



Mil Std 1275D Wide Input Range Multi-Phase Power Supply

Background

This highly efficient Power Supply provides low-noise power over a wide range of input voltages and output load conditions. The system is designed and tested to meet the stringent Military Standard 1275D transient and noise requirements for 28V military ground vehicles. In addition, the system is designed to operate down to 11V for use in standard civilian vehicles.

System Overview

The supply consists of:

- Military Standard 1275D input filter and protection network capable of withstanding and operating during $\pm 100V$ 100ms transients, $\pm 250V$ 100us transients and withstanding indefinite input reversals.
- System Fan Supply: 12V to 24V output at up to 1 Amp.
- Low-noise RF Supply: 8V at up to 2 Amps.
- Main Supply: 5V at up to 24 Amps using multi-phase load-shedding architecture.
- PLD (Programmable Logic Device) that implements non-overlapping sync waveforms, load-shedding control and sequencing.

The system operates over a wide 11V to 38V steady-state input voltage. All supplies are frequency synchronizable to an external signal source to minimize radio artifacts. The main supply operates at greater than 90% efficiency over the full input voltage range and output current range, including the losses in the 1275D protection and anti-reversal circuitry.

Project Scope

Bolton Engineering worked with the client to create a specification, designed the schematics and circuit board, simulated the power stages and control loops, wrote Verilog PLD code, fabricated and debugged the hardware, and delivered 20 working prototypes. The first-pass boards met all customer electrical, mechanical and thermal requirements, requiring only minor electrical changes before being production-ready.