter

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**Abstract:** This work studies the small-signal direct and cross-coupling audio-susceptibilities of the independent-input series-output boost converter with peak current-mode control. The converter functions in the continuous-conduction mode and comprises  $n$ -connected identical boost modules whose inputs are fed from separate voltage sources and outputs connected in series. Expressions for the module direct (self) and cross-coupling audio-susceptibilities are derived in symbolic form. The expressions explicitly show  $(n)$  as a variable and take into account the sampling action of the current loops. In addition, audio-susceptibility frequency responses following the closure of the voltage feedback loops are generated and the influence of increasing  $n$  is discussed. Detailed simulations using PSIM are performed to support the analysis.