

Agilent 81100 Family of Pulse/Pattern Generators

Magneto-Optical Disk Drive Research

Product Note 3

Magneto-Optical Disk Drive Research

Agilent Technologies pulse generators contribute to CD-ROM technology research.

To write to and erase a bit pattern from a magneto-optical disk, a laser generates pulses at different write and erase voltages and pulse widths. In research, it is necessary to experiment with writing and erasing over the same spot on the disk every disk revolution. Writing, places a “1” on the disk, which orients the magnetic fields at that spot in a specific direction. Erasing on the other hand, places a “0” on the disk and orients the magnetic field in the opposite direction.

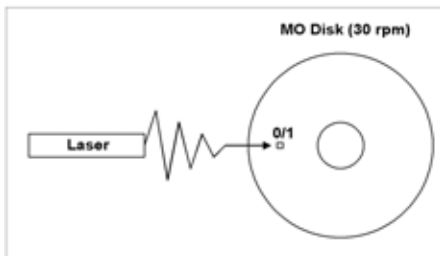


Figure 1: Magneto-Optical (MO) Disk

Required equipment for Lab 3:

- 1x Pulse/Pattern Generator (81110A + 2x 81111A, 81104A + 2x 81105A or 8110A + 2x 81103A)
- 1x Infiniium Oscilloscope
- 2x BNC cables

How to hook up the instruments:

1. Connect STROBE OUT (pulse/pattern generator) to Trig-In (scope).
2. Connect OUTPUT 1 (pulse/pattern generator) to Channel 1 (scope).



Figure 2: The setup of a pulse generator and Infiniium oscilloscope

The disk is rotated by a motor at 30 Hz. As the motor may speed up or slow down at any given time, the biggest problem is in finding the exact spot on the disk to write or erase over a second time. The critical requirement is therefore extreme accuracy and repeatable edge placement of the pattern with respect to the position on the disk per revolution. An encoder is attached to the motor to provide a clock signal, which is synchronized with the rotation speed of the motor. This clock signal is fed into the Agilent 81110A to maintain position repeatability on the disk. The external clock signal is increased from 30 Hz to 30 MHz in order to run at the same frequency as the desired write/erase data rate.

PLL mode is required here, as it adds the External Clock Input capability to the generator.

As seen in figure 4, two synchronized encoder pulses trigger the pattern to begin, and then clock each bit of the pattern.

By creating the write pattern on one channel and the erase pattern on a second channel, it is easy to independently vary the voltage levels and pulse widths, and then combine them into one pulse pattern via channel addition.

