

Q: How can I control the power supply rise time?

The Case of a Programmable Supply Ramp Function

The solution is launched from the **Power Setup** in the Main Test setup window. After first specifying the quiescent state of the power source - at 10mV resolution - press the "Ramp..." button, which takes you to a dialog box that lets you specify the slope and shape of the power supply's voltage curve for turn-on as well as turn-off. To be sure, many external factors, such as decoupling capacitors, come into play when programming the rise and fall time of a power supply. Therefore, it is imperative that the slope not only be estimated but also tested and easily adjusted to the empirical reality. The following describes how to generate the ramp function, and how to verify that indeed it will approximate the intended slope.

Generation

The two parameters of significance are %Voltage (of the programmed output of the supply) and Wait. For a linear slope you typically maintain a constant Wait period and program %Voltage in equal increments. Initial default is 10% with a 1000 ms wait. To achieve a reasonably linear slope, click the mouse on the first line of the "PowerOn Sequence" list box, then increment to 20%, click the mouse on the second line, and so on until reaching 100%. Linearity can be improved by incrementing at 5% intervals and (possibly) reducing the Wait period to 200 microseconds.

These waits are carefully measured out by the proprietary HiLevel I/O processor which is capable of granulating time to 60ns resolution and 99% accuracy. Thus, complicated ramp functions can be generated repeatedly and reliably -- and easily tested with a simple oscilloscope. The generation process may require fine-tuning depending on the accuracy requirements of the Device Under Test.

Testing

Just depress "Test" after your slope programming is completed. Using any oscilloscope, you will observe an accurate representation of the power supply voltage. Any deviation from the intended functions can easily be reconciled by changing parameters while observing the slope.

The Supply Ramp dialog box also refers to Liquid Crystal Hot-Spot Testing, which is akin to the aforementioned process by the manner in which power is accurately cycled. That, however, is the subject of Q'nApp #P9.

Also see:

Q'nApp #P20: Power and Ground.

Q'nApp #P22: Bypass capacitors

Q'nApp #P50: Run & Sample

Q'nApp #P59: Current Limit