

This series of application notes explains the key features and benefits of GENESYS+™ programmable power supplies.

## How to generate arbitrary waveforms

Arbitrary waveform generators are used to test electrical and electronic equipment to ensure that the product operates properly, or to pinpoint a particular fault. These can be used either repetitively or as a once only event (single-shot). The waveforms can be triggered to run by an external event, a signal from another piece of equipment for example, or manually. An arbitrary waveform generator is different to a function generator in that specific points in the waveform can be programmed to create custom waveforms.

The GENESYS+ series of programmable power supplies allows the storage of up to four arbitrary waveforms in internal memory cells to control the output voltage or current. Profiles can contain up to 100 steps and be triggered to operate using the communication interfaces or via the front panel.

These arbitrary waveforms can be easily created by using the Waveform Creator application provided on the CD-ROM (or downloaded from the TDK website)

There are two programmable modes; LIST and WAVE.

LIST allows a step function to be entered using up to 100 points. The example in Figure 1 is setting the output from 0 V to 5 V after a 20 ms delay from an external trigger. After 50 ms the output is increased to 10V for 60 ms before reducing back to 0 V.

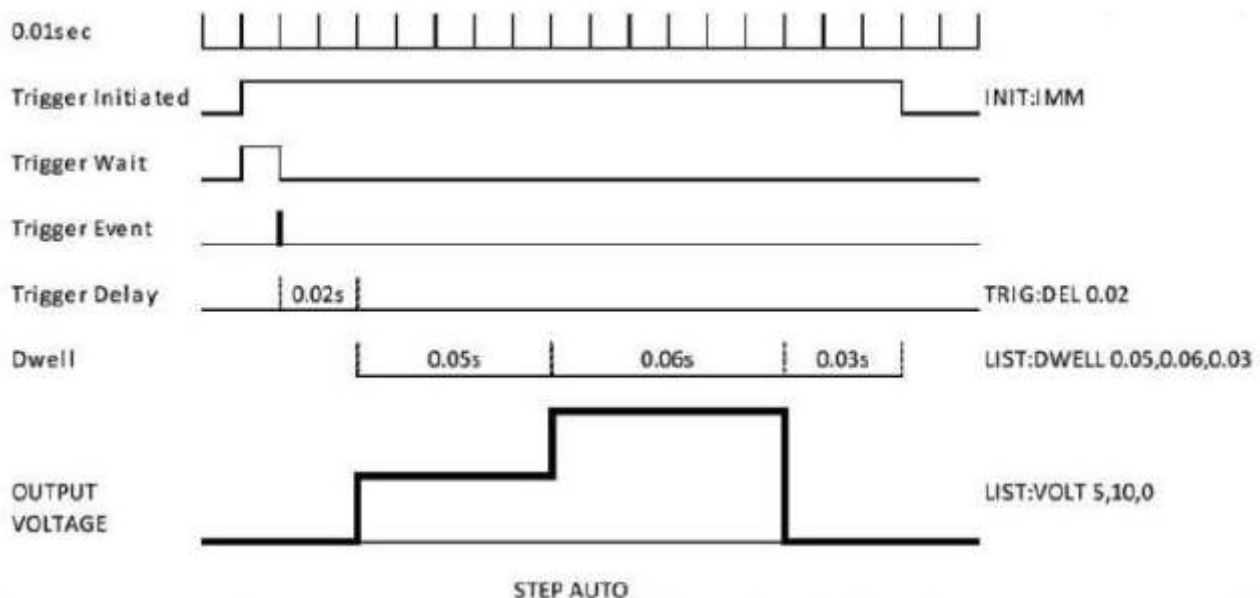


Figure 1: Typical battery voltage profile for “cold crank”

WAVE also allows gradual output voltage or current changes. In Figure 2 the output is again set from 0 V to 5 V after a 20 ms delay from an external trigger. This time it is gradually increased to 10 V over a 30 ms time period. It remains at 10 V for 20 ms before being programmed to gradually reduce to zero in 30 ms. In this case, the output is programmed to repeat this routine twice (COUN 2).

