



2601B-PULSE Example TSP Script

DigitizeCompletePulseFrontPanelOperation.tsp



Script Description

- This example script creates (and subsequently calls) a function that can be used with the Model 2601B-PULSE current pulser to output and digitize a single current pulse.
- With a few modifications, the basic approach shown in this example can be applied to the 2601B-PULSE SMU.
 - The integrating analog-to-digital converters must be used because the SMU does not have high-speed digitizers.
 - The pulser Pulse Width and Measure Delay attributes do not apply to the SMU. Instead Trigger Timers or SMU Source and Measure Delays must be used.

Note: This script is modified from the DigitizeCompletePulse.tsp for front panel control



Front Panel Operation

Basic Operation

- Save this script to thumb drive and plug it into the instrument
- Press MENU key->SCRIPT->USB1
- Select DigitizeCompletePulseFrontPanelOperation.tsp and press ENTER key
- Press RUN key to run the script and result will be saved automatically as csv format

Parameters to be entered:

- Current Level : Peak current level of pulse in amps
- Pulse Width : Width of current pulses in microseconds
- Aperture : Effective integration time in microseconds
- Range Voltage : Voltage measure range in volts
- Range Current : Current source and measure range in amps
- Source Protect: Voltage protection level at source terminals
- Sense Protect : Voltage protection level at sense terminals
- Bias Current : Idle current level in amps (base level for pulses)



Function Description

- The pulse is generated using the instrument's Asynchronous Trigger Model.
- The Pulse Width is determined by a new pulser command, which provide more precise timing than a Trigger Timer. Needed to support pulses as short as 10 μ s.
 - `smua.trigger.source.pulsewidth`
- Using the dual 1MS/s digitizers built into the current pulser, the voltage and current are sampled simultaneously across the entire pulse.
 - Digitizers run at 1MS/s. Sample taken every 1 μ s.
 - Setting measure aperture (`smua.pulser.measure.aperture`) greater than 1 μ s causes multiple samples to be averaged and returned as a single reading.
 - Thus, the aperture setting defines an effective sample interval. If the aperture is set to 5 μ s, then a reading is taken every 5 μ s.
 - Therefore the effective sample rate (i.e. reading rate) is 1/measure aperture.

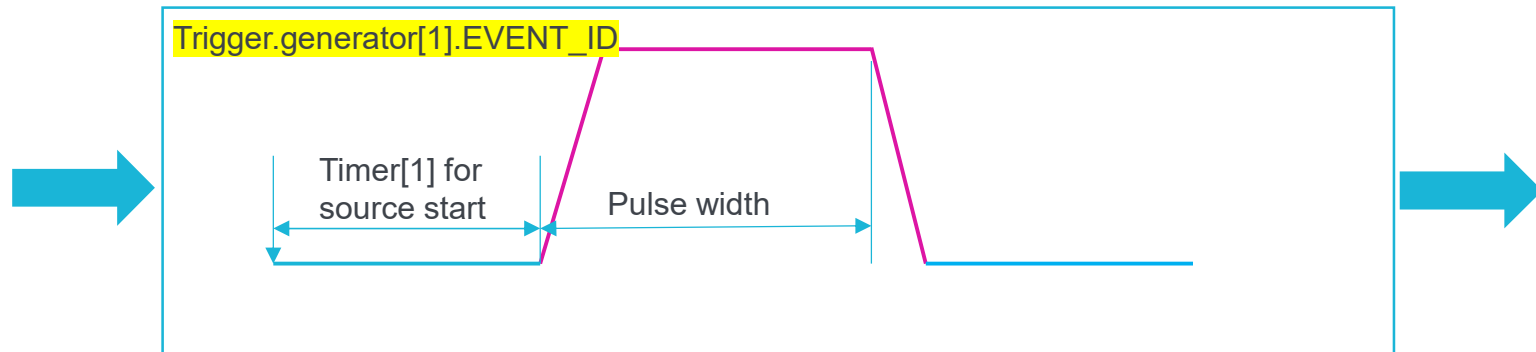


Function Description

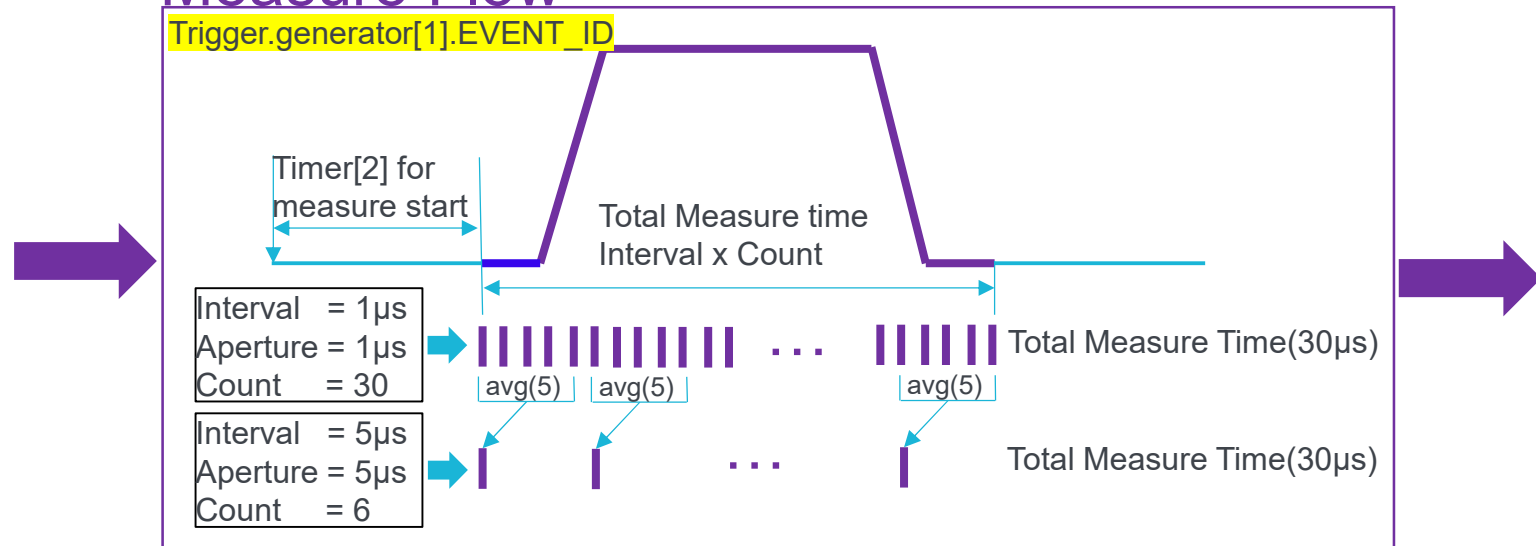
- The sampling nominally starts 10us before the start of the pulse and stops 10us after the end of the pulse.
- The pre-pulse acquisition interval is controlled using a standard Trigger Timer.
- The total acquisition time is the product of the measure count and the effective sample interval.
- See the next slide for a timing diagram.

Trigger Timing Scheme Used With Async Trig Model

Source Flow



Measure Flow



Complete Pulse Waveform

50US PULSE WITH 1MS/S

