Purpose

This document describes the variances between the DN3000K10 (P/N 501 0100 0001) and the User Manual for the DN3000K10.

Variances

The 1.5V Switching Power Supply, as used in the DN3000K10, is prone to instability. This may cause the power supply to operate outside the specified load regulation limits. The regulator loop response can be checked by observing the load transient response. Switching regulators take several cycles to respond to a step in DC (resistive) load current. When a load step occurs, $V_{OUT}$ immediately shifts by an amount equal to $(\Delta I_{LOAD} \cdot ESR)$, where ESR is the effective series resistance of $C_{OUT}$. $(\Delta I_{LOAD}$ also begins to charge or discharge $C_{OUT}$ which generates a feedback error signal. The regulator loop then acts to return $V_{OUT}$ to its steady-state value. During this recovery time $V_{OUT}$ can be monitored for overshoot or ringing that would indicate a stability problem. The $t_{th}$ external components will provide compensation for most applications. However, in this particular case, the output capacitors are not placed close to the output, resulting in instability. This results in the 1.5V supply ($V_{CCINT}$ for the FPGA’s) dropping outside the specified power supply limits of 1.425V minimum to 1.575V maximum.

Solution

Rework solution is available to existing users. Printed Circuit Board has been revised to Rev B.

Rework Instructions

- Attach two tantalum capacitors PANASONIC, P/N EEF-UE0J151R, across the output capacitors (C153, C156) to the bottom of the PCB.
- Remove transistor Q1 and resistor R38.
- Add four tantalum capacitors Panasonic, P/N T495D107K010AS, to the following locations: C158, C169, C184, C198.

Note: Contact the Dini Group for more information if required.