CLAIMS

We claim:

1. An apparatus comprising:

a power supply generator to provide current and voltage to a power supply rail;

a processor core coupled to the power supply rail, the processor core to operate with the current and voltage provided by the power supply generator;

a first circuitry to monitor the current provided by power supply generator; and

a second circuitry to at least partially turn off the power supply generator when the monitored current crosses a threshold current;

a third circuitry to request the processor core to reduce a current draw from the power supply rail when the second circuitry determines that the monitored current crossed the threshold current; and

a fourth circuitry to monitor the voltage on the power supply rail, wherein the third circuitry is to request processor core to reduce one or more performance parameters when the fourth circuitry determines that the monitored voltage crossed a threshold voltage.

~~2. The apparatus of claim 1 further comprising: a third circuitry to request the processor core to reduce a current draw from the power supply rail when the second circuitry determines that the monitored current crossed the threshold current.~~

~~3. The apparatus of claim 2 further comprising: a fourth circuitry to monitor the voltage on the power supply rail, wherein the third circuitry is to request processor core to reduce one or more performance parameters when the fourth circuitry determines that the monitored voltage crossed a threshold voltage.~~

4~~2~~. The apparatus of claim ~~3~~1, wherein the one or more performance parameters include: an operating frequency, fan speed, current draw, and divider ratio.

5~~3~~. The apparatus of claim ~~3~~ 1 further comprising a clamp circuitry to clamp the voltage on the power supply rail to a predetermined voltage level when the fourth circuitry determines that the monitored voltage crossed a threshold voltage.

6~~4~~. The apparatus according to claim 1, wherein the power supply generator comprises a high-side switch and a low-side switch, wherein the high-side switch is coupled in series

with the low-side switch, and wherein the high-side switch is turned off by the second circuitry when the monitored current crosses the threshold current.

~~7~~5. The apparatus of claim ~~6~~4, wherein the second circuitry is to turn off the high-side switch for a duration of an expected voltage droop on the power supply rail.

~~8~~6. The apparatus of claim ~~6~~4, wherein the second circuitry is to turn off the high-side switch for a duration of a voltage droop on the power supply rail, and is to turn on the high-side switch when the voltage droop substantially ends.

~~9~~7. The apparatus according to claim 1, wherein the power supply generator is one of: a DC-DC converter, a buck converter, a boost converter, a low dropout (LDO) regulator, a switched capacitor voltage regulator, or a bi-directional DC-DC converter.

~~10~~8. An apparatus comprising:

a power supply rail to receive a current and a voltage from a power supply generator;

a processor coupled to the power supply rail, wherein the processor is to operate with a current and a voltage provided by the power supply rail; ~~and~~

an interface to receive a request to throttle one or more performance parameters of the processor when a monitored current through the power supply rail or a monitored voltage on the power supply rail crosses a threshold current or a threshold voltage, respectively, wherein the threshold current is below a catastrophic threshold current of a voltage regulator, or wherein the threshold voltage is above a catastrophic threshold voltage of the processor; and

a clamp circuitry to clamp the voltage on the power supply rail to a predetermined voltage level when the monitored voltage crosses the threshold voltage.

~~11~~9. The apparatus of claim 10, wherein the one or more performance parameters include: an operating frequency, fan speed, current draw, and phase lock loop (PLL) divider ratio.

~~12. The apparatus of claim 10 further comprises a clamp circuitry to clamp the voltage on the power supply rail to a predetermined voltage level when the monitored voltage crosses the threshold voltage.~~

~~13~~10. The apparatus of claim ~~10~~8, wherein the power supply generator comprises a high-side switch and a low-side switch, wherein the high-side switch is coupled in series with the low-side switch, and wherein the high-side switch is turned off when the monitored current crosses the threshold current.

~~14~~11. The apparatus of claim ~~10~~8, wherein the power supply generator comprises a high-side switch and a low-side switch, wherein the high-side switch is coupled in series with the low-side switch, and wherein the high-side switch is turned off for a duration of an expected voltage droop on the power supply rail.

~~15~~12. The apparatus of claim ~~10~~8, wherein the power supply generator comprises a high-side switch and a low-side switch, wherein the high-side switch is coupled in series with the low-side switch, and wherein the high-side switch is turned off for a duration of a voltage droop on the power supply rail, and wherein the high-side switch is turned back on when the voltage droop substantially ends.

~~16~~13. The apparatus according to claim ~~10~~8, wherein the power supply generator is one of: a DC-DC converter, a buck converter, a boost converter, a low dropout (LDO) regulator, a switched capacitor voltage regulator, or a bi-directional DC-DC converter.

~~17~~14. A system comprising:

a DC-DC converter coupled to an inductor and a capacitor;

a processor coupled to the DC-DC converter, the processor comprising:

a power supply rail coupled to the inductor and the capacitor; and a processor core coupled to the power supply rail, wherein the processor core is to operate with a current and a voltage provided by the DC-DC converter;

wherein the DC-DC converter comprises:

a first circuitry to monitor current, through the inductor, which is provided as the current to the power supply rail; and

a second circuitry to turn off a high-side switch of the DC-DC converter when the monitored current crosses a threshold current; ~~and~~

wherein the system further comprises an interface to allow the processor to communicate with another device; and a third circuitry to send a request to the processor to throttle one or more performance parameters of the processor when a monitored current through the power supply rail or a monitored voltage on the power supply rail crosses a threshold current or a threshold voltage, respectively, wherein the threshold current is below a catastrophic threshold current of a voltage regulator, or wherein the threshold voltage is above a catastrophic threshold voltage of the processor.

~~18~~15. The system of claim ~~17~~14, wherein the processor comprises a clamp circuitry to clamp the voltage on the power supply rail to a predetermined voltage level when a monitored voltage of the power supply rail crosses the threshold voltage.

~~19. The system of claim 17 comprises a third circuitry to send a request to the processor to throttle one or more performance parameters of the processor when a monitored current through the power supply rail or a monitored voltage on the power supply rail crosses a threshold current or a threshold voltage, respectively, wherein the threshold current is below a catastrophic threshold current of a voltage regulator, or wherein the threshold voltage is above a catastrophic threshold voltage of the processor.~~

~~20~~16. The system of claim ~~19~~14, wherein the one or more performance parameters include: an operating frequency, fan speed, current draw, and phase lock loop (PLL) divider ratio.