Keysight Technologies

81100 Family of Pulse/Pattern Generators

Double Pulse Generation for Particle Image Velocimetry (PIV) Measurements

Technical Overview

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Introduction

Keysight Technologies, Inc. pulse/pattern generators are used for research in the aerospace and defense industry, among others.

One example of their use is in the reduction of takeoff and landing times at airports and the prevention of problems caused by wake vortex. Here, the industry works with methods like PIV (Particle Image Velocimetry) where a laser sends a double light pulse out. Particles in a flow get illuminated by the pulses and a camera takes pictures every time the particle reflects the light. (Figure 1)

The 81150A can simulate this double light pulse by varying the delay and the repetition frequency of the pulses.

Required equipment (Figure 2)

- 1 x pulse/pattern generator
- 1 x infiniium oscilloscope
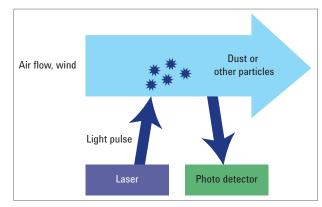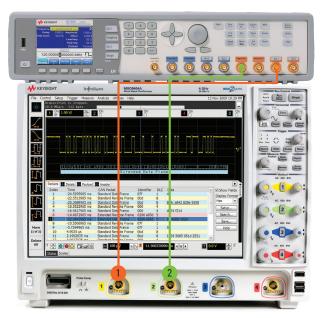- 2 x BNC cables

Figure 1. PIV method

Figure 2. The setup of a Keysight pulse generator and a Keysight infiniium oscilloscope

What do we need to stimulate a laser with double pulses

We need:

- Burst mode in general (Repetition of a pulse pattern after a trigger)
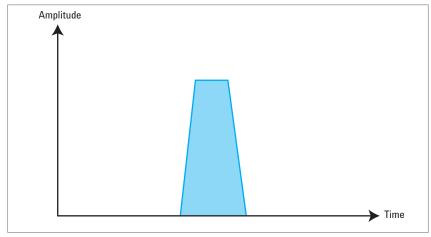

Figure 3. Single pulse

- Double pulses
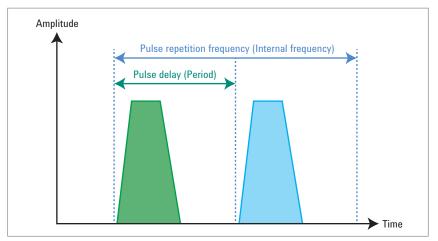- Variable period/frequency and internal frequency

Figure 4. Double pulse

Now let's set up the instrument as shown in the screenshots.

Step 1:
First, reset the instrument by pressing 'Store/Recall'. Select 'Set to defaults' and choose 'Yes'.

Select the 'Pulse' mode.

Step 2:
Change frequency into period by pressing the frequency button.

Step 3:
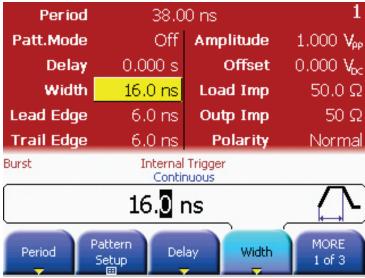Set period to 38 ns, width to 16 ns and leading edge to 6 ns.

Figure 5. Step 2 and 3

Step 4:
Press the 'Burst' button and set
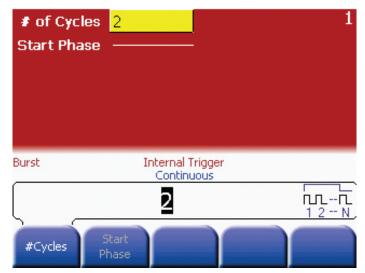#cycles to 2.

Figure 6. Step 4

Step 5:
Press the 'Trig' button, select source
and choose internal.

Step 6:
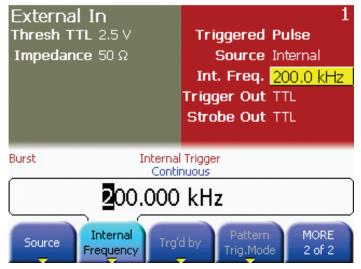Set 'Int. Freq.' up to 200 kHz.

Figure 7. Step 5 and 6

Turn output 1 on by pushing 'Out' 1.

Step 7:
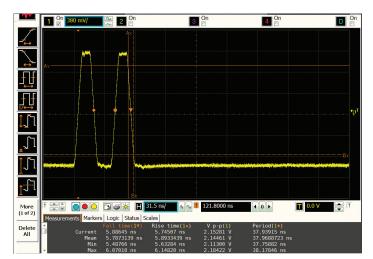View the resulting double pulse on an
infiniium oscilloscope.

Figure 8. Step 7

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(BP-06-09-14)

Related Literature

Publication title	Pub number
Keysight 81100 Family of Pulse/Pattern Generators - Brochure	5890-0489E
Keysight 81150A and 81160A - Data Sheet	5967-5984E
Keysight 81130A Pulse-/Pattern Generator - Data Sheet	5967-6237E
81100 Family of Pulse/Pattern Generators Dual Clock Gbit Chip Test - Technical Overview, Version 2.0	5991-2247EN
Simulation of Jittering Synchronization Signals for Video Interfaces - Technical Overview, Version 2.0	5991-2257EN
Radar Distance Test to Airborne Planes - Application Note	5991-2284EN

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