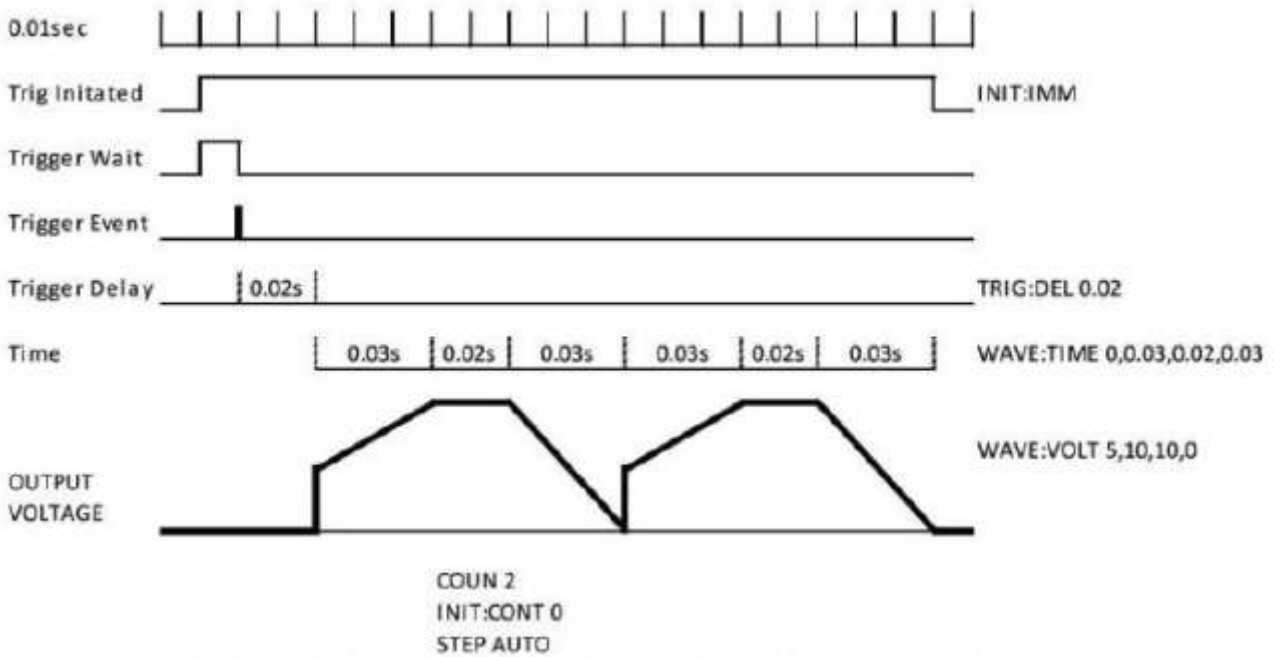


Figure 2: WAVE waveform example

The Waveform Creator on the CD provided with the power supply allows complex waveforms to be developed and all the values, trigger and repeat actions to be easily set, viewed and stored. See Figure 3.

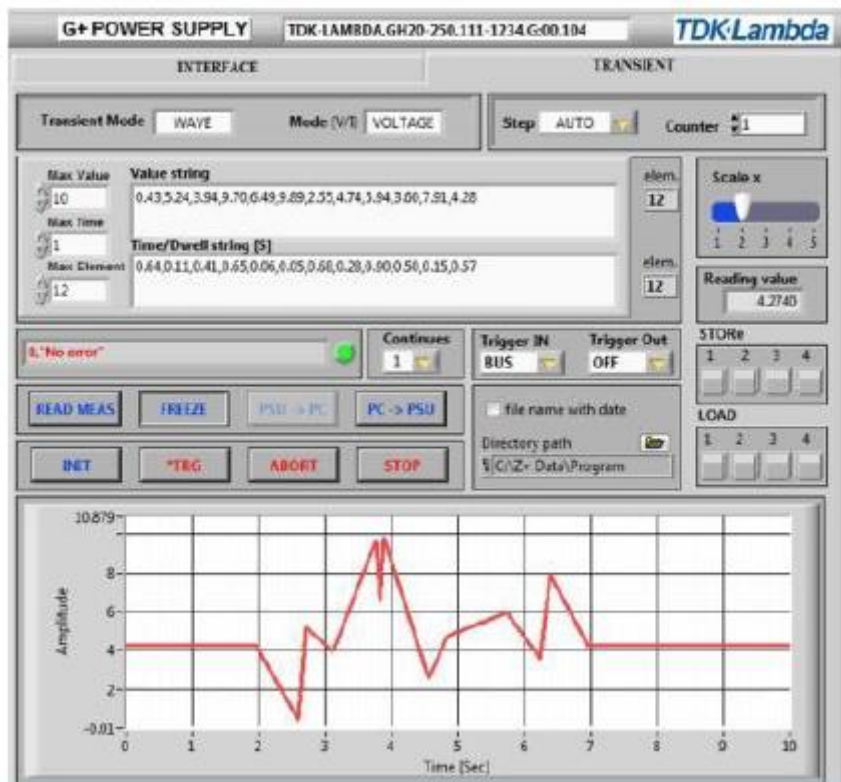


Figure 3: Waveform creator

The active memory cell number (1-4) is indicated on the GENESYS+ front panel display.

The Graphical User Interface (GUI), which can also be downloaded from the TDK website, contains a Waveform Profile Generator which can be used for more complex waveforms, including sine, triangle and saw tooth. See Figure 4.

