



*LA Techniques Ltd*

## LA19-01-03 PULSE PATTERN GENERATOR



The LA19-01-03 is a pseudo random pulse pattern generator capable of operation up to 3 Gb/s. It provides a fast rise time and low pulse distortion. The unit can accommodate two internal clock generators and supports an external clock input. It provides a clean pulse output suitable for applications such as optical communications, fast pulse amplifiers and high speed logic circuits development. Remote control is via an IEEE488 interface.

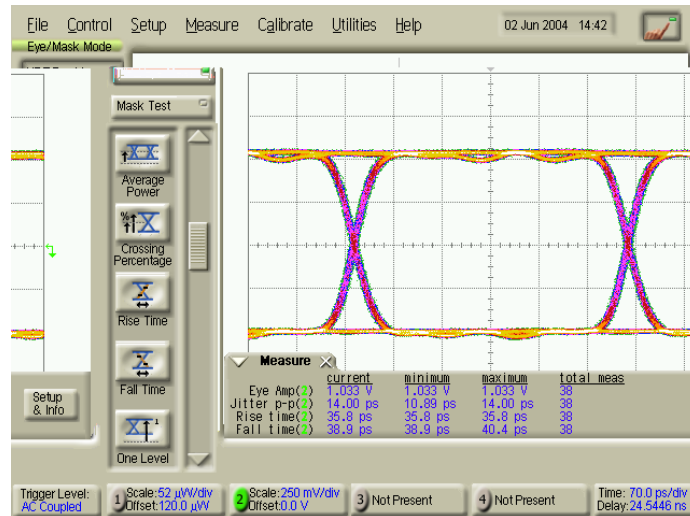
- Operation to 3 Gb/s
- 45 ps rise and fall times
- Low skew differential outputs
- 2  $v_{pp}$  output amplitude (differential)
- GPIB Interface
- Low cost

## Electrical Specification

( $t_{amb} = 25^{\circ}\text{C}$ )

Parameter	Units	Min	Typ	Max
Operating frequency				
Internal clock 1 (factory set) <sup>1</sup>	GHz	0.15	-	3.0
Internal clock 2 (factory set) <sup>1</sup>	GHz	0.15	-	3.0
External clock	GHz	0.15	-	3.0
External clock				
Input level (0.4 – 2.9 GHz)	V <sub>pp</sub>	0.5	-	2.5
Input level (<0.4, >2.9 GHz)	V <sub>pp</sub>	1.4	-	2.5
Internal clock				
Stability	ppm/ <sup>o</sup> C	-	0.3	1
SSB phase noise (100 kHz offset)	dBc/Hz	-	-95	-
Pseudo random binary sequence				
Pattern length <sup>2</sup> (2 <sup>n</sup> -1)	n	-	7,23	-
Mark ratio	-	-	1/1	-
Data output (Data and Data bar) <sup>3,4,5</sup>				
Single ended amplitude	V <sub>pp</sub>	0.9	1.0	1.1
Rise / fall time (20% to 80%)	ps	-	45	60
Skew	ps	-	-	10
Jitter(using internal clock) <sup>7</sup>	ps	-	20	30
Overshoot	%	-	5	10
dc Bias injection (BNC connector)				
dc current	mA	-100	-	100
dc voltage	v	-15	-	+15
dc resistance	Ω	15	18	25
3 dB bandwidth <sup>5</sup>	kHz	5	10	-
Clock output <sup>3</sup>				
Amplitude	V <sub>pp</sub>	0.6	1.0	1.5
Rise/fall time (20% to 80%)	ps	-	120	200
Clock/16 output <sup>4</sup>				
Amplitude	V <sub>pp</sub>	0.8	1.0	1.5
Rise/fall time (20% to 80%)	ps	-	120	200
Pattern sync output <sup>3,6</sup>				
Amplitude	V <sub>pp</sub>	0.8	1.2	1.5
Rise/fall time (20% to 80%)	ps	-	120	200
Operating temperature range	<sup>o</sup> C	+10	-	+35
Power	AC 100-250v (50-60Hz), < 50VA			
Remote Control	GPIB, IEEE488.2 compatible			
Weight	4.7 kg			
<b>Notes</b>	<ol style="list-style-type: none"> <li>1. Internal clock(s) are fixed frequency set during manufacture</li> <li>2. User selectable patterns, 2<sup>7</sup>-1 and 2<sup>23</sup>-1 in accordance with CCITT</li> <li>3. All data and clock inputs and outputs have SMA connectors</li> <li>4. Data outputs are non return to zero (NRZ)</li> <li>5. 50Ω Load connected to data output</li> <li>6. Pattern sync only on 2<sup>7</sup>-1 pattern length</li> <li>7. Measured on Agilent 86100A, clock output used to synchronise measurement</li> </ol>			

