Agilent 81100 Family of Pulse/Pattern Generators

The Dual Clock Gbit Chip Test

Product Note 2

Introduction

Agilent Technologies pulse generators are a necessity in the world of semiconductor test clocks and digital communication clocks.

Many customers need the ability to generate more than one clock signal simultaneously and at multiple frequencies. The 81110A is a perfect fit for functional tests of the Gbit chip in the dual clock mode. Using the pattern capability, it is easy to create the necessary clock signals, one at 150 MHz and the other at 30 MHz.

With 0.01% in PLL mode frequency, accuracy is ten times better than the clock requirement of 0.1%.

For additional margin testing, the 81110A offers you glitch free change of any timing parameter.

Required equipment for Lab 2:

- 1x Pulse/Pattern generator (81110A + 2x 81111A or 2x 81112A)
- 1x Infiniium oscilloscope
- 3x 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).
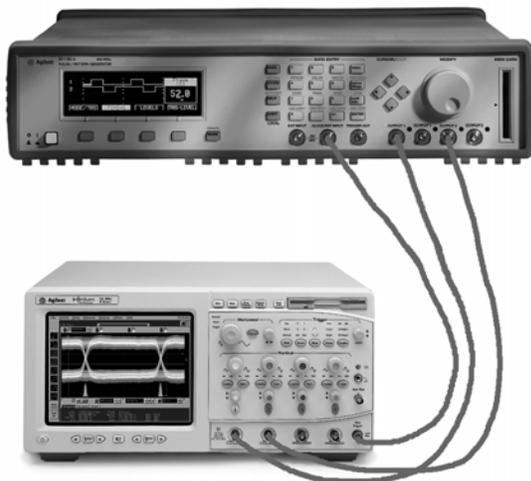3. Connect OUTPUT 2 (pulse/pattern generator) to Channel 2 (scope).

Figure 1: The setup of an Agilent pulse generator and Infiniium oscilloscope
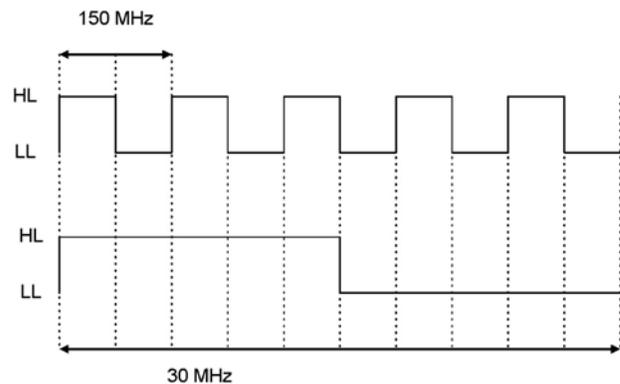

Figure 2: Different frequencies at each output channel

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So what do you expect from a pulse generator during a functional test of a Gbit chip?

You need:
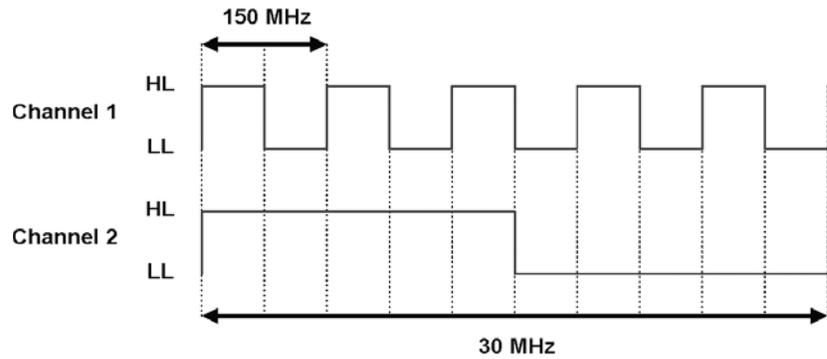- two output channels (figure 3)

