

SystemC AMS Day 2011

Industry Adoption of the SystemC AMS Standard

BLOCK 5: RESEARCH AND ACADEMIC

A Monolithic 3-Phase Grid-Tie Direct Current (DC) Alternating Current (AC) Inverter

Amal Banerjee, Balmiki Sur, Jim Freeman and Andreas Gerstlauer, University of Texas, Austin, USA

Using a judicious combination of SystemC AMS and SystemC, we design, model and evaluate a monolithic grid-tie direct current (DC) to alternating current (AC) converter (commonly called inverter). A grid-tie inverter transforms a solar panel's DC output to AC output so that the phase of its AC output waveform exactly matches the phase of the power utility grid's AC waveform, enabling it to inject surplus output electrical power into the power utility grid.

An extension of the single phase grid-tie inverter is the 3-phase grid-tie inverter. Each of the 3-phase grid-tie inverter's output waveforms match the phase of the corresponding waveform of industrial power utility grid output, each phase separated from the other by a constant 120 degrees. Our monolithic inverter design eliminates the complexities of existing discrete component designs, in compliance with each design requirement.