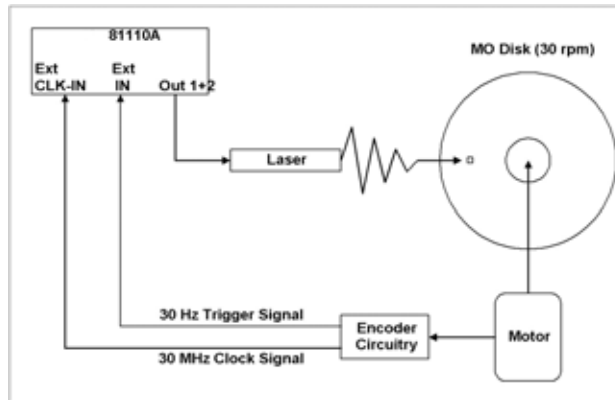


Figure 3: Application Setup

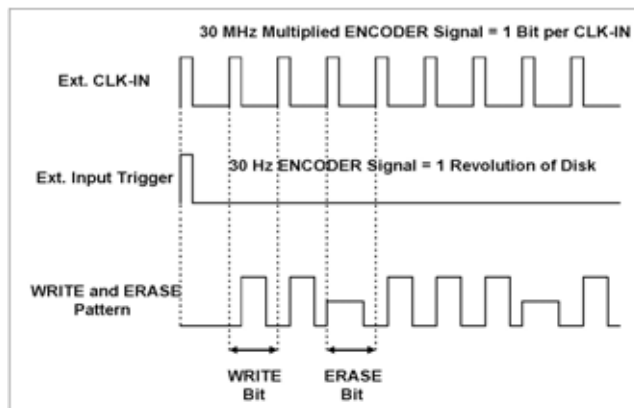


Figure 4: Pattern triggered by synchronized encoder pulses

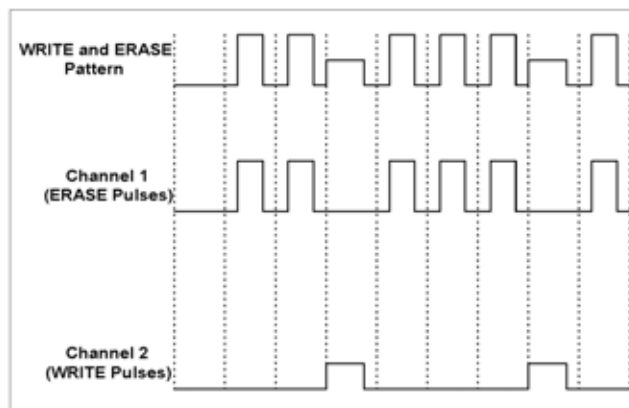
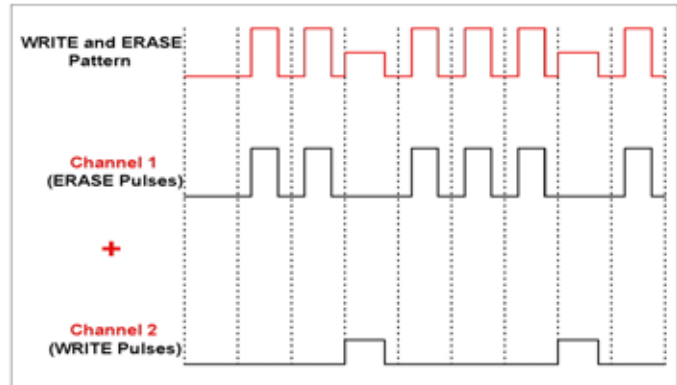


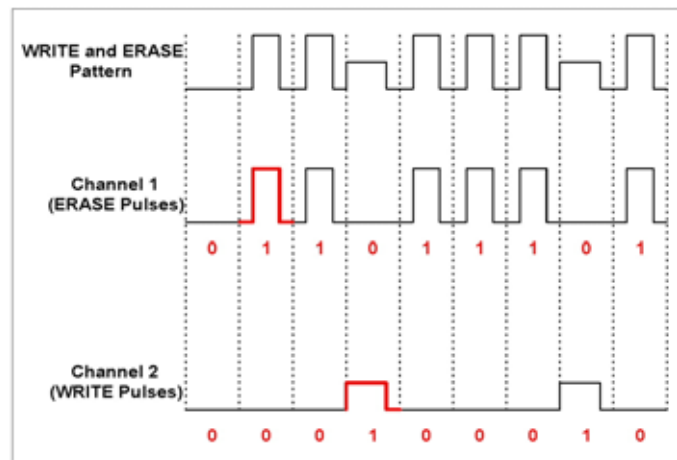
Figure 5: Channel addition

For this application we need:

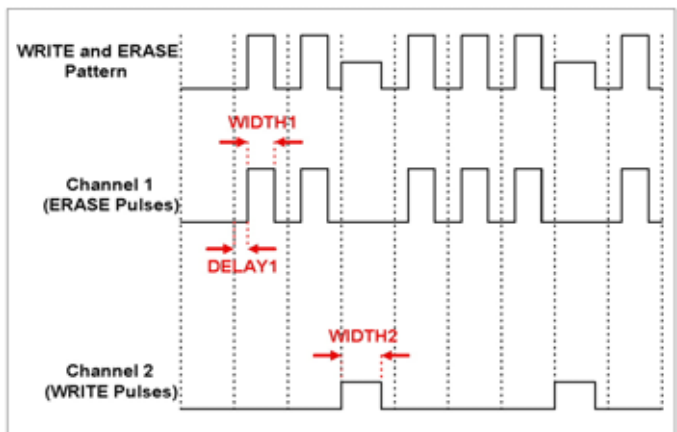
- two output channels with channel addition