Figure 3

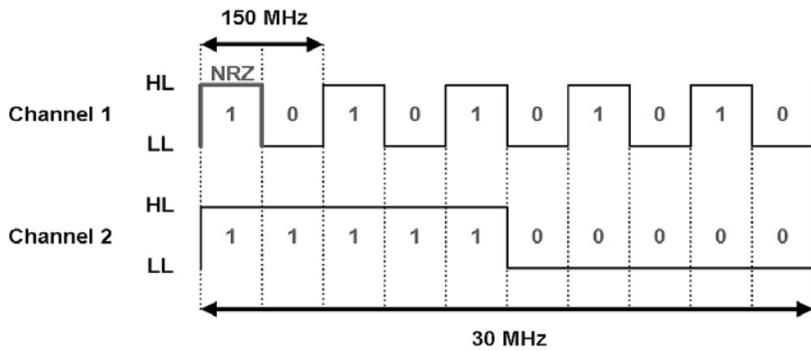- programmable patterns of NRZ-Pulses (figure 4)

Figure 4

- 300 MHz maximum frequency
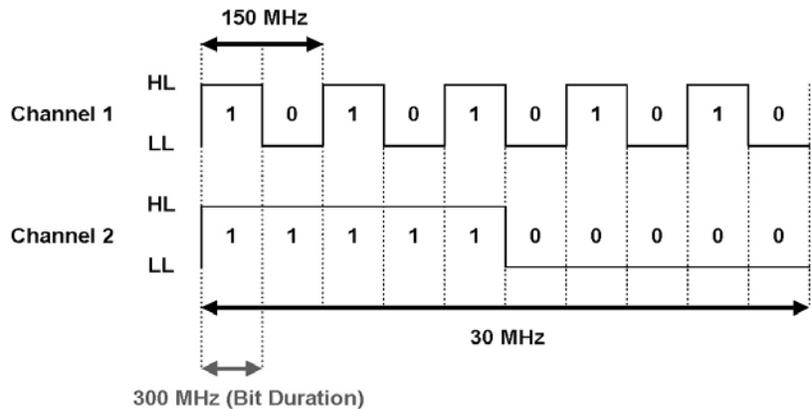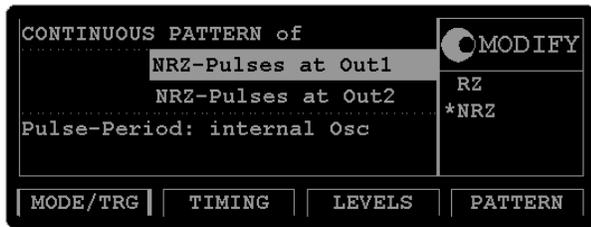- a high frequency accuracy of at least 0.1% (figure 5)

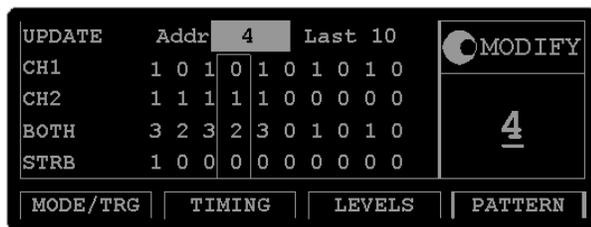**Figure 5**

Now let's set up the signal for the Gbit test (as shown in the screen shots) and have a look at the resultant pulse on the scope.

```
CONTINUOUS PATTERN of          (C)MODIFY
        NRZ-Pulses at Out1
                               RZ
        NRZ-Pulses at Out2     *NRZ
Pulse-Period: internal Osc

 MODE/TRG    TIMING    LEVELS    PATTERN
```
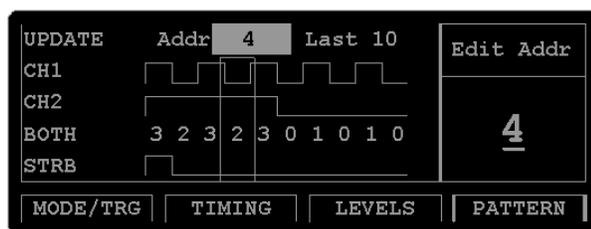
Step 1: First, reset the instrument by selecting RECALL + 0 (SHIFT, STORE + 0).

