

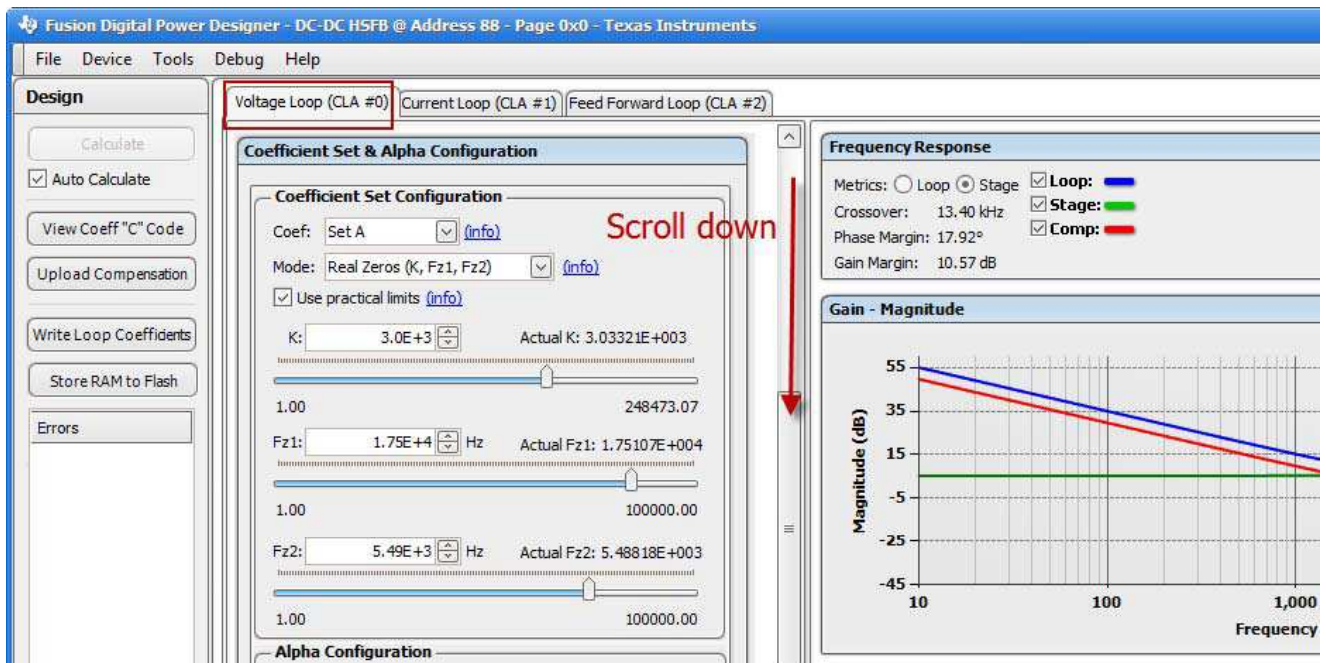


Figure 27 - Scroll down the stage parameters to see the compensator

The GUI comes equipped with 3 different ways to program the UCD3138 digital compensator. The figure below lists these options. The compensator hardware is described by the forth equation (Device PID). In this context; Kp, Ki, Kd and α are the raw register values used to configure the positions of the poles and zeros of the compensator. SC is a gain scaling term. Although it is normally set to zero, it provides additional gain for situations where the power stage gain may be low. PRD is used to configure the minimum operating period and KCOMP is used to configure the maximum operating period. In the context of the compensator they are simply gain terms that modify the overall transfer function by a fixed value. It is important to be aware that the proper way to configure PRD and KCOMP varies based on the control topology implemented. Please consult the relevant EVM user guide and training materials for details.

System Name	Transfer Function
Complex Zeros K, fz, Qz, fp	$2 \frac{K}{\omega_n^2} \frac{s^2 + \frac{\omega_n}{Q_z} s + \omega_n^2}{s^2 + \frac{\omega_n}{Q_p} s + \omega_n^2}$
Real Zeros K, fz1, fz2, fp	$2 \frac{K}{\omega_n^2} \frac{(s + \omega_{fz1})(s + \omega_{fz2})}{s^2 + \frac{\omega_n}{Q_p} s + \omega_n^2}$
Device PID Kp, Ki, Kd, α	$1000 \frac{K_p}{\omega_n^2} \frac{1 + \frac{K_i}{\omega_n} s + \frac{K_d}{\omega_n^2} s^2}{1 + \frac{1}{\alpha} \frac{s}{\omega_n}} 2^{SC} K_{COMP} 2^{\frac{19}{24}} \frac{1}{PRD}$

Figure 28 - Three ways to program the compensator