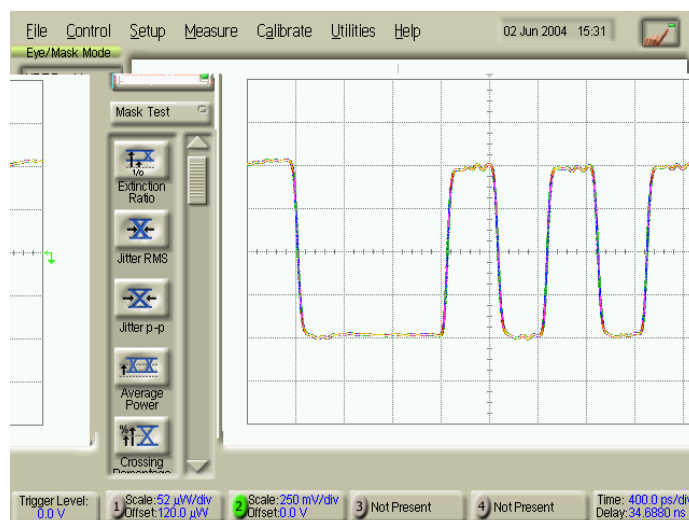
The LA19-01-03 provides a pseudo random binary sequence (PRBS) synchronised to either an internal or external clock. It provides three types of synchronisation output signals, Clock, Clock/16, and Pattern. The clock is a square wave with a typical amplitude of  $1.0 v_{pp}$ . The clock/16 is derived from the clock signal by means of low noise dividers. The typical amplitude of this is  $1 v_{pp}$ . The pattern synchronisation output produces an output synchronised to the length of the PRBS sequence selected. This allows, for example, the individual data bits to be observed on a sampling oscilloscope. It is available on the  $2^7-1$  pattern length setting.



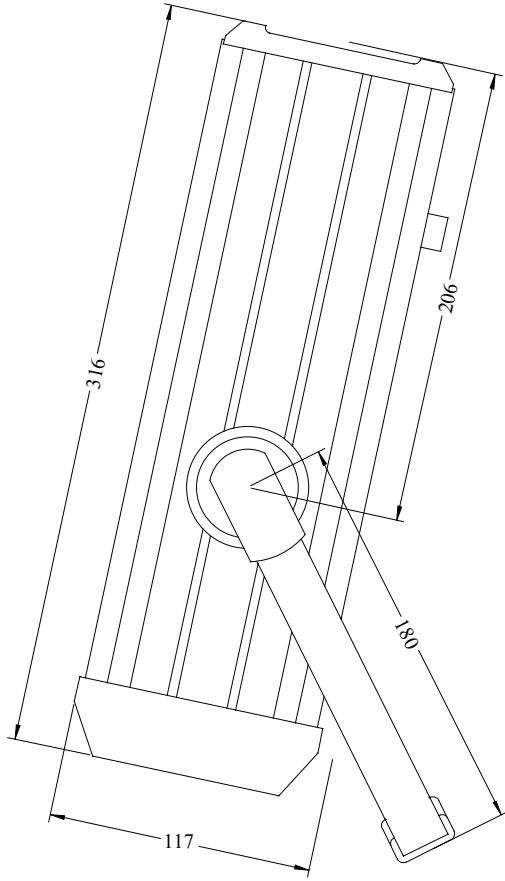
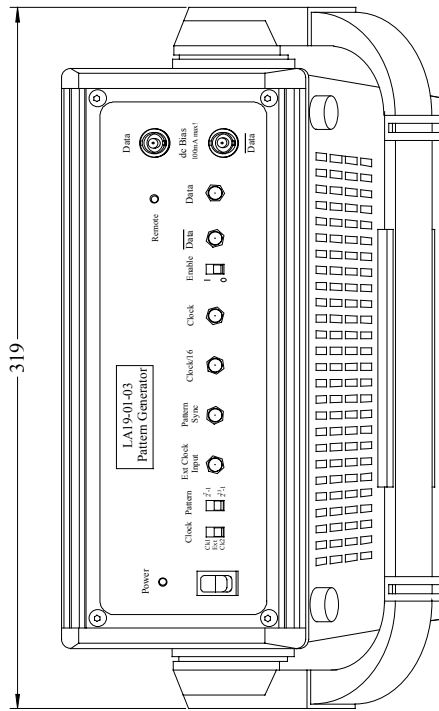
## 2.5 Gb/s, $2^{23}$ Pattern Eye Diagram

The data output provides differential outputs, each at  $1 v_{pp}$  with fast transitions of 45 ps. The output level can be boosted externally using one of LA Techniques' wideband amplifiers. For example, the LA32-04-03 will provide an output of  $7 v_{pp}$  into  $50 \Omega$  with a resulting rise time of 50 ps.

A dc offset can be added to each of the data outputs by means of the internal bias-Ts. These can handle a maximum dc voltage of  $\pm 15 v$  at  $\pm 100 mA$ . At high bias currents, a voltage drop will occur due to the internal dc resistance of the bias-T. This is typically  $18 \Omega$ .



## 2.5 Gb/s Output Using Pattern Synchronisation



Dimensions in mm

Manufactured in the UK

Specification subject to change without notification

**Ordering information:**

LA19-01-03 Pattern generator

Clock1 xx GHz (xx is frequency in the range 0.15 to 3.0 GHz)

**Option :**

Clock2 xx GHz (xx is frequency in the range 0.15 to 3.0 GHz)



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Contact