Select CONTINUOUS PATTERN of NRZ-PULSES at both Outputs in the TRG-MODE menu.
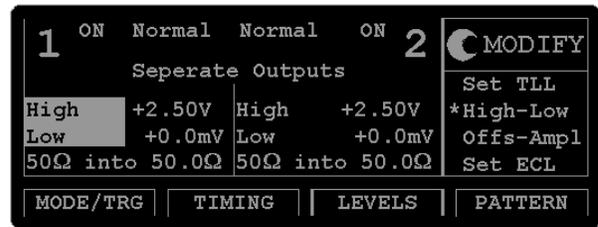
```
UPDATE     Addr   4    Last 10    (C)MODIFY
CH1      1 0 1 0 1 0 1 0 1 0
CH2      1 1 1 1 1 0 0 0 0 0
BOTH     3 2 3 2 3 0 1 0 1 0         4
STRB     1 0 0 0 0 0 0 0 0 0

 MODE/TRG    TIMING    LEVELS    PATTERN
```

Step 2: Set up the above bit pattern in the PATTERN menu. Start with setting the LAST bit to 10

```
UPDATE     Addr   4    Last 10    Edit Addr
CH1      ⎍⎍⎍⎍⎍⎍
CH2      ⎍⎍
BOTH     3 2 3 2 3 0 1 0 1 0         4
STRB     ⎍

 MODE/TRG    TIMING    LEVELS    PATTERN
```

Step 3: You can press the PATTERN key again to view the pulses.

```
1 OFF     Freq 300.0MHz   OFF  2  (C)MODIFY
Delay      0ps  Delay      0ps
Width   -------  Width   -------    300.0
LeadE    2.00ns  LeadE    2.00ns
TraiE    =LeadE  TraiE    =LeadE     MHz

 MODE/TRG    TIMING    LEVELS    PATTERN
```
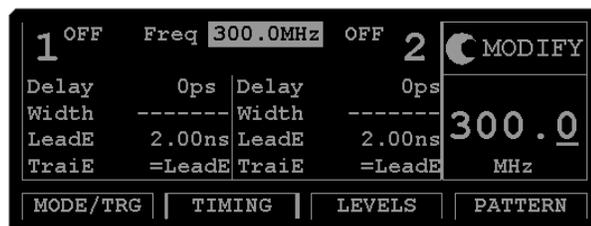
Step 4: Set the frequency to 300 MHz in the TIMING menu. This is the frequency of the bit stream when in the PATTERN mode.

```
1 ON    Normal   Normal    ON  2  (C)MODIFY
           Seperate Outputs          Set TLL
High    +2.50V  High    +2.50V     *High-Low
Low     +0.0mV  Low     +0.0mV     Offs-Ampl
50Ω into 50.0Ω  50Ω into 50.0Ω     Set ECL

 MODE/TRG    TIMING    LEVELS    PATTERN
```

Step 5: Go to the LEVELS menu to set the appropriate clock output voltages and switch on both outputs.
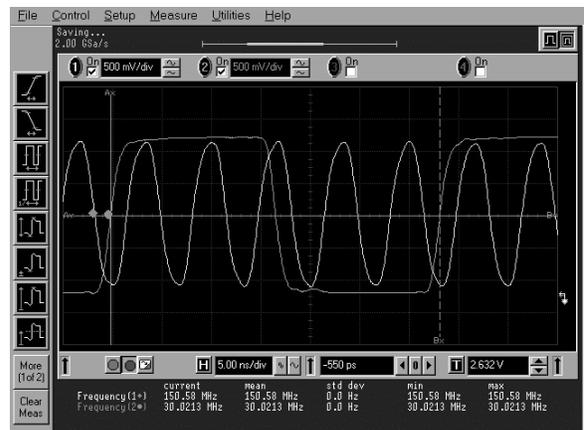
Step 6: View the resultant pulse on a 54845A Infiniium Oscilloscope.

The 81111A output channel goes up to 165 MHz and the timing system of the 81110A has a frequency up to 330 MHz. In this application, if the 81111A is installed and the frequency is set to 330 MHz, then you will receive a warning that the 81110A has been over-programmed (in this mode, the specs. are no longer guaranteed). In this case it is not critical, because the actual bit frequency is 150 MHz. The warning does not appear if the 81112A output channels (330 MHz) have been installed.

Over-programmed values can only be entered with DATA ENTRY keys or by using SHIFT + MODIFY knob.

Related Literature

	Pub. Number
Agilent Family of Pulse/Pattern Generators, brochure	5980-0489E
Agilent 81130A Pulse/Data Generator, data sheet	5967-6237E
Agilent 81110A/ 81104A Pulse/Pattern Generators, data sheet	5967-5984E
Agilent 81101A Pulse Generator, data sheet	5967-6274E
Radar Distance Test to Airborne Planes, product note 1	5968-5843E
Magneto-Optical Disk Drive Research, product note 3	5968-5845E
Simulation of Jittering Synchronization Signals for Video Interfaces, product note 4	5968-5846E

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