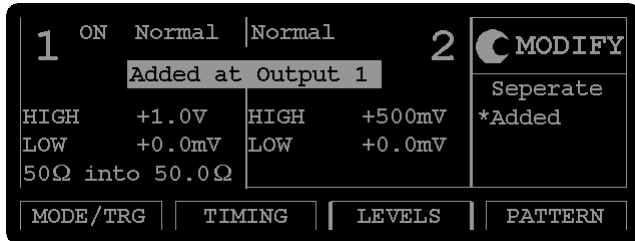
- programmable pattern of RZ-pulses



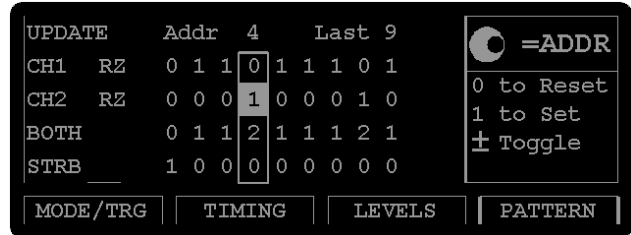
- adjustable delay and pulse width
- external trigger capability



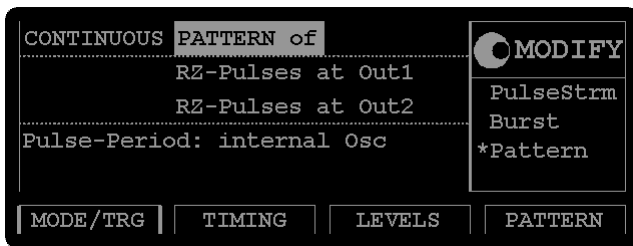
Let's set up the parameter values for the Write and Erase pulse, as demonstrated in the screen shot, and view the pulse on the scope.



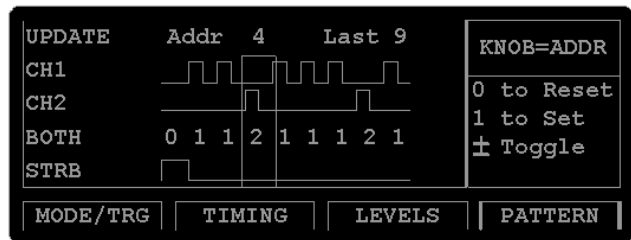
Step 1: First, reset the instrument by selecting RECALL + 0 (SHIFT, STORE + 0). Set the WRITE voltage levels on channel 1 and the ERASE levels on channel 2. Then select the outputs to be Added at Output 1 and switch on this output.



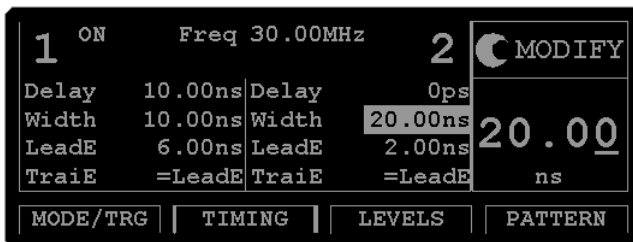
Step 4: Set up the following bit pattern in the PATTERN menu. Start with setting the last bit to 9.



Step 2: Select CONTINUOUS PATTERN in the TRG-MODE menu.



Step 5: Press the PATTERN key again to view the pulses.



Step 3: Set the frequency, width and delay values for the WRITE, ERASE pulses in the TIMING menu.



Step 6: View the pulse signal on a 54845A Infiniium Oscilloscope.

Related literature

- | | Publication number |
|--|---------------------------|
| • <i>Agilent Family of Pulse/Pattern Generators</i> , brochure | 5980-0489E |
| • <i>Agilent 81130A Pulse/Data Generator</i> data sheet | 5967-6237E |
| • <i>Agilent 81110A/81104A Pulse/Pattern Generators</i> data sheet | 5967-5984E |
| • <i>Agilent 81101A Pulse Generator</i> data sheet | 5967-6274E |
| • <i>Radar Distance Test to Airborne Planes</i> product note 1 | 5968-5843E |
| • <i>The Dual Clock Gbit Chip Test</i> product note 2 | 5968-5844E |
| • <i>Simulation of Jittering Synchronization Signals for Video Interfaces</i> , product note 4 | 5968-5846E |

For more information, please visit us
www.agilent.com/find/pulse_generator

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