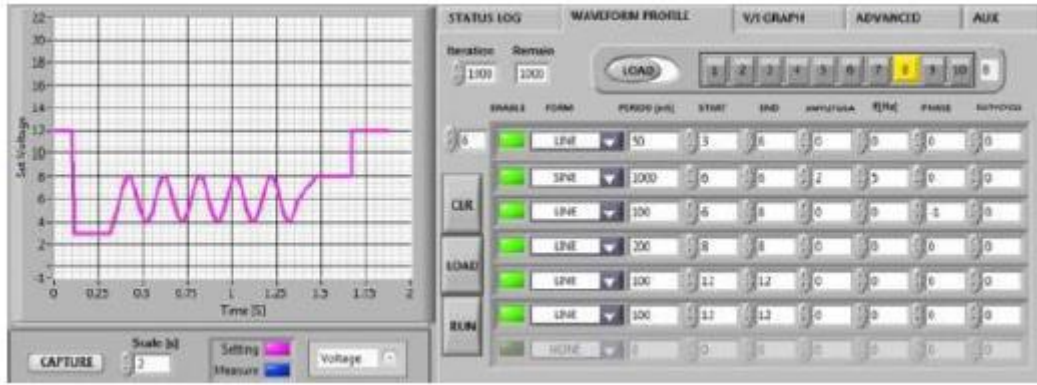


Figure 4: Waveform Profile Generator

The arbitrary waveforms can be used for a variety of applications including vehicle battery starting profiles to test automotive components and assemblies. See Figure 5.

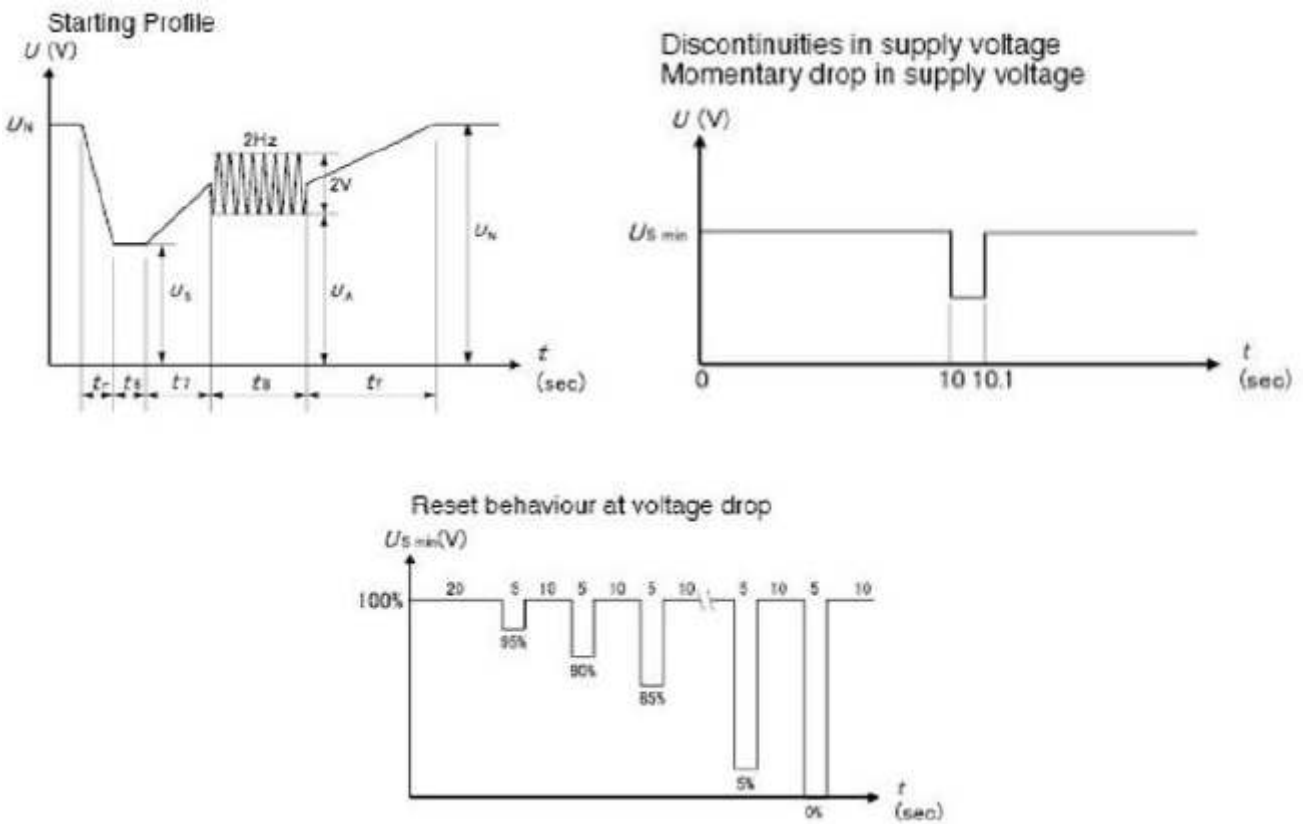


Figure 5: Examples of arbitrary waveforms

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