



## Advanced Triggering Concepts ...Time-qualified Trigger

**By:** Agilent Technologies

**Purpose:**

To show how to trigger a scope on an infrequently occurring glitch.

**Equipment:**

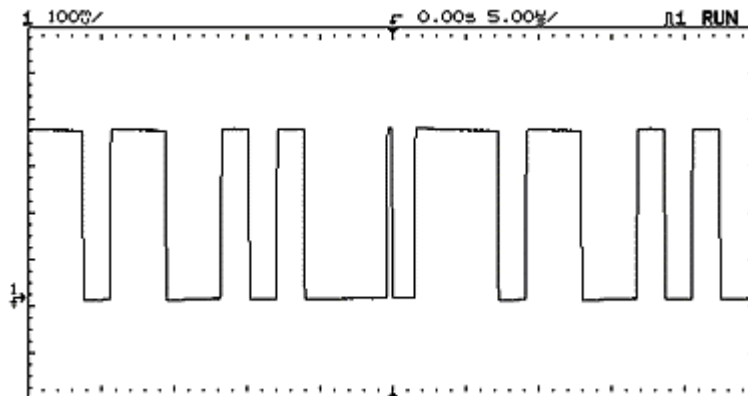
- Agilent 54645A Oscilloscope
- Agilent 54654A User Training Kit

Most oscilloscopes have some kind of peak detection, or a form of triggering that enables them to "see" a hazard condition, but these methods usually fall short of what a logic analyzer can do. However, there are some oscilloscopes that have a more sophisticated form of "glitch" trigger.

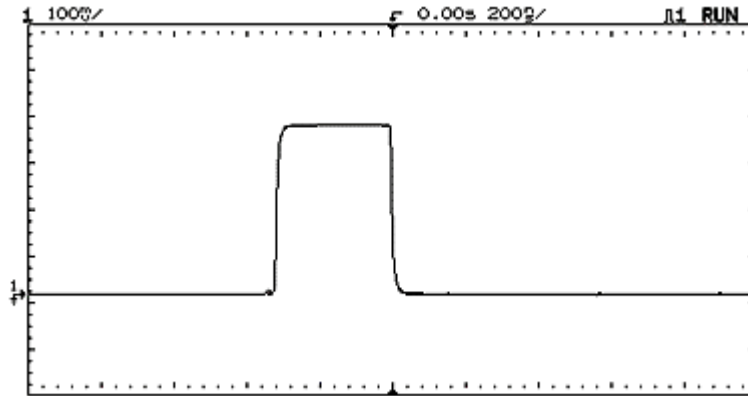
We used an Agilent 54645A Oscilloscope to measure the "glitch" output of an Agilent 54654A Training Kit signal generator. The training kit board puts out an infrequent glitch in the middle of a pulse stream. The highest intentional clock rate of the pulse train is about 1.9 microseconds.

We hit the "slope/glitch" button to bring up the trigger condition and set it to "glitch". Using the "Glitch Menu", we set it for a positive pulse, and set the scope to look for any glitch duration from 8 nanoseconds to 1.5 microseconds.

This "time-qualified trigger" mode produced the following waveform:



With the time reference of the screen set to "center", the glitch appeared as predicted at the center of the screen. Although the glitch occurs only once every few thousand cycles, it was easy to see it on the digitized screen. We then expanded it to get a closer look at the "glitch":



We then captured a long string of the pulse train, so we could manually scroll across the entire waveform and get an idea of the glitch's infrequency.



We can see the triggered "glitch" at the left of this small fraction of the waveform. We scrolled using the Agilent 54645A's MegaZoom technology that allows us to zoom and pan through the data even after it has been acquired, but were unable to see another glitch even though we captured over 1000 cycles of the pulse pattern. This proved the glitch was indeed infrequent, and showed the value of the "time-qualified trigger" function.